

The patinas of the Dogon-Tellem statuary: A new vision through physic-chemical analyses

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Numerous African art objects collected in the course of colonial or ethnological expeditions during the 20th century are partially or completely covered with a so-called "patina". These patinas have been formed during religious and ritual ceremonies, where different substances have been spread out at the surface of the objects. The anthropomorphic statuettes from the Dogon culture are well-known examples of this kind of practice. A better understanding of the chemical composition of these patinas could explain details of the ceremonial practices realized throughout the centuries. An important challenge is to extract unequivocal information about the original constituents of these patinas, and the techniques used for their application on ritual objects.

The Dogon statuary can be divided into three periods. The oldest one, before 1350 A.D., is called the Tellem period, according to the name of the people who lived in this area before the arrival of the Dogon. The most recent, after 1650 A.D., is the Dogon period. These two periods are separated by an intermediary period, where the attribution to the Tellem or to the Dogon cultures is difficult. During our study, we have worked on the patina of 12 Dogon artifacts from these three different periods. In this paper, we present the results obtained for two representative objects, one of the Tellem period and one of the Dogon period. The aim is to access the chemical composition of the patinas and to see if they can be compared to ethnological reports, as is often done in the literature on ethnological studies.

Chemical imaging techniques, based on the combination of microscopy and spectroscopy, are well suited to study both the composition and the spatial organization of heterogeneous complex mixtures of organic and inorganic matter. Time-of-flight secondary ion mass spectrometry (ToF-SIMS), followed by scanning electron microscopy with energy dispersive X-ray analysis (SEM-EDS), and synchrotron radiation-based Fourier transform infrared microscopy (SR- μ -FTIR) have been applied to non-destructive analyses of micro-samples of the patinas of several Dogon statuettes. A very careful preparation, using ultramicrotomy on embedded samples, allowed us to perform successively all these measurements on a single fragment. Comparison and superposition of the different chemical images lead us to identify minerals (clays, quartz and calcium carbonate), and different organic products (proteins, starch, lipids), as well as to map their spatial distribution.

The patina of the most recent statuettes presents a stratigraphy which can be related to successive uses of the objects for ritual purposes, and the results are in agreement with the ethnological reports. For the Tellem objects, the significant quantity of minerals and the lack of stratigraphy suggest that the patina was deposited according to a different recipe. This difference suggests the existence of a diversity of rituals that are more extensive than that described by the ethnologists.

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