

As a new collector of ancient Greek coins, one of the first books I came in contact with was David Sear's *Greek Coins and their Values Vol. 1*.<sup>1</sup> There, I encountered the idea that the philosopher-mathematician Pythagoras might have been responsible for the introduction and design of the incuse coinage of Magna Graecia. Amongst historians, archaeologists, and professional numismatists, this idea is not in vogue these days. However, once upon a time when some scholars looked at things more widely and painted with a broader brush, they noticed evidence for such a connection in ancient literature. The most important bit was that Pythagoras' father was a gem-engraver and Pythagoras himself would have been trained in the family business of celature. Adding this together with the oddity of the incuse coinage of Magna Graecia, this older generation of scholars came up with the theory that Pythagoras personally was behind the creation this coinage. I believe that this theory can be resurrected or rather, in pure Pythagorean fashion, reincarnated, through a new approach. However, instead of just looking at the literary record, it is more important to look at the coins themselves, and let them speak to us directly.

### The Incuse Coinages

By the incuse coinage of Magna Graecia I mean the first coinage of Magna Graecia that was mainly minted in the Achaean colonies on the Achaean standard. The

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<sup>1</sup> David Sear, *Greek Coins and their Values, vol. 1 Europe*, (Seaby, Spink & Son Ltd, London, 1978), p. 31

## Pythagoras and the Incuse Coins of Magna Graecia

As a new collector of ancient Greek coins, one of the first books I came in contact with was David Sear's *Greek Coins and their Values Vol. 1*.<sup>1</sup> There, I encountered the idea that the philosopher-mathematician Pythagoras might have been responsible for the introduction and design of the incuse coinage of Magna Graecia. Amongst historians, archaeologists, and professional numismatists, this idea is not in vogue these days. However, once upon a time when some scholars looked at things more widely and painted with a broader brush, they noticed evidence for such a connection in ancient literature. The most important bit was that Pythagoras' father was a gem-engraver and Pythagoras himself would have been trained in the family business of celature. Adding this together with the oddity of the incuse coinage of Magna Graecia, this older generation of scholars came up with the theory that Pythagoras personally was behind the creation this coinage. I believe that this theory can be resurrected or rather, in pure Pythagorean fashion, reincarnated, through a new approach. However, instead of just looking at the literary record, it is more important to look at the coins themselves, and let them speak to us directly.

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incuse coinage has a type in relief on the obverse, with the same type on the reverse, except incuse. Sear explains it as being like the mint error brockage,<sup>2</sup> except that minor features such as the ethnic and details in the obverse type do not appear on the incuse reverse.

There are five predominant mints; Sybaris, Metapontum, Kroton, Poseidonia and Kaulonia, that begin minting most likely in that order on the spread fabric. Besides these predominant mints, there are lesser mints; Tarentum, Laos, Palinuros/Molpa, Rhegion and Zankle in Sicily that are also incuse but begin later in the period of the medium fabric. Later, for some mints, there is the period of the dumpy fabric. Whereas the diameter shrank from the spread to the medium to the dumpy fabric, the weight stayed much the same at about 8 grams as the coins became considerably thicker.<sup>3</sup> For each mint there is one predominant type except for Tarentum which has two types. In addition to these, there are coins sharing the bull type of Sybaris, but exhibiting different ethnics, Sirinos/Pyxoes, the Ami[naioi], and the So[ntini]. In other words, there is quite a bit of range for the incuse issues, not even counting the presence of varieties, the use of secondary symbols and alliance issues. I mention all this detail to give the reader an idea of how extensive this coinage is. Also, one should have some idea of how extensive Pythagorean involvement must have been. Early on that influence was from Pythagoras himself and more refined and elaborate, later it must have been from his followers and more crude. However, while there was quite the variety produced by these various mints, we will start with only just one coin, in fact with just one die. The only coin we

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<sup>2</sup> Brockage occurs when a coin just minted sticks to a die and the planchette for the next coin is stamped with the image of one die, plus on the other side that same image in incuse from the features in relief from the stuck coin.

<sup>3</sup> This is for the Achaean standard, Poseidonia is on a different standard, also Rhegion, Zankle and So[ntini] are on a third standard.

immediately are concerned with here is a stater of Kroton, a very specific stater shown in Franke and Hirmer's *Die Griechische Münze*,<sup>4</sup> with its rather geometrical tripod brazier type. This geometry in the type of the coin is effectively the signature of Pythagoras.

### How Might We Learn Whether the Coins are from Pythagoras?

But let us back up. The geometry of the Krotoniate stater is the key, but first I should show how there even could be a key to indicate the involvement of Pythagoras. When I read about the possible Pythagoras' connection at the start of my collecting career, I said to myself that *if* the incuse coins were designed by Pythagoras, then there must be a way to tell. There must be a way to tell, for Pythagoreanism permeates every aspect of the lives of its believers. Coins would not have been left out of this all encompassing world-view. In other words, coins designed by Pythagoras would themselves reflect Pythagorean beliefs. Furthermore, they would have been meant to reflect Pythagorean beliefs.

The designs of the Pythagorean coins (type, ethnic, etc.) would not only owe their origin to their economic utility and to the minting polis' self-image, but also to the Pythagorean desire to surreptitiously propagate their teachings. "Pythagorean coins" would put forth Pythagorean propaganda intended for those already in the know. It may even be that a few special coins could be used as symbols of recognition, when one anonymous Pythagorean encountered another. Incidentally, this surreptitious propaganda is a bad way to design coins, symbolism in coins should be overt, reinforcing the

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<sup>4</sup> Franke, Peter R; Hirmer, Max; *Die Griechische Münze*, (Hirmer Verlag München, 1964), p. 92, top of page.

collective message for the entire issuing political body, not just one faction. But being early in the development of the invention of coinage, one should excuse the Pythagoreans for not yet having discovered that.

Early on, there must have been great deal of optimism when Pythagoras and the Pythagoreans arrived. Accompanying this optimism, the Pythagoreans had a great deal of influence on the cities of Magna Graecia, including on their issuance of coins. Later the elitism of the Pythagoreans would spur revolts that spread through Magna Graecia, purging the area of notable Pythagoreans with only a few exceptions. Although the evidence is scanty, it looks like the unique Pythagorean incuse coinage disappeared entirely from production at about the same time of the second purge.

Of course, that could be true only if there was such a thing as “Pythagorean coins.” That such things exist still needs to be determined. But if the incuse coins of Magna Graecia were “Pythagorean” coins, then a study of the coins on the one hand, and Pythagoreanism on the other, might allow us to clue in on and decipher a message. If we could recognize a message, then we would have confirmation of Pythagoreanism in the coins. Also, finding one message would suggest that we might look for more. Then perhaps we could unravel a whole set of messages, and in the process learn more about Pythagoreanism. We might even confirm that some claims in later literature do in fact date back to the time of the Master. Finding one message is merely the start of this project. It is the beginning, but a necessary beginning. Admittedly without that first strong step, the rest of the journey is but a fantasy.

It is not necessarily through looking for anything in particular that one is initially going to be clued in on whether these objects are Pythagorean. But rather it is through

immersing oneself in the stream of Pythagoreanism, wrestling with it and thus becoming intimately informed. It might be hard to articulate a specific Pythagorean message to the satisfaction of mainstream scholarship. We are, after all, talking about decipherment and with any decipherment, the more raw material to be deciphered, the better. Something not related, the Etruscan language, for example, presents problems because there are so few large quotations in that language. However, in our case if one message can be accepted as Pythagorean, then it will be easier to accept others as well. But first we need to find that one message that will serve as a sign post saying that we are dealing with Pythagoreans here.

Here we have a bit of a method to show the coins are Pythagorean. If the coins are by Pythagoras, they will show a Pythagorean message to those informed enough to read them. They will do so because Pythagoreanism is a complete way of life embracing an all-encompassing world view. Coins are part of that way of life and therefore in various ways, will express aspects of that way of life. They will express Pythagorean “lessons” if you will, as well as generally supporting a Pythagorean world view incompletely expressed through the medium of coins. Again, this would only be the case if the coins are Pythagorean. Therefore, our task now is to find some aspect “in” the coins which is undoubtably Pythagorean and not just Pythagorean, but originally “from Pythagoras” Pythagorean. Finding one “from Pythagoras” Pythagorean aspect to the coins will not only confirm that the coins are from Pythagoras, but will be useful in finding other Pythagorean aspects as well.

Pythagoras and Geometry

Every school child knows that Pythagoras discovered the “Pythagorean” theorem and every philosophy graduate will know that it was around a long time before he was. While Pythagoras may not have literally discovered the Pythagorean theorem, there is a certain simplicity to the school child’s belief that rings true. That simplicity is not enough for the academic for whom, while the school child accepts too much, the cleverness of the academic threatens to accept too little. Personally, I believe that there is much virtue in accepting the literary tradition about Pythagoras in general, and good intentions but no virtue in rejecting it wholesale.

The key is geometry and while mentioning various sources testifying to Pythagoras and his involvement of geometry, it should be understood that I am not advocating that any *particular* mention is correct. I am advocating that given the preponderance of the evidence, there must be some truth to the picture that Pythagoras was a mathematician. Furthermore, that truth is mirrored in a particular spread fabric incuse stater that appears to have been drafted. In other words, where there is smoke there is fire, with the smoke being all the reports in literature of Pythagorean geometry, and the fire reflected directly in the geometry conveyed through the coins from, ultimately, Pythagoras himself. I do not need to have every statement about Pythagoras and geometry to be true, I only need it to be true that Pythagoras engaged in geometry. Given all the testimony about Pythagoras’ geometry, such a claim is quite modest and reasonable. It is also natural to go the next step by asserting that he, being a celator, could have designed this particular coin with its carefully, geometrically drafted type.

We only have to look in one place for ancient literary sources testifying to the mathematical ability of the Pythagoreans in general, and Pythagoras specifically. Or rather, one modern source that puts many of the ancient sources together. That work is Euclid's *Elements*, edited by Sir Thomas Heath. Heath says, "we have sufficient grounds for regarding the whole of the substance of Book II [of Euclid's *Elements*] as Pythagorean."<sup>5</sup> Also a scholia on IV. 10, 11. states that "'this Book' (Book IV) and 'the whole of the theorems' in it . . . are discoveries of the Pythagoreans."<sup>6</sup> Proposition I.32 probably predates Pythagoras.<sup>7</sup> Eudemus states that the "application of areas," and their "exceeding" and "falling-short" shown in I.44 is a discovery of "the Muse of the Pythagoreans."<sup>8</sup> VI.25 is also accredited to Pythagoras.<sup>9</sup>

There are two definitions and fourteen propositions in Euclid's Book II. In it, Heath notes, "the whole procedure is *geometrical*; rectangles and squares are shown in the figures, and the equality of certain combinations to other combinations is proved by those figures."<sup>10</sup>

The definitions of Book IV involve the circumscription of figures around figures or circles or the inscription of figures within figures or circles. There are seven definitions and sixteen propositions in Euclid's book IV.<sup>11</sup>

Although we could venture further into the details of these definitions and propositions, I believe that this much is sufficient to show that the ancients themselves

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<sup>5</sup> Euclid, *The Thirteen Books of the Elements*, tr. + commentary by Sir Thomas Heath, 2<sup>nd</sup> ed. (Dover Publications, Inc. New York, 1956), Vol. 1, p. 414.

<sup>6</sup> Ibid. A "scholia" is a marginal comment in an ancient manuscript.

<sup>7</sup> Op. Cit. Vol. 1, p. 317.

<sup>8</sup> Op. Cit. Vol. 1, p. 343.

<sup>9</sup> Op. Cit. Vol. 2, p. 254.

<sup>10</sup> Op. Cit. Vol. 1, p. 373.

<sup>11</sup> Op. Cit. Vol. 2, pp. 78-111.

believed in the mathematical acumen of the Pythagoreans and also of Pythagoras himself. While we cannot necessarily prove that all of this knowledge dates all the way back to Pythagoras, we can reasonably assume that the majority of it dated back to the Master. Looking at the geometry of the spread fabric incuse stater we can see that this assumption of Pythagoras' background in geometry is correct.

We now have reached the point where having established a foundation, we can get into the coinage and its geometry. In my presentation I have tried to be very rational and methodical in reaching the point where we actually turn to the coins. But of course, for me it did not really happen that way. The logic of discovery is never that orderly. For me, a "Eureka!" moment did happen and everything else is filler after the fact. More precisely, I exclaimed, "you clever bastard!" "Bastard," of course, being in this case a fond term of endearment.

In a way I cheat at my own rules. I said I was looking for a well-defined statement from Pythagoras in the coins, a proposition alluded to in the types. But instead of coming from a particular propositional belief or a set of propositional beliefs, the "Eureka!" came from an aesthetics that in turn stemmed from geometry, and geometry in turn stems from a set of propositions. In other words, we have our Pythagorean propositions but initially only indirectly noticable through the aesthetics. I know that they are there but I am not a mathematician and so I am unfamiliar with the propositions themselves. If I was less mathematically illiterate I would investigate it further. However, things being what they are, I do not and I merely list the places in Euclid's *Elements* where Heath notes ancient sources proclaiming Pythagorean origins. However, while mathematically ignorant myself, I know a geometrical design when I see it.

Perhaps it is because I find geometry a little intimidating that I noticed the geometry in the first place. Most people in the past have probably quietly overlooked the geometry, never explicitly noticing it. For me there was more dissonance between the superficial appearance of the coin's tripod type and the geometry that underlay it. The aesthetics of this particular design for the spread fabric Krotoniate stater flows from the Pythagorean nascent understanding of geometry.

Looking at a wonderful Krotoniate stater in Franke and Hirmer's *Die Griechische Münze*,<sup>12</sup> it suddenly struck me that this particular spread fabric Krotoniate stater with its intricate tripod with volutes was drafted out using geometry. Other incuse coins from Kroton and the other poleis show a kind of balance or proportion aided or informed by geometry, but the coin in Hirmer and Franke on the top of p. 92, does them one better. It was designed and drafted out using a straight edge and a compass. I believe that the only touches that are exceptions to this rule are the 'S's of the serpents below the tripod's legs. Again, I am not a geometrician and so I cannot say what the mathematical implications of the design are. But if the Archaic racetrack in Corinth can reveal a certain knowledge of geometry in its set up, so too can this coin.<sup>13</sup>

A high level of mathematical understanding, however, is not necessary for seeing that the coin was drafted rather than done by freehand. I invite the reader to test me on this. Anyone can get a straight edge and a compass and trace the circles and the

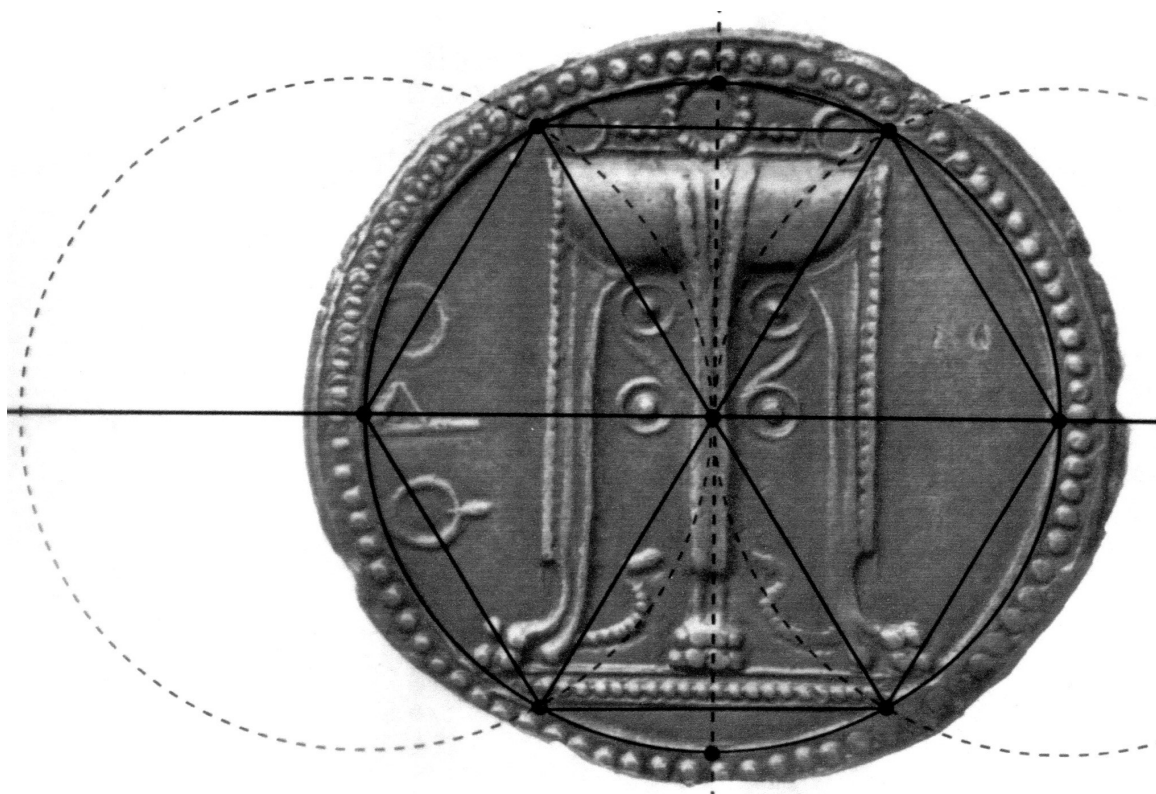
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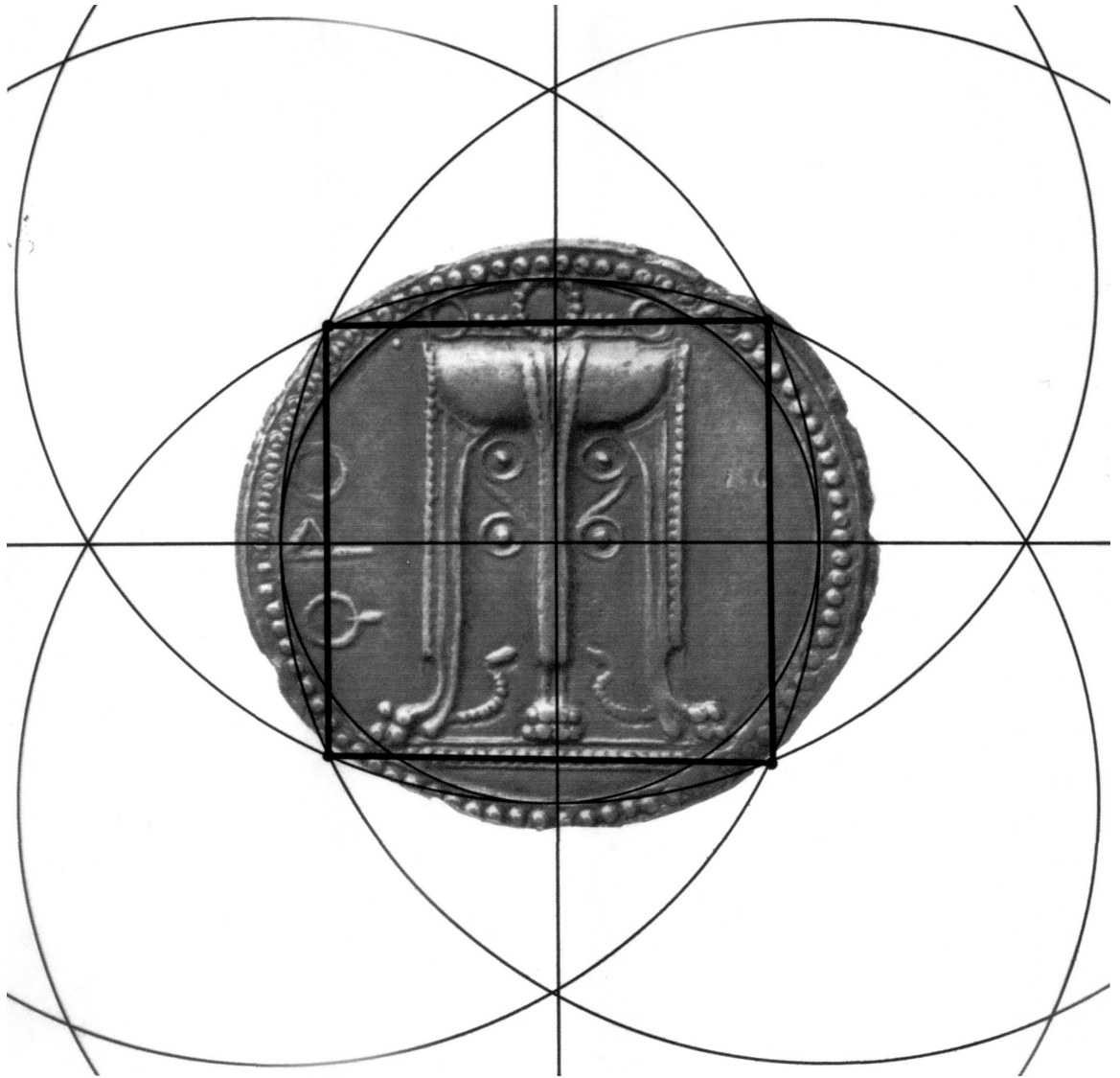
<sup>12</sup> Kraay and Hirmer's book [Greek Coins] is the English equivalent of this book. It has the same photos by Hirmer, but the text is by Colin Kraay, not P.R. Franke.

<sup>13</sup> "The nature of the reconstructed *dromos* in Corinth suggests an understanding of mathematics and geometry by the Greek architect that previously has been unrecognized as early as ca. 500 B.C." David Gilman Romano, *Athletics and Mathematics in Archaic Corinth: The Origins of the Greek Stadion*, (American Philosophical Society, Philadelphia, 1993), 76.



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dies used to mint the coins. By education he also was a mathematician. A celator naturally would be educated in some geometry,<sup>16</sup> and Pythagoras also benefited from the beginning of Greek mathematics. His knowledge would have been spurred on by contact with the neighboring Milesian philosophers and by his travels to visit priests in Egypt and elsewhere.

Pythagoras was in the right place at the right time, the stater was minted in Kroton after c. 532.<sup>17</sup> That is, after the time of Pythagoras' arrival in Magna Graecia. Arguments eliminating Pythagoras' candidacy on the basis of when the incuse coinage supposedly began, do not really apply here. These arguments concern just Sybaris and Metapontum and are mistaken at that. N. K. Rutter states that Kroton began minting c. 530.<sup>18</sup> That date is after Pythagoras' estimated time of arrival (62<sup>nd</sup> Ol. or c. 532) in Magna Graecia. Pythagoras had the means, motive and opportunity to make the obverse die for this particular coin. More than just means, motive and opportunity, again this geometry is effectively a signature from Pythagoras, showing his hand. The creative genius behind the geometry of this coin is Pythagoras, the famous philosopher-mathematician and celator who founded the Pythagorean order.

### The Uniqueness of this Coin

When looking at the coin, quite easily one could make the mistake of reading into it developments that come later. In fact, I suspect one reason why the oddity of these

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<sup>16</sup> A celator would know the five geometrical solids, (4, 6, 8, 12, 20) from rock crystals such as Iron Pyrite and Garnets.

<sup>17</sup> 532 B.C. more specifically 62<sup>nd</sup> Olympiad., Op. Cit. Iamblichus, section 8, # 35.

<sup>18</sup> Rutter, N.K., *Historia Numorum, Italy* (The British Museum Press), London, 2001), p. 167.

coins, besides their incuse reverses, has been underappreciated for so long is that ancient numismatists have traditionally been educated on Roman coinage first and Classical and Hellenistic next. This coin is from the Archaic Age, 50 years before Salamis and the commencement of the Classical Age. These incuse coins of Magna Graecia are probably the first coins that are circular, are flat, and have multi-letter ethnics often in exergue. They show well defined rims on both the obverse and reverse. Also, although not necessarily the first to do so, some of the incuse coins show a very early and sophisticated use of secondary symbols, and the issuance of smaller denominations and alliance coinage. Steeped in the history of coinage, an ancient numismatist is familiar with all of these characteristics, for most are used at one time or another for various Roman, Hellenistic or Classical issues. In seeing them in the incuse coinage, perhaps they are not surprised, but they ought to be. Each of these characteristics (flat, circular, rim, etc.) is essentially a new invention introduced with the incuse coinage. Furthermore, they are all happening at the same time in a small group of closely connected mints. They also are happening with few, if any, precursors. A proper appreciation of the incuse coinage does not come from looking at what comes after the incuse coinage, especially much after in the Roman or Hellenistic or even the Classical period, when many of these developments have become standard. Rather, a proper appreciation of how radical the incuse coinage is, comes from looking at what came before it.

The coinage predating the incuse coinage of Magna Graecia originates out of two entirely different regions, Asia Minor and Mainland Greece. The coins are minted on dumpy blobs of metal, with a single type on the obverse and incuse punch(es) or an incuse stamp on the reverse. The coinage is largely anepigraphic or with a single letter

ethnic such as Corinth's koppa. Double relief coinage has either not yet been introduced or has barely been introduced. There are no rims, few groundlines and therefore, no exergue inscriptions. Most inscriptions are of individual names, not ethnics. Overall, we can say that the early coinage of Asia Minor and Mainland Greece is at a primitive stage of development.

On the contrary the incuse coinage of Magna Graecia, while also from the Archaic Age, is quite sophisticated and indeed, in some cases, busy. It does not evolve from the early coinage, but rather so to speak, emerges like Athena full grown from the head of Zeus. In other words, the incuse coins are a radical development, and the failure to notice them as such has also blocked the equally radical suggestion that the creator of such coinage is none other than the philosopher, mathematician and celator, Pythagoras of Samos himself. Looking at the geometry of our Krotoniate stater, the reader should be starting to become aware that there may be even more to the picture of the incuse coins than immediately meets the eye. The reader should intellectually realize that these coins as media for a philosophical propaganda<sup>19</sup> are intrinsically strange to our modern conceptions of coinage, even if that realization is not yet viscerally felt.

If there is one Pythagorean "secret" in the coins (the geometry), then it is reasonable to assume that there might be more. If the tripod is also an exercise in geometry, we should ask whether or not the tripod or other types also might contain additional messages. Regardless of what we initially see in the incuse types, we should ask ourselves whether they merely should be taken at "face value." The answer is, yes, there are additional messages and they involve not only this coin, but also the coins from

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<sup>19</sup> It should be remembered that propaganda merely means 'that which propagates the faith,' and therefore need not have the modern negative connotation.

other mints. However, I will just mention a couple of messages, limited to the coins of Kroton. First of all, the Krotoniate type is a tripod (three-feet) and Kroton is the third Achaean mint to become active. Just looking at the Krotoniate coinage, we might realize that while the tripod type refers to Apollo, it also refers to the art of the celator, the creator of bronze tripods. This connection to the celator is reinforced by another aspect of the coin. The ethnic “QPO” (KRO) not only refers to Kroton, it also refers to “κροτεω” meaning “of a smith, *to hammer or weld together*.”<sup>20</sup> In fact, most of the ethnics for the incuse coins involve some kind of word play. This phenomenon is different, but related to canting puns, and to the Archaic philosophical exploration of the meaning of words through fanciful etymologies.

## Conclusion

Pythagoras designed this particular Krotoniate stater using his understanding of geometry. Perhaps one more skilled in geometry will explore this further. The coin is more than just a monetary unit, it is a token representing Pythagoreanism through the geometry of its type. Since not all Krotoniate staters had this geometry, perhaps this one could double for the knowledgeable as a symbol of recognition as well. Furthermore, the coin is contemporary with Pythagoras, and therefore the Pythagoreanism represented by this coin is the original “Pythagoras” Pythagoreanism, not some later accretion. Not only is the coin contemporary with Pythagoras and expressing a message from original

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<sup>20</sup> The ‘Q’ is an Archaic letter, the koppa which is the form of a circle sitting on a vertical line. Henry George Liddell, Robert Scott, *Greek-English Lexicon*, (Harper And Brothers, Publishers, New York, 1880), 887.

Pythagoreanism, the coin is probably from Pythagoras himself. He had the artisan and the mathematical training necessary to make it. Very few dies of Krotoniate staters express so perfectly this level of complexity in the geometry. Therefore, this complexity in the geometry when it shows up, is like the signature of Pythagoras, signifying that the Master himself created the dies.

Due to the use of geometry in this coin, we know that Pythagoras created it. I also believe that the entire set of coins of the incuse series, from Sybaris to Zankle, was at least first imagined by Pythagoras and made real by him and his followers. It is probably not merely a coincidence that there are, not including the Sybarite client cities, ten cities issuing incuse coins and that ten is also for the Pythagoreans the perfect number. Therefore, the geometry of the Krotoniate stater should be only the beginning of our understanding of the incuse coins.

It is a necessary beginning in that a discovery of such obviousness was needed to show that the coins held hidden Pythagorean aspects. In future articles, however, we can skip the discovery *that* there are hidden Pythagorean aspects and get more into *what* are the hidden aspects, other than the geometry. Those aspects which we might discover in the coins, do not come from nowhere, they come from the medium of ancient Greek literature. Just as the geometry of the Krotoniate stater translates into parts of Euclid's *Elements*, so too do other aspects of the coins make their appearance elsewhere in literature. We have in one sense the statement of an equation, with the left side being 'x' from literature equalling the right side 'y' from coinage. In other words, this goes far beyond what David Sear speculatively mentioned in passing, that Pythagoras may have

made these coins. Beyond Pythagoras just creating them, these coins can also illuminate and steer us through various statements of Pythagorean belief made in ancient literature.

Scholars know that there are various problems with the veracity of much of the Pythagorean claims in ancient literature. These coins, coming from early Pythagoreanism or even Pythagoras himself, perhaps can be used as a touchstone to tell us what is truly golden and what has a false sheen. Far from just being currency, these coins might be able to tell us what was current in Pythagorean circles, in Pythagoras' day. Pythagoras had the reputation of writing nothing but a few poems, perhaps however he merely "wrote" in a different medium, the medium of numismatics that we can finally begin to interpret today.