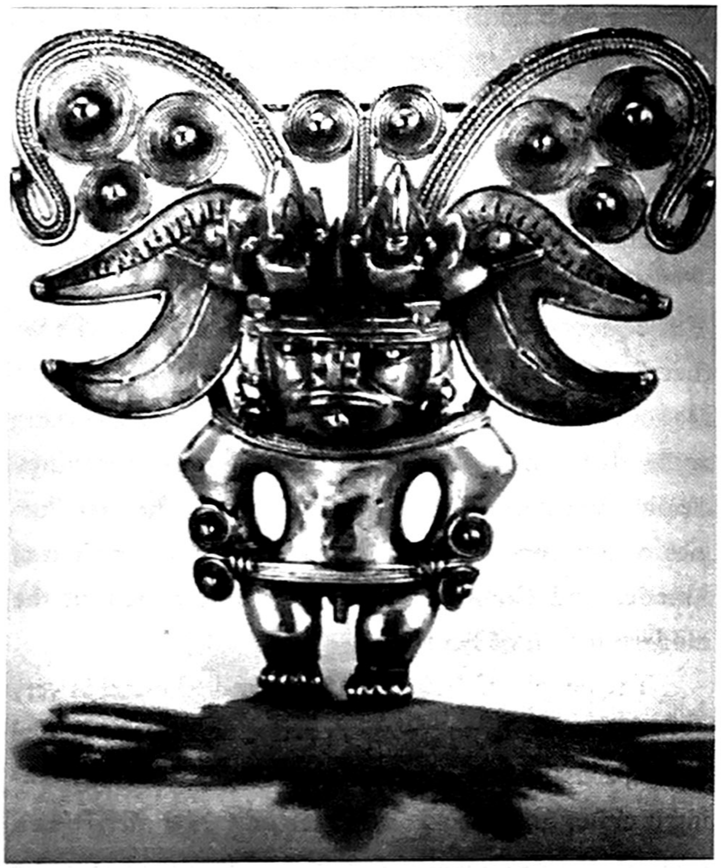

4.2

Figure pendant from Colombia: Tairona culture. Photograph courtesy of the Museo del Oro, Bogotá, Colombia.

Table 4.1 Chronological Development of Ecuadorian Metallurgy: First Appearance of Object Types, Metals, and Alloys

Relative Chronology	Type	Metals and Alloys
Integration (A.D. 800–A.D. 1530)	axe-monies axes	copper-tin (southern highlands only; Inka import)
Regional Developmental (500 B.C.–A.D. 800)	awls beads bells needles nose rings open rings pendants plaques tweezers	copper-arsenic copper-gold copper-silver
Formative (1500 B.C.–500 B.C.)	nose rings sheet metal	copper gold silver

feathers—objects exhibiting flat, highly reflective, and brilliantly colored golden, silvery, and sometimes bimetallic surfaces.

These Andean smiths did cast certain forms; for example, symbols of state such as star-shaped maces, decorative *tupus,* and massive solid nose rings. They sometimes used open molds and sometimes piece molds, and occasionally they used the lost-wax method. Bronze tools were also common; some, for example axes and hoes, were cast in molds and subsequently cold-worked to achieve their final form and to increase hardness. Metalworkers made smaller implements as well (needles, tweezers, awls, axes, and fishhooks) by hammering them to shape from an initial cast blank.

Lower Central American and Colombian metallurgy centered on casting, particularly by the lost-wax method and other techniques. *Tumbaga,* the copper-gold alloy, was extremely common, and metalsmiths used it to cast elegant and intricate earrings, pendants, and nose rings worn by elites (figure 4.2). Other, larger objects were employed in ritual. Artisans fashioned relatively few tools and implements from metal.

Each region lent certain elements to the metallurgy that emerged in the West Mexican metalworking zone. I will consider those that derive from southern Ecuador

Others—bells and rings—were display items. Bells were also ritual objects. All three are small and easily portable. All lack distinct iconographic features. Overall, their homogeneity in materials and design suggests that they may have been fashioned for exchange, supporting Salomon's argument that these were merchant societies. Certainly this facet of the technology was not the locus of major aesthetic or technical investments.

The Reinterpretation

West Mexican metalsmiths did not replicate the full array of objects and techniques that characterized the metallurgies of lower Central America and Colombia or of Ecuador, but incorporated only selected elements from each of those technologies. We can identify which elements derived from these two geographic areas, but there is a great deal we still do not know: how the choices of West Mexican smiths may have been constrained with respect to materials and techniques, and what events, encounters, and cultural forms may have encouraged or discouraged the adoption of particular aspects of these external metallurgical traditions. We do not know whether only certain classes of artifacts were exported from the south or which those might have been.

Lost-wax casting became the most important element of these technologies adopted by West Mexican artisans. The West Mexican repertoire of bells shows how extraordinarily interested they were in this technique and in the possibilities it allowed for casting these objects. As I have noted, Ecuadorian and lower Central American and Colombian artisans also made bells, but in far fewer numbers. Tables 4.3 and 4.8 show that bells constitute 15% of Colombia's Museo del Oro collections and slightly more than 23% of the objects in the Museo Antropológico de Guayaquil. With respect to sheer numbers, the most significant artifact classes in lower Central America and Colombia are cast ornaments: staff heads, nose ornaments, ear ornaments, lip plugs, and pendants. In Ecuador the most numerous objects, at least in the museum collections, are axe-monies, rings, and bells, all three of which are present in nearly equal proportions.

Prior to the introduction of metal, Mesoamerican peoples made bells and rattles from nonmetallic materials: seed pods, gourds, and fired clay. Rattles or *maracas* made of ceramic and probably of wood are illustrated in the Bonampak murals and were common in the Maya area between A.D. 700 and A.D. 900 (Healy 1988). In fact, ceramic musical instruments distinguish Late Classic Period sites on the Pacific coast of Guatemala (Shook 1965). One elite burial at El Paraíso, Guatemala (figure 6.1), contained a group of such pottery instruments including nine bells and several drums. As previously mentioned, numerous prehispanic ceramic bells also exist in the collections of the Regional Museum of Guadalajara in Mexico. However, pottery lacks metal's resonant qualities, and Period 1 West Mexican smiths chose to use the new material for objects that optimized properties that could not be replicated using other materials; the most important of these was sound.

West Mexican artisans had probably seen Ecuadorian bells, since bells figured among the objects on the sailing raft described by Bartolomé Ruiz. Yet Mesoamerican bells are lost-wax cast. This method of fashioning bells is particularly appropriate for peoples interested in visual and tonal variety, because such variety is a function of differing bell sizes and shapes. It is far simpler to alter bell size (and hence pitch) by casting bells to shape them than to plastically work the solid material. Junius Bird (1979) has suggested that the availability of certain raw materials might explain why New World metalworkers used the technique extensively in some areas and rarely elsewhere: