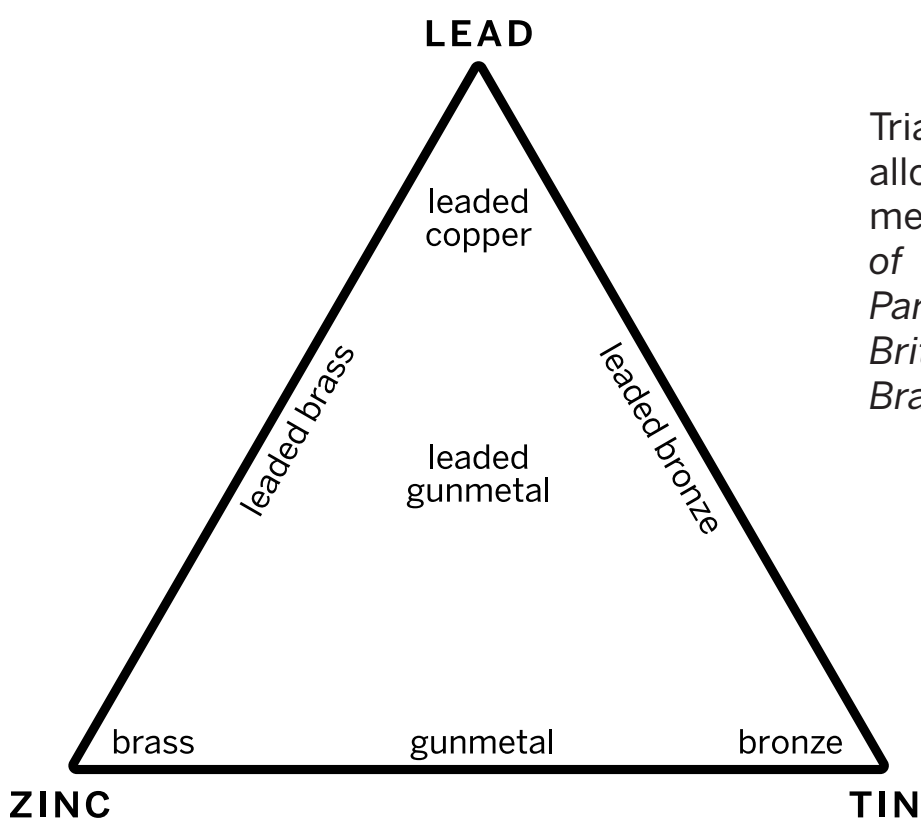


“Bronze”

While the term “bronze” is often applied to 19th-century statuary, foundries frequently used copper alloys ranging across a spectrum from bronze to brass. Bronze, one of the earliest copper alloys in use, is currently defined as a mixture of copper and tin, while brass is a mixture of copper and zinc. When both zinc and tin are combined with copper, the alloy is often called “gunmetal.” Lead can also be added to any copper alloy, which would then be described as “leaded.”

The proportions of the metals in casting sculptures are varied for a number of reasons. This ratio of elements affects not only the color of the resulting cast but also the metal’s working properties. Adding either tin, zinc, or lead to copper lowers the melting point and increases the fluidity of the melt, improving the castability of the alloy. Adding the metals in combination can decrease the melting point even further. The addition of tin and zinc improves the corrosion resistance of the alloy and increases the hardness of the cast, however, higher quantities of tin can result in a very brittle alloy. In contrast, lead softens copper alloys, making them easier to finish by chasing and polishing. In addition to these technological and aesthetic reasons for selecting certain alloys, affordability may also play a role, as tin has historically been more expensive than zinc and lead.

Most of Barye’s sculptures in this gallery are made of an alloy with a high percentage of copper and small amounts of tin, zinc, and occasionally lead. Only a handful are true bronzes and brasses, containing significantly higher quantities of tin or zinc. The elemental composition for each sculpture is presented in weight percentages on the object labels. These percentages should be considered approximations, as the analysis was conducted using a nondestructive technique, x-ray fluorescence (XRF), which measures the composition at the surface of the sculpture.



Triangular diagram with copper alloy names and component metals, from *The Production of Brass in Antiquity with Particular Reference to Roman Britain: 2000 Years of Zinc and Brass*, J. Bayley, 1990

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