"Cherry Amber" Phenolic Resin Beads

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Many phenolic resin beads are called "cherry amber" for their distinctive dark burgundy color. Intact necklaces of faceted "cherry amber" beads are particularly numerous in the antique and vintage jewelry markets. Larger, non-faceted beads with the same coloring also appear in the African trade (Figure 1). In this report, I present some historical and experimental evidence supporting the idea that most "cherry amber" beads were originally amber colored – faux amber being one of the earliest and probably most profitable uses of phenolic resin outside of industrial applications.

Figure 1. "Cherry Amber" phenol-formaldehyde (PF) beads from the African trade (top strand) and jewelry trade (bottom strand) (all images by the author unless otherwise noted).

Phenolic resin is made from phenol and formaldehyde (abbreviated PF in the chemical industry), and was first commercialized in 1910 as Bakelite, the invention of Leo Baekeland. Some PF formulations are chemically unstable, leading to a gradual color change when the material is exposed to oxygen, and in some cases turning dark red in a matter of weeks under ambient conditions (Ellis 1935:335; Ganzelewski 2004:477). Heat treatment accelerates the color-change reaction (Falabella 2016:12). The chemical responsible for the dark red color is thought to be aurin, a by-product of the phenol-formaldehyde reaction (Ellis 1935:294, 312). Aurin changes from yellow to dark red above a pH of 6.8, so a plausible reason for the color change is a gradual neutralization of the acidic environment in the cured resin. The specific reactants responsible for a pH change in the presence of oxygen are unknown.

Most faceted, "cherry amber" beads are likely from the interwar period, although Bakelite and Faturan turnery materials were advertised before WWI (Bouillet Frères 1914:2453). By the mid-1920s, many PF products were on the market for jewelry applications, and chemists developed new materials with reportedly greater color stability. For example, in 1925, the U.S.-based Embed Art Company advertised "Bakelite-Jewel Quality" with "permanent colors" for a 50% price premium over the "regular grade of Bakelite" (Embed Art Company 1925:27) (Figure 2).

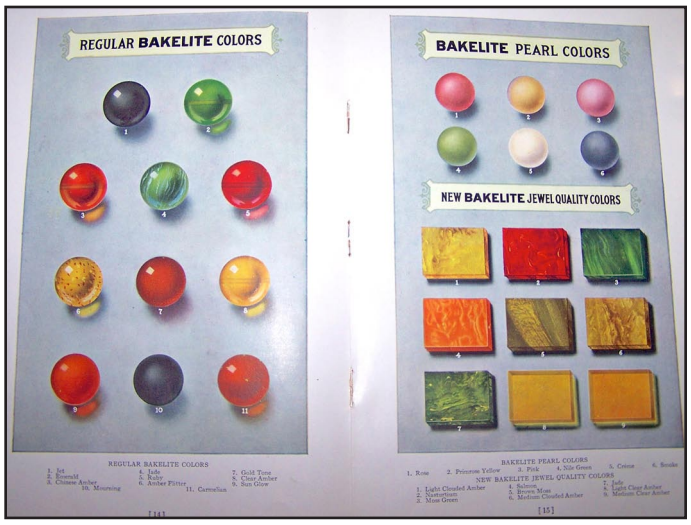

Figure 2. Illustrations from the *Gifts to Treasure* catalog (Embed Art Co. 1925:13-14).

An example from the European PF industry is Vigorit, a product of Dr. F. Rashig, Ludwighafen, Germany. Vigorit was introduced in 1926 and claimed "greater solidity and stability of colors when exposed to light" (Gumpert and Karklins 2005:27). While it is tempting to believe that unstable PFs were used until more color-stable products replaced them, the former apparently continued to have a market share alongside the latter, as was the case for the Embed Art offerings. Even after WWII, there were faux amber PF beads being sold that darkened with age. One case is documented by photographs of faux amber PF beads, purchased in 1952, that gradually turned into "cherry amber" in the subsequent decades (Günther Kuhn 2016: pers. comm.). The "cherry amber" color alone is therefore not a useful guide to the age of a PF item; other clues such as the style of the jewelry or bead, or the provenience, must be considered.

Further evidence of the color change of some PF beads from amber to "cherry amber" over time appears

in the Bakelite bead collection of Nancy Byck Welch. Mrs. Welch (b. 1924) is the daughter of Larry Byck, the first chemist hired by Leo Baekeland. In 2019, I examined the beads and jewelry Mrs. Welch saved from her father's side business, the aforementioned Embed Art Company. The items in the Welch collection are over 90 years old, since the Embed Art Company was active from approximately 1918-1928. The collection consists of a large number of "cherry amber" Bakelite articles including collar buttons, plaques, loose beads, pendants, and finished beaded jewelry pieces. Even though the Embed Art catalog advertises a number of yellow and amber-colored products, I saw none in the Welch collection. I believe that over time, all the yellow and amber items turned dark red, even the ones made of the more pricey Jewel Quality material. I found one group of "cherry amber" beads (Figure 3) labeled "Light Clear Amber," one of the Bakelite-Jewel Quality colors. Several of these beads have sparkly inclusions and correspond most closely to Amber Flitter, one of the Regular Bakelite colors. I saw no green items; they have probably turned dark enough to be mistaken for black (Figure 4). The Welch collection has a smaller number of dark brown and black beads that may have darkened but are likely the original colors of Brown Moss, Jet, and Mourning. The collection also has a good number of Bakelite Pearl beads (subject of a future report).

Figure 3. Bakelite beads from the collection of Nancy Byck Welch.

To experimentally demonstrate that "cherry amber" is in fact a surface discoloration masking the original color, I sectioned a random selection of translucent and opaque PF beads with a jewelry saw. The beads

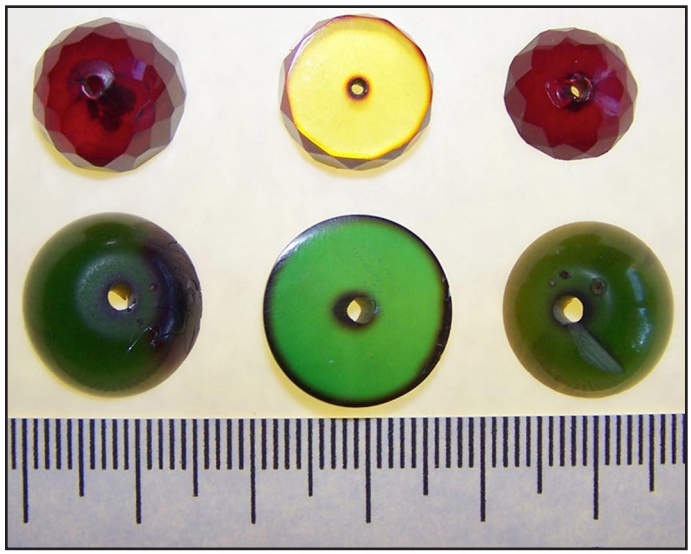

Figure 4. Central sections and corresponding end pieces from a faceted "cherry amber" PF bead and a smooth, dark green PF bead.

came from a variety of antique bead sellers, collectors, and African traders. In total, I examined seven trade beads and four faceted jewelry beads. I also sectioned one very dark green PF bead that appears almost black in natural light.

The sections of "cherry amber" beads reveal a variety of translucent, swirled, and opaque yellow interiors. The dark green bead has a translucent green interior. Figures 4 and 5 show representative results. Note that the observed surface color of each bead is due to a very thin, dark layer. Holdsworth and Faraj (2015) did a similar experiment by dissecting a "cherry amber" PF shift knob (assumed to be made of Faturan), revealing green and translucent yellow sections.

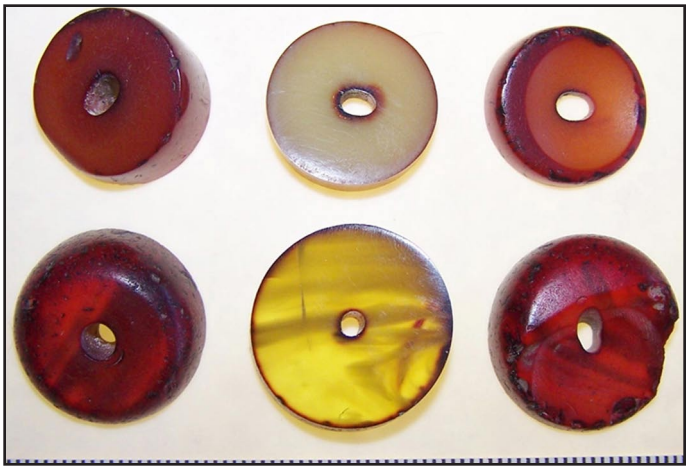

Figure 5. Central sections and corresponding end pieces from "cherry amber" PF African trade beads.

It is also possible that some "cherry amber" beads may have originally been a red color instead of yellow or amber. Their existence is suggested by a piece of "cherry amber" PF rod stock of unknown vintage, from an Istanbul prayer-bead shop. I sectioned it and found a solid red interior.

To gather some data on the time scale of the color change, the sections made for this report are being stored under ambient conditions and monitored. Preliminary information about the speed of the color change is already available from one faceted, "cherry amber" bead that I fractured in 2016. The thin sections from this bead have changed from light amber yellow to orange, suggesting that a complete transformation to "cherry amber" may take decades. The color change will likely proceed at different rates for each of the new sections, since PFs from different (and unknown) sources are expected to have slightly different chemical compositions. Hopefully an updated report can be issued on the new sections during the author's lifetime.

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