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ATHENIAN COIN DIES FROM EGYPT:
THE NEW DISCOVERY AT HERAKLEION

Abstract – This article publishes a set of obverse coin dies discovered in the IEASM excavations at Herakleion in Egypt. The three dies are engraved on a single block of bronze and thus resemble another set of dies, long known but never published, of which electrotype copies survive in the British Museum. All these dies are for the production of imitations of Athenian tetradrachms. Other evidence for dies from Egypt, and the hoard record for Athenian imitations of possible Egyptian provenance, are surveyed.

1. THE DISCOVERY OF THE HERAKLEION DIE

During the summer of 2000, the archaeological expedition of the Institut Européen d’Archéologie Sous-Marine under the direction of Franck Goddio located the ancient city of Herakleion-Thonis, on the sea-bed 6.5 km off the coast of Egypt, to the East of the modern town of Aboukir. Underwater survey and excavation of the site has proceeded on an annual basis ever since, through the sponsorship of the Hilti Foundation, and with the collaboration of Oxford University’s Centre for Maritime Archaeology. [1]

As a result of this work, the topography of the ancient site has emerged with exceptional clarity. The main part of the city, with its great temple of Amun-Gereb, was situated on a peninsula. To the east of this peninsula were a series of interconnecting basins that were separated from the main Canopic branch of the Nile by large sand dunes pierced by channels per-

* I am very grateful to Franck Goddio for the invitation to participate in these excavations and to publish the coin die, as well as for the maps reproduced here and the account of the die’s discovery and subsequent excavation in the immediate area; to David Fabre of IEASM and Damian Robinson of OCMA for further information about the excavation and for practical help; and to the Hilti Foundation for the support that has made my trips to Alexandria possible. At the Maritime Museum in Alexandria, where the Herakleion die is currently stored, I am indebted to Abd el-Hamid Abd el-Maguid and Youssria el-Gandour for their assistance and hospitality.

[1] For a full account of the discovery and the initial years of excavation, see GODDIO 2007, p. 69-130. Further accounts of the excavation and finds from Herakleion can be found in GODDIO & FABRE 2006.

mitting communication, via the basins, with the city and its ports. To the west of the peninsula lay a lake, which was connected to the eastern basins by a large 'Grand Canal' (map 1).
Situated at the entrance to the Canopic branch of the Nile, one of the main conduits into Egypt from the Mediterranean, Herakleion will have occupied a key place in the interactions, commercial and otherwise, between the Greek world and the Egyptian. However, on a long-term basis, the location of the city was far from ideal. Built on a sedimentary layer that was gradually sinking into the sea, it was doomed to failure. Herakleion’s demise seems to have been hastened by a catastrophic event, or perhaps a series of them, in the 8th century AD. The failure of the sedimentary layer underlying the city led to the collapse of the city as it sank beneath the Mediterranean. This, combined with subsequent disturbance of the site by the sea and flow of the Nile, has had obvious effects on our understanding of the archaeology of the site. But it has also ensured the preservation of a remarkable number and range of objects, and provides a unique window into an important interface between the Egyptian and Mediterranean worlds.

During the course of the 2006 season a survey was conducted of an area between the central ports of the city and the northern channel leading to the Nile, as part of the ongoing effort to determine the ancient topography. Here a ‘Long Island’, on which there may have stood a sanctuary, separates a northern and southern port area from each other (map 2).

For a summary of the geology of the site, its long term instability, and the possible causes of the city’s ultimate demise, see Stanley et al. 2007, p. 54-57. The city was still above water in AD 700, but probably not for much longer. A major Nile flood recorded for AD 741 or 742 is one potential culprit.
Immediately to the North East of this island a spot survey of an area of 2 m² was undertaken to determine the extent of the island. During the course of this survey was discovered the Athenian coin die which is the subject of this publication (Herakleion 9712) (map 3, plate 1-1).

The precise context is summarized by Franck Goddio thus: “In this place there is a single archaeological stratum under 40 cm of coarse sand mixed with small limestone elements proceeding most probably from pavement, washed away by the surf. The archaeological layer is 10-15 cm thick, right above a very thick layer of rather hard clay (archaeologically virgin except at its surface: some ceramics, lead and bronze objects are sometimes embedded in the upper level of that clay).” The die was found within this stratum, in proximity to various bronze vessels, statues and ritual paraphernalia (map 4). As Goddio notes, “As this die has been found in the passage close to the island, it could proceed from the erosion of that ‘island’”. [3]

[3] F. Goddio, pers. comm. He notes also: “In 2009 we performed an excavation (J6) which did not reach the place where the coin die was discovered but ended rather close to that spot. The excavation put into light a complex stratigraphy 210 cm thick, which varies along the excavation as we were excavating perpendicular to a large channel. At that place, we were 7 m away from the monetary weight and 25 m away from the coin die. But it however reflects the context influence of the ‘island’ as the ‘profile’ of the ceramics changed dramatically when we came close to that ‘island’: imported ceramics, 5th-4th century BCE.”
Of particular interest is the lead coin weight (Herakleion 9484, plate 1-2), found on the very NE edge of the Long Island, which may suggest monetary activity of some sort in the vicinity (see further below).

![Map 4 – Objects found to NE of ‘Long Island’]

2. THE HERAKLEION DIES

The Herakleion die consists of an irregular cube of bronze, with dimensions of c.30 mm × 30 mm × 33 mm, and weighing 233 g, on which are engraved on three sides obverse dies for imitations of Athenian tetradrachms. They are disposed upon the bronze in such way that each has on its opposite side a blank face. Presumably this feature was intended to avoid having to place any one of the dies face down while another die was being struck (fig. 1).
The three dies and impressions made from them are illustrated on plate 1-3-8. As is immediately clear, all three of these dies are characterized by the profile eye that became standard on Athenian issues of the 4th century BC.

Two of the dies (2 and 3) are of a very similar style, and can be attributed with some certainty to the same hand. The third (1) looks somewhat different. Dies 2 and 3 are recognizably of pi- or bracket-style. That is to say that the floral ornament on Athena’s helmet takes the form of a Greek letter π, with a central ‘branch’ through the middle. The two outer branches run down close alongside, though gently diverging from, the central branch for half of its length before curving more markedly outwards. In this respect they find their closest analogue in Bingen’s πi-group II. Die 1, at first sight, is markedly different. The two horizontal elements of the ornament, which project to either side of the central branch and form the top of the ‘pi’ seem to be absent. The result is more lotus-like than πi-style. However, it is likely this is the result of the rather light engraving of these horizontal elements on this die, rather than a radical stylistic divergence. More obvious is the difference in the shape of Athena’s head. The helmeted head of dies 2 and 3 has a rounded overall appearance, partly as a result of the curve at the rear of the helmet. By contrast, the rear of the helmet on

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die 1 has a more angular look, lending the whole head a quasi-triangular feel. Finally, there is a clear difference between the dies in the treatment of the helmet at the back of Athena’s neck, and of her hair as it emerges from beneath it. On die 1 the front edge of the helmet at this point curves sharply forward from the back of the earring towards the middle of the neck truncation. On dies 2 and 3 this edge is aligned almost vertically downwards from behind the earring. As a result the front-most lock of hair on die 1 moves round the edge of the helmet in a semicircular line, whereas the same lock on dies 2 and 3 follows the edge of the helmet in a straight line. On die 1 the disposition of the hair below the edge of the helmet is unclear, but on dies 2 and 3 it is quite clear, and quite unusual. On genuine products of the Athenian mint, the locks of hair are generally disposed in two or three concentric rings. These rings are often elongated in an oval shape. On dies 2 and 3, the outermost oval ring is in fact composed not of one continuous row of dots but of two. The first begins at the earring and circles round to the back of the head, but does not continue to form a full loop. A second line of dots begins at the front corner of the helmet’s neck-guard and from there proceeds round in a curve, extending further than the outermost loop. Within these two partial looping lines there is a third line of dots, which simply extends horizontally without making an attempt to match the curves of the outer lines. This curious disposition of dots is perhaps the most striking feature of these two obverse dies, and offers the best chance of identifying comparanda. Sadly, this is an area that is often missing from the Athenian type coinage struck during the 4th century BC, partly because of the small and often deformed shape of the flans used during this period.

As yet, I have been unable to detect the product of any of these dies among published coins, or among the unpublished collections in New York, London and Athens. It is difficult, therefore, to place a precise date on the die itself. The beginning of the pi-style at Athens is generally taken to have occurred around the middle of the 4th century BC, but its end date is difficult to determine and may have occurred later in the 4th century, or even early in the 3rd. On balance it seems unlikely that the production of Athenian imitations continued anywhere for long after the eastern conquests of Alexander the Great. At this point the position of the Athenian tetradrachm as ‘Hellenic coinage’ in Egypt and elsewhere was usurped by that of Alexander. The Herakleion die is thus likely to have been produced and used within the period c.350–330 BC.

3. THE ADDA DIES

Remarkably, a second cube die from Egypt has long been known, although never properly published. At a meeting of the Royal Numismatic Society held on 17th November 1938, E.S.G. Robinson presented to the assembled Fellows “electrotypes of two Greek coin dies in the possession of Monsieur V.A. Adda of Alexandria – one for the obverse of an Athenian tetradrachm, and the other for the reverse of a Philip II stater, the former with dies carved on three sides of it.” The electrotype of the Athenian die is still in the British Museum, [6] and was examined and described by Vermeule in his catalogue of ancient coin dies as no. 5: “The die block has three heads of Athena cut in joining faces – so that each head is opposite a blank striking surface. Two of the heads are squarely centred in the surface; the third is centered on the four corners. The smooth surfaces are encrusted and show no particular evidences of hammer blows.” [7]

The Adda die presents at first glance a remarkable similarity to the Herakleion cube. It is slightly larger at c.40 mm x 39 mm x 39 mm, but the dies are again disposed so that each has an unengraved face on its opposite side (plate II:1-6). [8] However, there the similarities end, for the style of the dies is quite different.

We may begin with the most obvious point. None of the Adda dies has the triangular profile eye seen on the Herakleion dies, and it is thus clear that we are in a different phase of Athenian imitation. There seem in fact to be three clear variations in rendition (fig. 2). Die 1 has a large frontal eye of irregular shape, composed of upper and lower lines that are virtually identical in shape, but rotated through 180°. These lines meet at the rear of the eye but appear not to do so at the front. Die 2 has an eye composed of two differently shaped upper and lower lines, which meet at the back, but diverge widely at the front, giving a profile appearance to the eye. The eye of die 3 is made up, like that of die 1, of two similar curved lines facing each

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[6] The original die appears now to be lost. The Adda collection of coins was sold upon his death at Christies (“The Property of a Lady”) in London, 9th October 1984. Neither of the dies said to be in his possession were included in the sale.


[8] The electrotype copy of the die, on which these observations are based, is now in the British Museum. It is accompanied by a ticket which reads “From Sais in Egypt. Made in 1910”. However, it seems likely that this ticket has wandered from the casts published by Hill 1922 of a pair of obverse and reverse dies shown at the Museum in 1910, and said to be from Sais. For help in locating and studying the electrotype, I am grateful to J. Cribb and A. Dowler at the British Museum.
other, but set slightly apart such that the lower line extends back beyond the upper at the rear, and the upper forward beyond the lower at the front. There is a larger gap at the front than rear, again showing a tendency towards profile depiction.

![Fig. 2 – The eyes of Adda dies 1-3](image)

To this we may add the clear difference in the floral ornament on Athena’s helmet. None of the Adda dies is of the \textit{pi}-style. Within the Adda group there appear to be two different styles of ornament (fig. 3).

![Fig. 3 – The floral ornaments of Adda dies 1-3](image)

There are five basic elements to this ornament: a central branch, two upper transverse branches, and two lower ones. On die 1 the upper branches curve outwards, perpendicular to the central branch, to which they are attached, while the two lower branches are slightly detached from the central one and curve outwards but very slightly downwards. Die 2 is very similar, although the lower right perpendicular branch is difficult to discern. Die 3 has a somewhat different feel. The upper perpendiculars barely curve, and the lower certainly do not, but rather stretch straight down at 45° to the central branch, from which one of them at least appears to be detached.

It is clear that we are in a different stylistic world from that of the \textit{pi}-style imitations’ produced by the Herakleion die. The Adda die was influenced instead by the late 5th century frontal eye issues of Athens. This category of imitation is well known, and the evidence for its use and circulation in Egypt has been the subject of a number of studies. Two in particu-
lar have sought to categorise these issues stylistically. Both are based on the study of particular Egyptian hoards, and in one case the scholar responsible reached the conclusion that certain stylistically distinct categories of Athenian frontal eye imitations are likely to have been produced in Egypt.

The first seriously to look at the problem was Dattari, in his study of the Tell el-Athrib (Benha el-Asl) 1903 hoard (IGCH 1663). Dattari categorized the coins in this hoard by the style of the eye, and identified four variations of the frontal eye. In his second type, he notes, “although the archaistic style is still maintained, the front corner formed by the upper and lower lids is divided, notwithstanding the fact that the under lid extends as far as the end of the eye” (p. 104). From re-examination of the coins in Athens, which have now been republished by Nicolet-Pierre, it is possible to identify several specimens that provide obvious comparanda for the eyes on the Adda dies. However, Dattari stopped short of identifying these frontal eye variations as Egyptian in origin.

The second attempt to categorise Egyptian imitations was made by Buttrey on the basis of the still unpublished Fayum hoard (CH X.442). He identified three styles within the hoard, which, on the basis of percentage representation and die-linkage, he argued were likely to be close to their place of production, and thus Egyptian in origin. He labeled these styles X, B and M. Of these, X stands apart stylistically and, as Flament has shown, in terms of circulation. Styles B and M, however, are evidently closely related to each other stylistically and behaviorally. In their basic features they are fairly similar, this being most evident in the curiously shaped eyes, which have not yet lost their frontal appearance, yet tend to open at the front in attempt to create the impression of a profile depiction. Moreover, as Flament has demonstrated, styles B and M coins tend to turn up in the same hoards. What distinguishes style B from M on the obverse is essentially the design of the floral ornament, and in these designs we can see clear analogies with the Adda die.

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[10] See e.g. Nicolet-Pierre 2001, pl. 4, nos. 42 (cf. die 1) and 47 (dies 2 and 3). I am grateful to D. Evgenidou for permission to study both the hoard and the reverse die associated with it, and to P. Tselekas for his assistance in Athens.


[12] For a representative sample of styles, see the illustrations gathered in Flament 2007, p. 115-116 (Group III).

The style M ornament consists of a central branch with two sets of perpendicular branches to either side. [14] These may curve slightly or appear straight. They may also become detached from the central branch. There are clear similarities here to Adda dies 1 and 2. This similarity is confirmed by the size and shape of the eye on dies 1 and 2, which find obvious comparanda among the corpus of style M coins (see plate III:1–2).

The style B ornament consists, as Nicolet-Pierre has put it, of ‘cinq éléments rattachés à la base’. [15] That is to say, there is a central branch from which 4 other branches emerge, all at the same place. The upper two branches tend to spread outwards on either side, almost perpendicular to the central branch, perhaps with a slight curl. The two lower branches proceed downwards at approximately 45° to the central branch. This style of ornament is entirely familiar from the genuine issues of the late 5th century mint. Here we note a similarity to Adda die 3. The design of this die is particularly poorly preserved, but two elements at least are evident. The style of the eye is clearly akin to that of dies 1 and 2, and places us in the environs of styles B and M. The style of the floral ornament is undoubtedly different from that of dies 1 and 2, and resembles that of Buttrey style B.

It seems, therefore, that we have the two Buttrey styles that have the best claim to be Egyptian present on a single cube of bronze. Moreover, this cube seems to have been found in Egypt, and now has a clear parallel in the Herakleion die, which was indisputably found in Egypt. There can be little doubt that Buttrey was correct to suggest that some of the coins of this style in the Fayum hoard belong to an Egyptian mint. A full, published die-study of that hoard is badly needed, to establish the variety within those styles and their relationship to coins of similar style found in non-Egyptian finds.

As far as the dating of the Adda die is concerned, this must proceed from the dates that can be deduced for styles B and M from the hoard evidence. As Flamant has noted, there are three key hoards. The first is from Al Mina (IGCH 1487; CH IX:396) and contains coins of both styles B and M (see plate III:3–4), as well as 7 obols of Aradus. The latter are dated by the Elayis to the late 5th or early 4th century BC. The second (IGCH 1486; CH IX:395) contains no Athenian type coinage, but was excavated from the stratigraphic level as the first at Al Mina. Its Sidonian content has been dated by the Elayis to the reign of Ba’alsillem II (407/402–372–368 BC). Both hoards are thus likely to have been deposited some time in the first quarter of the


4th century BC. The third hoard comes from excavation at Naxos in Sicily (CH X 378) and contained two tetradrachms of style B and two of style M. The hoard was concealed within a building abandoned around the end of the 5th century BC, perhaps in the context of the destruction of the city c. 402 BC. It is not impossible that the hoard was buried during a later reoccupation of the site; however, the generally fresh condition of the late 5th century Sicilian coins in the hoard suggest that the deposit is unlikely to be long after the end of the century. Once more, a terminus ante quem of early in the 4th century BC is suggested for the beginning of the striking of styles B and M. It is likely therefore that the Adda die is to be dated at some point during the first quarter of the 4th century BC.

4. SOME CONCLUSIONS

The two bronze cubes discussed above, while superficially similar as objects, seem to belong to different periods, and to be connected with two distinct phases of coin production in Egypt. The first chronologically is the Adda die, which seems to be related to the phenomenon of style B and M imitation coinage, and probably belongs within the first quarter of the 4th century BC. The second, from excavation at Herakleion, was designed to produce imitations of the pi-style coinage that came into use at Athens around the middle of the 4th century.

Remarkably, both dies confirm hypotheses, made on the basis of the hoard evidence, that such coins were struck in Egypt. Buttrey’s hypothesis regarding styles B and M is well known and has been discussed above. The hypothesis that pi-style imitations were produced in Egypt was first advanced by Dattari in his publication of the Tell el-Athribis hoard, but has received comparatively little attention. He was surely correct, and the Herakleion die provides an important ‘missing link’ between the early 4th century imitations and the famous signed satrapal issues of the 340s-330s. This is not to suggest that Athenian imitations were produced con-

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[18] Dattari 1905, p. 105 for a description of the type and p. 109 for the conclusion: "I think that all the evidence is in favour of the idea that the said coins were struck in the land where they were found (Egypt)". Dattari, as we have noted above, categorized the coins of the basis of eye types. However, as can be seen from the material in Athens, a significant number of his profile eye (type 5) coins are imitations of Athenian pi-style. See Nicolet-Pierre 2001, pl. 5 and 6.

[19] On these, see the fundamental study of Nicolet-Pierre 1979.
continuously in Egypt throughout the 4th century: the evidence does not as yet warrant such a conclusion. But three basic phases of production do emerge through the evidence of these two dies, the signed issues and the hoard evidence (table 1).

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*Table 1 – Conspectus of Egyptian imitations and hoards containing them*

[20] For the Sais and Athribis dies, see below [n. 25 and 26].

[21] To the lists provided by Nicolet-Pierre 2003, p. 151-154 and Flament 2007, p. 81-82, for styles B and M, I have added *IGCH* 1259 and 1660, on the basis of autopsy of coins in the British Museum collection (plate III·5-6). I have included both the Nahman and Endicott hoards as containing imitative *pi*-style, since both seem to me to contain *pi*-style coins struck on uncharacteristic flans.
The list of hoards is most probably skewed by the amount of work done by Flament to identify style M and B coins in the hoards concerned, and by the lack of similar attention that has in general been paid to imitative pi-style coins. It may well also be skewed by our current lack of clarity concerning the complex style B and M dies. It is possible to suggest (as have, for example, Flament & Marchetti 2004) that a portion of the style B and M coinage is genuinely Athenian, and that it is these issues of which some of Buttrey’s coins and the Adda dies are imitative. A die-study of all this material is badly needed. Uncertainty about earlier issues aside, it is clear that the list for the later signed issues, which are the easiest category to identify, is currently complete. Two observations can safely be made. First, it is striking that we have no Egyptian find-spot for the signed issues. Second, the breadth of the circulation pattern for the style B and M issues is quite startling. These styles certainly do turn up on coins in hoards from Egypt, but also in hoards from Syria, Asia Minor, Greece, Thrace and especially Sicily. Flament, to be sure, has pointed out important die-links between a coin of style M found in Sicily with one found at Al Mina, and between coins of style B found at Al Mina, Tell el-Mashkuta and Piraeus, which might encourage us to believe that coins found in such disparate locations could indeed be the product of a single workshop. [22] But we are still a long way from being certain that all of the coins of styles B and M belong to the same workshop. Among the questions that we will need to consider is whether this is an indication of differences in places of production, mobility in styles (workmen), dies or coins.

The discovery of the Herakleion die and rediscovery of the Adda die raise some important questions about the nature of die-production and die-use for these imitation coinages. Of particular interest is the appearance of three dies on a single block of bronze. On the one hand, this makes perfect sense as a means of maximizing the practical value of an expensive resource (the cube of bronze). It is far more economical to engrave three dies on one block, than to use three separate blocks. The engraving of three dies on one block also serves the practical purpose of reducing the bulk and weight of coin-making equipment. Thus the paraphernalia required for the production of coinage potentially becomes more portable – an attractive proposition for an itinerant workshop or for one based in a location apart from the centre of die-engraving. So, for example if we are to imagine a wandering moneyer selling his Athenian-imitation-making ser-

vices from port to port, then the attraction of carrying multiple dies on one piece of bronze is obvious. But equally, if a small production workshop (‘mint’) was to be set up in a town close to the supply of metal and the recipients of the resulting coin, there is no guarantee that the necessary die-engraving skills were to be found in the region. If such engraving had to be commissioned at a distance, then the transport of finished dies would have been facilitated by reducing the size and weight of the bronze to be engraved.

Either of these scenarios (and others could undoubtedly be proposed) challenge our traditional conception of a ‘mint’ where all elements of the coin production process were carried out as a coherent whole. The new dies remind us how portable different aspects of this process could be, and perhaps often were. The archaeological context of the Herakleion discovery is particularly tantalizing. On the one hand we can certainly give the die a harbour context; but we cannot say for certain how it ended up on what in antiquity was the sea-bed. It may be that it became dislodged from the nearby Long Island during the catastrophic submergence of the city in Late Antiquity. The discovery in the same area of what appears to be an Attic standard coin weight ([H9484, plate 1-2]) might encourage us to think of this particular vicinity as being connected with the production and exchange of coinage. [23] But we cannot rule out the possibility that the coin-die was originally aboard ship, and thus part of an itinerant workshop, potentially supplying any coastal city in need of Attic coinage with a supply produced to order.

The very portability of these coin dies is suggestive, in the same way as is the dispersion of the style b and m Athenian imitations. To this we may add a third curious pattern: that of the recovery of dies from Egypt. From Herakleion and an uncertain findspot we have the cube dies discussed above. From Tell el-Athribis, found apparently in the same area as the coin hoard ([IGCH 1663]), we have the famous reverse die now in the Numismatic Museum in Athens (plate iv-1). [24] At Sais were found the pair of dies shown to Hill at the British Museum, and of which he published plaster

[23] See my comments in Goddio & Fabre 2007, p. 208-210. The weight has the reverse design of an Athenian tetradrachm stamped on one side and a ram’s head on the other. At 41.6 g it is clearly intended to serve as a weight for 10 Attic drachms. Interestingly this is one of the convenient bridging points between the Attic and Persian standards (10 Attic drachms = 8 sigloi): Xenophon, Anab., 1.5.6.

[24] Dattari 1905, p. 110-111 with plate ii-1-3: “found… on the very same mound of ruins where the Athenian tetradrachms were found”. Vermeule 1954, no. 2; Malkmus 2007, p. 91, v-2.
casts (plate IV.2). There are possibly two further obverse and reverse dies in the Graeco-Roman Museum in Alexandria, of uncertain provenance, donated by King Fouad in 1936. From the pre-Alexandrine period we now know of no fewer than four Athenian-type coin dies from Egypt, with the possibility of two more. For the remainder of the classical Greek coinage we know of only six more certainly identified coin dies and one hub.

No less remarkable than the survival rate of these dies from Egypt is their geographical distribution. We seem to have firm findspots of Sais, Athribis and Herakleion. Once more the evidence may be pushing us towards considering a devolved pattern of production. Certainly it is difficult to proceed from this evidence to the categorical assertion that the mint of all of these issues was at Memphis.

We are faced instead with a number of different possible models for coin production in 4th century Egypt: a number of devolved mints based in major population centres; a large central mint and perhaps several branch mints; or a number of itinerant ‘workshops’ moving where the work and the monetary needs took them. As Buttrey (p. 139) has seen, for Style B alone we must reckon with “hundreds and hundreds of dies, and millions of coins struck from them”, then it is likely that there were some major production facilities at work. However, the lack of die-linkage that he was able to discern among the coins that he examined may be a sign of multiple smaller unconnected facilities at work around the edges. It is perhaps into this milieu that our cubes are to be inserted.

Whichever of these options we choose, we surely cannot dismiss this as a marginal economic phenomenon. Buttrey’s figures suggest that for Style B alone we may be dealing with a production of 500–600 dies, which, at a conservative estimate of 20,000 coins per die, placed 1–1.2 million coins (4–4.8

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[25] Hill 1922, p. 14, pl. 1–9 and 12 (not listed by Vermeule 1954). See also above [n. 9]. Malkmus 2007, p. 91, v-2a and 2b, misleadingly describes them as being of lead. Hill specifically states that “the material and other details were unfortunately not noted at the time”.

[26] Malkmus 2007, v-4a and 4c (not listed by Vermeule 1954). The literature on these is somewhat confused. Aspropoulos 1990 describes the reverse die (inv. 24378) thus: “A bronze die measuring 9 cm, with an owl (?), but the die is insufficiently preserved to determine whether this is in fact the reverse of 24380, cited below”. He describes the obverse (inv. 24380) as “A bronze die, 4 cm in diameter, with a helmeted head of Athena facing left. Dated to the 4th century BC, and perhaps representing an issue of Alexander the Great.” Clearly they cannot be a pair if they are for a coin of Alexander and have an owl reverse.

[27] See Malkmus 2007, v-1, v-1a, v-1b, v-1d (hub), v-1e, v-1f, v-4b.

million drachmai; 666-800 talents) into circulation. The Athenian tetradrachm will have been a familiar sight in Herakleion and its neighbouring communities.

BIBLIOGRAPHY

Dattari 1905 = G. Dattari. Comments on a hoard of Athenian tetradrachms found in Egypt, JAN 8, p. 103–114.

[29] Applying Carter’s simplified formula to the figures of 124 obverse dies observed in 146 specimens within the Fayum hoard, yields an estimate for the original number of dies of 510–636. Some caution is required, since the sample is drawn from a single hoard. Moreover, C. Arnold-Biucchi 2006–2007, on the basis of a re-examination of the coins in Ann Arbor, has cast doubts on the die identifications of Buttrey, suggesting that there may be more dies than he allowed. I owe this reference to Jack Kroll.


ATHENIAN COIN DIES FROM EGYPT: A NEW DISCOVERY

PLATES

1.1 – The Herakleion coin die (Herakleion 9712)
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1.2 – Coin weight from Herakleion (Herakleion 9484)
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1.3 – Herakleion die, face 1
1.4 – Idem, face 2
1.5 – Idem, face 3
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1.6 – Impression of Herakleion die, face 1
1.7 – Idem, face 2
1.8 – Idem, face 3
ATHENIAN COIN DIES FROM EGYPT: A NEW DISCOVERY

III-1 – ANS 1953-171-228

III-2 – ANS 1929-115-4

III-3 – British Museum 1937-11-6-3 (ex IGCH 1487 – Courtesy of the Trustees of the British Museum)

III-4 – British Museum 1937-11-6-6 (ex IGCH 1487 – idem)

III-5 – British Museum 1914-1-3-1 (ex IGCH 1259 – idem)

III-6 – British Museum 1916-12-8-4 (ex IGCH 1660 – idem)
IV.1 – Athribis die, from Dattari (1905), pl. II

IV.2 – Sais dies, from Hill (1922), pl. I