

Chapter VII

Texture and Compositional Analysis in Archaeology

TEXTURE

What is the “Texture” of an Archaeological Evidence?

In this section, we will consider *archaeological textures* as the archaeological element’s surface attributes having either tactile or visual variety, which characterize its appearance. The surfaces of archaeological objects, artifacts, and materials are not uniform but contain many variations; some of them are of visual or tactile nature. Such variations go beyond the peaks and valleys characterizing surface micro-topography, which is the obvious frame of reference for “textures” in usual speaking. Archaeological materials have variations in the local properties of their surfaces like albedo and color variations, uniformity, density, coarseness, roughness, regularity, linearity, directionality, frequency, phase, hardness, brightness, bumpiness, specularity, reflectivity, transparency, and so on. *Texture* is the name we give to the perception of these variations. What we are doing here is introducing a synonym for “perceptual variability” or “surface discontinuity.” It is a kind of perceptual information complementing shape information.

Texture has always been used to describe archaeological materials. Maybe the most obvious texture example in archaeology is the surface irregularities due to the characteristics of the raw material. We can distinguish between different archaeological materials, because of the appearance of the raw material they are made of. For example, based on textural properties, we can identify a variety of materials such as carved lithic tools, stripped bones, polished wood, dry hide, painted pottery, and so on.

Furthermore, texture patterns are not only intrinsic to the solid itself. Beyond those physical, geological, or biological characteristics of the raw material, some visual features of an artifact’s surfaces are consequences of the modifications having experimented that object along its history. After all, the surface of solids plays a significant role in any kind of dynamic processes. This study is usually called *tribology*: the science and technology of interacting surfaces in relative motion and the practices related thereto. Solids are rigid bodies and resist stress. When a force is applied, a solid deforms; the deformation determines its perceptual appearance largely. As a result, solid surfaces appear usually heterogeneous. The solid surfaces are generally not equipotential, because surface energy varies from point to point, given

the number of asperities and irregularities (Lüth, 1993; Rao, 1972). That means that when a surface interact with another surface, texture is more intense, higher points have more intense effects (higher energy) than lower areas. When a surface is plane and uniform, there is a low quantity of texture, because all surface points have the same interfacial contribution, that is, all points have the same potential to induce changes on a contacting surface (energy).

When we analyze macro or microscopically an object's surface, we should *recognize* some differential features (striations, polished areas, scars, particles, undifferentiated background) which are the consequence of an action (human or bio-geological) having modified the original appearance of that surface (Figure 7.1). Consequently, the main assumption is that artifacts have surface properties because of the way they have been made, or the way they have been used. That is, we should distinguish two kinds of perceptual appearances, one of them is inherent to the artifact raw material, and the other one is the result of modifications on the surface generated by work activities.

For instance, making and/or using an instrument make important alterations in its surface

features, so we can use a description of such changes to understand how the object was made and/or used. Texture variations due to human work are observable, and may vary according to different causal factors, among them:

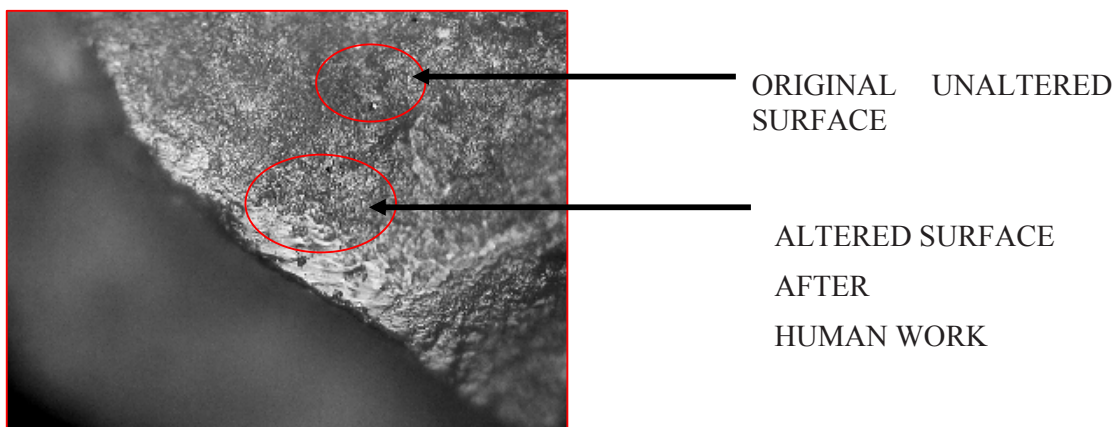
- Movement: longitudinal (cutting), transversal (scrapping)
- Surface of friction: the effects of worked material (wood, bone, shell, fur, etc.)

In the same way, decoration should be understood in its physical nature, and not only stylistically. Engraved, carved or painted, decorative patterns are man-made modifications on the surface of some objects, and they can be considered as an example of induced texture (Maaten et al., 2006)

Preservation also alters surface features. It implies a third factor for texture origin: original visual appearances of raw material and man made surface modifications should not only be taken into account, but also taphonomic and post depositional modifications.

Therefore, it is easy to see that the problem of texture variation is a complex one. Texture analysis mainly aims to represent computationally an intuiti-

Figure. 7.1. Altered surface properties as an example of archaeological texture in a lithic tool (Photograph by the author's research team).



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