Etruscan and South Italian Bird-Askoi

A Technological View

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The pottery vessels of Classical antiquity represent some of the finest ever produced in the Old World. They come in numerous distinct shapes and often carry painted decorations which scholars have been able to assign not only to narrow time spans, but also to various regions of production and even to specific workshops. The vast number of decorative themes, the unparalleled mention of the names and functions for many of these vessels from a variety of ancient texts, and painted scenes actually depicting the use of some of these vessels have led scholars to study Classical pottery primarily as works of art and historical documents, rather than as examples of technological development.

Comparatively few studies of Classical pottery have concerned themselves with aspects of ancient ceramic technology (see Noble 1965). Fewer still address the processes involved in the production of specific vessels. Only brief comments are provided in such studies, with descriptive terms such as "handmade" or "individually formed" employed in discussions of how a particular vessel achieved its shape. It was the question of the relationship of form to manufacturing processes that led me to select a series of vessels for study using two non-destructive techniques: macroscopic examination and xeroradiography.

In 1965 the Curator of the Mediterranean Section, Professor Emeritus G. Roger Edwards, and I began a review of that section's Classical collection in preparation for an investigation of the manufacturing methods responsible for some of the pottery. Selection of the pieces to be studied was by no means an easy task, for there are hundreds of complete vessels carefully packed away in the section's storage area, and broken sherds from other vessels are even more numerous. As we began our search we noticed that the most suitable artifacts for analysis were intact vessels with uncertain proveniences. In the early days of The University Museum (and most other museums with extensive archaeological and ethnographic collections), many artifacts were acquired from private collectors, usually the form of a gift. Unfortunately, the provenance and archaeological context of such artifacts are often unknown or have been guessed at by the collector or dealer. Occasionally there are a few scraps of information that can be tracked down through the Museum's accession card for each object. More often, it is left to the archaeologist to narrow down the date of the object and/or attribute it to its cultural milieu based on comparisons with artifacts from better documented archaeological contexts.

The most suitable example of pottery for my fabrication study turned out to be a series of closed vessel forms, technically known as askoi (Fig. 1). The term askos is the ancient Greek word for "vineskin," and in the context of pottery it refers to a vessel form having a rounded or bag-shaped body, a constricted neck, and a handle arising between the body and a spur. This form has a long history throughout the Mediterranean, beginning in the early 3rd millennium B.C. or Early Bronze Age. At that time, the forms were mostly one-handled jugs whose spouts were perhaps used to pour oil or wine. A number of morphological varieties developed thereafter, one of which was the bird-askos. The Etruscan in particular fancied this class of zoomorphic bottle.

As we had explored, little information concerning the technological origins of the askoi selected for study could be gleaned from the registration cards. One vessel (L. 84-38) came from "Tunisia Carthage," as indicated in pencil on its base. Another (L. 84-51b) is not illustrated but was assigned to a specific tomb, and the intact condition of the rest suggests that they may have been from burials. It was primarily through stylistic comparisons with the Askoi of askoi originated within South Italy or Etruria (Fig. 2), during the 8th through the 3rd centuries B.C.

For the scholar interested in studying the complex burial customs of specific peoples within Italy during the 1st millennium B.C., or in characterizing the painting styles of individual objects in this period in such a region, these objects have little if any value. At best, the scholar may be able to attribute the style of pottery manufacture and xeroradiography

Macroscopic examination (with the naked eye) of pottery vessels in order to discern details of their manufacture is an essential first step toward understanding the various methods employed by the potter in antiquity. We will define three essential stages through which the potter puts a vessel prior to its being fired into a durable product: formation, final shaping, and surface finishing. The specific techniques used in each stage leave a set of marks on the vessel's surface. Occasionally, a visual examination of the finished pot will reveal very precise information and enable the observer to reconstruct the various stages involved. More often, however, each subsequent stage erases or masks the marks left by that preceding. For example, the horizontal striations characteristic of manufacture on a wheel are often obliterated by rougher smoothing and/or by coating the surface with a thin layer of clay (slip). In such cases the surface markings on the end product may give a false impression of how the product was made. Macroscopic examination alone will not enable the observer to reconstruct the specific operations utilized by the ancient potter. Obviously, a different and complementary examination method is required. The method most effectively utilized at present is xeroradiography.

Xeroradiography has been most widely applied in the field of medicine, especially breast cancer research. It differs from conventional medical radiography in the way in which the image is obtained and processed. As its name implies, xeroradiography is a non-photographic technique essentially similar to that used in electrostatic copying machines. Like the copier, it involves the photographic duplication of the line drawing. The entire time necessary for exposure and image development is only a few minutes.
The chief advantage of xeroradiography for ceramic analysis lies in its ability to produce sharp images of details within the wall of a vessel. After a vessel or large shard has been exposed to x-rays (Fig. 3), particles of toner are blown across an electrostatically charged plate which will then retain the x-ray image. When the toner particles move into position, they create a crisp outline of the pot (or shard); within the clay matrix, regions of entrapped air are revealed, as are mineral (lithic) and/or organic inclusions (Fig. 4). Air voids are of primary importance in the study of manufacturing techniques. Air is trapped in the clay fabric whenever two or more clay members are joined together. The trapped air produces pockets along the contiguous surfaces. If the potter manipulates the vessel extensively after joining the clay members together, then the air pockets, here called “air voids,” become distorted in response to the pressures that have been applied. For example, when a potter builds a vessel from several clay coils, the contiguous surfaces of the coils trap air. If a potter shapes a vessel by thickening out its side wall while it is rotated on a tournette or potter’s wheel, then minute air voids tend to elongate essentially in two directions: horizontally or spiral in response to the rotary motion, and vertically in response to the drawing movements of the potter’s hands as he pulls the clay upward (Fig. 5). The xeroradiographic image reveals the presence and alignment of those air voids; macroscopically, all one usually sees are the surface markings left by the subsequent shaping and/or finishing stage.

Thus, by studying both the xeroradiographic image and the visible surface markings, one can define and reconstruct the methods used by the potter at each stage of manufacture. It is also possible to discern the kind of clay body that the potter had prepared, both in qualitative (and semi-) quantitative terms.
that may be the remnants of burned-out organic matter. Method 2

The duck-shaped askos (MS 5315) was made by manufacturing Method 3. Macroscopically, it has an elongated body with its long axis oriented horizontally. Its breast end is rounded yet blunt, retaining traces of trimming marks that spiral outward from its center; cut vertically, it has a circular cross-section. The tail end is elongated and flattened, with traces of a slight upward fold over its wide tip. Wet-smoothing marks cover both surfaces. Feathers are depicted by paint and incised lines. The base of the askos is merely a flattened portion of the vessel wall.

A xeroradiographic image reveals the reason for its naturalistic shape (Fig. 6). In the image, a series of vertical lines appear, spiraling up from the duck’s blunt breast toward its tail, indicating that the vessel was wheel-made. When the vessel was being formed, the blunt end served as its base: the potter drew up the vessel wall into a cylindrical or slightly conical form while its mass was rotated with the potter’s hand—device that rests upon the wheel-head of the wheel groper. While the clay was still moist enough to manipulate, the opening at the top of the vessel was constructed and folded together (Fig. 5B). Some excess clay was smeared over the fold in order to seal it shut. A fairly life-like duck’s body was achieved by reorienting the vessel, using the blunt base as the breast and the folded orifice as the tail; the only modification needed was a slight trimming of the breast. The base of the askos was created by flattening the side-wall once the desired orientation had been achieved.

Large air voids clearly show the methods by which spouts and handle were attached. Each of the vessel’s spouts was wheel-thrown, and affixed over holes punctured through the vessel wall. In the xeroradiographic image, one can see the clay that still hangs down from these holes, attesting to the potter’s actions. The head and bill of the duck appear to have been added to the forward spout as separately formed, handmade clay members. The handle was attached after both spouts had been affixed. One little wad of clay was deemed sufficient by the potter to secure the rear join of the handle. A horizontal line in the middle of the body represents the incised delineation of the feather pattern on the vessel’s exterior. On the interior, some material has apparently cemented over the surface, especially beside the spout holes. The askos clay fabric can be described as having a moderate frequency of microfissures, strongly radiopaque inclusions, thus standing in vivid contrast to the large angular inclusions in our handmade askos. Method 3

Despite obvious differences in size and painted decoration, the remaining four askoi all can be described under one general manufacturing method, with two minor variants (3A and 3B). Macroscopically, all of these vessels have a rather squat body with an oval cross-section along the horizontal axis. A spout and/or tail is positioned at either end of the body. The lower half of the body was trimmed down to a new basal feature, a ring base. Each askos exhibits the marks of wet-smoothing by hand, especially on the ridge which runs along the back, between the head and tail. On the example representing Method 3A (50-1, 56), there is a sharp concave ridge directly beneath the handle. The large Method 3B example (MS 1568) has a blunt edge beneath and parallel to one edge of the handle, with a lateral incision running beneath the opposite edge of the handle.

Xeroradiographic images (Figs. 7-9) reveal a method of formation that is radially different from the askos described above. Wheel marks are clearly visible, are oriented horizontally, and spiral upward from the base to the handle. These marks indicate that each vessel was wheel-thrown, and that the present orientation of the vessel is that in which it was formed (Fig. 5E). The lateral xeroradiographic images all show a fold of clay along the back that is...
not unlike that in the tail of MS 5515, but with a greater overlap. The oval bodies of these askoi were therefore formed by pinching the sides of the aperture together to form the duck's back.

The two variants of Method 3 represent slightly different ways of closing the askoi back, and can be distinguished solely by means of xeroradiography. In Method 3A, a strip of clay was placed along the back in order to securely seal the pinched sides (Fig. 7a, b). It is this strip that is responsible for the sharp ridge on the exterior noted above. In Method 3D, the overlap of the two sides was large enough to seal properly without requiring an additional strip of clay. Although the reason for these two varieties lies merely in the skill or preference of the potter.

At either end of the back seam on a Method 3 vessel, a hole could be left to serve as a guide for the placement of a spout. Since the overlap was substantial, the hole seems to have required additional widening. This potter accomplished by inserting his finger, which resulted in some clay being forced in toward the interior (Figs. 7a, b). The way in which handles were attached varies. On the large painted Method 3 askoi (MS 5506, Fig. 8), the handle curves up between two spouts and forms a nearly complete arc, with the handle terminus stretched smoothly out along the back seam. On the small plain askoi with two spouts (50-3-38, Fig. 7) the handle terminates adjacent to the narrow pouring spout and has been set into the back seam; the opposite end follows the curve and the filler spout and is smoothed into the back seam. This method of attachment creates a highly stylized shape, with emphasis seemingly shifted to the wide filler spout. The second small askoi (L 64-38, Fig. 41) has only one wide spout which forms the "head." A small wad of clay was added to the underside of the handle terminus next to the vestigial tail. Elaboration of the tail occurred either by pinching up excess body clay, or by adding a small clay wad.

All of the filler spouts on Method 3 askoi were wheel-thrown and added separately. The naturalistic head spout on MS 5506, however, was formed by a coil wound upon itself as a spring (Fig. 8). A large break occurs in its neck near the head, and the xeroradiographic image reveals a slightly different fabric in each segment. The neck area, like the body of the vessel, has a moderate frequency of moderately radiopaque lithic inclusions as well as radiolucent structures. The latter are probably the result of burned-out organic matter, although no consistency in this is found on the head. The fabric, on the other hand, has many minute radiolucent structures, along with a few very thin lithic inclusions exhibiting strong radiopacity. These data coupled with macroscopic observation of the fabric suggest that the head is a modern restoration. The fabric of L 84-38 (Fig. 9), though similar to MS 5506, the types of inclusions, exhibits a different and more homogeneous size range of inclusions. Askoi MS 386 (Fig. 7) has apparently been leached severely on its interior, resulting in its patchy appearance. Del Chiaro notes that this fabric has a high frequency of strongly radiopaque lithic inclusions, quite unlike any of the previous examples.

Toward Workshop Attributions

From the discussion above, it is clear that a number of different potting techniques were used to produce the askoi in Terracina and Sutri during the Classical period, ca. 600-300 B.C. What is thought to be the earliest vessel in the corpus was entirely handmade, by Method I (MS 5537). Its style indicates that it was made by an Italian workshop located along the southeast coast in the second half of the 6th century B.C. (Green Peers, Speculum, pp. 295-300). Del Chiaro and Damians, continued to make some handmade vessels painted in a local style over a naturally occurring fabric. Once established and wheel-made vessels became common, typical Damians ware and Greek imported vessels occur in the same tombs (Kyle Phillips, pers. com. 1987).

The third askoi, painted Etruscan askoi that have been studied by Del Chiaro. As stated in the introduction, Del Chiaro defined four groups or types based solely on certain morphological criteria, and on painted style. It is interesting to compare his analysis with the results obtained here through a study of manufacturing techniques and details of vessel form.

Del Chiaro's "Chiasmus Group" is characterized by lily-like portrayals of ducks. Vessels assigned to this type have a gaily painted body, with folded wings that taper toward the fan-like tail. The wings are set toward the back of the bowl while the duck's bill becomes a naturalistic shell. Del Chiaro believes that this kind of vessel was manufactured at Chiusi, ancient Chianum, in northern Etruria (1984, Figs. 6-12, 15-16, Figs. 1-3). Our askoi MS 5515 is most closely related to this type. It suggests that the naturalistic shape of Chiasmus Group askoi is a direct result of the way in which these vessels were painted. The potter's view of the body was a realistic attitude by placing it lengthwise, and folding the wings into the pointed tail. The potter could then accentuate morphological traits of the duck's bill such as the wings, by incision and/or paint.

Del Chiaro's second group, labeled Type A, is thought to have been manufactured near Tarquinia or Vulci. Less gracle and naturalistic than the Chiasmus Group, Type A "bird-askoi" have a deep, truncated body. Again the filling spout is set on top of the rim; a high head is pierced for pouring. Two variants are recognized (Types A and B). Del Chiaro notes that the painted decoration, tail shape, and slight differences in the placement of the rear filling spout (Del Chiaro 1984: 16-19, Figs. 4-7). The Museum's painted askoi made by Method 3, MS 1598, is included within Type A by Del Chiaro. The third group, Del Chiaro's Type B, has an even deeper body than Type A. It may have either a double spout or a single spout. Those with a single spout have a knob-like tail. In general, the painted decoration on this group of bird-askoi is debased and highly abstract in appearance, with less decorative enhancement of anatomical features. Del Chiaro attributes this type to a workshop in Caere (1984: 16, 10, 20, Figs. 8-9).

A fourth type (the "Spout-Tail" askoi; Del Chiaro 1984: 10, 20, Fig. 10) is a South Italian product, and represents a further evolution of the single-spouted version of Type B. Its painted decoration is unrelated to a bird's anatomical features. Method 3 as defined here was probably used to make both Type A and B askoi. This is not too surprising, since Del Chiaro saw some continuity in the "concept of a bird" between his groups. We have shown that this morphological concept is directly related to the style in which the vessel was made. The form of the bird's body necessarily became stylized once the original orientation of the thrown vessel was retained and the pinched and folded rim was used as a back. Given the similarity in form of the Spout-Tail askoi and our askoi L 64-38, it seems likely that the former was also made by Method 3.

Del Chiaro used style to postulate four regional manufacturing centers for bird-askoi. Even though the provenience for all but one of The University Museum askoi is unknown, they can now be used to argue for the existence of a number of ceramic workshops. The xeroradiographic images have revealed several distinctive manufacturing methods. In addition, the clay fabric differed: the sizes, anisotropy, and frequencies of lithic and organic inclusions prove that different clay bodies had been prepared by the potters. Since the inclusions reflect the geological environment of the region from which the potters obtained their raw material, future compositional analyses may help to more narrowly define the locations of askoi workshops than was possible using criteria of painted style, vessel shape, and paste color.

This study establishes the value of careful macroscopic examination and xeroradiographic images as a means of gathering information on
ceramic production that complements that obtained through more traditional methods. The xeroradiographs also raise a whole new set of questions concerning the relationships between workshops producing a given vessel shape by the same manufacturing method. For example, does a sharing of manufacturing methods necessarily imply close contact between pottery workshops, or does it merely reflect an aesthetic demand placed on the potter by the buyers? Were painted decorations deliberately varied in order to distinguish the otherwise similar products of different workshops? To what extent does a clay fabric represent a compositional "fingerprint" of the workshop that produced it?

Once properly excavated and documented Etruscan and South Italian askoi have been examined macroscopically and xeroradiographically, these questions will have answers. We will have more concrete data with which to define manufacturing groups, and we may be able to relate products to specific workshops, and perhaps even potters. The ability of the xeroradiographic technique to quickly define the characteristics of a vessel's shape and fabric in a non-destructive manner, enabling a better understanding of the finished product, will surely make it an invaluable tool for all archaeologists concerned with pottery typologies and traditions, workshop identifications, and trade patterns. Our askoi are now back on their shelves and in their display cases, having brought to light the potential that exists in their study from a new point of view. The same potential exists for many other pottery vessels in The University Museum's collections.

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**Acknowledgments**

The author wishes to thank Prof. Emeritus C. Roger Edwards for his encouragement in this study. Permission to use the Outpatient X-Ray Unit of the Hospital of the University of Pennsylvania was kindly given by Drs. Grace G. Miller, M.D., Head of the Radiology Unit, Ms. Anne Rufo, Chief Technologist, and her staff (Louise Ayres, Princess Lovett, Arlene Pinnock, Mary Reilly, and Mary Reuther) are to be thanked for their enthusiasm and expertise in procuring the xeroradiographic images. The author also wishes to thank Drs. Stuart Fleming (Scientific Director of MASCA), Mary Voigt, and Kyle Phillips for assistance and comments on earlier drafts of this study.

**Acquisition information on the askoi**

- MS 1596: Collected by the American Exploration Society in 1846-47; gift of Mrs. Phoebe A. Hearst in 1897.
- MS 5315: No acquisition data available.
- 50-106: Collected by Mr. R. Hare Davis; gift of Mrs. R. Hare Davis in 1950.
- MS 5871: Found uncataloged and undocumented in the Museum in the Mediterranean Section's collections in 1970.

**Bibliography**

- **Principles and Applications of Radiography and Xeroradiography**

**Ceramic Technology**


**Askoi and Other Classical Pottery**


