

Stylistic Comparison of Incuse Borders

Studies on the incuse coins of Southern Italy have typically focused on metrology, imagery or sequencing through die linkages. The characteristic borders of incuse coinage have not been subject to the same examination despite the uniqueness they represent. No other coins in circulation in this period, most significantly those of Corinth, have borders at all. These were therefore a design, and subsequently a manufacturing choice which in itself was as unique as the much-celebrated incuse fabric. This examination will focus on the initial period of the coinage in each polis, which are dated to be roughly contemporary. The intent is to determine if the structure and style of the borders provide any additional evidence to the origination and early spread of the incuse technique, including any collaboration between the mints of these poleis. References in brackets are HN Italy¹.

Polis	From	To	Type(s)
Metapontion	c.540	510	[1459] Noe Class I through Noe Class VII Obv: Barley ear with bracts at base; beaded border; MET Rev: Barley ear incuse; sometimes MET
Sybaris	c.550	510	[1792] Obv: Bull standing l., head turned back; above or in exergue, VM or, occasionally MV Rev: Same type r. incuse; legend usually omitted [1730-1734] As above, variations in ethic and symbols. [1735] As above, obverse bull r., reverse bull l.
Poseidonia	c.530	500	[1107] Obv: Poseidon r. bearded or beardless, chlamys over shoulders, brandishing trident and sometimes holding necklace or octopus; in field, sometimes, pistrix or dolphin; <i>pos</i> , <i>posei</i> , <i>poseidani</i> Rev: same type incuse; <i>pos</i>
Kroton	c.530	500	[2075] Obv: Tripod QPO or QPOTON; border usually raised and beaded, occasionally cable Rev: Tripod incuse; border varies from course beading to fine striations [2078] Obv: Tripod; in field, crab; QPO (P reversed) Rev: Tripod incuse; legend as obv [2081] Obv: Tripod; QPO, in field marsh bird perched on O of ethnic Rev: Tripod incuse; in field marsh bird; QPO [2084] Obv: Tripod; QPOTO or QPOTON Rev: Eagle flying r. incuse
Laos	c.510	500	[2270] Obv: Bull r., with bearded male head turned back, on ground-line of dots between two lines; border of dots between two linear circles; <i>lawi</i> Rev: same type as incuse; <i>nos</i>
Taras	510	500	[824] Obv: Naked male (Hyacinthus?) kneeling l., holding flower and lyre; TARAS retrograde Rev: Incuse kneeling male r., as obv.; rayed border [825] Obv: same as last (same obv. die) Rev: Incuse dolphin rider r.; TARAS retrograde [826] Dolphin rider r.; below shell; TARAS retrograde Rev: Incuse dolphin rider l. as obv.; TARAS, sometimes retrograde
Kaulonia	c.525	500	[2035] Obv: Apollo standing r. branch in raised r. hand; on extended l. arm, small figure carrying branches; in field, stag with head turned back KAVA Rev: Same type, incuse; no legend [2036] Obv: Type similar to last; KAVA or KAVAO (the final letter detached in field and often shown with pellet at centre, resembling theta) Rev: Same type, incuse (Apollo sometimes has branches in both hands); legend as obv

Table 1 – Poleis, dates and types examined in this paper

¹ Historia Numorum Italy, N. K. Rutter, British Museum Press, 2001

The American Numismatic Society Mantis (ANS), the British Museum Collection (BMC), Bibliothèque Nationale de France Gallica (BnF), the Ashmolean (HCR) and the Münzkabinett Berlin (MB) provided the primary corpus to be used², supplemented by examples from auction records where there were significant gaps.

The methodology used in border attribution is as follows:

[1] Border Type Identification

The entirety of the corpus was reviewed to identify patterns which constituted a distinct border type based on design elements. It must be noted that there within each pattern there is some variation across examples which share essentially the same design features, but where the engraving of the design shows differing manufacturing techniques in terms of its application to the die. This means that within each pattern there is some visual differentiation even though the individual elements it consists of remain the same. A balance is therefore required between recognising the essential similarities and creating multiple additional types to recognise smaller differences. A similar approach is taken by all standard references, where a coin type is specified and minor variations noted in the description. The border types identified were then assigned a classification number and associated description.

One of the challenges in border type identification is that the planchets themselves, although comparatively broad within the period under analysis, often have the borders partially off-planchet so you are assessing only part of the border (See Figure 1). This is exacerbated by wear which has in some cases obfuscated part or all of the design.

It became apparent during this initial phase that the borders had been added subsequent to the initial central design, although whether this was part of the same hand in a continual process, or had been handed off as a secondary process was not clear. What was clear is that the engraving of the borders was often not to the same standard of the main image, with numerous examples of borders being corrected or reworked on the die. It seems clear that an error in the border application may not have been fully corrected but allowed to stand or was corrected without fully reworking the original error.



Figure 2 - Sybaris, HCR111757, example of overlapping border



Figure 1 - Poseidonia, BMC1867,0101.233, herringbone border going off flan

There is also evidence of multiple borders being applied, sometimes of a different type. This could indicate cases where a coin has been overstruck, but a smaller die being used in the overstrike did not extend to the border, so leaving traces of the underlying coin. For example, Figure 4 is a coin of Poseidonia which has an enclosed pellet obverse border, but there is evidence of a prior, partially obfuscated border, which appears to be the inline border pellet

² Attribution to Diomedes refers to my personal collection which may be found at Diomedes Ancient Coins, www.protantus.co.uk

pattern typically found on the obverses of Sybaris, Kroton, Metapontion, Kaulonia and Laos, but crucially, not at Poseidonia.³



Figure 4 – Poseidonia, BMC 1946,0101.429, example of underling border



Figure 3 - Kaulonia, BnF btv1b84805534, example of underlying border

Figure 3 illustrates a typical enclosed pellet border on the obverse of a coin of Kaulonia, however the edge of the planchet it typical of the common striated border used exclusively on reverses. In this case, although only partially visible, it appears to be a less common wedge striation found only on the reverses of Kaulonia and Poseidonia.

One characteristic of the borders is that they may sit in the plain of the planchet, or be part of a raised border, or indeed may be sunken in relation to the planchet. In each instance the placement – inline (i), raised (r) or sunken (s) – relates to the surface on which any detailing sits. This has been noted by an arrow beside the border pattern illustration and as part of the border type designator, although each is aggregated by type when performing the analysis as the pattern is consistent.

[2] Assignment to Type

Photographs of each coin were then reviewed and the obverse and reverse borders assigned to one of the identified border types. Where the example was too worn or the border too off-planchet to identify definitively the border type this was noted but the obverse or reverse was excluded from the subsequent analysis.

A significant caveat to this work is that a detailed analysis relies on high-quality photos but even then, there are details, especially relief height or incuse depth, which are not possible to properly assess without having the coin in hand. A cautious approach has been taken in as far as possible, but some interpretation of the photographs has of necessity been. In many instances the depth of the border varies over examples, in itself indicating a secondary process where the weight of the application was inconsistent across the primary image. This also causes problems in assessing -i, -r and -s types and so these have been separately attributed but combined in the analysis.

[3] Type Analysis

The results of the border assignments for each polis are then illustrated as a Sankey diagram, flow width proportional to coin count. Obverse types are shown in blue on the left, reverse types in teal on the right; unclear/non-typical attributions are shown in grey and are included as their own category. The source data for these diagrams may be found in Appendix A. Any clustering of border type is then noted to identify any standard type for the polis, with significant outliers from the clusters also noted.

Where possible, a sequencing for the border clusters is then proposed. If prior research with die linkage has been undertaken this is taken as the primary identifier of sequence. A consistent

³ The British Museum identify this coin as an overstrike and identify Metapontion as the under type.

observation in the examination of the coins of Southern Italy is that the diameter of the planchets alters over time, moving from ~30mm to around 20mm in a sequence which has been attested in Metapontion⁴ and Kroton⁵. An assumption is made that this is a consistent feature of incuse coins across all poleis under examination and therefore the diameters of the coins are used where available to propose the sequencing in border styles.

A separate section is allocated to poleis where the incuse coins are known from individual, or very scarce examples, meaning that there is insufficient evidence to derive a standard border type, but where the border may provide useful insights onto their relationship with other poleis.

[4] Cross-Polis Analysis

Finally, the evidence captured across all poleis is examined to see if there is any evidence of collaboration or shared practices in this early phase of the incuse coinage in Southern Italy.

The intent is to shed light on any evidence that the border types were shared across poleis, which in turn may indicate a political decision, a shared manufacturing process or cross-pollination of engravers.

⁴ The Coinage of Metapontum Parts 1 and 2, Sydney P Noe with Additions and Corrections by Ann Johnston, ANS New York 1984, p10-11;

⁵ *Historia Numorum Italy*, N.K. Rutter, British Museum Press 2001, p167

Type Descriptions

Twelve distinct border types were identified across the poleis under examination.

Border Type 1 [Inline bordered pellet]



Sybaris obverse Diomedes 212



Border Type 2 [Sunken pellet]



Poseidonia obverse www.acsearch.info/image.html?id=5418915



Border Type 3 [Threaded pellet]



Sybaris obverse Diomedes 212



Border Type 4 [Enclosed pellet]



Sybaris obverse Diomedes 212



Border Type 5 [Boxed pellet]



Sybaris Reverse BMC 1928,0120.21



Border Type 6 [Straight striation]



Kroton reverse Diomedes 77



Border Type 7 [Curved striation]



Poseidonia Reverse www.acsearch.info/image.html?id=6337599



Border Type 8 [Wedge striation]



Poseidonia reverse www.acsearch.info/image.html?id=566378



Border Type 9 [Herringbone]



Poseidonia reverse www.acsearch.info/image.html?id=7472502



Border Type 10 [Laurel]



Poseidonia Reverse BMC 1867,0101.232



Border Type 11 [rails]



Sybaris Reverse BMC 1851,0503.135



Border Type 12 [Rings]



Sybaris Reverse BMC2024,4005.511



Individual Polis Analysis

Metapontion

Metapontum is an Achaean settlement founded in 630 BC at the instigation of Sybaris, which was seeking to mediate the power of the Dorian City of Taras which sat further to the north-east.⁶ The relationship in the period of the earliest coinage is unclear, but there is weak evidence they were involved in a symmachia with Sybaris and Kroton which destroyed the other Achaian polis of Siris.⁷

Metapontion is one of the most studied series in Southern Italy due to the extensive work undertaken by Sydney P Noe and Amy Johnston.⁸ They have produced a partially die-linked sequence of this coinage which is divided into a number of classes. Noe indicates that “It remains to indicate the broad classes into which the early coinage divides itself. For this purpose, the form of the border is the first criterion...”⁹. The stylistic analysis of the borders has therefore already been undertaken, and this section simply maps these classifications onto the border types identified earlier to allow for cross-poleis comparisons at a later point. Note that the border forms only one of the criteria used by Noe in the classification – the ethnic, badge style, diameter etc. also come into play.

Classes I to VII encompass the broad flat incuse staters which are typical of the period from the inception of incuse coinage through to their reduction to what is called the ‘medium’ and ‘dumpy’ flans after around 510 BC. In terms of the sequencing of this coinage, Rutter notes that “Noe’s classes III-VII are grouped on the basis of common feature such as forms of legend or the use of symbols, but these features are not sufficient to construct a chronological sequence...”¹⁰. There is therefore a sequence generally agreed that classes I to VII are between 540 and 510 BC, with an interpretation that class I is the earliest in this period and evolved into class II, with the remaining classes being towards the end of the period.

Terminating at class VII aligns this analysis with the period undertaken at the other poleis within this paper although incuse coinage at Metapontion continues for another 40 years. To this end, the coins of the ANS and BMC are used, as it has not been possible to align the references in the other sources to the Noe phases which form the framework of the analysis. A total of 65 coins were assessed, with the top-level classifications being set out in Figure 5 - Attribution of Metapontion obverses and reverses (overall).

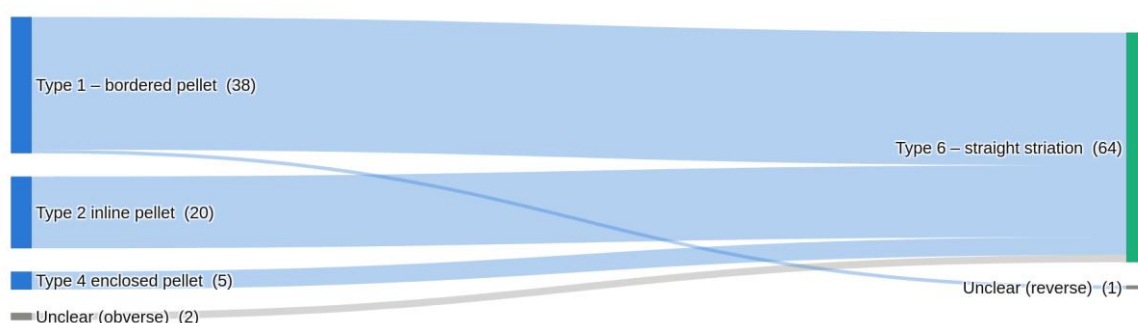


Figure 5 - Attribution of Metapontion obverses and reverses (overall), n=65, type = HN1459

⁶ Strabo, Geography, C265.

⁷ Justin, Epit. 20.2.2-3 (Latin text ed. Arnaud-Lindet 2003 not public domain; English trans. J. S. Watson, London: Bohn, 1853)

⁸ Noe, Johnson, Ibid

⁹ Ibid, p. 10

¹⁰ Historia Numorum Italy, N.K. Rutter, British Museum Press 2001 p.131

The clear signal from the analysis is that the reverses stay consistent throughout the period as straight striations (Type 6). It should be noted that within this classification there are broad stylistic differences ranging from tight regular striations through to broad striations which resemble Type 11 (rails) missing an outer border, with a range between these two extremes. The rails designation has not normally been assigned as there is no evidence of a deliberate raised outer border, rather than a raised rim caused by silver displacement from the punch impact. Figure 6 illustrates a standard straight striation border, Figure 7 shows the same border type with displaced silver at the edges (no outside border) and Figure 8 shows the broader striations. All are treated under the same classification.

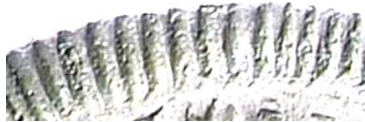


Figure 6 - BMC 1967,0808.3



Figure 7 – BMC 1846,0910.81

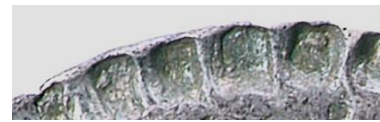


Figure 8 - BMC 1946,0101.291

Given the sequencing has already been achieved by Noe we can use that segmentation to examine the border types within the Noe class. The first observation is that all of the staters have straight striation reverse borders. The Noe classes I and II showing the broader striations and transitioning to the tighter striations for the remaining examples. The cross-reference to the Noe classification was achieved by cross referencing the ANS examples, which Noe used to base his classifications. This reduced the corpus to 46 examples.

Noe Class I



Figure 9 - Metapontion, Noe Class I, n=18, type = HN1459

All of the Noe I obverse borders are of the sunken pellet design, type 2, with the distinction as observed by Noe that there is an inner circle line tracing the circumference of the main image “an inner border, very much finer, begins early, and that this develops by steps which have a clear evolutionary trend and ultimately becomes continuous and linear”.

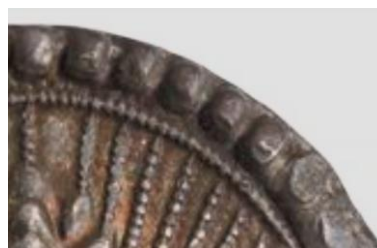


Figure 10 - Metapontion obverse SNGANS.2.166

For the purpose of border analysis this inner circle on these coins has been associated with the main image rather than the border as it is mechanically more aligned with it, as illustrated in Figure 10.

Noe Class II

Noe class II transitions to the border pellet, Type 1 with 2 out of the 8 examples still retaining the inline pellet design of class I. This is a stylistic development with an outer circle being included within the border. Noe describes it as being “in the same plain, or almost the same plain as the field”, not becoming fully raised until class III.



Figure 11 - Metapontion, Noe Class II, n=8, type = HN1459

This is a normal evolutionary transition where there is a shared reverse whilst the obverse border is modified, the difference being an enhancement to the existing design to highlight the border by engraving concentric lines around the pellets of border type 2.

Noe Class III to VII

As the separation in Noe classes beyond class II is stylistic rather than chronological, classes III to VII are considered together and show a clear uniformity. Noe views these issues as having a sharp break with the previous ones but omits to explain what the characteristic which identifies this is. The main differentiator from class II is that the bordered pellet obverse border remains but is now raised in relation to the planchet as type 1(r). The overlap from class II is fuzzy as there continue to be a small number of

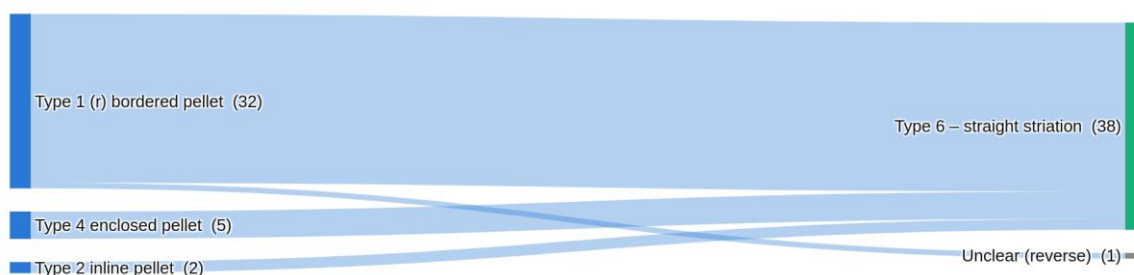


Figure 12 - Metapontion, classes III–VII, n=39, type = HN1459

The reverses remain straight striation; however, the obverses are now strongly Type 1(r) in line with the observations noted by Noe above. There remain outliers of Type 2, which is a remnant of the older class I coins. The fact that this border type exists across Noe classes I through VI may indicate the operation of a second mint which continued to use this border type whilst the main mint evolved through the bordered pellet and to the enclosed pellet designs.

The enclosed pellet which now appears anticipates the increased usage of this form in the later class VII to X coins. There is therefore a clear evolution of the reverses from an inline pellet (type 2) to the pellet being on a raised border (type 1), and then to an enclosed pellet (type 4). This is an increase in complexity

as new details are added which indicates a confidence and stylistic development in the engravers of the polis.

Sybaris

A total of 76 coins were assessed for Sybaris, although condition issues, especially in the British Museum collection, rendered some coins of small value in the analysis. One coin was a significant outlier and so has been omitted from the diagram below and will be considered separately. A significant advantage in the treatment of this coinage is that a die-linked sequence is already available by Emanuela Spagnoli¹¹. Because the Spagnoli phasing is built on die-link analysis and denominational structure, and the border typology used here is built on stylistic features of the borders alone, agreement between the two as set out below may be treated as independent validation.

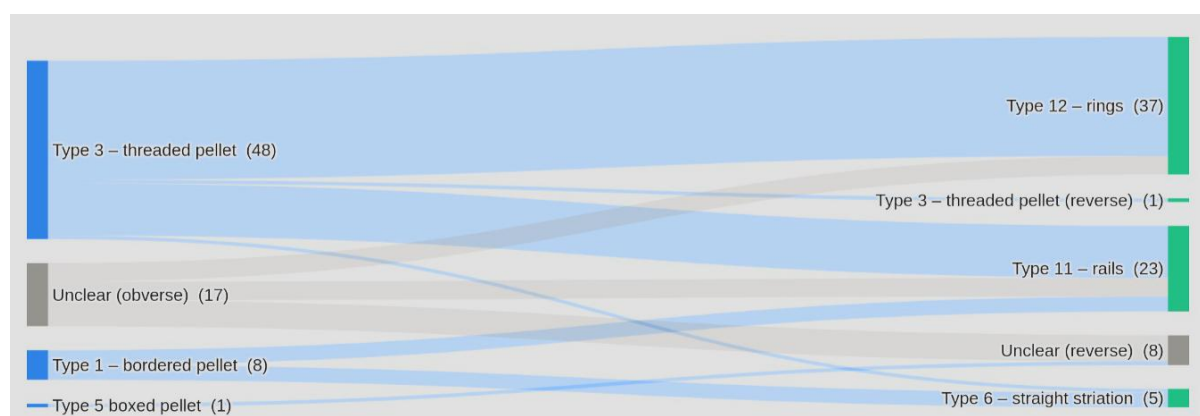


Figure 13 - Sybaris Analysis

As with Poseidonia, see below, a dominant pairing emerges as threaded pellet obverses (83% of attributable examples) with rings reverses (55%) together account for 47% of fully attributable coins. In this case however there is a clear evolution on the reverse, with the threaded pellet obverse being associated with two different reverses over a substantial number of examples. A second smaller cluster also appears with a preference for a reverse which is not found in the main cluster.

Emanuela Spagnoli has proposed a standard chronology for the coins of Sybaris which classifies them as Phase A (later 530s–c.525), Phase B (c.525–514) and Phase C (514–510). The corpus under investigation was mapped to the Spagnoli phasing to identify any evolution in the border types and is set out in the diagrams below.¹²



Figure 14 - Sybaris, Spagnoli Phase A

¹¹ La Prima Moneta in Magna Grecia: il Caso de Sibari, Emanuela Spagnoli, Diogene Edizioni 2013

¹² It was possible to match 62 out of the 76 coins to the Spagnoli sequence by object identifier

In Phase A all of the coins displayed the rails border reverse (Type 11), which account for 16 out of a total population of this reverse type of 23. This may indicate that the rails reverse was the first to be used in the production of the staters as there are fewer examples of this reverse in each of the other phases.

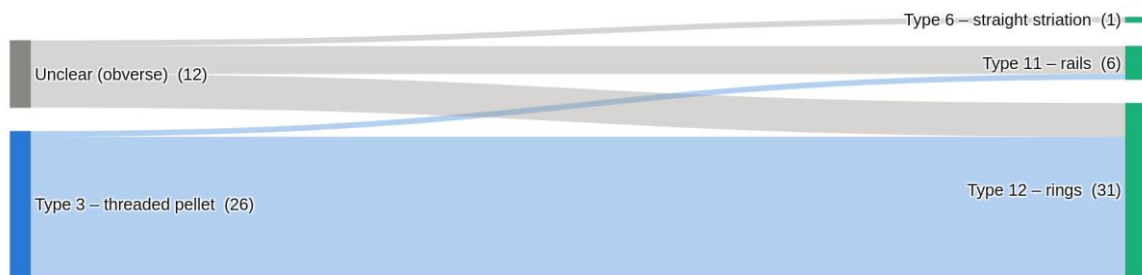


Figure 15 - Sybaris, Spagnoli Phase B

In Phase B, the Type 11 (rails) reverse gives way to the Type 12 (rings) reverse, which account for 31 out of a total of 37 ring examples overall.



Figure 16 - Sybaris, Spagnoli Phase C

Spagnoli Phase C runs for a very short period and has a limited number of examples from which to draw any statistically relevant conclusions. Stylistically, the three examples which have Type 3 obverse borders may more logically lie at the start of Phase B as one example shares the rails reverse typical of Phase A, siting it as a transitional coin between Phase A and Phase B in terms of border treatment. This re-attribution would then result in a clear Phase 3 border set of a border pellet obverse paired with a straight striation reverse (Type 1 – Type 6), but it suffers from the problem of not applying the same logic to the reoccurrence of the Type 1 obverse border seen in Phase A. Rather than re-attributing them, it may therefore be better to accept that the border evolution is more complex than as simple transition to a new design. There is no obvious explanation for the borders of the two coins with a threaded pellet reverse, which is more commonly found as an obverse border type.

A couple of unusual examples stand out where a border type which is normally found on the obverse of the coinage can be found on the reverse.



Figure 18 - Sybaris ANS SNGANS.2.846



Figure 17 - Sybaris BnF ark:/12148/btv1b113156772



The obverse of the ANS example (Figure 18) has the typical threaded inline pellet design common in Phase B, but there is no obvious reason why the same design would have been added to the reverse. This is not a case of a brockage as the design is in relief. The BnF example illustrated in Figure 17 is further distinguished by having an ancillary laurel symbol above both the obverse and reverse bull, with a further ancillary symbol above the obverse bull head which is not distinguishable, and a trace letter in the left field of the obverse, possibly epsilon (possibly an overstrike of Metapontion?)¹³. The boxed pellet (Type 5 (o-3-i)) example further introduces a sense of confusion in the issues of this short period.

The coin that was excluded from the classification was BnF Luynes 551.



Figure 19 - Sybaris Stater BnF Luynes.551

The challenge with this coin is that the border on the obverse does not fit into a described type, but it also changes in character around the circumference. In the lower left of the obverse is similar to Type 2 Type 2 except that the pellets are quite clearly formed with a ring punch (see bottom right quadrant meeting the ground line). This merges with what can only be described crude oblong punches, which reflect the punch types on the reverse. The punches stop abruptly at 6h which does not seem attributable to wear. There are also traces of a previous border at 12 h. The reverse is formed of crude inverse pellets with only the very faintest trace of a band. The chaotic nature of the design sits more naturally to the final years of the Sybarite mint, where in relation to the borders the designs become more varied and the quality of the workmanship deteriorates markedly. Spagnoli assigns the coin to phase B, but that should perhaps be revisited.

The three phases used by Spagnoli therefore somewhat fit into broad border groupings with some overlap indicating an evolution in the designs. Spagnoli phase A is characterised by a threaded pellet obverse paired with a rails reverse (Type 1- Type 11). In phase B the obverse transitions to a threaded pellet, while the reverse has a slower transition to the rings border type, creating an overlap with phase A on the reverse. Phase C sees a further transition to the bordered pellet obverse with a new straight striation reverse (Type 1 – Type 6).

Sybaris - Kroton Issues

The defeat by Kroton did not end with the complete destruction of Sybaris, but rather there is evidence cited by Hansen & Neilson that after its capture it became a dependency of Kroton with a governor appointed from that city.¹⁴ As further evidence they cite the incuse coins inscribed with the abbreviated ethnics of both Kroton and Sybaris, which has often been referred to, illogically, as an example of ‘alliance coinage’. These staters have the Krotonite tripod on the obverses with the Sybarite incuse reverse-headed

¹³ This type is HN Italy 1732 and is directly referenced by Rutter; there is no indication if there are other examples. Hoover records no symbols or monograms for this type.

¹⁴ Ibid. p297

bull on the reverse. The two examples examined had borders of obverse type 1 and reverse type 6, aligning with Spagnoli Phase C at Sybaris. Kraay proposes that the Sybaris - Kroton issues were minted at Sybaris itself¹⁵. There are only seven coins of Phase C within the analysis however it is interesting to note that three of these share the same Type 1 – Type 6 border arrangement as the two examples of the Sybaris – Kroton coins. Given that the Sybaris – Kroton coinage is clearly a post-war issue it would be worth exploring if these three examples within Phase C could also be attributed to the immediate aftermath of the war, adopting the border style commonly on the coins of the victor. Unfortunately, the metrology of these coins is not available within this study to allow this exploration.

Siris in alliance with Pixos

There has been much debate about whether the ethnics on these coins, which otherwise are identical to Sybarite staters, are the names of cities and if so, which cities they represent. Rutter summarises the discussion and the current position as that these cities fell within the sphere of influence of Sybaris but were not minted there. They are rather a joint issue by dependent cities, but which cities remain unproved by either archaeology or literary sources. In this model the type of Sybaris, the reverse headed bull, is not just a nod to that dependence but also a means of making the coin exchangeable within that sphere of influence. Rutter dates the coinage as 540-510 BC, so aligning its termination with the destruction of Sybaris.

Of six examples examined, two mirrored the Type 1 – Type 6 border arrangement found at Sybaris however the remaining four were Type 4 – Type 9. Interestingly the herringbone Type 9 is only found in the coins of two other cities which are assumed to fall within the Sybarite sphere – Poseidonia and Laos. Indeed, if there is an evolution in show here then it mirrors that found in Poseidonia, where both these combinations can be found. If we introduce in the coins of Laos, which are thought to have been influenced by the refugees from Sybaris and so must be later than 510 BC, this suggests that the Type 1 – Type 6 Sybarite border pattern was used in by those of Siris/Pixos but after its fall the border type transitioned to be a common herringbone reverse across Siris/Pixos, Poseidonia and Laos, while Siris/Pixos and Poseidonia also transitioned to an enclosed pellet obverse.

To test this proposal it is worth looking at the rarer incuse coins of mints suggested to fall within the sphere of Sybaris type to see if they follow the same pattern. These would be AMI, PAL-MOL (Palinurus and Molpa) and SO.

- The PAL-MOL ethnic has a type of a boar/incuse boar and is minted on the Achaian standard. The clearest illustration¹⁶ shows the border as Type 1 – Type 4. The five illustrations of PAL-MOL provided by Marta Barbato in “Le Monete Incuse a Leggenda PAL-MOL : una Verifica della Documentazione Disponibile” are less clear but do not suggest any deviation from this.
- There are only four examples known of AMI, which shares the reverse headed bull type of Sybaris with an altered ethnic and a grasshopper above the bull. They are minted on the Achaian standard. This has been attributed to a settlement on the river Crathis which was destroyed at the same time as Sybaris. The two images available are Type 4 - Type 9¹⁷.
- There are only two known examples of SO. These are exceptional in that while they share the same type as Sybaris, they are not on the Achaian standard and have been interpreted as drachms on the Chalkidian standard. It has been proposed that this mint was connected with

¹⁵ The Coinage of Sybaris after 510 BC, Colin M Kraay, The Numismatic Chronicle and Journal of the Royal Numismatic Society, 1958, Sixth Series, Vol. 18 (1958), pp. 13-37

¹⁶ Kray & Hirmer, Greek Coins, Thames & Hudson 1966, plates 223o/r

¹⁷ Rutter, Historia Numorum plate image 1356 and Kray & Hirmer, Greek Coins, Thames & Hudson 1966, plates 213o/r

the Lucanian Sontini on with Sanza, on the route between Sybaris and Campania. The one available image shows borders Type 1 – Type 6.

Therefore SO aligns with the border types of Sybaris before its destruction and AMI aligns with the later border types of Siris/Pixos. So, both pull from the same border set as Sybaris. PAL-MOL shares a common obverse border with Sybaris but has a separate type and reverse border.

Poseidonia

There are literary references to Poseidonia being founded by Sybaris include Strabo “The Sybarites [when they founded the city] built the fortifications close upon the sea, but the inhabitants removed higher up.”¹⁸ however the evidence of the nature of the relationship in this early period is unclear. It should be noted that the early incuse coinage at Poseidonia stands apart from the other poleis using this fabric in that it was minted on a local rather than the Achaian standard. Any relationship noted appears to have been constructed on the numismatic evidence of a change of standard in the mid-fifth century BC to the Achaian one, accompanied by the use of the bull imagery normally associated with Sybaris (but not reverse facing). These two factors have led to a supposition that refugees from Sybaris fled there after its destruction (Herodotus states that they fled to Laos and Scidrus, not mentioning Poseidonia¹⁹). Rutter is careful in his *Historia Numorum Italy* state that refugees from Sybaris II *may* have found refuge in Poseidonia (my emphasis).

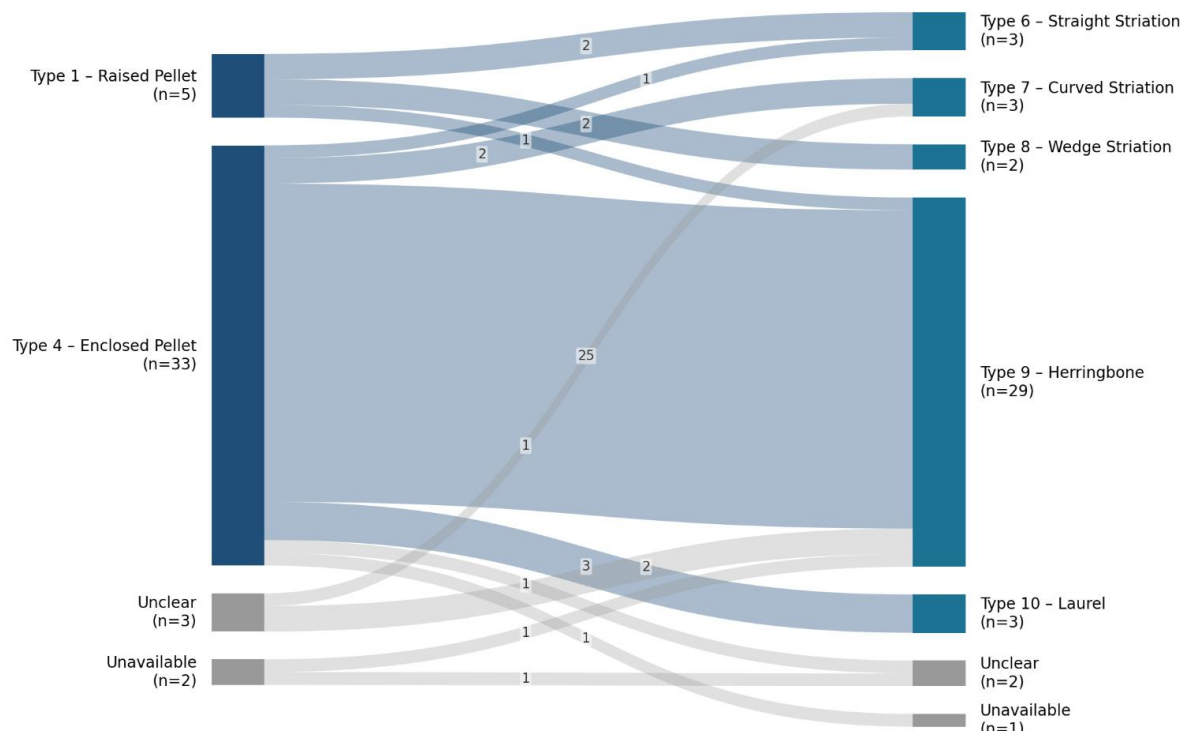


Figure 20 - Poseidonia Analysis, n=43, Type = [HN 1107]

The most striking result here is that there are only two obverse type borders used.

¹⁸ Strabo, Geography C251

¹⁹ Herodotus, Histories, 6.21

Type 4 Obverse Cluster (Dominant)

Type 4 (enclosed pellet) accounted for 87% of the attributable obverses²⁰, Type 9 (herring bone) accounted for 69% of attributable reverses and in combination these accounted for 69% of coins where the borders of both sides could be attributed, making this (Type 4 – Type 9) the dominant style in this period. The Type 4 obverse cluster has a minimal overlap with the Type 1, sharing reverses in only three examples. One example can be resolved as the coin is another example of a possible overstrike of a stater of Metapontion, where that polis consistently used straight striations on the reverse (see Figure 21). A more likely explanation in this instance is that when the reverse was overstruck the original border was retained, rather than a unique border being used by Poseidonia.²¹



Figure 21 - BMC RPK,p281A.4.PosG, possible overstrike

The remaining two coins noted as having curved striations on the reverse are possibly a case where the outside design of the herringbone is completely off-planchet²². The angle of the striations would support this view and simplifies the overall picture, cleanly separating the two clusters and leaving only the three coins in the Type 4 obverse cluster which differ in having the Type 10 (Laurel) reverse. These are interesting in themselves as two are die-linked on the reverse (see Figure 22), which would suggest they were issued in roughly the same period, or at least with the timespan of the reverse die. This may have been a short-lived experiment as the laurel type is a small proportion of the overall Poseidonia corpus and is also not seen elsewhere. The third example of the laurel border is not die-related.



Figure 22 - Reverses of BMC RPK,p281A.2.PosG (left) and BMC 1867,0101.232 (right)

Type 1 Obverse Cluster

The Type 1 obverse cluster contains five coins, three of which also, uniquely within the corpus, include a dolphin subsidiary symbol on both obverse and reverse²³. Figure 23 illustrates the use of this subsidiary symbol. It is reasonable to assume that the change of border types to striation and the inclusion of the dolphin on both faces as a subsidiary symbol are related design changes, which sets them apart from the

²⁰ Calculated as number of borders attributed to Type 4 (1+2+25+3+1+1) = 33 divided by the total number of obverse borders attributed = 38, giving 33/38 = 87%. All subsequent calculations follow a similar pattern.

²¹ The Poseidonia overstrike mentioned above as BMC 1946,0101.429 and illustrated in Figure 4 has the herringbone reverse used at Poseidonia itself, so in that case the overstrike, if it is such, included a Poseidonat reverse border.

²² BMC TC,p40.1.Pos and HCR5270

²³ BMC 1946,0101.431, SNGANS.2.617, SNGANS.2.617

standard issues. We can only speculate as to the reason for this particular issue – perhaps to commemorate an alliance or celebrate a particular victory?



Figure 23 - BMC 1946,0101.431

Of the remaining two examples in the second cluster, the BnF example (Figure 24) does not have the subsidiary symbol but does have an unusual ethnic on the reverse, written in Oscan, a native language.



Figure 24 - BnF btv1b113156503

Poseidonia was located on the edge of the frontier between the Greek coastal world and the Oscan interior, but this is a singular example of an Oscan inscription on a Greek coin of the region. The coin was previously in the collection of Honoré d'Albert de Luynes and the notes to the coin in that reference²⁴ state “on a proposé différentes interprétations du mot *fiis* qui est vraisemblablement le non de la petite rivière Is, laquelle arrose la plaine de Paestum, plutôt que, comme le proposait Barclay Head, le début du mot osque *Fiisia*, équivalent du latin *Feriae* ou *Festus*”. Again, this combination of border seems to have been used in conjunction with amendments to the ethic or ancillary symbols which set the issue apart from the standard Poseidonat coinage. In this case if you accept the Head rationale, which in my opinion is closer to the text of the inscription, the use of the epichoric Oscan inscription, meaning holidays, festivals, or days of rest dedicated to the gods, sets this aside as a special issue.

The final coin in this cluster is unremarkable other than its use of a crude herringbone pattern, which is visibly only within a small arc of the reverse and may potentially be an example of a second offset striation border due to a restrike or poor initial engraving (see Figure 25).



Figure 25 - BnF btv1b8598441k

²⁴ Catalogue de la Collection De Luynes, Monnaies Grecques, I Italie et Sicile, Babylon, Paris 1924

Sequencing

Unfortunately, few of the source images are accompanied by diameter information²⁵ and so there is little that can confidently be derived in terms of sequencing from the early borders of Poseidonia, save than the Type 1 obverse coins are unlikely to precede the Type 4 obverse coins as the latter are already at the diameter expected of the earliest issues. The prevailing border type is therefore an enclosed pellet on the obverse paired with a herringbone patterned reverse. There are examples which switch to a raised pellet obverse and striated reverse, but which have other alterations which indicate an issue which is celebratory or commemorative and so may be contemporary to the main border style rather than an evolution or predecessor.

Laos

Strabo is very clear that Laos was founded by Sybaris and therefore is also an Achaian city, where refugee Sybarites settled after the defeat of Sybaris in 510 BC. Rutter attributes the earliest coinage of Laos to these settlers²⁶ and so it may be viewed as a continuation of the incuse coinage of Sybaris, using a type similar to its reverse headed bull, but adapted to be man-faced, perhaps reflecting a local river god (Laos was also the name of the river the city was built on).

Only seven examples of sufficient quality of the coins of Laos were available within the sources used. The border attribution of this corpus is simply that they all have the same combination of inline bordered pellet, Type 1, obverse and herringbone, Type 9 reverse. Indeed, an analysis the images indicates that four are die-linked obverse and reverse²⁷. The remaining three are unrelated in terms of dies but are so stylistically consistent that it is hardly conceivable that they were not from the same engraver – there is no design drift. Both the rarity of surviving examples and the design closes indicate that the coins were from a very narrow time period.



Figure 26 - Laos obverses



Figure 27 - Laos reverses

²⁵ Five coins are listed as between 29.5 and 30mm, all of which are Type 4; however, without any Type 1 diameters being listed it is impossible to make any inferences on sequence.

²⁶ *Historia Numorum Italy*, N.K. Rutter, British Museum Press 2001, pp177

²⁷ BnF btv1b11315565c, *Numismatica Ars Classica (NAC)* auction 116 Lot17, Münzkabinett Berlin 18215969 and NAC auction 150 lot 529. The remaining three examples are BMC 1946,0101.287, NAC auction 27 lot 30 and Stack's Bowers auction Jan 2012 NYINC lot 41

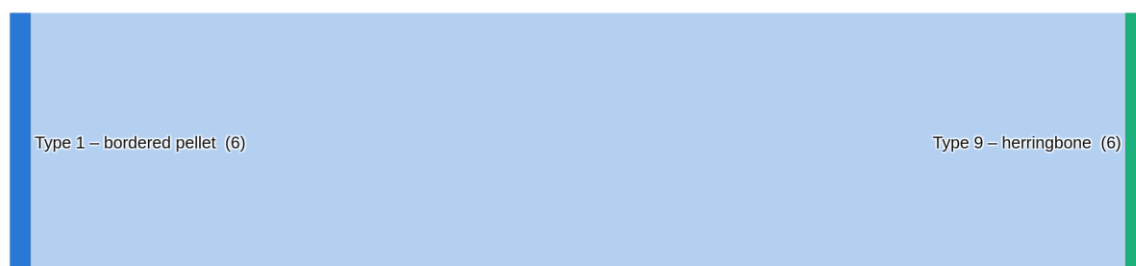


Figure 28 - Attribution of Laos obverses and reverses

It might have been expected that if the incuse coins of Laos were a continuation of those of Sybaris, even with an altered main type, the borders would have followed those of Spagnoli Phase C. However, while those coins have some examples of the Type 1 obverse border, there are no examples in any of the Sybarite corpus of the herringbone (type 9) reverse. Indeed, the only other city using this reverse is Poseidonia, another proposed settlement of Sybaris. This can be plausibly interpreted as engravers being mobile between the Sybarite ἀποικία. The short duration of the technique at Laos is unexplained but may have been due to the more limited resources of that city could not support the more expensive technique, or indeed the influence of the Sybarite refugees may have waned quickly.

One further observation is that the diameters of these incuse coins have a mean of 24mm, which is far smaller than other contemporary incuse coinage. As the incuse coins of Laos can be closely attributed to the last decade of the sixth century, this reduced flan size does not reflect the drift over time to smaller planchets seen in the larger mints. It is however comparable in diameter to the brief issues at Taras.

Kroton

According to Strabo Kroton was an Achaian foundation and, citing Antiochus, he dates it as later than Sybaris.²⁸ This is supported by Herodotus who refers to them as descended from Achaians ‘Κροτωνιῆται δὲ γένος εἰσὶ Ἀχαιοί’²⁹. The involvement of Kroton in alliance with Metapontion and Sybaris is noted in a previous section. Kroton is also believed to have founded Kaulonia, Terina and Skylletion.³⁰

To allow a comparative analysis the corpus used has been restricted to the period up to the end of the sixth century BC as provided by N. K. Rutter. For Kroton this would restrict the analysis to the following types – HN Italy 2075, HN Italy 2078, HN Italy 2081 and HN Italy 2084³¹. However, these types continued to be produced through to the end of incuse coinage period around 430 BC where the differentiator is only the planchet diameter, moving from spread incuse (530-500), medium incuse (500-480) to dumpy incuse (480 to 430). This diameter is not recorded in many of the source archives used for this analysis. This resulted in two possible paths – to extend the period used for this coinage, or to extend the sources used to include those which clearly state the period of the coin. This second approach is used, while acknowledging that moving to different sources has a potential impact on a comparative analysis.³²

²⁸ Strabo, Geography, 6.1.12

²⁹ Herodotus 8.47.1

³⁰ An inventory of Archaic and Classical Poleis, Mogens Herman Hansen & Thomas Heine Neilson, Oxford University Press 2004, pp 267

³¹ So-called ‘alliance’ issues have not been included to retain the focus on the types clearly aligned to Kroton; hence HN Italy 2080 (alliance with Temesa) is absent.

³² Images were taken from Astarte (3), Baldwin (1), Bertolami Fine Arts (20), Chaponnière & Firmenich (1), Gemini (2), Genevensis (1), Harlan J. Berk (1), Heritage (13), Leu (10), Nomos (2), Pegasi (3), Roma (16) and Stacks & Bowers (1).

The images captured from the auction sites were deduplicated using a perceptual hashing image analysis script coupled with a loose matching threshold. This resulted in a corpus of 73 images across 4 types.

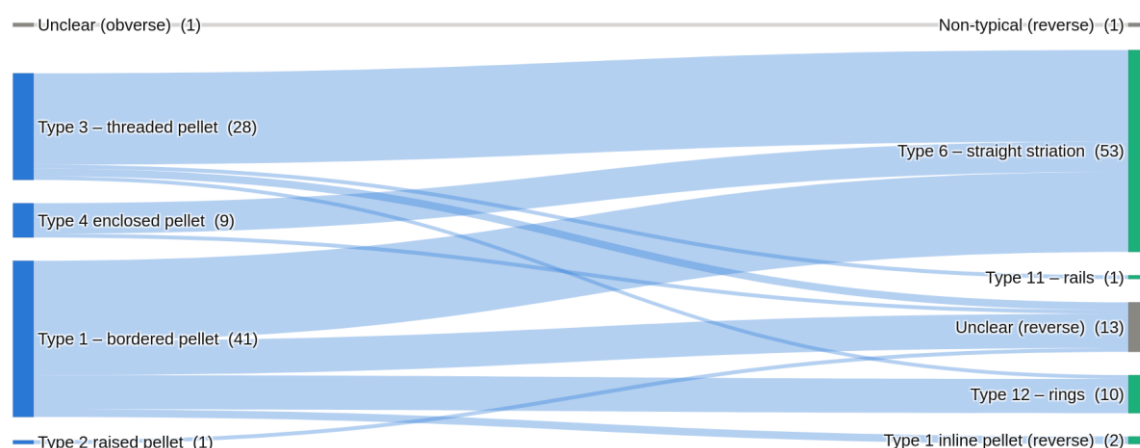


Figure 29 - Attribution of Kroton obverses and reverses (overall)

There is a clear preference for the use of straight striations on the reverses of the coins (77% of borders attributed); however, the picture painted by the border types of the obverse is less clear until you drill down into the individual types.

Type HN 2075

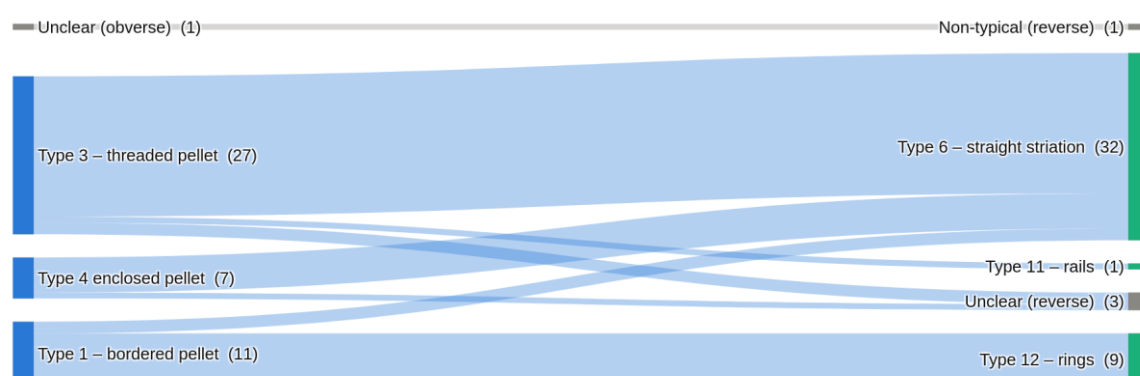


Figure 30 - Kroton, HN 2075 (incuse tripod, no ancillary symbols) – 47 coins

HN 2075 is the most common type and there are three clear divisions. Although not part of the border analysis it is worth noting that the tripod on both the obverse and reverse is frequently, but not always, accompanied by two snakes which appear in the bowl of the tripod or around the feet (or both).

- [1] An obverse threaded pellet, Type 3, associated with straight striations in the reverse (the division between inline and raised threaded is subjective as it is not possible to quantify the border height above the planchet from the photographs). In these types, the snakes are uniformly in the bowl of the tripod.
- [2] An obverse enclosed pellet, Type 4, paired with a straight striation on the reverse. It also has the straight striations and the snakes in the bowl of the tripod.
- [3] An obverse bordered pellet, Type 1, obverse coupled with either a straight striation or rings reverse. Irrespective of the reverse type, this border type is typically associated with two snakes

These distinctions by themselves give little concept of sequence. There is an observed drift of incuse coinage from the broad flat flans at about 30mm towards more 'dumpy' flans of 22mm in the coins of Metapontion specifically, via Noe, however this drift is seen in other cities including Kroton. In this instance we have deliberately selected predominately early types, which means that the drift would be slight if at all evident, but it is worth examining the diameters to see if they provide any indication of sequence in this case.



This coin type includes one reverse border which is classified as non-typical and needs to be addressed (Heritage Auction 3067 Lot 30008). This coin has evidence of multiple border applications, illustrated in Figure 32 and Figure 33.



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Type HN 2078



Figure 34 -Kroton, HN 2078 (incuse tripod with crab) – 13 coins

This type has a predominant bordered pellet obverse, Type 1, coupled with a straight striation reverse, Type 6. The exception with the Type 2 obverse has characteristics which indicate a special issue, being coupled with a dolphin reverse ancillary symbol (not in the obverse). The commonality of the borders places HN 2078 as a possible successor to the third and latest division of HN 2075 noted above. This is supported by an analysis of the planchet diameters which has a mean of 27.2mm for this type compared to HN 2075 Type 1 border mean of 28.4mm. The diameter continues to shrink and the snakes at this point seem to be wandering, appearing above and below and in most cases both above and below.

There are two unusual examples where the reverse border mirrors the reverse (not incuse). See Figure 36.



Figure 36 -Astarte Auction 26 Lot 175 reverse border



Figure 35 - - Astarte Auction 26 Lot 175 exergue

Type 2081



Figure 37 - Kroton, Type 2081 (incuse tripod with marsh bird) – 8 coins

This type is consistent as having a bordered pellet, Type 1, coupled with a straight striation reverse, placing it towards the end of the main HN 2075 type, It shows a further diminution in diameter to a mean of 26.5mm.

Type 2084

The final type in the analysis has been included for its comparative value only. Although Rutter records issues of this type in the period 530-500 BC (HN 2084), the majority of the auction examples are assigned to the later 500-480 BC (HN 2095). The coins used in this analysis are attributed in the catalogues as the

earlier HN 2084 however the diameters listed, which is the only available discriminator, would indicate that these have been mostly mis-attributed. Nevertheless, these are included for completeness.



Figure 38 - Kroton, Type 2084 (incuse eagle)

This type has a consistent bordered pellet with a straight striation reverse. However, the examples show a mean diameter of 23.6mm, which would place them as NH 2095.

A proposed chronology of the borders of Kroton, supported by a reducing diameter, is that the earliest type was HN 2075, which evolved from an obverse threaded border combined with straight striations to an enclosed pellet obverse border retaining the striations. The obverse then changed to a pellet obverse border coupled with a transition from striations to rings on the reverse. This may have been a branch, as the rings never progressed beyond this type and displace the striations on the reverse. The type finally transitioned to a bordered pellet on the reverse with a striated reverse. Note that these transitions do not imply a strict sequencing but may have involved a considerable overlap as existing dies were phased out.

At the point where the obverse border transitioned to individual pellets, a crab type was introduced (HN 2078), as was a marsh bird type (HN 2081), both of which retained the reverse and obverse borders of the later HN 2075 and simply adding the ancillary symbols. We can therefore propose a sequencing within the broader Rutter allocation of 530-500 BC. The eagle types (HN 2084) simply confirm the direction of evolution of the borders.

Taras

Taras is attested in many texts as a Lacedaemonian settlement with an interesting founding story of exiled παρθενοι.³³ It was therefore a doric city in an otherwise largely Achaian landscape.

There are three incuse types for Taras – the Hyacinthus [HN 824] type, of which only 2 examples have been included, and the Phalanthos with shell type [HN 826] with 19 examples. These images were drawn from the sources but supplemented by auction images to achieve a statistically valid set. The corpus was then de-duplicated, resulting in a final sample size of 21 coins.³⁴ No examples of HN 825 were available.

³³ Strabo ibid 6.3.1.2

³⁴ 2 Münzkabinett Berlin, 2 Ashmolean, 2 British Museum Collection, remaining from auction houses, predominately Numismatica Ars Classica.



Figure 39 -Taras, types HN 824 and HN 826

For both types the borders were an enclosed pellet obverse, Type 4, coupled with a straight striation reverse, Type 6. No exceptions were noted. Stylistically the borders are aligned with the HN 2075 variant from Kroton. One further observation is that the average planchet size was 24.7 mm, which is considerably lower than all the other cities producing incuse coinage at this time, excepting Laos.

Kaulonia

Kaulonia is explicitly called out as an Achaian foundation by Strabo³⁵ and this is further supported by Pausianus³⁶. Pseudo-Skymnos further attributes this foundation to Kroton³⁷.

A corpus of 33 coins taken from the BMC, ANS, BnF, Ashmolean, Fitzwillian and Munzkabinet Berlin collections was analysed.



Figure 40 - Attribution of Kaulonia obverses and reverses

There is a clear main type consisting of an enclosed pellet border, Type 4, at 86% of the attributed coins, with a more limited type of an inline bordered pellet, Type 1. Both pair with a straight striation reverse.

In his work *The Coinage of Caulonia*, Sydney P Noe reviews the incuse series and proposed four groups (A though D) for the sequencing of these coins.³⁸ The primary differentiator in constructing a sequence for these groups is the diameter of the coin and he then marks the boundaries by stylistic or ethnic changes. Group A has a diameter of around 30mm and is the largest issue, with the ethnic limited to four letters on the reverse and is described as having a cable border (equivalent to the Type 4 border described here). The upsilon does not as yet have its 'stem'. The diameters in group B are reduced (assumed to 29-28mm although not explicitly stated by Noe) and an annulet is placed above the reverse stag. Noe notes a transition in the border type within this group, placing the cable border at the start and then quickly transitioning to a beaded border between two lines, Type 1. Group C diameter shrinks to 27-26mm, and the ethnic is now five letters and appears on obverse as well as reverse. Finally, group D contains coins of diameter 24mm-21mm and the ethnic is mostly confined to the obverse. The groupings seem to be fairly

³⁵ Ibid, 6.1.8.10

³⁶ Pausianus, *Description of Greece*, 6.3.12

³⁷ Pseudo-Skymnos, *Circuit of the Earth*, 300

³⁸ *The Coinage of Caulonia*, Sydney P Noe, *Numismatic Studies* No. 9, 1958, p. 7-9

arbitrary³⁹ with the sequencing being based solely on the diminution in coin diameter which is seen at other mints.

Unfortunately, of the institutions from which the corpus here is taken, only the Ashmolean provides the diameter of the coins. In the seven examples taken from it, six are enclosed pellet borders (Noe's cable border) and have a mean diameter of 30.4mm. The one inline pellet border example has a diameter of 29.6mm and is the smallest of the seven examples. Assuming the diameter correlates to sequencing then this confirms the enclosed pellet border as preceding the inline bordered pellet border. The five inline border examples within the corpus all display the annulet of group B as expected for this group.

³⁹ Noe himself admits that group C "hardly deserves the distinction of being classed separately)" and notes exceptions to each of his stylistic markers in each group.

Cross-Polis Border Comparison

The poleis in the border analysis all shared a common incuse fabric and with the exception of Poseidonia, a common weight standard. The adoption of a single weight standard is an economic statement in that it allows for more seamless use of coinage from one polis within the economic sphere of another⁴⁰.

Poseidonia's non-compliance with this standard despite its origin being attributed to Sybaris may simply indicate a more local trading influence with its closer neighbour, Velia, which used a similar Phocaeen standard⁴¹. The use of the incuse fabric itself, especially in consideration of the additional associated costs, is political in nature; however, whereas the badge of the city expressed its identity and sovereignty, the shared fabric is an expression of commonality. This attribution of features to economic or political drivers are discussed extensively in the numismatic literature.

The use of a border may be a manufacturing decision to strengthen the structure of the thin planchet of the incuse type (though it should be noted that Taras and Laos also have bordered planchets although they use a thicker planchet). This observation sits neatly with the widespread use of the straight striation reverses which may indeed have a structural purpose similar to corrugation. The rails/rings reverses at Sybaris, which terminate at its destruction and are not adopted by its daughter cities, are only found elsewhere at Kroton, where it is far less frequent than the striated borders. The herringbone reverses found only at the daughter cities of Sybaris – Poseidonia and Laus – are similar in their corrugated structure, save are more decorative, and so may also be viewed as an evolved structural element fulfilling the same function. The reverse borders are mostly sunken (indicating that the die had a raised reverse border)⁴², which is consistent with their interpretation as a structural part of the incuse fabric.

The obverses are primarily raised in respect to the planchet and consist of dots or beads in various configurations, which would add nothing to the structural integrity of the coin. If we consider the reverses as a structural element then any political or economic alignment attributable to design decisions on border styles should be considered principally with reference to the obverse borders, which simplifies the analysis. The obverse borders of these poleis were limited to 5 types. This is quite a limited palette shared amongst the poleis which does imply a degree of shared experience or design concepts.

The evidence from the obverse borders is that there is no consistent alignment with expected spheres of influence. For example, Sybaris transitions from the bordered pellet (type 1) to a threaded pellet (type 3); however, when the incuse technique is taken up by Laus after the destruction of Sybaris uses the earlier bordered pellet. The other attested Sybaris foundation, Poseidonia, uses an enclosed pellet (type 4) which is actually shared only by the Krotonite daughter polis Kaulonia and for a very brief period, Taras. Coming at it from the other direction, Metapontion initially uses a distinctive sunken pellet (type 2) before transitioning from Noe III onwards to a bordered pellet (type 1) which is used at early Sybaris and then at Laus and Kroton.

⁴⁰ It has been argued that the variation in weights or quality control between poleis would have prevented this. From the samples used in this analysis: Sybaris (mean 7.85g CVar 3.9%), Metapontion (mean 7.90g CVar 5.3%) and Kroton (mean 7.83g CVar 5.8%) seems to illustrate you are just as likely to get an underweight coins of your own city as one of the others and so should not be a barrier to mutual acceptance in trade.

⁴¹ Phocaeen standard of 7.5g didrachm stater.

⁴² This numismatic note is not intended to address manufacturing approaches to these incuse reverses, but it seems unlikely that the dies were carved to create a raised border, which is very much an ancillary element in the overall design, and therefore contributes further weight to the proposition that hubbing was used in the manufacture of reverse dies.

The short-lived experiment with incuse coinage at Taras, covering only ten years or so, shared both obverse and reverse border types with Kroton and its daughter polis, Kaulonia. This is interesting as this makes a natural geographical spread of the concept of producing regional coinage at Taras less likely given the relative locations of these poleis, with Metapontion lying far closer to it than either Kroton or Kaulonia. Following the destruction of Sybaris, Taras seems to have adopted the style of the victor in that war rather than its close neighbour.

With the available evidence, there is no clear political signalling involved in the types of borders used. They are not consistent enough across the Achaian poleis to indicate a deliberate alignment and in the major polis there is a variety of borders used which, while showing some sequencing, does not indicate a true evolution as multiple border types appear to have co-existed and, in some cases, older border types re-appear. Examples of these are the reappearance of the Spagnoli phase A bordered pellet at Sybaris in some examples of Spagnoli phase C; also, Kroton HN2075 using both type 1 and type 3. There are however traces of 'spheres of influence' where daughter cities inherit some of the characteristics of the main polis.

The analysis does however demonstrate that the borders may be used as a guide to the early sequencing of the coinage. At Metapontion changes in borders are aligned with the Noe classes and they independently substantially support the sequencing proposed by Spagnoli for Sybaris, where the analysis also integrates the Kroton-Sybaris 'alliance' coinage. It further provides an insight into the evolution of the coins at the enigmatic Siris/Pixos issues. At Kroton, where there is no similar pre-existing chronology, the analysis suggests a sequence which is re-enforced by the design change in relation to the position of the snake subsidiary elements.

A complex picture therefore emerges for the choice of borders in some instances being associated with manufacturing process (which in turn arises from the choice of the incuse fabric), a shared design palette within which the choice of border was not a political concern but may have arisen from the experience or design preference of the individual engravers, and some cultural or political spheres of influence which imitated the parent polis or more dominant coinage of the time. A further possibility is that there was some cross-pollination of techniques by imitation or by migratory engravers happening below the level of formal political arrangements. This allowed for the border styles to be shared where the main badge design was retained as the statement of identity.

Die Manufacture and the Question of Hubbing

The border evidence also bears on the question of die manufacture. Hill argued specifically that on the incuse reverse of Metapontion the punctate border formed part of the hub itself – punched onto the hub before it was used to strike individual dies – rather than added at the die stage.⁴³ The pattern recorded here is difficult to reconcile with that reading. Border patterns – rows of pellets, striations, simple linear elements – are trivially cut in intaglio, the form required of a die, but are mechanically very difficult to cut in relief, the form a hub would need to carry if the border were transferred to the die as part of a single hub impression together with the main device. Producing a raised border of this kind directly in relief on a hub, rather than as a secondary intaglio addition to the die itself, represents a substantially harder engraving task for no evident gain in the finished coin. This is a mechanical argument independent of, and complementary to, Noe's argument from the sheer volume of metal that direct engraving of a relief reverse die would have required removing, without leaving detectable traces across an extended coinage

⁴³ Ancient Methods of Coining, George F. Hill, *The Numismatic Chronicle and Journal of the Royal Numismatic Society*, Fifth Series, Vol. 2 (1922), pp. 1–42, at p. vii, discussing the reverse of an incuse stater of Metapontion (BMC 1946,0101.304).

– the argument Noe used to support hub-based manufacture of the primary device at Metapontion.⁴⁴ Together they suggest that while the main device was hubbed, the border was applied as a die-stage rather than a hub-stage addition.

This reading is directly supported by a separate, corpus-based analysis of the Metapontion and Poseidonia series undertaken as a companion to this paper.⁴⁵ Three coins of Noe class V share an identical central image – barley ear, awns and the ancillary dolphin symbol – while differing in their border: a hub-linked rather than a die-linked relationship, since a genuine die match would require every element, border included, to agree. The dolphin's position was found to be fixed relative to the central design across the three coins but variable relative to the border, consistent with the dolphin being co-transferred with the main device from the hub while the border was completed separately on each die. This is the reverse of Hill's reading of the Metapontion evidence: rather than the border forming part of the hub, the hub appears to have carried the main device and its ancillary symbol, with the border added at the die stage. The equivalent test on the Poseidonia corpus returned no hub-linked matches, which is consistent with, rather than contrary to, this account, given Noe's own observation that the shallower relief at Poseidonia may not have required hubbing at all. The threaded-pellet reverse anomaly noted within Spagnoli Phase C at Sybaris, elsewhere in this paper, is compatible with the same mechanism: an unaltered hub, still carrying the obverse border design, would be expected to produce exactly this kind of border 'bleed' onto the reverse if the die-stage border were incomplete or omitted.

Together, the mechanical argument and this empirical evidence indicate that, at Metapontion at least, the border was applied as a die-stage rather than a hub-stage element – the reverse of Hill's reading of the same coinage. Extending the companion methodology to the reverses of Sybaris, Kroton and Kaulonia, where ancillary symbols also occur but corpus size has so far been prohibitive, would test how generally this holds.

Conclusion

The evidence set out in the previous section does not support border style as a marker of formal political alignment between the Achaian poleis examined. Shared and divergent border types recur independently of the political relationships attested by Herodotus, Strabo and Polybius, and a polis's border style does not reliably track that of the polis to which it is otherwise closest. Border choice is, in this sense, agnostic to political grouping: it neither confirms nor contradicts it, and cannot serve as an independent proxy for political arrangement.

The more economical explanation remains engraver mobility and the informal transmission of craft technique between mints, rather than deliberate political alignment. A shared weight standard and a shared incuse fabric are plausibly political or economic choices in a way that the fine detail of border design is not: the badge of the polis carries the purpose of civic identity, while the border, added as a secondary process on the die, is where individual engraving approach or experience remains most visible.

Against this negative result stands a positive one, which functions as an internal control on the method itself. At Kroton, where no die-linked chronology exists, the sequence proposed here is independently corroborated by two variables not used to construct it – planchet diameter and snake position – and the same method independently reproduces the die-linked sequencing already established for Sybaris by

⁴⁴ The Coinage of Metapontum Parts 1 and 2, Sydney P Noe with Additions and Corrections by Ann Johnston, ANS New York 1984, pp. 3–4.

⁴⁵ An Examination of the Evidence for Hubbing in Incuse Coinage II, unpublished numismatic note available at www.protantus.co.uk, Protantus, 2026.

Spagnoli. Where an established chronology exists, border typology recovers it; where none exists, it can be used to propose one with reasonable confidence.

A further finding, set out in [Die Manufacture and the Question of Hubbing](#) above, concerns die production rather than political alignment: mechanical and empirical evidence together indicate that the border was applied as a die-stage rather than a hub-stage element at Metapontion – the reverse of Hill's reading of the same evidence.

It would be worth revisiting this analysis once more detailed photography, more complete metrology and more numerous examples of key types become available.

Appendix A: Data Tables

Poseidonia

	Obverses				
		Type 1 Raised pellet	Type 4 Enclosed pellet	Unclear	Unavailable
	Type 6 : Straight striation	2	1		
	Type 7 : Curved striation		2	1	
	Type 8 : Wedge striation	2			
	Type 9 : Herringbone	1	25	2	1
	Type 10: Laurel		3		
	Unclear		1		1
	Unavailable		1		

Table 1 - Attribution of Poseidonia Obverses and Reverses

Sybaris

		Obverses					
		Type 1 (i) Inline pellet	Type 1 (r) Raised pellet	Type 3 (i) Threaded pellet	Type 3 (r) Threaded pellet	Type 5 Boxed pellet	Unclear
Reverses	Type 3 : Threaded pellet	1		1			
	Type 6 : Straight Striation	3	1	1			
	Type 11 : Rails	4		4	10		5
	Type 12 : Rings			27	5		5
	Unclear					1	7

Table 2 - Attribution of Sybaris Obverses and Reverses

		Obverses					
		Type 1 (i) Inline pellet	Type 1 (r) Raised pellet	Type 3 (i) Threaded pellet	Type 3 (r) Threaded pellet	Type 5 Boxed pellet	Unclear
Reverses	Type 3 : Threaded pellet						
	Type 6 : Straight Striation						
	Type 11 : Rails	2	10				4
	Type 12 : Rings						

Table 3 - Spagnoli Phase A

		Obverses					
		Type 1 (i) Inline pellet	Type 1 (r) Raised pellet	Type 3 (i) Threaded pellet	Type 3 (r): Threaded pellet	Type 5 Boxed pellet	Unclear
Reverses	Type 3 : Threaded pellet						
	Type 6 : Straight Striation						1
	Type 11 : Rails			1			5
	Type 12 : Rings			21	4		6

Table 4 - Spagnoli Phase B

		Obverses					
Reverses		Type 1 (i) Inline pellet	Type 1 (r) Raised pellet	Type 3 (i) Threaded pellet	Type 3 (r) Threaded pellet	Type 5 Boxed pellet	Unclear
	Type 3 : Threaded pellet			2			
	Type 6 : Straight Striation	2	1				
	Type 11 : Rails			1			
	Type 12 : Rings					1	

Table 5 - Spagnoli Phase C

Metapontion

		Obverses				
Reverses		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Inline pellet	Type 4 Enclosed pellet	Unclear
	Type 6 : Straight striation	6	31	20	5	2
	Unclear		1			

Table 6 – Attribution of Metapontion Obverse and Reverses

		Obverses			
Reverses		Type 1 (r) bordered pellet	Type 2 Inline pellet	Type 4 Enclosed pellet	Unclear
	Type 6: Straight striation		16		2

Table 7 - Metapontion Noe Class I

		Obverses			
Reverses		Type 1 (i) bordered pellet	Type 2 Inline pellet	Type 4 Enclosed pellet	Unclear
	Type 6 : Straight striation	6	2		

Table 8 - Metapontion Noe Class II

		Obverses			
Reverses		Type 1 (r) bordered pellet	Type 2 Inline pellet	Type 4 Enclosed pellet	Unclear
	Type 6 : Straight striation	31	2	5	
	Unclear	1			

Table 9 - Metapontion classes III to VII

Kroton

Reverses	Obverses						
		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Raised pellet	Type 3 (i) threaded pellet	Type 3 (r) threaded pellet	Type 4 Enclosed pellet
	Non-typical					1	
	Type 1 : Inline bordered pellet		2				
	Type 6 : Straight striation	16	5		14	10	8
	Type 11: Rails					1	
	Type 12 : Rings	9				1	
	Unclear	6	3	1	1	1	1

Table 10 - Attribution of Kroton obverses and reverses

Reverses	Obverses						
		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Raised pellet	Type 3 (i) threaded pellet	Type 3 (r) threaded pellet	Type 4 Enclosed pellet
	Non-typical					1	
	Type 6 : Straight striation	2			14	10	6
	Type 11 : Rails					1	
	Type 12 : Rings	9					
	Unclear				1	1	1

Table 11 - Type HN 2075 (incuse tripod, with incuse tripod reverse, no ancillary symbols) – 47 coins

Reverses	Obverses						
		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Raised pellet	Type 3 (i) threaded pellet	Type 3 (r): threaded pellet	Type 4 Enclosed pellet
	Type 1 : Inline bordered pellet		2				
	Type 6 : Straight striation	5	1				
	Unclear	1	3	1			

Table 12 - Type HN 2078 (incuse tripod, incuse tripod reverse with crab in both fields) – 13 coins

Reverses	Obverses						
		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Raised pellet	Type 3 (i): threaded pellet	Type 3 (r) threaded pellet	Type 4 Enclosed pellet
	Type 6 : Straight striation	3	1				
	Unclear	4					

Table 13 - Type 2081 (incuse tripod, incuse tripod reverse with marsh bird in both fields) – 8 coins

Reverses	Obverses						
		Type 1 (i) bordered pellet	Type 1 (r) bordered pellet	Type 2 Raised pellet	Type 3 (i) threaded pellet	Type 3 (r) threaded pellet	Type 4 Enclosed pellet
	Type 6 : Straight striation	2	3				

Table 14 - Type 2084? (incuse tripod, incuse eagle)

Laos

	Obverses	
Reverses		Type 1 : bordered pellet
	Type 9 : Herringbone	7

Table 15 - Attribution of Laos obverses and reverses

Taras

	Obverses		
Reverses		Type 4 : Enclosed pellet	Unclear
	Type 6 : Straight striation	18	3

Table 16 - Taras types HN 824 and HN 826

Kaulonia

	Obverses			
Reverses		Type 1 bordered pellet	Type 4 Enclosed pellet	Unclear
	Type 6 : Straight striation	4	24	1
	Type 8 : Wedge striation	1		
	Unclear		2	

Table 17 - Attribution of Kaulonia obverses and reverses

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