

APPENDIX A

THE METHODOLOGY OF DETERMINING EXEKIAS' CHRONOLOGY

This is a revised version of Appendix A (Mackay 2010). It presents a description of a mechanism developed in the 1970s and used through to the early 1990s for producing accurately proportioned profiles of large Greek vases such as amphorae of various types. These were based on a series of exact measurements obtained as described below, with finer details such as lip and foot mapped onto them with the aid of conventional lead-wire moulding. The mechanism was exhibited at the *Ancient Greek and Related Pottery* symposium in Amsterdam, 1984, and a preliminary summary of findings was published in the proceedings (Mackay 1984).

Vase-profile comparisons can be undertaken only when one has a group of vases of the same basic shape, such as neck-amphorae, or Type B amphorae, or (because they are significantly different from Type B) Type A amphorae. The primary requirement in an analysis of profiles is for a means of exact comparison. Problems arise from the curvature and complexity of the profiles, and the substantially differing heights that may occur within each group of vases of the same shape. A mathematical approach, involving a proportional comparison of a series of key measurements, would resolve the height problem, but developing an algorithm that would allow comparison of all the intricacies of the profile would require very complex sets of measurements that would be challenging to obtain for so many vases in such diverse museums with differing regulations for study access. A more direct visual comparison can be achieved through the reduction of the profile of each vase to a common scale (that is, so that all the profiles have the same height while remaining in proportion), and the superimposition of these on a common axis (the central vertical axis of each vase): this is the approach that was adopted as the basis for the present study. It must be recognized from the outset that there is one serious limitation: the vases to be studied must be sufficiently complete to allow measurement of the original height, and should not be markedly lop-sided.

A small degree of variation can be allowed for by measuring the (vertical) profile at more than one point around the circumference of the vase, and then averaging the result. Initially in the study of Exekias, four profiles were measured for each vase, as indicated in Fig. 1.

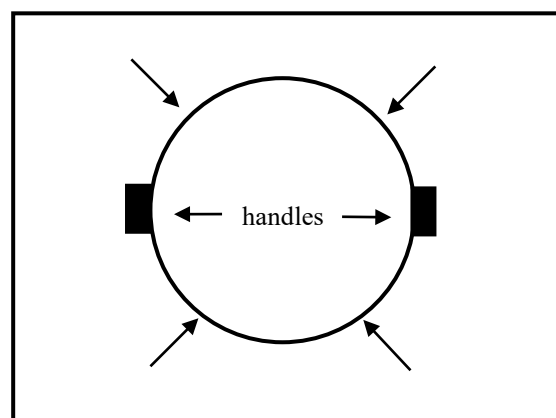


Figure 1. The four points on each vase circumference at which the four vertical profile contours were measured.

The variation was found to be so slight, however, that in a subsequent extension of the study to include vessels painted by other hands, two profiles were considered sufficient, usually taken from a little to one side of the bisector at 90° to a diameter between the handles, on the obverse and reverse of the vase. The reason for this off-centre position is that not infrequently larger amphorae present a slight indentation on the greatest circumference in the middle of the scene, where one vase may have rested against another before or during the firing process.

Analysis by the method described above required an accurately measured set of profiles for each vase. These were obtained by working with the actual vase, as even photographs that conform to Bloesch's stringent criteria¹ present significant distortion of the profiles and obscuration of details at articulation points. At a time well before the development of the electronic scanning devices now available, a mechanical instrument was devised to assist in the drawing up of an accurate profile. As is illustrated in Fig. 2, it consisted of a vertical pole (A-B), 770 mm in length, and 22 mm in diameter, built to very close tolerances of duraluminium, joined in the middle with a spigot-type ferrule and set onto a spigot on an aluminium base-plate of 65 x 153 x 156 mm. A series of holes of 3.1 mm diameter was drilled through the pole at right-angles to its length, at intervals of 10 mm from the centre of one hole to the centre of

¹ Bloesch (1951: 29 n. 2): 'Usable pictures are obtained if: (a) the lens is on the same level as the greatest diameter of the vase ..., and (b) the distance measures six times the dimension (height or width).'

the next, measured from the bottom of the base plate. A small rod of perspex² (C-F), 377 mm in length and 3 mm in diameter, could be passed through the holes in the pole with minimal play.

The pole was placed against a vase in such a way that it touched the widest point of the circumference (G), and with the holes at right-angles to the surface of the vase at that point. The rod was inserted into the holes one after another, working from the bottom to the top, and in each was pushed through until the tip rested lightly against the vase (C). The section of rod protruding from the pole on the side opposite to the vase was measured with a steel rule, graduated in millimetres, and was recorded to the nearest half-millimetre. This gave a negative of the profile.³

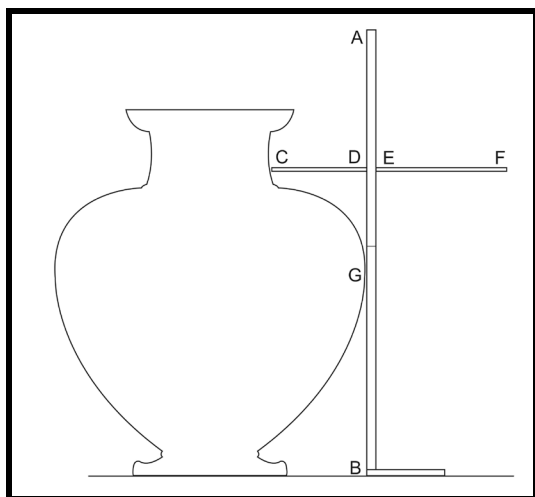


Figure 2. The mechanical device developed for measuring vase-profiles

This procedure was followed four times at different points around each vase's circumference, as indicated in Fig. 1 above. Where the top of the vase did not coincide with one of the pre-set holes, an approximate measurement was recorded and marked as such. Sketches of the important articulation points were made to assist in the drawing-up of the profile.

Finally, the data was evaluated by means of two formulae,

$$X = (((A + B + C + D) \div 4) - J) \div I$$

$$Y = H \div I$$

² Perspex, or plexiglass, so as not to risk injury to the vases.

³ It should be noted that the height of the pole was determined so as to be greater than the height of any vase to be measured, and the length of the rod, so as to exceed the greatest difference between the widest and narrowest points of a vase's profile.

where X and Y are the rectangular coordinates, H is the height of the vase in millimetres where the specific reading was taken, I is the proportional factor achieved by dividing the height of the vase into 230 ($I = 253 \div H$), and J is the correction to centre-line, achieved by finding the difference between the maximum average profile readings and the maximum radius of the vase. These formulae were used for every set of readings at centimetre intervals of the vase's full height, and they resulted in a series of coordinates, which, when graphed, gave the mean profile, that is, an average of the readings taken at the different points around the vase.⁴

All the entire vases of Exekias were measured by the method described above, and the results evaluated according to the formulae. Finally, the profiles, thus reduced to a common height of 230 mm, but retaining their original proportions, were drawn up and superimposed for comparison according to shape. This produced two series: five of the neck-amphorae (Boston 89.273 {1}, New York 17.230.14a,b {8}, Berlin F 1720 {11}, London B 209 {18}, and London B 210 {31}),⁵ and three of the Type A amphorae (Louvre F 206 {7}, Orvieto, Faina 2745 {17}, and Vatican 344 {32}).⁶ Of the three Type B amphorae, only Boulogne 558 {21} survives to its original height.

When the neck-amphorae profiles were superimposed on an alignment of the vertical bisector of each vase, certain remarkably consistent features immediately became apparent. The most obvious was a striking uniformity of the belly-contours, with one exception: apart from London B 209 {18}, in no case did the belly contour of one neck-amphora cross that of another between shoulder and base-fillet. The diagram in Fig. 3 below illustrates the superimposed profiles with London B 209 omitted for clarity. It can be seen, too, that the height of the point of greatest diameter (marked in by horizontal lines) rises in more or less direct proportion to the reduction in the diameter measurement. The diagram in Fig. 4 below illustrates the superimposed

⁴ As a check on the degree of disparity between the profile at one point, and that at another on the vase's circumference, all four sets of readings were plotted individually for Vatican 344 {32} and compared with the mean result: no significant difference was perceived, although the possibility of more significant variation must be borne in mind in the case of a more obviously asymmetrical vase.

⁵ Munich 1470 {2} was excluded because its missing foot meant that the original height could not be estimated, and Berlin F 1718 {5} could not be measured because it is lost.

⁶ Budapest 50.189 {6} and Philadelphia MS 3442 {27} both lack their original feet so that no height could be estimated, and the other Type A amphorae are too fragmentary.

profiles of London B 209 and London B 210 {31}, where the proportion of greatest diameter to height is close, but the point of greatest width of London B 209 is significantly lower than that of London B 210. The former vase thus does not fit into the potting series, and one might conclude that it was thrown by a different potter.⁷ The diagram in Fig. 6 below superimposes the profiles of London B 210 and Dublin 1921.97 {X6}, which, despite their similar girths in proportion to their heights, have a marked divergence in the height of the point of greatest diameter: in potting as in its painting, the Dublin vase does not fit with the vases signed by or attributed to Exekias.

The Munich neck-amphora {2} can be approximately fitted into the series by aligning the profile from the base-fillet up: its profile coincides almost exactly with that of the Boston neck-amphora {1}. On the basis of a profile drawn from an extant photograph, the lost Berlin F 1718 {5} can be assigned an approximate position between the Boston and Munich vases and the New York neck-amphora {8}, and rather closer to the latter: certainly the belly-contour of the lost vase seems consistent with the other vases potted by Exekias, despite the different form of the foot.

The series of three Type A amphorae is statistically smaller and less convincing (partly because these larger vessels require a greater reduction when reducing to a height of 230 mm), but as can be seen in the diagram in Fig. 5 below a similar superimposition of the profiles leads to somewhat parallel observations: there is a similarity of the belly profiles, and a rise in the height of the point of greatest diameter that is more or less proportionate to the reduction of diameter measurement.

What is also noticeable in the two sets of superimposed profiles is that there is no apparent pattern in the forms and proportions of the lips and feet, nor in the shaping of the vase necks leading to the lips, nor again in the shaping and position of the base-fillets above the feet. Nevertheless, when the feet and lips are compared in real terms (i.e., drawn at 1:1 scale), certain developments can be perceived, as has been described in some of the chronological discussions in the relevant chapters (Mackay 2010).

It was assumed that the likely development of Exekias' potting was from stouter to more slender vases, in keeping with the generally observed development of Greek vase shapes from 'heavy and plump forms to slender and more elegant ones.'⁸ Thus the Boston and Munich neck-amphorae were taken to be early, and London B 210 late, while the ordering of Type A amphorae was Louvre F 206, Orvieto, Faina 2745, and Vatican 344. A comparison of the belly-profiles of the three Type B amphorae, which must necessarily be very approximate because of the state of preservation of the German and Swiss amphorae, exhibits in the first instance again a clear similarity in the curve, and suggests that, while the three vases are probably not too far apart in time, their order seems to have been Boulogne 558 {21}, followed by the German {22} and Swiss {23} amphorae in private collections.

This comparative analysis of vase profiles provided a sketchy chronology for Exekias' potting within each shape. In order to develop a painting chronology, some of the more commonly recurrent characteristics of Exekias' painting were selected: details of male anatomy,⁹ and of horses. Examples of these details were initially taken from the six neck-amphorae (including Munich 1470) and arranged, each feature separately, in the order of apparent potting development, to see if they might perhaps reveal a developmental pattern for the painting. A similar series of the same characteristics from the Type A amphorae was then separately constructed, and it quickly became obvious that both series presented a parallel development.

These sets of painting criteria were then used first to integrate the two shape-based sequences into a single list, and finally to insert the other vases of Exekias into their appropriate places within each separate painting characteristic series. The resulting developmental lists for each separate feature showed a considerable similarity of vase-order when all the separate lists were compared, leading to the conclusion that this was a viable means of establishing a comparative chronology for Exekias' extant vases. It did not provide an absolute order of production, but rather indicated a series of clusters of vases, with some sense of whether a given vase was earlier or later within its cluster.¹⁰ The validity of this approach was confirmed by other observable painting phenomena, most noticeably the use and positioning

⁷ It does, however, show affinities with vases attributed to the Lysippides Painter, and to a vase listed by Beazley as Near Exekias, New York 98.8.13 (GR 547: *ABV* 149; *Para.* 62; *Add.*² 42; BAPD 310427).

⁸ Bloesch (1951: 29).

⁹ See Ch. 34, n. 4.

¹⁰ These relationships have been discussed in some detail in the 'chronology' sections at the end of each vase-chapter.

of inscriptions, and the increasing use of thickened black gloss contouring to firm up the outer silhouettes of the figures, but also details of the ornamentation. The chronology thus established has been the basis for this study (as laid out in Mackay 2010, Ch. 34).

REFERENCES

- Bloesch, H. (1951). "Stout and slender in the late Archaic period". In: *Journal of Hellenic Studies* 71, pp. 29–39.
- Mackay, E.A. (1984). "Amphorae by Exekias". In H.A.G. Brijder (ed.), *Ancient Greek and Related Pottery. Proceedings of the International Vase Symposium Amsterdam 12-15 April 1984*. Allard Pierson Museum: p. 153.
- Mackay, E.A. (2010). *Tradition and Originality. A Study of Exekias*. Archeopress, British Archaeological Reports.

VASE REFERENCES¹¹

- Berlin F 1718 {5}: lost (once Berlin, Staatliche Museen), BAPD 310387.
- Berlin F 1720 {11}: Berlin, Antikensammlung, BAPD 310383.
- Boston 89.273 {1}: Boston, Museum of Fine Arts, BAPD 310386.
- Boulogne 558 {21}: Boulogne-sur-Mer, Chateau-Musée, BAPD 310400.
- Budapest 50.189 {6}: Budapest, Musée Hongrois des Beaux-Arts, BAPD 350456.
- Dublin 1921.97 {X6}: Dublin, National Museum of Ireland, BAPD 350457.
- Germany, private {22}: now Universität Zürich Vasensammlung ETH, BAPD 310412.
- London B 209 {18}: London, The British Museum, BAPD 310390.
- London B 210 {31}: London, The British Museum, BAPD 310389.
- Louvre F 206 {7}: Paris, Musée du Louvre, BAPD 310394.
- Munich 1470 {2}: Munich, Antikensammlungen, BAPD 310388.
- New York 17.230.14a,b {8}: New York, The Metropolitan Museum of Art, BAPD 310385.
- New York 98.8.13: New York, The Metropolitan Museum of Art. BAPD 310427.
- Orvieto, Faina 2745 {17}: Orvieto, Museo Civico, Collection Faina, BAPD 310393.
- Philadelphia MS 3442 {27}: Philadelphia, University of Pennsylvania Museum, BAPD 310398.
- Switzerland, Private {23}: now Universität Zürich Vasensammlung ETH, BAPD 310414.
- Vatican 344 {32}: Vatican Museums, Museo Etrusco, BAPD 310395.

¹¹ The numerical references marked as {...} refer to the numbered catalogue of Exekias' vases in Mackay 2010).

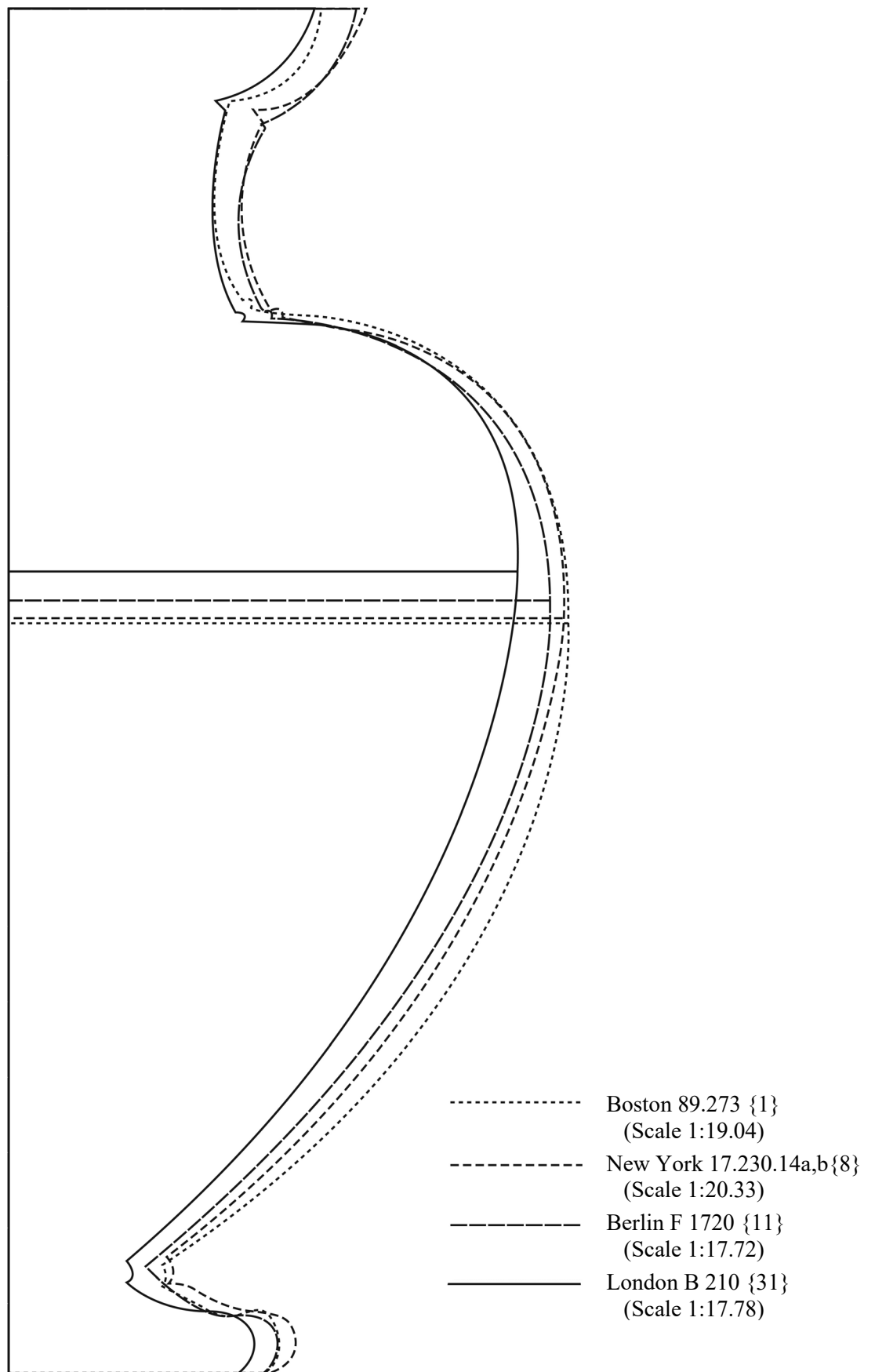


Figure 3. The superimposed profiles of the four entire neck-amphorae (excluding London B 209), scaled to a common height of 230 mm.

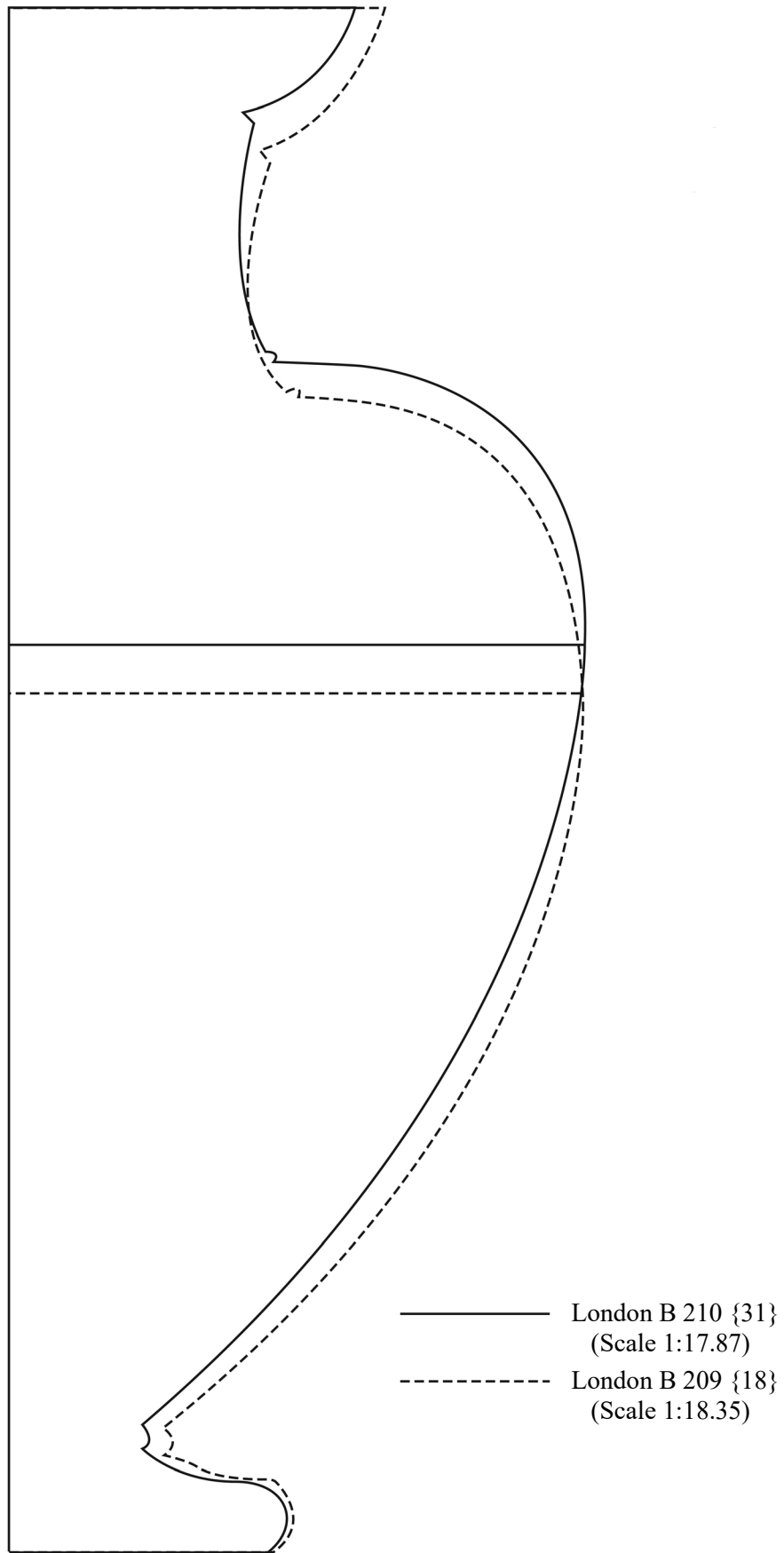


Figure 4. The superimposed profiles of London B 209 and London B 210, scaled to a common height of 230 mm.

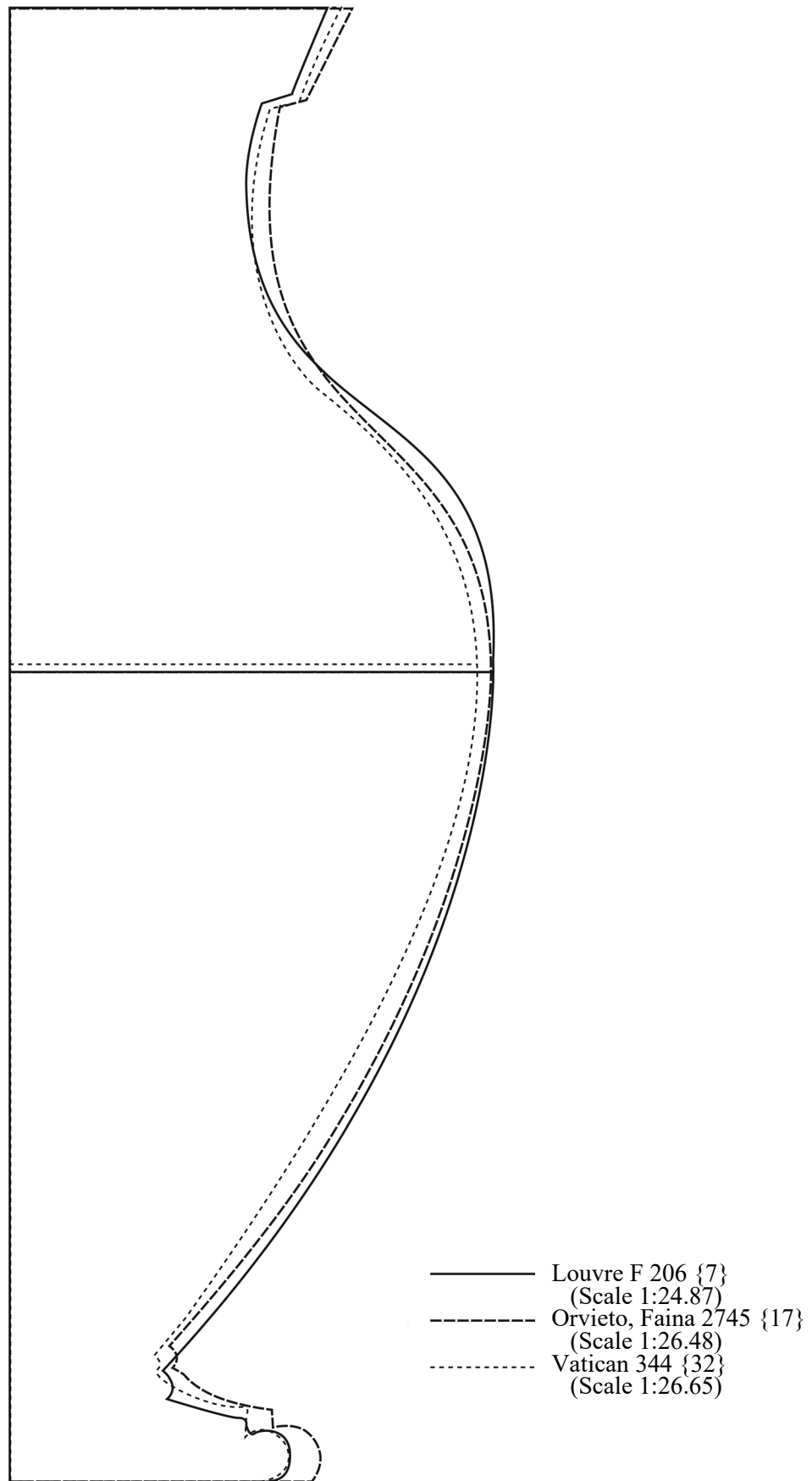


Figure 5. The superimposed profiles of the three entire Type A amphorae, scaled to a common height of 230 mm.

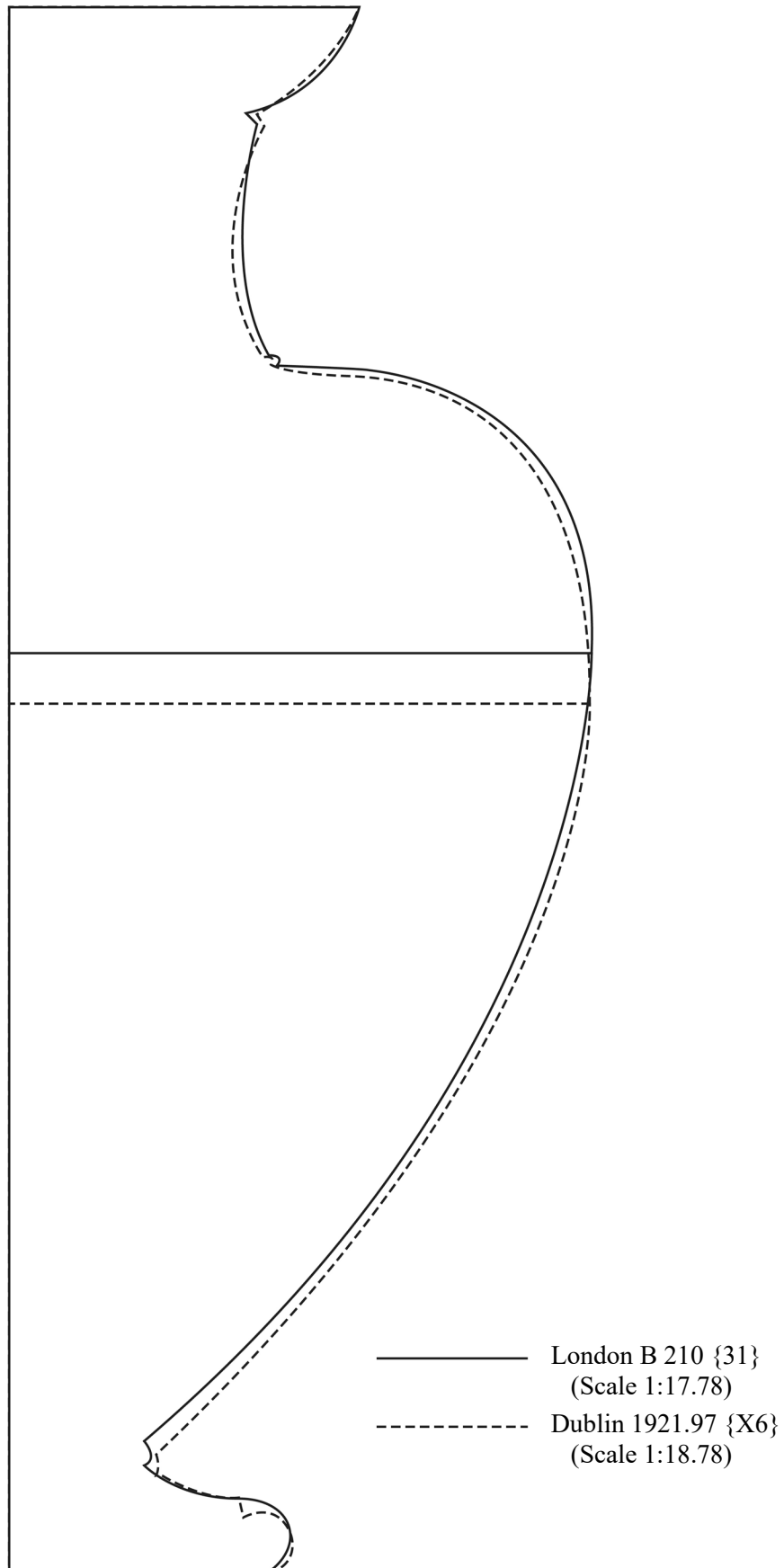


Figure 6. The superimposed profiles of Dublin 1921.97 and London B 210, scaled to a common height of 230 mm.