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A COMPUTATIONAL APPROACH TO THE STUDY OF MAGICAL GEMS

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1. Conceptualizing Magic Gemstones as an Attribute Network

1. Introduction

With the significant growth in the published corpora of magical gems, the subfield has reached a position—not unlike that of many other cognate disciplines—where broadly focused research questions can not be easily answered through non-computational methods alone. Estimates for the total number of gems being held in public and private collections range from 3,500 to 5,000.¹ By 2004, Simone Michel's magisterial *Die magischen Gemmen: Zu Bildern und Zauberformeln auf geschnittenen Steinen der Antike und Neuzeit* (London: 2004) was able to include 2,600 gems from numerous collections and more have been published since then.² Since each gem has multiple elements, such as material, color, iconography and inscription, the total data points easily grow into the tens of thousands. Fortunately, the accessibility of computing solutions has been expanding by leaps and bounds for decades and it is scarcely necessary to demonstrate the utility of digitizing such large sets of data and applying some sort of statistical analysis.³ A wonderfully illustrative quote comes from the late

¹ Richard Gordon, "The Power of Stones: Graeco-Egyptian Magical Amulets," *JRA* 21 (2008): 713 n. 3. Simone Michel, "(Re)interpreting Magical Gems, Ancient and Modern," in *Officina Magica: Essays on the Practice of Magic in Antiquity* (ed. Shaul Shaked; Leiden: Brill, 2005), 141.

² In 2007 part two of *Sylloge Gemmarum Gnosticarum* (Rome: Instituto Poligrafico E Zecca Dello Stato) was published by Attilio Mastrocicinque and most recently he has been working on the soon-to-be-republished (forthcoming 2013) Paris collection, re-edited and expanded by several hundred gems to a total of 693.

³ Quantitative linguistics was already rapidly developing by the early twentieth century, beginning with V. Mathesius and the Prague School. See Marie Tesitelova, *Quantitative Linguistics* (Praha: Czechoslovak Academy of Sciences, 1992), 15, 149-50). It entered the field of archaeology in the 1950s and by the 1970s quantitative archaeology was implicit in the scientific orientation of the so-called "New Archaeology" revolution, i.e. processual archaeology. See Albert J. Amerman, "Taking Stock of Quantitative Archaeology," *ARA* 21 (1992): 234. At around the same time the field of New Testament studies entered the quantitative realm with the development of the Claremont profile method in 1959, arising out of the need to more rigorously analyze the overwhelming number of manuscript variations, followed by syntax studies pertinent to the study of "translation" Greek in both the New Testament and Old Testament. See

Morton Smith in his book *The Secret Gospel* (New York: 1973), only a few years after modern statistical computer packages became available to social scientists and linguists.⁴

Discussing a pseudepigraphical letter from Clement of Alexandria, Smith states with his typical sarcasm:

As to Clement, the heading could be checked. If Clement wrote the letter it would be in his vocabulary and his style. So all I had to do was compare it, word by word and phrase by phrase, with his recognized works. That was a simple matter... it took all my spare time for two years. Computers had not then become generally available for linguistic research; today the actual computation could probably be done in two hours.⁵

How one employs statistical analysis depends greatly on the type of data and how it is organized. What Smith was engaged in was what is called "fuzzy string searching," which entails searching for sequences of text (or other types of data) for either exact or approximate, i.e. "fuzzy", matches. This type of analysis works well when the discrete data elements are all of essentially the same sort—in Smith's case, strings of Greek text all in the Greek alphabet. The mode of analysis for studying inscribed gems, however, involves identifying correlations between different classes of features mentioned above (the aforementioned material, color, iconography and inscription). Furthermore, each datum may have a one-to-many or many-to-one relationship, which is to say, an iconic or inscriptional element may have various correlations with multiple other elements. This mode of analysis organizes the gems into networks and, therefore, I will argue that this

Ernest C. Colwell, "Method in Locating a Newly Discovered Manuscript," in *Studies in Methodology in Textual Criticism of New Testament* (ed. Ernest C. Colwell; NTTS 9; Leiden: E. J. Brill, 1969), 26-33; Raymond A. Martin, *Syntactical Evidence of Semitic Sources in Greek Documents* (Eugene: Wipf & Stock Publishers, 1974); Karen Jobes, *The Alpha-text of Esther: Its Character and Relationship to the Masoretic Text* (SBLDS 153; Atlanta: Scholars Press, 1996).

⁴ The earliest statistical software packages readily available to social scientists were SAS (= Statistical Analysis System) and SPSS (= Statistical Package for the Social Sciences), both dating to the late 1960s, but the use of statistics in the social sciences and humanities dates much earlier.

⁵ Morton Smith, *The Secret Gospel: The Discovery and Interpretation of the Secret Gospel According to Mark* (New York: Harper & Row, 1973), 26.

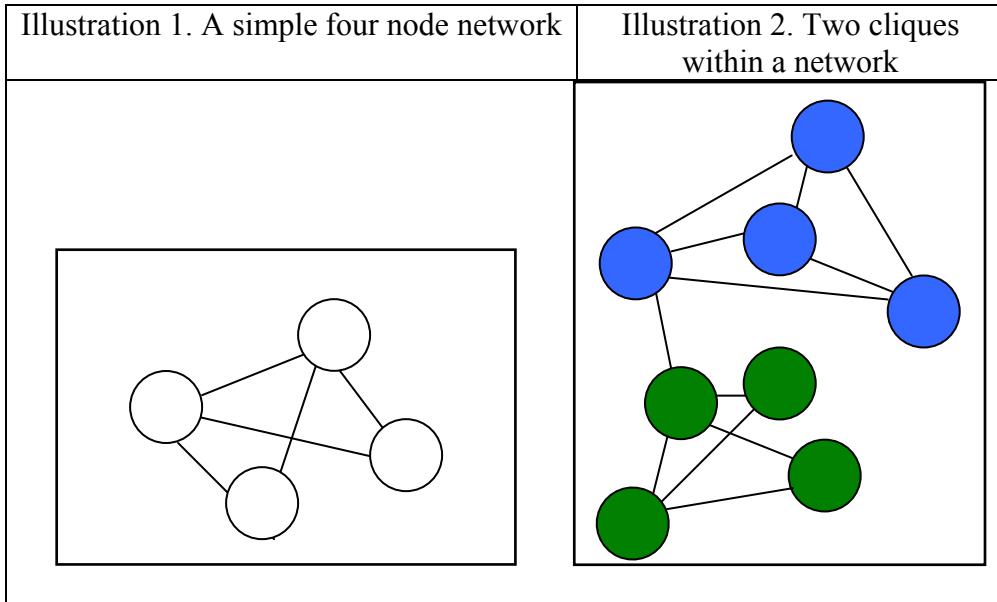
fact makes the use of network theory and analysis particularly useful in the study of magical gems. The most important overall result of this analysis will be to demonstrate that Campbell Bonner's claim that there was no "authoritative system" at play in the design of magical gemstones can no longer be maintained.

2. What is a Network?

a. Definitions and Concepts

In network analysis a *network* is comprised of two fundamental elements: (1) the *node* (sometimes called a vertex) and (2) the *edge*.⁶ A *node* is any discrete datum that can be plotted on a graph—in our case, the attributes found on magical gems. An *edge* is the link between two nodes. A node may be linked to one or more other nodes (Illustration 1). An edge between any two single nodes indicates that both nodes are attested together on at least one gem. The number of gems that attest to the collocation of any two nodes plays an important role in terms of how closely or distantly the nodes are positioned in the network—the greater the frequency, the shorter the edge. For instance, if one node is the color green and another node the god Harpocrates and both attributes appear on the same gem five times then the edge weight can be given as five. One shortcoming of this simple edge-weight determination is that it does not inform us as to the ratio of the indicated correlation. If, returning to the above hypothetical example, the total number of gems that have Harpocrates number 100 and the total number of gems that are green number 500, it is clear that five net correspondences is a very weak correlation. On the

⁶ Maarten van Steen, *Graph Theory and Complex Networks: An Introduction* (Lexington: Maarten van Steen, 2010), 18-19.



other hand, if one were to only keep track of the percentages it would never be evident whether an observed correlation is an outlier or not. Once again returning to the above example, if the total number of gems that have Harpocrates were only ten and those having the color green were five, the corresponding percentages of 50% and 100%, respectively, would appear to reveal a very important correlation. But if the total dataset were comprised of 3,000 gems, one may easily consider the observed correlation, attested by only five gems, as merely an outlier. Therefore, analysis will need to take into account both edge weights and the corresponding percentages on a per-correlation basis.

Networks rarely evince an evenly distributed set of nodes; rather, closely interconnected nodes are typically observed (see discussion below). These nodes are called *subgraphs* or *cliques* (Illustration 2), and form the basis for identifying *clusters*, i.e. larger closely connected areas of the network. The significance of such structures

within a network depends on the network model being used, of which there are two: the "flow" model and "bond" model.

b. Two Types of Network Models

What Borgatti and Halgin call the "flow" model is one where the network consists of so-called pipes through which information or other objects flow from one part of the network to another.⁷ It is most commonly associated with the study of social and communication networks⁸—although it has also been applied in other fields such as neuroscience, genetics and information studies.⁹ The key feature of this type of network model is that nodes are analyzed primarily in terms of degrees of separation (i.e. how many nodes one has to pass through to reach one given node from another) as opposed to diachronic or spatial terms.¹⁰ The historian of ancient Greece, for instance, could study the trade connectivity of *poleis* in terms of how many trips trade ships tend or need to take from port to port until they reach city B from city A. The significance of this is that connectivity need not correlate to physical distance. Two cities close to each other may

⁷ Stephen P. Borgatti and Daniel S. Halgin, "On Network Theory," *OS* 22.5 (2011): 1172-3.

⁸ Steen, *Graph Theory*, 3-11. Social Network Analysis was greatly advanced in 1933 by Jacob L. Moreno with the notion of the "sociogram," a graph plotting social relationships between individuals. See Jacob L. Moreno, *Who Shall Survive? A New Approach to the Problem of Human Interrelations*. (New York: Nerv. & Ment. Dis. Publ. Co., 1934). Serious interest did not develop until after 2000, when the prominence of online social networks greatly increased and more recently has even been expanded to the study of non-human social networks. See Stephen P. Borgatti and Halgin, "On Network Theory," 1169; Andrew Sih, Sean F. Hanser, and Katherine A. McHugh, "Social Network Theory: New Insights and Issues for Behavioral Ecologists," *BES* 64.7 (2009): 975-88; and Clinton E. Arnold, *Ephesians: Power and Magic* (Cambridge: Cambridge University Press, 2001), 26-39 for a careful study of the history of network analysis in recent years.

⁹ David Parker, "Complexities and Uncertainties of Neural Network Function," *Philos. T. Roy. Soc. B* 361.1465 (2006): 81-99; Sebastian Halary, et al., "Network Analyses Structure Genetic Diversity in Independent Genetic Worlds," *PNAS* 107.1 (2010): 127-32; James Moody and Ryan Light, "A View From Above: The Evolving Sociological Landscape," *TAS* 37.2 (2006): 67-86.

¹⁰ Irad Malkin, *A Small Greek World: Networks in the Ancient Mediterranean* (Oxford: Oxford University Press, 2011), 9.

have less connectivity because of how many nodes separate them than two other cities much further apart geographically, but more directly connected in terms of trade or population movement.¹¹

Indeed, the last several years has seen a significant rise in the use of network analysis among archaeologists to explore data through visualization, metrics and experimentation and to validate previous conclusions arrived at by other means by demonstrating patterns in the networks.¹² This mode of analysis avoids certain shortcomings present in world-systems analysis and other previous approaches in archaeology since (1) network analysis easily scales from the household level to the world level, (2) it makes no core-periphery assumption, and (3) can be non-directional.¹³

In the "bond" or "coordination" network model analysis is non-directional. It focuses on group relationships rather than movement of goods, people or information, and it is this model that is appropriate for analyzing the attribute networks of magical gems. Examples of "bond" networks are social power networks and reputation networks, where clusters of nodes are viewed as discrete units representing power or reputation structures in a society.¹⁴ Another example is that of the "honor" network that historian J. E. Lendon envisions influencing much of the dynamic between major social groups within the government of the Roman empire.¹⁵

¹¹ See Malkin, *A Small Greek World*, 54, 171-204; Jonathan Hall, *Hellenicity: Between Ethnicity and Culture* (Chicago: University of Chicago Press, 2002), 90-124.

¹² Carl Knappett, "Introduction: why networks?," in *Network Analysis in Archaeology: New Approaches to Regional Interaction* (ed. Carl Knappett; Oxford: Oxford University Press, 2013), 7-9.

¹³ Knappett, "Introduction," 5-6.

¹⁴ Stephen P. Borgatti and Halgin, "On Network Theory," 1173-5.

¹⁵ J. E. Lendon, *Empire of Honour: The Art of Government in the Roman World* (Oxford: Oxford University Press, 2001). Interestingly, he does not ever explicitly invoke network theory or its jargon, rather using phrases such as "webs of influence," but his description of the role of "honor" within the social fabric is precisely a "network."

It is this type of network model, the "bond" or "coordination" model, that is applicable to the study of magical gems, where the focus is on group relationships among gem attributes. Here, clusters of gem attributes reveal the preferences of both the designers and users of these objects in terms of the supernatural powers and actions that were seen to be involved in the collocation of different icons, inscribed declarations or commands, invoked deities and the medico-magical attributes of particular materials and colors. Being able to both visualize and precisely measure how the revealed preferences of the gem designers group offers two clear research benefits: (1) the ability to identify the relevant attribute *clusters*, allowing one to then ask what particular socio-religious factors should pertain to the existence of these clusters, and (2) by identifying the full range of clusters, one may then arrive at a more empirically informed taxonomy for magical gems.¹⁶

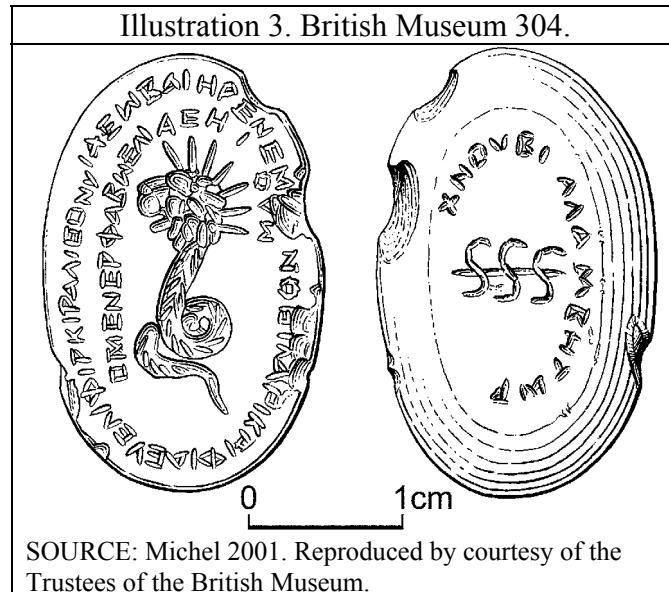
3. Prior Studies

The aforementioned research benefits mirror the two primary efforts that have characterized research into magical gems over the course of the twentieth century, namely, to arrive at meaningful gem categories and elucidate the cultural and religious forces behind particular attribute groups. Both Campbell Bonner's classic *Studies in Magical Amulets: Chiefly Graeco-Egyptian* (Ann Arbor: 1950) and more recently Simone Michel's *Die magischen Gemmen: Zu Bildern und Zauberformeln auf*

¹⁶ Furthermore, two other, practical, benefits obtain from situating this project within the domain of network analysis: (a) a common set of technical vocabulary will make the study more accessible to a cross-disciplinary readership, and (b) many techniques and tools have already been developed that allow for rapid and sophisticated network analysis.

geschnittenen Steinen der Antike und Neuzeit (London: 2001) and moved in this direction, but both utilized certain shortcuts in the process. First, the proposed taxonomies were largely defined ahead of time and the gems then distributed among them. Second, iconography alone was the organizing criterion. In the case of Bonner, as an early pioneer of the field and operating prior to the widespread use of computing resources, this can be understood and forgiven. In the case of Michel, operating at the turn of the new millennium, but substantially using the same methods and shortcuts of the previous half century, the lack of an explicit network perspective resulted in a peculiar shortcoming in her gem classifications. Turning to the final section of her volume (235-345), entitled *Materialliste nach Motivgruppe*, one finds an exhaustive catalog of 57 different categories among which her gems are distributed. An explicitly

network-oriented perspective would have well recognized that nodes and clusters can have multiple and overlapping correlations, yet her catalog never double-counts a gem entry. For instance, category 19, *Harpocrates*, contains a subcategory (19.2.a) where a scarab has replaced the lotus, but the gems of this sub-category are not again listed in category 50, *Skarabäus*. The result is that one cannot turn to category 50 to obtain an



exhaustive list of all gems with a scarab, something which *seems* should be the case, which in turn means accurate statistics cannot be derived from her catalog.

In addition to avoiding double-counting, this section of her volume clearly reveals the privileged role of iconography in her classificatory scheme. Here she treats material and color as purely dependent variable, meaningful only to the extent that they descriptively expand on categories which have already been established according to iconographic criteria. That gem material and color need to receive more emphasis has been increasingly illustrated in recent research and the ancient sources themselves bear out the importance of both these attributes.¹⁷ The lapidary of Socrates and Dionysius recommends "white onyx" (ὄνυχίτης ... λευκὸς) for (regular) Chnoubis (i.e. a lion-headed serpent with radiate crown (see Illustration 3 and for general discussion chapter 3) gems (*De Lap.* 35) and black onyx (ὄνυχίτης... μέλας) for Chnoubis with three heads (*De Lap.* 36),¹⁸ while Marcellus Empiricus says to use jasper, but specifies no color (*De Med.* XX, XXIV). Galen specifically mentions green jasper (χλωρὸς ἵασπις) in connection with Chnoubis gems (*Simp. Med.* 207; see discussion in chapter 4.§2.2). The apparent contradictions of these ancient testimonies aside,¹⁹ the explicit recommendation

¹⁷ Christopher A. Faraone, "Text, Image and Medium," in '*Gems of Heaven: Recent Research on Engraved Gemstones in Late Antiquity c.AD 200-600*' (ed. Chris Entwistle and Noël Adams; BMRP 177; London: The British Museum Press, 2011), 50-61; Attilio Mastrocicque, "The Colours of Magical Gems," in '*Gems of Heaven: Recent Research on Engraved Gemstones in Late Antiquity c.AD 200-600*' (ed. Chris Entwistle and Noël Adams; BMRP 177; London: The British Museum Press, 2011), 62-68.

¹⁸ This is apparently under the influence of Hecate imagery. See Robert Halleux and Jacques Schamp, *Les lapidaires grecs* (Paris: Les Belles Lettres, 2003 [1985]), 171 n. 1.

¹⁹ Some of these contradictions may be resolved by a closer analysis of the ancient terminology for jasper. Although ἵασπις and "jasper" are etymologically related, it is nearly certain that the ἵασπις of the ancient sources does not refer to what is now called jasper. When ancient authors refer to ἵασπις they speak of a translucent or transparent green stone, whereas modern jasper is an opaque stone. See Earle R. Caley and John F. C. Richards, *Theophrastus On Stones: Introduction, Greek Text, English Translation, and Commentary* (Columbus: The Ohio State University, 1956), 107. This distinction continues to be missed even in more technical mineralogical literature such as see Ruslan Kostov, "Orphic Lithica as a Source of Late Antiquity Mineralogical Knowledge," *Ann. of the Univ. of Mining and Geology* 51 (2008): 109. The requirement for onyx in the lapidary of Socrates and Dionysius may also be more apparent than real. While

of specific materials and colors in correlation with a particular iconographic element make clear that color and material cannot be simply treated as dependent variables, but may be core attributes affecting the use of particular magical gems. Richard Gordon has characterized Michel's monograph as favoring a "learned but uncritical iconographic-museographic approach."²⁰ This is consonant with a traditional art historical approach to the study of magical gems which privileges iconography over all other attributes. Not only does the iconographic-museographic assumption prevent an objective classification by assuming that other gem characteristics, such as material, color and inscription, can not provide equally strong (or stronger) explanatory force for any given gem's significance, it also assumes that a gem's iconography can be defined and pigeon-holed in a precise and absolute manner. This speaks to the "museographic" component of Gordon's criticism, where each cataloged item must have one and only one entry. Such pigeon-holing allows one to largely unhinge the taxonomy from the actual data, since one already "knows" which iconographic features are important; and while this knowledge may have been informed through a detailed study of all individual items, it is by its nature impressionistic.

onyx is used only once for Chnoubis gems (Paris 234), the term ὄνυχίτης is more general, encompassing stones that would today be classified as onyx, banded chalcedony and agate. See Robert Halleux and Schamp, *Les Lapidaires Grecs*, 330-31; also see the discussion for ὄνυχιον in Earle R. Caley and Richards, *Theophrastus On Stones*, 127-28. That §35 and §36 in Socrates and Dionysius classify solid-colored stones (white and black) as ὄνυχίτης suggests that the term could even extend to unbanded chalcedony. In sum, the ancient sources speak of white or green translucent or black stones used with Chnoubis, not far from what is actually attested (brown is attested in 23% of the gems).

²⁰ Gordon, "The Power of Stones," 716. For criticism of the iconographic approach, see: Arpad M. Nagy, "Gemmae Magicae Selectae: sept notes sur l'interpretation des gemmes magique," in *Gemme gnostiche e cultura ellenistica* (ed. Attilio Mastrocinque; Bologna: Patron, 2002), 155-56.

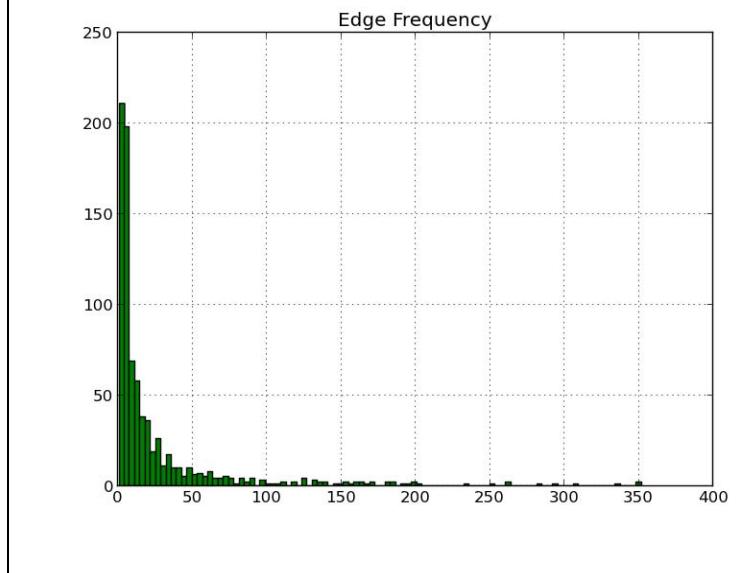
4. Modeling the Gem Attribute Network

a. Network Topology

The database assembled comprises a total of 2,530 gems attesting 822 different attributes across four types. The attribute network contains 10,126 edges and when the distribution of edges per attribute is plotted, an extreme skew to the left is evident (Illustration 4). This

reveals that a small number of nodes are highly connected and thus act as "hubs" in the network. This type of network topology (not to be confused with "typology") is characteristic of so-called

Illustration 4. Distribution of the frequency of edges per attribute node.



"scale-free" networks. As will be discussed below, a scale-free network has two important features: it is non-random and it is globally informed. This would suggest that the gem designers did not, overall, choose attributes at random and the choices they made were informed by preferences and tendencies broadly shared.

For years, it was assumed that most complex networks, both natural and artificial, are arranged randomly, which is to say, the amount of edges that each particular node has is randomly determined. Following the pioneering work of Albert-László Barabási and

Réka Albert (1999), it was demonstrated that many complex networks, including the World Wide Web, are not random but rather exhibit a property called "scale-free."²¹ The principal feature of scale-free networks is that they are characterized by a small number of nodes that act as *hubs*. A hub is a node that shares many more connections than the average node in the network; furthermore, most nodes in a scale-free network have relatively few connections and cluster around "hub" nodes. They follow a power-law distribution, which means that the probability that a node has very many edges is inversely and exponentially proportional to the total amount of its edges.²² This can be expressed by the following equation where k is the number of edges for a particular node, $P(k)$ is the probability that a node with k edges appears in the network, and γ is the exponential factor by which $P(k)$ decreases for every increase in k :

$$P(k) \sim k^{-\gamma}$$

For a graph to be scale-free, it must not only exhibit an inverse relationship between the number of edges per node and the probability of the node's presence in the network, but this relationship must be exponential, which is to say, γ must be greater than 1. When the average γ is computed for the entire edge distribution in our gem attribute network, it turns out to be 1.61. This not only demonstrates that the network is scale-free, but indicates that it is a special type of scale-free network. Most scale-free networks exhibit a γ between 2 and 3. Those networks with γ between 1 and 2 exhibit an important distinguishing feature: whereas scale-free networks with $2 \leq \gamma \leq 3$ maintain the same average number of edges as more nodes are added, networks with $1 \leq \gamma \leq 2$ increase the

²¹ Albert-László Barabási and Réka Albert, "Emergence of Scaling in Random Networks," *Science* 286 (1999): 509-12.

²² Reuven Cohen, Shlomo Havlin, and Daniel ben-Avraham, "Structural Properties of Scale-Free Networks," in *Handbook of Graphs and Networks: From the Genome to the Internet* (ed. Stefan Bornholdt and Hans Georg Schuster; Weinheim: Wiley-VCH Verlag GmbH & Co. KGaA, 2003), 86-87.

average number of edges as new nodes are added.²³ The importance of this rather abstract observation is far-reaching since it implies that it is more likely that a new edge is created than a new node is added. Since nodes in our network are gem attributes, this means that it is less likely for a magician to create a new icon, choose a new color or material, or invoke a new divine name or formula than simply create new connections between such existing elements, which can only happen if there is a globally recognized set of nodes.

As Sayed-allaei, et al. conclude with regard to $1 \leq \gamma \leq 2$ scale-free networks, "Interestingly, a peculiarity of the model is that it involves global moves. This requires some sort of global information exchange mechanisms, that is not part of the network itself, that allows nodes to act globally."²⁴ This result problematizes Bonner's observation that there was "no authoritative system which determined the characteristics of these amulets, but rather that various magical practitioners, working with motifs that were widely known, made their prescriptions according to their own notions."²⁵ While the practitioners' own notions—the designer's "whim" mentioned earlier—were, indeed, largely limited to widely known motifs, the observation that $1 \leq \gamma \leq 2$ scale-free networks involve "global information exchange mechanisms" suggests that there may have been an "authoritative system." It may be that the "authoritative system" was merely the cultural milieu itself, strongly biasing the practitioner to choose from a recognized set of elements, or it may have been something more concrete.

To put a γ of 1.61 into perspective, a modern-day parallel, although not perfect, can be adduced. When Ebel, et al. examined the network of email exchanges on a single

²³ Hamad Seyed-allaei, Ginestra Bianconi, and Matteo Marsili, "Scale-Free Networks with an Exponent Less Than Two," *PhysRevE* 73 (2006): 1-5.

²⁴ Hamad Seyed-allaei, Ginestra Bianconi, and Marsili, "Networks with an Exponent Less Than Two," 4

²⁵ Campbell Bonner, *Studies in Magical Amulets: Chiefly Graeco-Egyptian* (Ann Arbor: University of Michigan Press, 1950), 20.

university email server from Kiel University over the course of 112 days, they observed a γ of 1.81.²⁶ In this email network, a new node is added every time some university member sends an email to a new email address never contacted before by him/herself or any other member of the university. It is evident that new nodes would seldom enter the email network and that most communication would happen between nodes already present in the network (which is to say, emails that are already in people's contact lists). When new email addresses do enter the email network, they are not likely to be widely used by the diverse university membership. The γ for our gem attribute network is notably lower than this, implying that it is even less likely for a new gem attribute to have acquired general currency than for an email address to acquire wide usage in a university community. When Ebel, et al. again computed the γ for the same email server, but restricted it to only student email addresses from the university (that is, all external email contacts excluded, as well as faculty and staff), the result was significantly lower: 1.32. In this case, a new node would only enter the network if a new student entered the university community.²⁷ While 1.32 is lower than the γ for the gem network (1.61), it is not by much, providing at least a rough idea of the likelihood (or lack thereof) of a new gem attribute entering usage. Significant social and/or cultural forces would be needed to propel a new "magical" symbol to wide recognition. One of the implications of this is that certain gem elements widely observed on gems but virtually absent from the Greek Magical Papyri and other text-based *materia magica*, are likely to have been widely

²⁶ Holger Ebel, Lutz-Ingo Mielsch, and Stefan Bornholdt, "Scale-Free Topology of E-Mail Networks," *PhysRevE* 66 (2002): 1.

²⁷ The obvious complication here is when the academic year begins many new students enter the community; however, the period of 112 days used for this study did not overlap with student matriculation.

culturally recognized. Their absence from text-based *materia magica* must be due to other social factors, to be discussed in the next chapter.

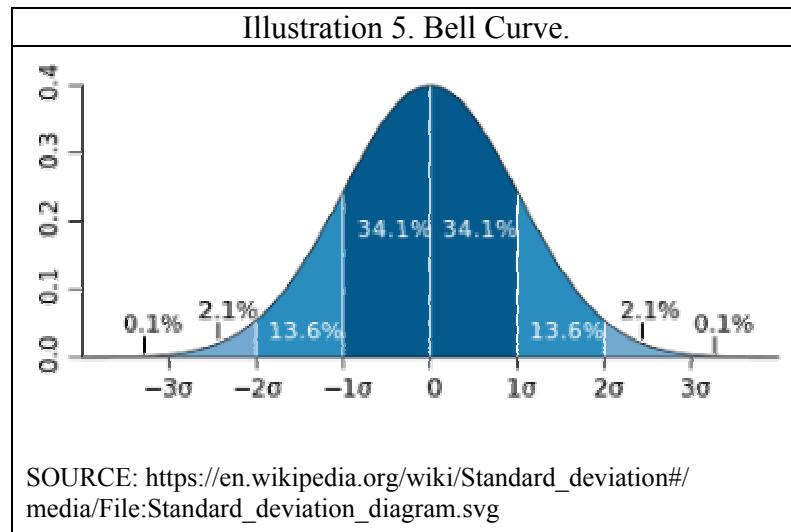
b. Outliers

The above discussion of network topology takes a holistic view, bringing in all of the available gem data in the database; however, not all attribute correlations are significant from a historian's perspective—how many gems attest them and the ratios involved are critical considerations in deciding which correlations say something about broader preferences. Indeed, the majority of correlations (65%) turn out to be attested by only a single gem. This reveals something about the character of the phenomenon of magical gems in general, namely, that a large proportion of the combinations of physical and iconographic characteristics are one-off events, *seemingly* the result of the designer's whim. Bonner had stated years ago, "In a rough way we can distinguish certain types characterized by similar designs and legends; but the number of amulets that conform closely to such types is small as compared with specimens that vary from the standard, or combine features belonging to two or more types."²⁸ Combining features belonging to two or more types speaks to the polyvalent nature of many amulets, but the general validity of Bonner's statement can not be determined until the distribution of statistically significant attribute combinations is undertaken.

²⁸ Bonner, *Magical Amulets*, 18.

c. Determining Statistically Significant Attribute Correlations

The simplest, but sometimes the most misleading, approach to determining whether an observed relationship is "significant" is to simply count up the observed instances and take a percentage. For example, if some observed attribute X occurs with attribute Y sixty percent of



the time one might deem this to be significant and worthy of comment. The exact percentage at which "significance" is declared may vary from investigator to investigator and is sometimes left unstated. Qualifiers such as "many," "most," "often," "regularly" or conversely, "few" or "rarely" pepper all varieties of research in the Humanities and it is impossible to avoid such language—nor should one endeavor to do so. But, the simple approach of tallying instances and computing a percentage can at times mislead the investigator, especially when attempting to decide whether the correlation between two elements which occur often in a corpus is significant or not.

A more sophisticated approach to determining statistical significance is to plot the above percentages on a graph to observe the distribution. Sometimes such distributions fall into what is called a *normal curve* or *bell curve* (Illustration 5). In this case, statistical significance can be determined by how far the observed percentage deviates from the

center of the curve. This type of analysis typically speaks of *standard deviations* from the center. But Illustration 4, which plots the distribution of edge frequencies, already hints at a possible problem, since the edge frequency is heavily skewed to the left. This may indicate that the correlation percentages may be skewed as well. In fact, when the distribution is computed the curve is heavily skewed (see Illustrations 24-26 in Appendix D), which undermines the use of standard deviations to determine whether an attribute correlation is significant or not.

A common method for dealing with highly skewed distributions is to divide them into quartiles (Q_{1-4}), compute the inter-quartile range (IQR), and then use this to determine significance.²⁹ Q_1 is defined as the median of the first half of the data, Q_2 is defined as the median of the data, and Q_3 as the median of the second half of the data. The IQR is computed by subtracting Q_3 from Q_1 . In our distribution, Q_1 is 1.56, the median (Q_2) is 4.55 and Q_3 is 10.86, giving an IQR of 9.30. Values above $Q_3 + 1.5 \times \text{IQR}$ are considered significant, which here comes out to any correlation percentage above 24.04%.

However, an important shortcoming applies to this approach. Attributes which are extremely common will have a rate of occurrence significantly higher than the median correlation (4.55%), which will vitiate the utility of the $Q_3 + 1.5 \times \text{IQR}$ result for determining the correlation's statistical significance. Let us take the example of Iaô and the ouroboros. Iaô occurs on 23% of gemstones that have an ouroboros (64 out of 280 gems), which is close to the $Q_3 + 1.5 \times \text{IQR}$ minimum (24.81%). This might suggest that the correlation is nearly statistically significant until one notes that Iaô occurs on nearly

²⁹ Robert S. Lockhart, *Introduction to Statistics and Data Analysis: For the Behavioral Sciences* (New York: W. H. Freeman and Co., 1998), 82-87.

one in five gems (475 gems, 18.8%). One would then expect for 52 (0.188 x 280) gems to have both Iaô and an ouroboros. The data can be summarized in a contingency table.

Table 1. Contingency Table For The Iaô and Ouroboros Correlation.		
	Observed Rate	Expected Rate
Iaô	64/475	52/475
Ouroboros	64/280	52/280

A common statistical test for precisely this sort of comparison between expected and attained results is called the chi-squared (χ^2) test.³⁰ Unfortunately, the χ^2 test is non-directional.³¹ This means that it can not distinguish between whether statistical significance was attained because the observed frequency was particularly high or particularly low. Mixing the two types of correlations (extremely high and extremely low) would result in a meaningless network map since interpretation of the significance of any set of connections would be impossible. Fortunately, another type of statistical test exists for 2 x 2 contingency tables called the Fisher Exact test.³² In addition to directionality, the Fisher Exact test has the added benefit of being able to deal with contingency tables where certain counts are very low, for which the χ^2 test is not sufficiently robust.³³ Since Iaô and the ouroboros are very common their contingency table does not have any counts below 5 (the lowest is 52), but this will not be the case for many rarer attributes; therefore, the χ^2 test is doubly problematic for this dataset.

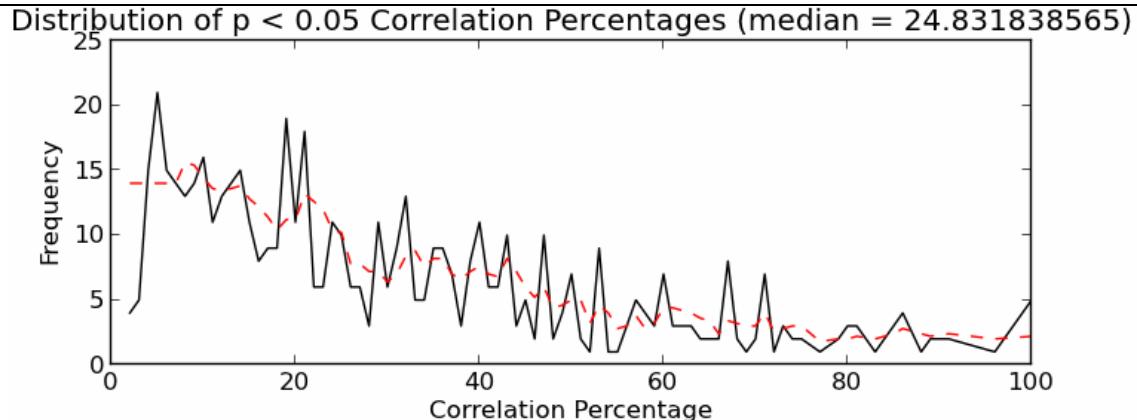
³⁰ David C. Howell, *Fundamental Statistics for the Behavioral Sciences* (Independence: Cengage Learning, 2007), 462-86.

³¹ With some manipulation and under some circumstances the χ^2 test can be used to state the alternative hypothesis directionally (David J. Sheskin, *Handbook of Parametric and Nonparametric Statistical Procedures: Third Edition* (Boca Raton: Chapman & Hall/CRC Press, 2003), 237-39), but other problems attending this test still render it less desirable for 2 x 2 contingency tables.

³² Duncan Cramer and Dennis Howitt, *The SAGE Dictionary of Statistics: A Practical Resource for Students in the Social Sciences* (Thousand Oaks: SAGE Publications, 2004), 65-66; Grahan J. G. Upton, "Fisher's Exact Test," (1992): 395-402.

³³ Minor variations for counts under 20 can be very discontinuous under the χ^2 test. The Fisher Exact test offers a more robust and logical alternative Howell, *Fundamental Statistics*, 472-74; Hugh Coolican, *Research Methods and Statistics in Psychology, Fifth Edition* (New York: Routledge, 2013), 412-13.

Illustration 6. Statistically Significant Correlations.



As was mentioned above, 64 instances of an ouroboros are attested on gems with the divine name Iaô, while only 52 are expected if these occurrences are purely random. We will use the Fisher Exact text to determine whether the increased incidence of ouroboroi on Iaô gems is statistically significant or not. If the computed probability is less than 5% (i.e. $p < 0.05$) then the number of attested gems is greater than what would be the case by random chance; but, if it is not less than 5% ($p < 0.05$) this difference will not be considered statistically significant. Here, the probability that a random sample of Iaô gems has more than 64 ouroboroi is 21.8% ($p = 0.218$). This result is less than 5% but it is not statistically significant since it is not under 5%.

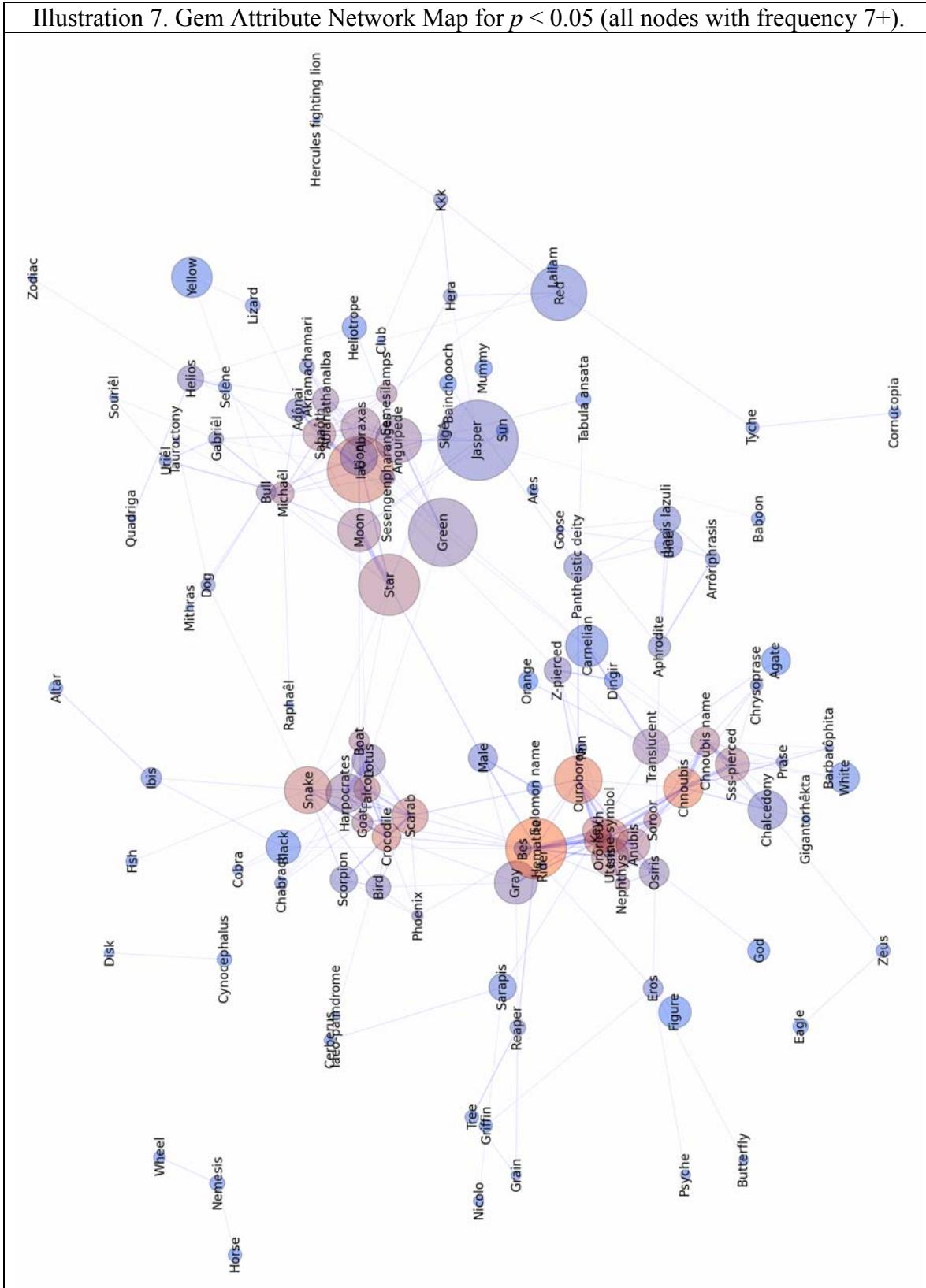
When the distribution of only statistically significant correlation percentages is plotted (Illustration 6), the median correlation percentage of 24.83% neatly coincides with what was already estimated with the $Q_3 + 1.5 \times \text{IQR}$ minimum (24.04%). It turns out that the vast majority of attribute correlations on magical gemstones are not statistically significant. Only 114 nodes and 278 edges survived the culling, which is a reduction of

over 97% edges (See Illustration 7 for the network map).³⁴ This has left the percentage distribution rather bumpy, even though some of the original slope is still evident (Illustration 7). While over 97% of correlations are not statistically significant, this affects a surprisingly small number of gems. Of the 2,530 gems in the database, 1,524 (60%) have at least one statistically significant ($p < 0.05$) correlation. For $p < 0.01$ (99% significance), there remain 77 nodes and 165 edges. Under this significance level about 1.6% of all attribute combinations are found on 1,325 (52%) gems. This small number of statistically significant attribute combinations seems to form an essential core from which most engravers felt obligated to choose—therefore, insights gained about a relative tiny number of attribute correlations can tell us something about the general phenomenon of antique magic gemstones.

This conclusion further problematizes Bonner's claim that there was no "authoritative system" at play in the design of magical gemstones. It has already been observed that the gem attribute network is a $1 \leq \gamma \leq 2$ scale-free network, which implies some "global information exchange mechanism." Now, we observe that there is a small core set of attribute combinations that dominate the corpus. Together, this strongly suggests the presence of an "authoritative system," but not construed in traditional terms. This system would not have prescribed complete formulas for the entire design of a gem; rather, it prescribed important attribute combinations which themselves could be combined on a single gem (or on other *materia magica*). This brings to mind another statement by Bonner quoted earlier: "In a rough way we can distinguish certain types characterized by similar designs and legends; but the number of amulets that conform

³⁴ The γ for the statistically significant network is 1.76, relatively close to the value observed when all insignificant attributes are included.

Illustration 7. Gem Attribute Network Map for $p < 0.05$ (all nodes with frequency 7+).



closely to such types is small as compared with specimens that vary from the standard, or combine features belonging to two or more types."³⁵ The problem was that Bonner was thinking in terms of gem *types* as the locus of analysis rather than *feature sets* that can be applied to gems in a variety of combinations. If the notion of gem *types* is abandoned then traditional gem taxonomies must be abandoned as well. In their place, one must think in terms of *feature sets* and develop a taxonomy that shows how they relate to each other and combine on individual gems. These feature sets can be identified as clusters in the attribute network.

d. Identifying Clusters

While a visual inspection of the network map in Illustration 7 may suggest several clusters, especially those dominated by the prominent hubs of Iaô, the uterine symbol, Harpocrates, the star and Chnoubis, a number of computational tools exist to identify clusters (also often called "communities"). Smaller clusters exist as well, both independently (i.e. weakly or not at all connected to the rest of the network) or as structures within larger clusters. The algorithm here chosen for cluster detection is the "Louvain" method, one of the most widely used cluster detection algorithms.³⁶ The Louvain method is a class of modularity maximization algorithms which iterate over all possible node groups, first identifying the smallest communities and then merging them until the largest communities of densely connected groups of nodes, called modules, are

³⁵ Bonner, *Magical Amulets*, 18.

³⁶ Vincent D Blondel, et al., "Fast unfolding of communities in large networks," *J. Stat. Mech.* (2008), also found at <http://arxiv.org/abs/0803.0476>.

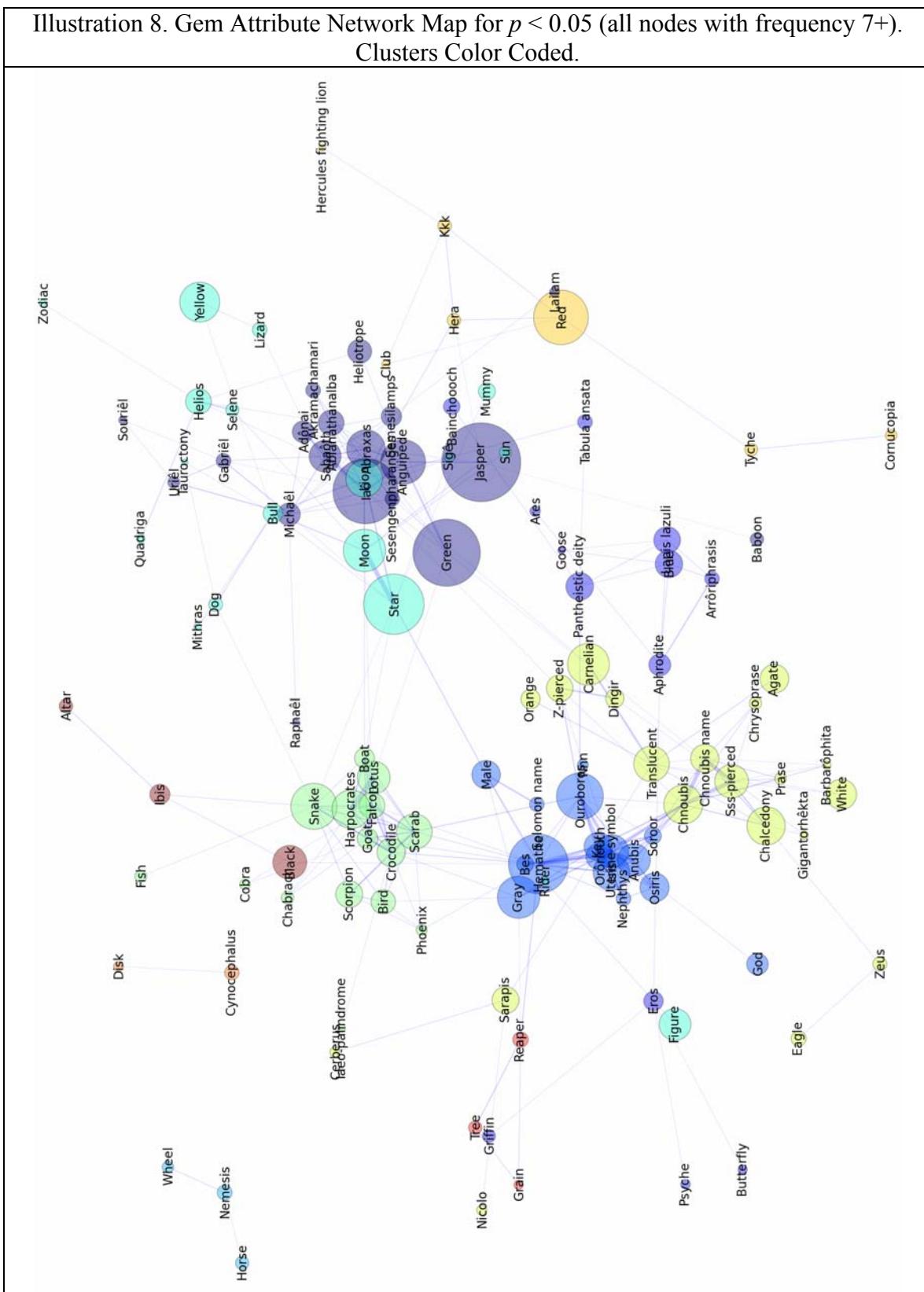
identified.³⁷ Although popular, this method is not fail-proof and may sometimes fail to identify an optimal module and, instead, group it within a larger community. The possibility of finding optimal sub-clusters within a larger community is most marked in communities whose total number of edges is less than $\sqrt{2L}$, where L is the total number of edges in the entire network;³⁸ however, since $\sqrt{2L}$ for the gem attribute network is small, only 24 edges, it is unlikely that optimal modules may have been misidentified in such a small cluster and, moreover, a manual examination would be sufficient to identify them. Illustration 8, below, displays the network map with the clusters color coded.

Proper interpretation of the network map is essential. A large cluster, in terms of total nodes, only means that the feature set has more attributes. The frequency of a particular node within the entire corpus is indicated by its diameter. More importantly, simply because two clusters are disconnected or very weakly connected does not mean that those sets of attributes rarely coincide. Rather, it means that the rates at which they coincide are not statistically significant. For instance, the most common attribute, by far, is the material jasper, appearing on nearly a third of all magic gems, but it is not connected to most of the rest of the network in a statistically significant way. The composition of clusters varies. Some clusters are dominated by inscriptional attributes, such as the Iaô cluster. Others are dominated by iconographic elements, such as the Harpocrates cluster. Yet others evince a little bit of each, such as the Uterine cluster. Clusters can overlap in significant ways. Both the Harpocrates cluster and Uterine cluster share the Hematite hub, while the Uterine cluster shares the Chnoubis hub. These

³⁷ David A. Bader, et al., *Graph Partitioning and Graph Clustering* (Contemporary Mathematics 588; American Mathematical Society, 2013), 143-45.

³⁸ B. H. Good, Y. A. de Montjoye, and A. Clauset, "The performance of modularity maximization in practical contexts," *Phys. Rev. E* 81.4 (2010).

Illustration 8. Gem Attribute Network Map for $p < 0.05$ (all nodes with frequency 7+).
Clusters Color Coded.



overlaps speak to the polyvalent nature of magical gems. At this point, it is not yet clear whether polyvalence should be primarily identified on the level of individual attributes or complete gems. In the first case, the meaning and significance of individual attributes may change according to the feature set(s) they coincide with on the gem. A possible example is the figure of Chnoubis, who, when part of the Chnoubis cluster, is typically the largest iconographic feature on the gem, but when shared by the Uterine cluster he is typically relegated to one of four tiny figures atop the uterine symbol. Has his role and meaning changed? The other possibility is that the polyvalence occurs on the level of the gem. In this case, when a gem shares multiple feature sets then it can have multiple uses according to the multiple powers and uses offered by the feature sets present. It is as yet premature to determine which of these possibilities is characteristic of magical gems in general and this dissertation will not aim to answer this question. There is no *a priori* reason to doubt that both of these possibilities play a role.

An additional cluster analysis on each of the clusters identified above allows for more fine-grained identification of attributing grouping and will be central to the following chapter organizations. The full results of this second iteration of cluster analysis have been included in Appendix B. Each of the following chapters will focus on a separate cluster from Illustration 8 and proceed to analyze the subgroups identified in Appendix B. Chapter two will focus on an inscriptional element (Iaô), the third chapter on a material element (hematite) and the fourth chapter on an iconographic element (Chnoubis).

5. Conclusions

The aim of this chapter has been to demonstrate the applicability of network theory to the study of inscribed magic gems. Conventional methods for studying and classifying these objects have had limited success in part because of practical difficulties in study such a large corpus without computational tools. Furthermore, traditional classificatory schemes which treat magical gemstones primarily from an art-historical perspective have been unable to take proper stock of the complexity of these objects.

In this chapter the applicability and usefulness of network theory for the study of magical gemstones was established by first identifying which type of theoretical model applies to a network of gem attributes. I argued that a "bond" or "coordination" network model best conceptually fits an attribute network. Next, two important discoveries were made. First, the attribute network was determined to be a $1 \leq \gamma \leq 2$ scale-free network. These types of scale-free networks seem to have a "global information exchange mechanism" whereby the node combinations derive their meaning and significance from a prior set of norms.³⁹ I argued that this prior set of norms calls into question Bonner's declaration that there was no authoritative system governing magical gems.

Then, following the identification of only statistically significant attribute correlations (Appendix A), I observed that, while only 2.7% (278) of correlations are statistically significant, 60% of magic gemstones have at least one of these attribute combinations. This further suggests that there was some authoritative system at play; however, it did not govern prescriptions for complete gemstones but rather for essential feature sets that can be combined in different ways. Outside of these core feature sets, the

³⁹ Hamad Seyed-allaei, Ginestra Bianconi, and Marsili, "Networks with an Exponent Less Than Two," 4

designer could call on a larger body of attributes and customize the gem. This larger body of attributes does not form any statistically significant combinations and, therefore, the motivation for including any of them on a gem likely speaks to the whims of the engraver and/or designer and will likely always remain outside the analytical powers of the historian.

Chapter 2. The Iaô Cluster and Magical Tradition

1. Preliminary Considerations

The initial high-level analysis of the entire attribute network identified the following twenty-one attributes as constituting a cluster closely associated with the divine name Iaô: *Abelanathanalba*, Abraxas, Adônai, *Aianagba*, *Akramachamari*, the Anguipede, the baboon, the material carnelian, the solar disk, Gabriêl, the color green, the material heliotrope, the material jasper, *lailam*, Michaêl, Rafaêl, Sabaôth, *semesilam*, *sesengenbarpharanges*, Sourîêl, and Uriêl. I have named this cluster the "Iaô cluster" not because Iaô is the most widespread attribute within it (jasper and the color green are), but because it is the most widely connected and, more importantly, it is the most common divine name found on magical gems. Table 2 illustrates this point by listing all of the statistically significant links Iaô has with other attributes within the cluster.

Table 2. Statistically Significant Links with Iaô					
% of gems	<i>p</i> -value		% of gems with Iaô	<i>p</i> -value	
Iaô (33%)	0.004831		Green (27%)	0.004093	164
Iaô (30%)	0.000000		Anguipede (57%)	0.000000	147
Iaô (23%)	0.000000		Abraxas (54%)	0.000000	112
Iaô (22%)	0.000000		Sabaôth (80%)	0.000000	107
Iaô (8%)	0.000044		Adônai (67%)	0.000394	40
Iaô (7%)	0.002810		Michaêl (49%)	0.007837	33
Iaô (7%)	0.004832		<i>Abelanathanalba</i> (41%)	0.010566	36
Iaô (4%)	0.027260		<i>Semesilam</i> (42%)	0.047036	22
Iaô (3%)	0.021947		<i>Akramachamari</i> (60%)	0.048605	15
Iaô (3%)	0.021947		<i>sesengenbarpharanges</i> (60%)	0.048605	15
Iaô (3%)	0.040968		Gabriêl (54%)	0.075372	15

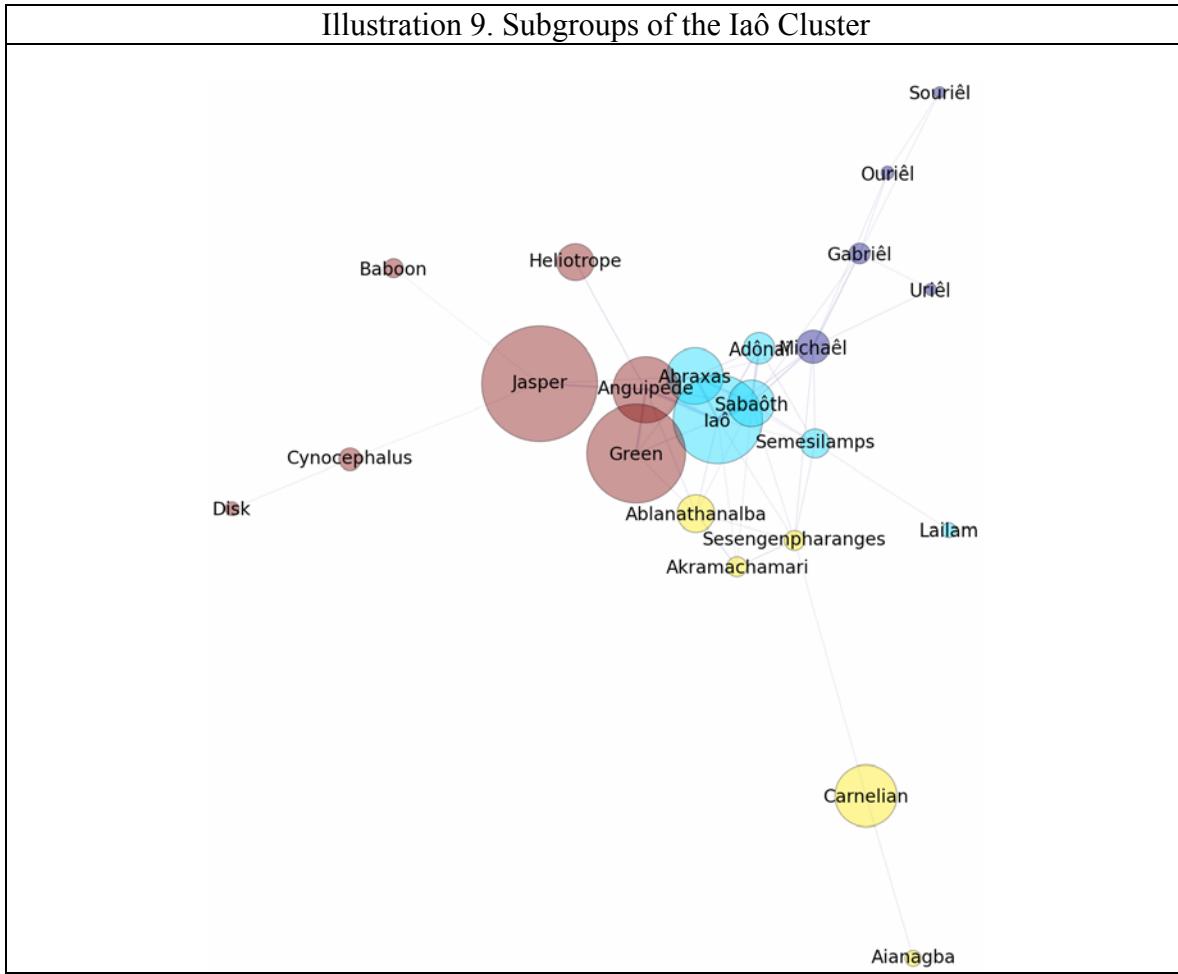
When the Louvain algorithm is run only on this cluster, four subgroups are identified and color-coded in Illustration 9. The purple subgroup consists of Jewish

angelic names: Gabriël, Michaël, Rafaël, Sourîël, and Uriël (section §5). The blue subgroup consists mostly of epithets of the Jewish God and two *voces magicae* of certain Hebrew origin: Adônai, Abraxas, Iaô, Sabaôth, *lailam*, *semesilam* (section §2). The yellow subgroup consists mostly of other *voces magicae*: *Ablanathanalba*, *Aianagba*, *Akramachamari*, *sesengenbarpharanges* as well as the material carnelian (section §4). Finally, the red subgroup consists of attributes closely linked to the figure of the Anguipede: the color green, the materials heliotrope and jasper (section §3). The algorithm has also flagged the figure of the baboon/cynocephalus and the solar disk as part of this subgroup, but they are outliers. The solar disk is statistically significantly linked only to one attribute, the baboon/cynocephalus, which in turn has only one significant link in the entire attribute map, which is the material jasper. Since jasper is also closely associated with the Anguipede and Abraxas, the baboon/cynocephalus and the solar disk were included in this subgroup by the Louvain algorithm even though they never share a gem with the Anguipede. A similar phenomenon occurs in the purple group with the angels Rafaël, Sourîël, and Uriël, none of whom ever directly coincides with Iaô (although the conceptual link is evident; see discussion below).

These subgroups are not equally present on magical gems. Of all the gems which fall into this cluster, the greatest number (565) have attributes found in the red subgroup. This is largely due to the widespread use of the material jasper, used for 829 gems in my dataset, and one of its most common colors, green, which accounts for 603 gems. The second most populous subgroup is blue: 407 gems have at least one of these attributes. The blue subgroup is far more tightly interconnected than the red and gems that fall into this subgroup tend to share more than one of its attributes. Because the blue subgroup

contains the Iaô attribute it will be analyzed first, followed by the red subgroup. The two remaining subgroups, yellow and purple, accounting for 99 and 62 gems, respectively, will be subsequently analyzed in this order.

Following the analysis of each of these subgroups I will provide a brief survey of the phenomenon often described as Jewish magic and how Iaô and other attributes found in this cluster should be construed within the broader Jewish context (section §6).



The analysis in each of these sections gradually leads to the conclusion that the elements in the Iaô cluster must be construed as standing in a primary relationship with the Jewish God and all other associations, particularly solar ones, are of a subordinate or secondary

character. This thesis stands in opposition to many prevailing opinions concerning the role of the divine name Iaô within the syncretistic world of Hellenistic Magic and is strongly bolstered by the statistical evidence adduced throughout this chapter, evidence which aims to tease apart apparent associations from those which are statistically significant on magical gems.

2. The "Yahweh" Subgroup (blue)

Iaô (Ιαω, rarely Ιαου,¹ Ιεω,² Ιαεω³ and similar vocalic variations) is the typical Greek rendering of Yahweh, the God of Israel.⁴ It is generally agreed that Iaô is a Greek rendering of the trigram יְהָוָה, a hypocoristic of יההנָּה⁵ (i.e. the tetragrammaton⁶)—largely attested in theophoric compounds.⁷ It is the most common divine name invoked in the corpus, occurring on nearly 19% (480 gems) of the gems in our database. It is similarly

¹ Getty 38.

² BM 288.

³ Mich 102 and others. See David G. Martinez, *P. Mich. 6925: A New Magical Love Charm* (Ann Arbor: The University of Michigan, 1985), 107-08 for further discussion of this variant.

⁴ The best general overview of the phenomenon of the trigram Iaô is still found in Richard Ganschinietz, s.v. "Iao," *Pauly's Realencyclopädie der Classischen Altertumswissenschaft* (Munich: Alfred Druckenmüller, 1914), 689-719. *Der Neue Pauly Enzyklopädie der Antike* merely redirects "Iao" to the much shorter "Jahwe" article. See also the useful, but limited, overview in David E. Aune, s.v. "Iao," *Reallexikon für Antike und Christentum* 17 (Stuttgart: Anton Hiersemann, 1994), 1-11. For further discussion and bibliography, see Martinez, *P. Mich. 6925*, 107-08.

⁵ For a dissenting view which considers יְהָוָה to be the original form, see: Martin Rose, "Jahwe: Zum Streit um den alttestamentlichen Gottesnamen," *TS* 122 (1978): 5-44. For the possibility that it represents an early, alternate tradition for the pronunciation of the divine name, see Sean M. McDonough, *YHWH at Patmos: Rev. 1:4 in its Hellenistic and Early Jewish Setting* (Eugene: Wipf & Stock, 2011 [1999]), 116-22. For יְהָוָה in the Elephantine papyri both as a personal name (Yahô) and as part of a theophoric compound for Yahweh's consort (Anat-Yahu), see Karel van der Toorn, "Anat-Yahu, Some Other Deities, and the Jews of Elephantine," *Numen* 39.1 (1992): 80-101; R. Dussaud, "Yahô chez les juifs d'Éléphantine," *Syria* 26.3/4 (1949): 391. For the pronunciation of Yahu on the black obelisk of Shalmaneser III, see Baruch Halpern, "Yaua, Son of Omri, Yet Again," *BASOR* 265 (1987): 81-85; P. Kyle McCarter, ""Yaw, Son of 'Omri": A Philological Note on Israelite Chronology," *BASOR* 216 (1974): 5-7.

⁶ For general discussion of the tetragrammaton, s.v. "Tetragrammaton," *The Jewish Encyclopedia* (New York: Ktav Publishing House, 1901).

⁷ E. C. B. MacLaurin, "YHWH, the Origin of the Tetragrammaton," *VT* 12.4 (1962): 444-47.

popular in the *Greek Magical Papyri* (PGM).⁸ The above percentage probably should be considered a lower bound as among the *voces magicae* there are frequent vowel combinations which are likely allusions to the divine name, many of which attempt to replicate the pronunciation of the full tetragrammaton (יההָי): Ιααευηε (Cologne 3), Ιαηιε (Cologne 29), Ιαουη (Paris 170), Ιαουι (Schwartz ANS 69), Ιαεω (Paris 98), Ιαουω (Paris 621), Ιαωαι (Paris 200), Ιαβε (Walters 42.872), Ιαει (Schwartz ANS 70), Ιαια (BM 498), Ιαη (Walters 42.869) and Ιαη (Schwartz ANS 69).⁹ These must be carefully distinguished from the ever common vowel *Vokalreihen* (αεηιουω), although, sometimes these too seem to have been used as invocations of the divine name through small modification, such as in Michigan 77, where one finds ιααηιουω (cf. Michigan 75).¹⁰ The bigram, Ια (=ְיָ), is also attested, but must be identified with discretion, only when the two letters are clearly isolated, such as in BM 180 where they are found alone within a *tabula ansata* being held by the pantheistic deity.¹¹

The above forms in various degrees coincide with what the early church fathers cited as the pronunciation of the tetragrammaton: Iaoe (Clem. Alex., Strom. 5.6.34),

⁸ "Except for Helios no other deities appear so frequently and are invoked so often as Iao (for Jewish), Sabaoth and Adonai." William M. Brashear, "The Greek Magical Papyri: an Introduction and Survey; Annotated Bibliography (1928-1994)," *ANRW II* 18.5 (1995): 3427.

⁹ This is not an exhaustive list of all possible forms, but fairly representative. Of these, *Iən* (יְהָן) with the sound of the *Waw* omitted) is the most numerous. The pronunciation which most of these forms seem to approximate is *yāhweh* (i.e. Yahweh) and not *yəhuwāh* (i.e. Jehovah), which calls into question Kotansky and Spier's claim that: "many magical texts in Semitic and Greek establish an early pronunciation of the divine name as both Yehovah and Yahweh." (Roy Kotansky and Jeffrey Spier, "The "Horned Hunter" on a Lost Gnostic Gem," *HTR* 88.3 (1995): 318). The *vox* in question is restored as *Iοαηνωνη* and then analyzed by them in light of a parallel text where one finds *Iοαηνονενε* (René Mouterde, *Le Glaive de Dardanos: Objets et inscriptions magiques de Syrie* (MUSJ 15.3; Beirut, 1930), 72-74, no. 7, pl. 2-3, fig. 7). The ending *toeue* is understood as Jehovah. There are two problems with this line of reasoning. Firstly, the final *e* does fit a *āh* pronunciation. Secondly, the sequence of vowels in the parallel text, *αηνου*, also happens to be in the standard sequence found in *Vokalreihen* in general. If this *vox*, like Michigan 75, is merely a *Vokalreihe* augmented to also give some Yahweh vocalization, then one should look to where it deviates from the standard sequence. This is to be found in the beginning (το) an ending (ενε), which when taken together, *τοενε*, approximates *yāhweh* better than it does *yəhuwāh*.

¹⁰ Ganschinietz, s.v. "Iao," 706-07.

¹¹ See also BM 465.

spelled out as *ioth, alpha, ouau, he* by Diodorus of Tarsus (Fr. 64 in Deconinck), Ιαβε (Theodoret, *Exod.* 15) and Ιαβαι (Theodoret, *haeret. fab.* 5.3). A total of 83 gems have these Yahweh-variants, and when they are included the total number of gems rises from 480 to 547 gems (for the sake of simplicity I will continue to refer to the group as Ιαω gems with the understanding that ~15% also have a Yahweh-variant). Perhaps the most peculiar appropriation of the Hebrew tetragrammaton is in the Greek form ΠΙΠΙ (e.g. Paris 609, Budapest 18) since it approximates the visual rendering of the Hebrew יהוה,¹² which then reentered the Jewish magical tradition as פִּפִּי.¹³ The use of ΠΙΠΙ was not limited to magical texts, but also had some currency in biblical manuscripts and even led to some confusion among early Christians that the divine name should be pronounced "pipi."¹⁴

The apparent concern with the proper pronunciation and form of the tetragrammaton in these cases should not suggest that using the trigram Ιαω—as happens 85% of the time—instead betrays an ignorance of the Jewish character of the divine name. The rendering Ιαω for Yahweh reflects an actual tradition in pronunciation,¹⁵ one that was in use late enough, at least in Egypt, to have entered the third century CE Demotic magical text PDM XIV.592 as *Iaho*, correctly adding the /h/ sound found in the

¹² Attilio Mastrocinque, *From Jewish Magic to Gnosticism* (STAC 24; Tübingen: Mohr Siebeck, 2005), 150; Paul D. Wegner, *The Journey from Texts to Translations: The Origin and Development of the Bible* (Grand Rapids: Baker Academic, 2004 [1999]), 174.

¹³ *The Sword of Moses* V.2, IX.7. See Daniel Sperber, *Magic and Folklore in Rabbinic Literature* (Jerusalem: Ahva Cooperative Press, 1994), 85; Joshua Trachtenberg, *Jewish Magic and Superstition: A Study in Folk Religion* (New York: Behrman's Jewish Book House, 1939), 101; for possible variation, פִּיִּי, see James R. Davila, *Hekhalot Literature in Translation: Major Texts of Merkhabah Mysticism* (SJT 20; Leiden: Brill, 2013), 283, n. g.

¹⁴ See Henry S. Gehman, "Manuscripts of the Old Testament in Hebrew," *BA* 8.4 (1945): 102. Cf. Jerome, *Epist. 25 ad Marcell.* (Migne, *Patr. Lat.*, col. 429); Evagrius, *Scr. Eccl. εἰς τὸ πιπί.* See also Bruce M. Metzger, "A Magical Amulet for Curing Fevers," in *Studies in the History and Text of the New Testament in honor of Kenneth Willis Clark, PhD* (ed. Boyd L. Daniels and M. Jack Suggs; SD 29; Salt Lake City: University of Utah Press, 1967), 35, 94, 108.

¹⁵ See note 5 above.

Hebrew (יְהֹוָה).¹⁶ This Demotic text adds the determinative for "god-name," making it clear that it was not understood as merely a word of power.¹⁷ Iaō is found in a Qumran fragment of Leviticus (4Q LXX Lev^b) and Diodorus Siculus (1.94.2) gives the name of the Jewish God as Iaō. Macrobius (1.18.19-21) is aware of the name, which he gives in Greek as Iaō, but does not know its significance.¹⁸

2.1. Divine Epithets of Iaō in the Blue Subgroup

a. Adônai and Sabaôth

Several divine epithets closely associated with Iaō are present in this subgroup, with Adônai, Sabaôth and Abraxas being the most common. Adônai (lit. "my Lord") is a reverential periphrasis for Yahweh and Sabaôth is the second word (plural) in the bound construction Yahweh Sabaôth, meaning "Lord of Hosts."¹⁹ The rate of incidence at which Sabaoth is accompanied by Iaō (79%) is strikingly similar to that of the Hebrew Bible (235 out of 286 instances, or 82%), although, this statistic is somewhat misleading. While Iaō and Sabaôth often occur on the same gem, many times they do not occur in a bound construction meaning "Lord of Hosts" as is the case in the Hebrew Bible. Magical gems and magical texts in general often treat Sabaôth as a separate, singular, entity and not as the second half of a bound construction. But, this usage does not necessarily indicate non-

¹⁶ Gideon Bohak, "The Impact of Jewish Monotheism on the Greco-Roman World," *JSQ* 7.1 (2000): 5.

¹⁷ Bohak, "Impact of Jewish Monotheism," 8.

¹⁸ Cf. Varro fr. 17, whose attribution is conjectural, where one finds Iaō. Burkhardt Cardauns, *M. Terentius Varro. Antiquitates Rerum Divinarum* (2 vols.; AAMz; Wiesbaden: Steiner, 1976), 22, 146.

¹⁹ For difficulties with the phrase and comparative evidence, see: John H. Choi, "Resheph and yhwh sēbā'ôt," *VT* 54.1 (2004): 17-28. For the meaning of Yahweh Sabaôth as a solar epithet, see: J. Glen Taylor, *Yahweh and the Sun: Biblical and Archaeological Evidence for Sun Worship in Ancient Israel* (JSOT 111; Sheffield: JSOT, 1993), 99-105.

Jewish borrowing and misunderstanding of the phrase.²⁰ Examples of the same phenomenon, although much less common, can be found in magical texts of demonstrably Jewish authorship. Lines 6-7 in the Geniza amulet T-S K 1.100 read, "In the name of (sigil) / Sabaôth, Sabaôth, Sabaôth, Sabaôth."²¹ In Geniza text T-S K 1.18, lines 19-20, one finds, "In the name of Shaddai, Sabaôth, Adonai." Shaddai is an epithet meaning "mighty" or "destroyer," and is usually found modifying El, i.e. El Shaddai, "God Almighty."²² The tendency for a divine attribute or epithet to become a name itself for the divinity or a name being hypostasized into a separate entity is attested in the ancient Near East and already present to a limited extent in the Hebrew Bible itself. In Jeremiah the term kâbôd (כָּבֵד = "glory"), which previously had been a divine attribute, comes to be used as a divine name itself.²³ In Deuteronomy and the Deuteronomistic Historical Works (Joshua, Judges, Samuel and Kings) the word šêm (שֵׁם = "name") is hypostasized and dwells separately in the Temple of Jerusalem while God himself dwells in heaven.²⁴ A more chronologically proximate example comes from *Hekhalot Zutarti*,

²⁰ The treatment of Sabaôth as an independent, singular entity reaches its pinnacle in the Gnostic texts *Hypostasis of the Archons* (CG II, 4) and *On the Origin of the World* (CG II, 5), where parallel accounts are given of Sabaôth, son of Ialdabaoth, being enthroned in heaven as "God of the Forces, Sabaôth"—drawing heavily from apocalyptic Judaism and paralleling themes found in Hekhalot literature (see n. 25 below). For the Gnostic accounts of Sabaôth and their relationship to Judaism, See: Francis T. Fallon, *The Enthronement of Sabaoth: Jewish Elements in Gnostic Creation Myths* (Leiden: E. J. Brill, 1978), especially 25-88, 133-35; Nathaniel Deutsch, *The Gnostic Imagination: Gnosticism, Mandaeism and Merkabah Mysticism* (Leiden: E. J. Brill, 1995), 72-74. For the meaning of Ialdabaoth, see: Fallon, *The Enthronement of Sabaoth*, 32-34; Gershom Scholem, "Jaldabaoth Reconsidered," in *Mélanges d'histoire des religions offerts à Henri-Charles Puech* (Paris: Presses Universitaires de France, 1974).

²¹ Lawrence H. Schiffman and Michael D. Swartz, eds., *Hebrew and Aramaic Incantation Texts from the Cairo Genizah* (STS 1; Sheffield: JSOT Press, 1992), 106-08.

²² J. Naveh and and S. Shaked, *Magic Spells and Formulae: Aramaic Incantations of Late Antiquity* (Jerusalem: The Magnes Press, 1993), 152-55.

²³ Tryggve N. D. Mettinger, *The Dethronement of Sabaoth: Studies in the Shem and Kabod Theologies* (Lund: CWK Gleerup, 1982), 106-11.

²⁴ Mettinger, *The Dethronement of Sabaoth*, 129-32.

dating to the second or third centuries CE.²⁵ At §358b one reads, "I am the Lord your (pl.) God, your (sg.) God, my God, God, God, God Almighty, armies, Sabaôth."²⁶

In two Gnostic texts from Nag Hammadi, *The Hypostasis of the Archons* (CG II, 4) and *On the Origin of the World* (CG II, 5), found on the same manuscript, two related mythological accounts (CG II, 4 95.13-18 and CG II, 5 103.32-104.6, respectively) narrate the enthronement of Sabaôth. Here, Sabaôth is presented as the son of the demiurge Ialdabaoth who repents of his father's blasphemy, ascends to the seventh heaven and is enthroned as "God of the Forces, Sabaôth." The imagery in the accounts seems to draw on a number of Jewish figures: (1) the God of the Hebrew Bible, (2) the notion of the leading angel of God,²⁷ and (3) the apocalyptic visionary.²⁸ It is difficult to determine whether the hypostatization of Sabaôth first developed in principally Jewish speculation or Christian Gnostic, but it can scarcely be doubted that it is this kind of hypostatization, observed in the above texts, that lies behind the independent use of Sabaôth on both magical gems and the PGM.

Brief comment should be made about the concept of "hypostatization." The term has been criticized due to its special use in certain streams of biblical scholarship where it was argued that hypostatization of God's attributes developed in Second Temple Judaism in order to help supply intermediaries between man and God because God himself was

²⁵ for dating of *Hekhalot Zutarti* see Davila, *Hekhalot Literature in Translation*, 192-93.

²⁶ This is the translation given in Davila, *Hekhalot Literature in Translation*, 215. Christopher Rowland and Christopher R. A. Morray-Jones, *The Mystery of God: Early Jewish Mysticism and the New Testament* (CRINT 12; Leiden: Brill, 2009), 283 give the reconstructed Hebrew as 'יְהוָה אֲהָוָה אֲדוֹנִי אֱלֹהִים אֱלֹהָה אֶל שְׁדי צְבָאָתָם צְבָאָתָה'.

²⁷ See: Jarl E. Fossum, *The Name of God and the Angel of the Lord: Samaritan and Jewish Concepts of Intermediation and the Origin of Gnosticism* (WUNT 36; Tübingen: Mohr-Siebeck, 1985), 257-338.

²⁸ Fallon, *The Enthronement of Sabaoth*, 34-36.

increasingly viewed as distant and inaccessible.²⁹ A great deal of scholarship from the latter part of the twentieth century has found this line of argumentation faulty and I do not in any way wish to suggest that my use of the term implies the thesis that God in Second Temple Judaism had become inaccessible.³⁰ Here, hypostatization simply means that certain attributes and epithets of God came to be treated as having some sort of personal agency and being more than just characteristics of Him.³¹

b. Abraxas

Unlike Adônai and Sabaôth, the name Abraxas does not have an obvious Hebrew derivation and its widespread use on magical gems and close association with Iaô calls for an explanation. One aspect of the name, at least, is unproblematic. It is widely agreed that Abraxas (more often Abrasax) has a numerological significance. The name's isopsephic value is 365 and according to some ancient attestations it was in Basilidian Gnosticism the name of their Highest God,³² although it predates Basilides, with the earliest attestation possibly in the first century,³³ at which time it may also have been

²⁹ Saul M. Olyan, *A Thousand Thousands Served Him: Exegesis and the Naming of Angels in Ancient Judaism* (TSAJ 36; Tübingen: J. C. B. Mohr, 1993), 89-91. This was an important pillar of F. Weber's theory of post-biblical Judaism and widely influential on New Testament scholarship. See E. P. Sanders, "Literary Dependence in Colossians," *JBL* 85.1 (1966): 33-59.

³⁰ For discussion see Sanders, "Literary Dependence," 212-17.

³¹ See James Barr, "Hypostatization of Linguistic Phenomena in Modern Theological Interpretation," *JSS* 7 (1962): 85-94, especially 93.

³² PGM XIII.156; for full list of citations to early Christian apologists linking Abraxas with the Basilidians, see Mastrocinque, *Jewish Magic to Gnosticism*, 43, n. 170; for appearance in Gnostic texts, see Howard M. Jackson, "The Origin in Ancient Incantatory "Voces Magicae" of Some Names in the Sethian Gnostic System," *VC* 43.1 (1989): 75; Martinez, *P. Mich.* 6925, 15, n. 34; Bonner, *Magical Amulets*, 192; E. R. Goodenough, *Jewish Symbols in the Greco-Roman Period* (vol. 2; New York: Pantheon Books, 1953), 250-51; for more extended bibliography, see Brashear, "The Greek Magical Papyri," 3577.

³³ Audollent no. 231 (*l. 16-17, αβρασαρξ*) and no. 252 (*l. 23, αβρασαξ*) are both from Carthage. The dating to the first century in, A. Audollent, ed., *Defixionum Tabellae* (Paris: A. Fontemoing, 1904), 556, should be taken with caution. On the name not originating within Gnosticism, see Birger Albert Pearson, *Gnosticism*

coined.³⁴ A commonly hypothesized etymology looks to the Hebrew word 'rb^ca (אַרְבָּעָה), meaning "four," understood as referring to the four letters of the tetragrammaton.³⁵ First one arrives at αβρα (‘br^ca) by metathesis. Next, by analogy with Greek endings for numbers (μονάς, δυάς, etc.), a *sigma* is added, arriving at the attested form αβρας.³⁶ Finally, -αξ is appended in order to arrive at the numerological value of 365. Another derivation has been suggested by Shaul Shaked based on an unpublished magical text in the Shøyen collection (MS 1911/1), where he finds reference to 'brḥsy' (אַבְרָהָסִיָּה), which reads on the first line, "In the name of Abrahsiya the great, the holy, the king of the world." He speculates it may be an Aramaic original for Abraxas, meaning something like "holy" or "chaste."³⁷ A similar form appears in Geniza text T-S K1 .143:20.12, where we read, "...in the name of Abrasaxia ('brsksyh) (3x)." This form would seem to be a hybrid of the Greek form and the aforementioned 'brḥsy'. Another similar form appears in T-S K 1.26:1a.6: 'brskswh. However, the Greek form is by far the most common one found in Jewish magical texts.³⁸ Table 3 lists the instances and contexts for all cases known to me.

and Christianity in Roman and Coptic Egypt (New York: T & T Clark, 2004), 257-58; Bonner, *Magical Amulets*, 133-34.

³⁴ Lucien Janssens, "La datation néronienne de l'isopspéphie: Νεῦλος (=Osiris) = Ἀβρασάξ = γιον νομα = Μείθρας," *Aegyptus* 68.1/2 (1988): 105-11, dates the coining of Abraxas, along with other isopsephic names/phrases (ἄγιον ὄνομα, Μείθρας and Νεῖλος), to the Neronian period.

³⁵ Francisco Marco Simón, "Abraxas. Magia y religión en la Hispania tardoantigua," in *Héroes, semidioses y daimones: Primer encuentro-coloquio de ARYS, Jarandilla de la Vera. Diciembre de 1989* (ed. Jaime Alvar, Carmen Blánquez, and Carlos G. Wagner; Madrid: Ediciones Clásicas, 1992), 488-90; Martinez, *P. Mich. 6925*, 105; A. A. Barb, "Abraxas-Studien," in *Hommages à Waldemar Deonna* (Latomus 28; Brussels: Revue d'études latines, 1957), 68-71.

³⁶ Cf. BM 31, where one finds ABPI / AIAIA / APΧΑΩΘ / ABPAΣ / IAΩ.

³⁷ Shaul Shaked, "Dramatis Personae in the Jewish Magic Texts: Some Differences Between Incantation Bowls and Geniza Magic," *JSQ* 13.4 (2006): 376, n.28, 77-78.

³⁸ For general discussion and late survivals, see: Trachtenberg, *Jewish Magic*, 100. As in Greek usage, most instances of Abraxas listed here reveal the more common, and likely original, spelling "Abrasax." A syncretistic Syriac Christian magical text from the 6th-7th century instead has a close rendering of "Abraxas": "אַבְרָהָסִיָּה" (= אַבְרָהָסִיָּה = 'brksys)—see Philippe Gignoux, *Incantations magiques syriaques* (CREJ; Louvain: E. Peeters, 1987), 33, l. 29.

Table 3. References to Abraxas in Jewish Magical Texts from Palestine and the Cairo Geniza (19 total)

Form	Context
אברקסוֹס	Amulet 1: In a sequence of <i>voces magicae</i> . ^a
אברסְכָּס	Amulet 2: "Abrasax Ya Ya Yahu" ^b
אברסְכָּס	Amulet 12. "In the name of Abrasax who is appointed over..." ^c
אבראַסְכָּס	Amulet 19, 11. "I adjure and write in the name Abrasax, who is appointed over you (i.e. fever)" ^d
אַברְסָס	Amulet 22, 9. "...Araoth, Abla, Abrasas... who rules, Yah, his name..." ^e
אַברְכְּסִיס	Amulet 24, 5. In a sequence of <i>voces magicae</i> . ^f
אַברְכָּסָה	T-S K 1.4, 2b.14. Abraxah among a list of <i>voces</i> which are labeled as the divinity who spoke to the prophet Jeremiah, i.e. Yahweh. ^g
אַברְסְּכָּסָה	T-S K 1.26, 1a.6. Abrasaxuah named in between El and Yahu, suggesting it is an epithet of Yahweh. ^h
אַברְסָס	Geniza 6 (T-S K 1.73). "In the name of Abrasax the great angel who overturned Sodom and Gemorrah" ⁱ
אַברְסָס	T-S K 1.127. In a sequence of <i>voces magicae</i> . ^j
אַברְ[אָסְ][כָּתָה]	Geniza 18 (T-S K 1.143), 3.5. "I invoke you... by the power [of your] great [name] and by the power of Abr[a]s[ax]." ^k
אַברְ[אָסְ]כָּס	Geniza 18 (T-S K 1.143), 5.11. Abrasax in a list of angels. ^l
אַברְאָסְכִּיה	Geniza 18 (T-S K 1.143), 20.12. "In the name of Abrasaxia (3x)." ^m
אַברְסָס	T-S K 1.163, 1a.11. In a sequence of <i>voces magicae</i> . ⁿ
אַברְסָס	T-S K 1.163, 1a.26. Eleazar ben Maliha adjuring by the name Abrasax in <i>Schwindenform</i> . ^o
אַברְ[כָּתָה]	Geniza 19 (T-S K 1.167), 1.34. "In the name of Abraxas, the Prince of [Wisdom?]" ^p
אַבְרְסָסָה	Geniza 23 (T-S Arabic 44.44). "In the name Adoniel, in whom the ineffable name was engraved, Ab<r>sax, the great and awesome." ^q
אַברְסָס	T-S AS 143.106,1a.11. In a sequence of <i>voces magicae</i> referred to as the name of the "Great God." ^r
אַברְסָס	T-S NS 153.162, 2a.7. In a sequence of <i>voces magicae</i> . ^s

^a Joseph Naveh and Shaul Shaked, *Amulets and Magic Bowls: Aramaic Incantations of Late Antiquity* (Jerusalem: The Magnes Press, 1985), 41.

^b Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 45.

^c Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 95.

^d Naveh and Shaked, *Magic Spells and Formulae*, 63.

^e Naveh and Shaked, *Magic Spells and Formulae*, 75.

^f Naveh and Shaked, *Magic Spells and Formulae*, 82.

^g Peter Shäfer and Shaul Shaked, *Magische Texte aus der Kairoer Geniza: Band I* (3 vols.; TSAJ 42; vol. 1; Tübingen: Mohr Siebeck, 1994), 240.

^h Peter Shäfer and Shaul Shaked, *Magische Texte aus der Kairoer Geniza: Band II* (3 vols.; TSAJ 64; vol. 2; Tübingen: Mohr Siebeck, 1997), 268.

ⁱ Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 231.

^j Lawrence H. Schiffman and Swartz, eds., *Hebrew and Aramaic Incantation Texts*, 117.

^k Naveh and Shaked, *Magic Spells and Formulae*, 198.

Table 3. cont'd.

^l Naveh and Shaked, <i>Magic Spells and Formulae</i> , 190.
^m Naveh and Shaked, <i>Magic Spells and Formulae</i> , 198.
ⁿ Peter Shäfer and Shaked, <i>Magische Texte aus der Kairoer Geniza: Band II</i> , 250.
^o Peter Shäfer and Shaked, <i>Magische Texte aus der Kairoer Geniza: Band II</i> , 251.
^p Naveh and Shaked, <i>Magic Spells and Formulae</i> , 210.
^q Naveh and Shaked, <i>Magic Spells and Formulae</i> , 221.
^r Peter Shäfer and Shaked, <i>Magische Texte aus der Kairoer Geniza: Band II</i> , 236.
^s Peter Shäfer and Shaked, <i>Magische Texte aus der Kairoer Geniza: Band II</i> , 202.

Most instances suggest an angelic role for Abraxas (especially amulet 12, Geniza 6, Geniza 18, and Geniza 19),³⁹ although amulet 2, where Abraxas is the first supernatural entity invoked followed by hypocoristics of Yahweh, suggests a more important role. This is strengthened by line 10, where one reads "In the name of I-am-who-am." This clear reference to Yahweh, the only entity by whose name the invocation takes place, suggests that Abraxas in the first line be understood as an epithet. In Geniza 23 Absax (sic) is called the "ineffable name," which refers to the tetragrammaton. T-S K 1.26:1a.6 lists Abrasaxuah (sic) in between El and Yahu, suggesting it is an epithet of Yahweh and in T-S K 1.4:2b.14 one finds Abraxah among a list of *voices* which are labeled as the divinity who spoke to the prophet Jeremiah, i.e. Yahweh. All of this anticipates an amazing reference to "Yahweh Abrax(as)" (יהוה אבראקס) in the *Shi'ur Qomah*.⁴⁰ The above examples clearly undermine Bonner's suggestion that Abraxas "may be regarded as a word of power rather than a proper name."⁴¹ Rather, they indicate that Abraxas often was understood as a name or epithet. This is not to say that it wasn't *also* used as a word of power, but most references to Abraxas in the Jewish material surveyed above clearly presuppose a name or epithet of some sort. The PGM further support this

³⁹ Gideon Bohak, *Ancient Jewish Magic: A History* (Cambridge, UK ;New York: Cambridge University Press, 2008), 247-50.

⁴⁰ Cohen, *The Shi'ur Qomah*, 188, l. 27.

⁴¹ Bonner, *Magical Amulets*, 134.

understanding with PGM XII.207 and XXXVI.42 both citing Abraxas as a "name." And, it can scarcely make sense to say "I, Abrasax, shall deliver!" (PGM LXXXIX.1) if Abraxas there were not functioning as a name or epithet.

The solar associations of Abraxas are widely claimed.⁴² The most obvious clue is its isopsephic value, 365, which is the number of days in the solar year. Abraxas is sometimes understood in these terms in the PGM,⁴³ and an echo of this remains in the *Sepher Ha-Razim*, where Abraxas is the first among 31 angels who lead the sun by day.⁴⁴ This begs the question why on magical gems Abraxas is not significantly correlated with either Helios or the Sun. In fact, the correlations to these two, such as they exist, seem to be completely random.⁴⁵ In addition, other iconographic elements which are traditionally considered to have primarily solar associations have weak correlations with Abraxas: Chnoubis ($p = 0.98$), Cynocephalus ($p = 0.50$), Harpocrates ($p = 0.37$), Heliorus ($p = 0.50$) and Sarapis ($p = 0.94$).⁴⁶

The above statistics compel us to reject the common hypothesis that Abraxas has primarily a solar import because this hypothesis cannot account for the popularity of the name in Jewish magical texts and its not infrequent use as an epithet for Yahweh (See Table 3 above).⁴⁷ This is not to say that Abraxas or the various epithets of Yahweh cannot be invoked in parallel with solar attributes and divinities and even identified with

⁴² "il y a donc recours allusif à la symbolique de l'isopspéphie pour signifier, rappeler à des initiés, à des mystes, le caractère solaire d'Abrasax tout comme Héliodore l'avait précisé pour *Neilos*," Janssens, "La datation néronienne de l'isopspéphie," 107. Simone Michel, *Die magischen Gemmen: Zu Bildern und Zauberformeln auf geschnittenen Steinen der Antike und Neuzeit* (SWH 7; Berlin: Academie Verlag, 2004), 106. Pearson, *Gnosticism and Christianity*, 257; Bonner, *Magical Amulets*, 134-36.

⁴³ PGM IV 331-332; VIII 49; XIII 156, 466.

⁴⁴ Bohak, *Ancient Jewish Magic*, 249; Michael A. Morgan, *Sepher Ha-Razim: The Book of Mysteries* (Pseudepigrapha Series 11; Chico: Scholars Press, 1983), 67-68.

⁴⁵ The p value for Helios is 0.31 and for the Sun 0.75, which is to say, there is a 31% chance that the nine gems sharing Abraxas and Helios are purely coincidence and a 75% chance for the one gem which has both Abraxas and the Sun.

⁴⁶ For claimed association between Abraxas and these icons see Bonner, *Magical Amulets*, 150-55.

⁴⁷ See also comments in Bohak, *Ancient Jewish Magic*, 249-50.

them, something which happens not infrequently in the PGM.⁴⁸ Wolfgang Fauth, in his detailed monograph on the syncretistic valences of Helios in Late Antiquity (*Helios Megistos: Zur synkretischen Theologie der Spätantike*), identifies a certain Iaô-Helios complex in the PGM.⁴⁹ His examination of the role of Helios in several PGM texts leads him to two broad categories, (1) those cases in which Helios is the Supreme God, overseeing or taking on as epithets other divine names;⁵⁰ and (2) others in which Iaô is the Supreme God and Helios takes on an intermediary role, parallel to that of the Metatron.⁵¹ The Metatron, a likely Latin borrowing into Hebrew (*Heb.* מַטְרֹן < *Lat.* metator, "measurer"),⁵² was an epithet first for the Jewish God in his role as the one who measures the land inherited by Israel,⁵³ and later for an intermediary, an angel designated to help lead Israel.⁵⁴ It first occurs in *Sifre to Deut.* 32, 49 (§338),⁵⁵ a text from the early third century CE, but may ultimately be based on Philo's *Logos*.⁵⁶ Fauth's examination suggests that while syncretistic forces regularly collide Yahweh with Helios in the PGM, the relationship between the two is more complex than simple ciphers or synonyms for one another, at least when it comes to texts in his second category, where Helios takes on a subservient role. Furthermore, I would suggest that the Egyptian provenance of the PGM should more greatly influence syncretistic Solar speculation than that of magical

⁴⁸ See David Martinez, "Papyrology," in *The Oxford Handbook of Ancient Greek Religion* (ed. Esther Eidinow and Julia Kindt; OHCAC; Oxford: Oxford University Press, 2015), 139-41.

⁴⁹ Wolfgang Fauth, *Helios Megistos: Zur synkretischen Theologie der Spätantike* (RGRW 125; Leiden: E. J. Brill, 1995), 73ff.

⁵⁰ Fauth, *Helios Megistos*, 74-89.

⁵¹ Fauth, *Helios Megistos*, 89-118, especially 93 for the suggested equivalence to "Jao-Metatron".

⁵² M. Black, "The Origin of the Name Metatron," *VT* 1.3 (1951): 217-19; George Foot Moore, "Intermediaries in Jewish Theology: Memra, Shekinah, Metatron," *HTR* 15.1 (1922): 65-68. For an exhaustive survey of all of the proposed etymologies see Andrei A. Orlov, *The Enoch-Metatron Tradition* (TSAJ 107; Tübingen: Mohr Siebeck, 2005), 93-96.

⁵³ Moore, "Intermediaries in Jewish Theology," 62-64.

⁵⁴ Fossum, *The Name of God*, 310-12; Moore, "Intermediaries in Jewish Theology," 64-65.

⁵⁵ Moore, "Intermediaries in Jewish Theology," 62.

⁵⁶ Black, "The Origin," 218-19.

gems, whose provenance is more diverse. It is, in fact, generally agreed that there is only limited cross-over between the PGM and magical gems, with a number of *voces magicae* and images common on magical gems nearly or completely absent from the PGM.⁵⁷ Finally, if the Yahweh-Helios/Solar correspondences as they are seen on magical gems were as significant as on the PGM one should observe a statistically significant correlation between them, something which, as already noted, is distinctly lacking.

The hypothesized etymology by which the name ultimately derives from the Hebrew word for *four* as a reference to the tetragrammaton (see above) and is then, secondarily, transformed to give it numerological significance ($\alpha\beta\rho\alpha\sigma\alpha\xi < \alpha\beta\rho\alpha\varsigma < 'br^c a < 'rb^c a$; see above) better accounts for the evidence. On two gems in the Paris collection (Paris 493, 669) one finds the *vox magica* Αρβαθιαω. Here, the construct form of the number "four" ($\alpha\beta\alpha\theta < \text{אַרְבָּעַת}$)—which is necessary when you have a genitive construction in Hebrew—is combined with $\iota\alpha\omega$ and can only mean "four of Yahweh," referring to the four letters of the tetragrammaton. Αρβαθιαω must be seen in a genetic relationship with the name Abraxas,⁵⁸ both developing from the same impulse to refer to the ineffable name, but one taking on a secondary solar mantel (its isopsephic value) while the other retains its more Jewish character.

Why Abraxas should have been formed to give it an isopsephic value of 365 if in practice it does not seem to have a primarily solar import remains an open question. It is quite possible that usage of the name deviated from the original intent, but this deviation must have been already established before it came to be used on magical gems since its

⁵⁷ Morton Smith, "Relations between Magical Papyri and Magical Gems," in *Actes du XVe congrès international de papyrologie* (ed. Jean Bingen and Georges Nachtergael; PapBrux 18; Brussels: Foundation égyptologique Reine Élisabeth, 1979), 129-36.

⁵⁸ As already observed by Barb, "Abraxas-Studien," 68, 84.

connection with other solar attributes is weak and its correlation with Iaô overwhelming ($p = 0.000001$). One possible stream of tradition that may have informed the creation of the name comes from 1Enoch and certain Qumran texts. The Second Temple period attests to three different calendrical systems: a solar calendar, a lunar calendar and a lunisolar hybrid calendar.⁵⁹ 1Enoch and certain Qumran texts, especially Jubilees, present the solar calendar (given as either 364 or 365 days) as the eternal, divinely ordained, division of time.⁶⁰ If the isopsephic value of Abraxas is an allusion to the Jewish solar calendar and not the divine sun, and this allusion was widely recognized, then this could explain why magical gems do not reveal any statistically significant links between Abraxas and solar attributes. He may be, as the PGM state, "the number of the days of the year" (PGM VIII.49; XIII.156, 466), a metonym for the solar calendar and not specifically Helios.

Or, perhaps, the statistical connections are due to the influence of Basilidian Gnosticism. While Basilidians were mostly limited to Egypt, it may be that their early appropriation of Abraxas thereafter left their particular interpretation of the name's meaning as a stamp on its future use. Irenaeus (*adv. haer.* 1.24.3-4) informs us that in the Basilidian system successive generations of angels each created a new heaven until there were 365 heavens, which accounts for there being 365 days in the year. The angels of the lowest heaven created the known world and the chief of them is the Jewish God, whereas the highest chief was Abraxas. Epiphanius (*Pan.* 1.2.24.7) informs us that, according to Basilides, the preeminence of Abraxas was due to its isopsephic value and that, as a result

⁵⁹ For a brief bibliography see Rachel Elior, *The Three Temples: On the Emergence of Jewish Mysticism* (Oxford: The Littman Library of Jewish Civilization, 2004), 45 n. 47.

⁶⁰ Elior, *The Three Temples*, 82-110. Unfortunately, Elior overstates her case in trying to extend the preference for a solar calendar to the full range of Qumran literature. For important criticisms see Martha Himmelfarb, "Merkavah Mysticism since Scholem: Rachel Elior's *The Three Temples*," in *Wege mystischer Gotteserfahrung* (ed. Peter Schäfer; Schriften des Historischen Kollegs 65; München: R. Oldenbourg, 2006), 19-36.

of this, not only did the year have 365 days but humans had 365 members. At the same time, there is nothing distinctly Basilidian in the use of Abraxas on magical gems.

Basilidians believed that Jesus was sent by the Father (who is distinct from the Jewish God) in order to save man from the angelic forces who created the world, including their chief, the Jewish God.⁶¹ It is unlikely that a Basilidian would choose to associate Iaô so closely with Abraxas.⁶² And, at any rate, one should not even expect anything distinctly Basilidian to be revealed on any magical gems—assuming this Gnostic sect had any influence on them—if Irenaeus' claim that Basilides taught his disciples that they should care to avoid revealing their true faith to others is correct.⁶³ Irenaeus (*adv. Haer.* 1.24.6) states:

And as the son was unknown to all, so must they also be known by no one; but while they know all, and pass through all, they themselves remain invisible and unknown to all; for, "Do thou," they say, "know all, but let nobody know thee."⁶⁴

With knowledge that the Basilidians spoke of Abraxas as the highest divinity, and that they too preach about Jesus, the son of the Father, but the general population knowing little more of their Gnostic system, it seems natural that Abraxas and the Jewish High God could come to be confused together. The Basilidians' (partial) influence on the

⁶¹ Irenaeus, *adv. Haer.* 1.24.4; Epiphanius, *Pan.* 1.2.24.3.

⁶² Kurt Rudolph, *Gnosis: The Nature and History of Gnosticism* (San Francisco: Harper & Row, 1985 [1983]), 311, misspeaks when he states that Basilides had equated Abraxas with the Jewish God. Irenaeus (1.24.2) makes clear the distinction between the Jewish God and the Father above him, and Epiphanius (1.24.7) further clarifies that the highest power, in the highest heaven—the Father—is known as Abraxas. Unfortunately, this has led to some confusion since Michel follows him in his error (Michel, *Die Magischen Gemmen*, 107 n. 563). Rudolph is, however, right that Abraxas was originally based on the Hebrew word for the number four, as discussed above, and was associated with the Jewish God, but before Basilides appropriated Abraxas and transmogrified its meaning.

⁶³ Irenaeus, *adv. Haer.* 1.24.6; Epiphanius, *Pan.* 1.2.24.5.

⁶⁴ Tr. Cleveland Coxe, *The Apostolic Fathers with Justin Martyr and Irenaeus* (ANF; New York: Christian Literature Publishing Co., 1885), 350.

general use of the name Abraxas may have been fueled by their own magical practice, which Irenaeus claims to be extensive.⁶⁵

Both the calendrical and Basilidian Gnostic hypotheses for the isopsephic value of the name Abraxas bring it within the ambit of Helios and solar powers more generally, and, therefore, Fauth's Iaô-Helios complex. I would like to suggest that the simplest explanation for why Abraxas is not statistically significantly linked with solar elements on magical gems but at the same time has a partially solar derivation insofar as its isopsephic value is concerned, proceeds as follows: (1) the name was originally a derivation from the Hebrew word for "four" alluding to the tetragrammaton, but was not intended to be Yahweh himself, but rather an angel bearing his name; (2) as this took place in Egypt, Abraxas was imagined as a Metatron in terms of the second category of Fauth's Iaô-Helios complex, and therefore took on solar attributes. But, (3) as these solar attributes were of secondary concern, since Fauth's second category posits Yahweh as the supreme God, the association with Yahweh persevered far more strongly than the association with Helios. Or, perhaps, Helios was conceptually subsumed under Abraxas and explicit reference to Abraxas' Helios connection became less relevant. Given the chronology of the name's attestation, I am inclined to view the Basilidian role in all of this limited, if present at all, and the extent to which they used the name Abraxas and exploited its isopsephic value to be a secondary phenomenon.

⁶⁵ *Adv. Haer.* 1.24.5: "Utuntur autem et hi magia, et imaginibus, et incantationibus, et invocationibus, et reliqua universa perierga." Mannucci, ed., *adv. Haer.*, 258.

3. The "Anguipede" Red Subgroup

a. Green Jasper

As mentioned earlier in this chapter, the red subgroup, hereafter the "Anguipede" subgroup, has the most gems within this cluster associated with it, but this is primarily because two of its attributes are the material jasper and the color green. The color green happens to be strongly linked to two attributes in the Yahweh subgroup: Iaô and Abraxas. The clustering algorithm instead grouped the color green and the Anguipede in a separate subgroup simply because the Anguipede is the attribute to which it is most significantly linked: 52% of all Anguipede gems are green with a *p-value* of 0.000002, which is to say, there is only a 2 in a million chance that this is a random occurrence. Likewise, although the material jasper is statistically linked with both Abraxas and the Anguipede, its association with the latter is much stronger ($p = 0.000012$ versus $p = 0.009231$). Few other attributes in the entire gem network map are statistically linked with jasper and the color green, and usually it is only to one or the other. For example, *ablanathanalba* and Iaô are linked only to the color green while the baboon/cynocephalus only to jasper. This leaves Abraxas and the Anguipede in a special category, since they are statistically linked to both the color and the material.

Why jasper should be the preferred stone for any gem is difficult understand. It was the most common material for inscribed gems simply because of its ready availability. It was widely used in ancient Egypt for both amulets and jewelry, although usually in the color red. Indeed, yellow and red oxides are most common in jasper.⁶⁶ The

⁶⁶ Paul T. Nicholson and Ian Shaw, *Ancient Egyptian materials and technology* (Cambridge ;New York: Cambridge University Press, 2000), 29.

comparative scarcity of green jasper may account for why 30% fewer magical gems are green than red (402 compared to 603) and why a gem design that preferred jasper would simultaneously prefer the color green. This is not to say that there aren't attributes statistically linked with the color red, but of those few, only one, Heracles, has a specific preference for red jasper, and this constitutes only sixteen gems.

b. The Anguipede

The Anguipede, literally, "snaked-legged," is perhaps the most famous iconographic element on magical gems.⁶⁷ It is the fourth most common icon in our corpus, showing up on 10% of our gems (258). It is typically composed of five key features: snake legs, head of a rooster, shield in left hand, whip in right hand and armored torso (see Illustration 10). Given its popularity on gems, the figure is depicted with startling rarity on other media. Andrew T. Wilburn identifies the figure drawn in PGM XXXVI.231-55 as "a rooster-headed, cuirassed divinity, the anguipede,"⁶⁸ although it is missing the very feature that would literally make it an "anguipede," i.e. snake legs.⁶⁹ Of course, he is not alone in identifying a rooster-headed, cuirassed figure with human legs

⁶⁷ For general discussion see Goodenough, *Jewish Symbols* (v. 2), 245-58; Bonner, *Magical Amulets*, 123-39. For bibliography prior to A. Delatte, see Arpad M. Nagy, "Figuring out the Anguipede ('snake-legged god') and his relation to Judaism," *JRA* 15 (2002): 161, n. 12.

⁶⁸ Andrew T. Wilburn, *Materia Magica: The Archaeology of Magic in Roman Egypt, Cyprus and Spain* (Ann Arbor: The University of Michigan Press, 2012), 148.

⁶⁹ Marina Piranomonte, "Religion and Magic at Rome: The Fountain of Anna Perenna," in *Magical Practice in the Latin West: Papers from the International Conference held at the University of Zaragoza: 30 Sept.-1 Oct. 2005* (ed. Richard L. Gordon and Francisco Marco Simón; Leiden: E. J. Brill, 2010), 209, doubts that these images are related to the Anguipede.

as an "Anguipede"—Michel does the very same with BM 230-232. The variant is rare, if it is to be considered as such.⁷⁰



A more tantalizing figure is found in the Roman-German museum at Mainz, a bronze figurine 14.6cm tall, depicting the standard Anguipede, originally from the early 19th century private collection of Louis Levade, claimed to have been found in the region of ancient Aventicum.⁷¹ As for its authenticity, Leibundgut warns caution due to the otherwise absence of three-dimensional Anguipedes and the suspect quality of Levade's collection, but he also makes clear that the patina and style are not suspicious and there is

⁷⁰ It is unclear why Wilburn doesn't make a similar identification for the figure in PGM XXXVI.69-101 since there one finds a human figure with rooster head, whip (something missing in the previous figure) and what too may be a cuirass (although, the figure is too stylized to be certain).

⁷¹ Annalis Leibundgut, *Die Römischen Bronzen der Schweiz II: Avenches* (Römisch-Germanisches Zentralmuseum zu Mainz - Forschungsinstitut für Vor- und Frühgeschichte; Mainz am Rhein: Philipp von Zabern, 1976), 38-39, plates 21-22. It is the only bronze Anguipede listed in Marcel Le Glay, s.v. "Abraxas," *Lexicon Iconographicum Mythologiae Classicae* (Zürick: Artemis, 1981), 3.

no overt evidence of it being an early modern forgery.⁷² In fact, Leibundgut's warning may be overstated since the partial base of a snake-legged statue discovered in the Santa Prisca mithraeum and included in Vermaseren's magisterial corpus of Mithraic monuments and inscriptions seems to be that of our Anguipede and not a Giant.⁷³

Equally interesting is an Anguipede reported by James Wiseman inscribed on a lead *defixio* (one of four), found in the "Fountain of the Lamps" in the gymnasium area at Corinth.⁷⁴ He describes him as having the head and torso of a human and holding a sword in his right hand and snaked-wrapped staff in his left. According to Wiseman, the bath became a cult center after the ceiling collapsed in the 4th century, at which point, and until the 6th century, thousands of lamps were deposited.⁷⁵ Since by this period the chamber was flooded it is possible that they had been deposited before the ceiling collapse, although, there is no way to be certain.

⁷² "Da die Patina und der Stil nicht verdächtig sind und auch keine eindeutigen Beweise gegen die Echtheit vorgebracht werden können, muß die Frage vorläufig offen bleiben," Leibundgut, *Römischen Bronzen II*, 39. Leibundgut laments that this figure has never been cited in all of the rich literature on "Abraxas." Since Leibundgut's publication in 1976, the figurine has been cited in a number of publications. See, for example, Augusto Consentino, "Il dio anguipede dalla testa di gallo," in *Atti XI Congresso Internazionale di Studi Classici, Kavala (Grecia), August 24-30, 1999* (Athens, 2004), 590; Simón, "Abraxas," 486; Martin Henig and Anthony King, *Pagan Gods and Shrines of the Roman Empire* (OUCA 8; Oxford: Oxford University Committee for Archaeology, 1986), 165.

⁷³ M. J. Vermaseren, *Corpus Inscriptionum et Monumentorum Religionis Mithriacae* (2 vols.; vol. 1; The Hague: Royal Flemish Academy, 1956), 200, #491, pl. 142. Only the snake legs, short tunic and trace of shield on his left arm remain. Vermaseren identifies him as a "Gigant," but tunic and shield are not typical accoutrements of Giants in Hellenistic and Imperial art. J. R. Harris, "Iconography and Context: *ab oriente ad occidentem*," in *Pagan Gods and Shrines of the Roman Empire* (ed. Martin Henig and Anthony King; OUCAM 8; Oxford: Oxford University Committee for Archaeology, 1986), 176, n. 34, is convinced that this must be an anguipede.

⁷⁴ James Wiseman, "The Gymnasium Area at Corinth, 1969-1970," 41.1 (1972): 33. See brief discussions in Ranger Cline, *Ancient Angels: Conceptualizing Angeloi in the Roman Empire* (RGRW 172; Leiden: E. J. Brill, 2011), 121 and Arja Karivieri, "Magic and Syncretic Religious Culture in the East," in *Religious Diversity in Late Antiquity* (ed. David Morton Gwynn and Susanne Bangert; Leiden: E. J. Brill, 2010), 419.

⁷⁵ Wiseman, "The Gymnasium Area," 27. The *defixio* in question, MF-69-114, was found "between the basins and the bench, but below the level of the bench seat." Wiseman, "The Gymnasium Area," 33.

Scholars have long argued that the Anguipede was primarily a solar deity;⁷⁶ of Iranian extraction;⁷⁷ a cosmic deity combining solar, chthonic and earthly elements;⁷⁸ a representation of "some one or other" of the powers of Yahweh with some solar associations;⁷⁹ a visual representation of Yahweh as a Sun-God;⁸⁰ and a visual epithet of Yahweh.⁸¹ As will be seen, the statistics strongly point to the Yahweh-centric hypotheses.

Table 4. Statistically Significant Links to the Anguipede					
Anguipede (58%)	0.000148		Jasper (19%)	0.000022	149
Anguipede (57%)	0.000000		Iaô (30%)	0.000000	147
Anguipede (53%)	0.000002		Green (23%)	0.000000	136
Anguipede (24%)	0.000012		Abraxas (32%)	0.000019	62
Anguipede (13%)	0.002376		Sabaôth (26%)	0.003393	34
Anguipede (9%)	0.012317		Ablanathanalba (27%)	0.017652	23
Anguipede (8%)	0.014425		Heliotrope (28%)	0.020992	21
Anguipede (5%)	0.034826		Semesilam (26%)	0.0471	14

About 57% of the time the word Iaô accompanies the Anguipede on gems and 30% of the time Iaô is found specifically inside the creature's shield (on 14 examples

⁷⁶ Yvan Koenig, "Des «trigrammes panthéistes» ramessides aux gemmes magiques de l'Antiquité tardive: le cas de' Abraxas, continuité et rupture," *BIFAO* 109 (2009): 311-25; John Coleman Darnell, *The Enigmatic Netherworld Books of the Solar-Osirian Unity* (OBO 198; Fribourg: Academic Press, 2004), 385-9; Michel, *Die Magischen Gemmen*, 108-09, briefly entertains the Jewish/Iaô hypothesis (Goodenough, et al.) but ultimately sides with the solar interpretation. See also Paul Post, "Le génie anguipède alectorocéphale: une divinité magique solaire," 40 (1979): 202-04; Bonner, *Magical Amulets*, 127; A. Delatte and P. Derchain, *Les intailles magiques gréco-égyptiennes* (Paris: Bibliothèque Nationale, Cabinet des Médailles, 1964), 30-33.

⁷⁷ A. Alföldi, "Der iranische Weltriese auf archäologischen Denkmälern," *JbSchwUrgesch* 40 (1949-1950): 25-28.

⁷⁸ Martin P. Nilsson, "The Anguipede of the Magical Amulets," *HTR* 44.1 (1951): 61-64; cf. John Ferguson, *The Religions of the Roman Empire* (Ithaca: Cornell University Press, 1970), 167-68.

⁷⁹ Goodenough, *Jewish Symbols* (v. 2), 252.

⁸⁰ E. Zwierlein-Diehl, *Antike Gemmen und ihr Nachleben* (Berlin: Walter de Gruyter, 2007), 220; E. Zwierlein-Diehl, *Magische Amulette und andere Gemmen des Instituts für Altertumskunde der Universität zu Köln* (Papyrologica Coloniensis 20; Opladen: Westdeutscher, 1992), 29-35; Marc Philonenko, "L'anguipède alectorocéphale et le dieu Iaô," *CRAI* 123e.2 (1979): 297-304. Outright identifying the creature as Iaô is also found in authors not specifically concerned with the Anguipede; see Piranomonte, "Religion and Magic at Rome," 209; Zlatko Pleše, *Poetics of the Gnostic Universe: Narrative And Cosmology in the Apocryphon of John* (NHMS 52; Leiden: E. J. Brill, 2006), 188. I can in no way discern how Pleše arrives at the conclusion that Iaô is seven-headed or that he has lunar connections in addition to solar.

⁸¹ Nagy, "Figuring out the Anguipede," 159-72.

other text is found accompanying Iaô inside the shield and on 21 examples other text has replaced Iaô). In 9 cases the shield is missing.

24% (62 gems) of the time the name Abraxas accompanies the Anguipede. This has led in earlier centuries to call the creature "Abraxas" and attribute to it a Gnostic pedigree; and, although Bonner decisively put this notion to rest,⁸² the appellative has lingered on, if only weakly, in some of the secondary literature.⁸³ The perception that Abraxas coincides with the Anguipede with suspicious frequency prompted Paul Corny Finney to put to print his nagging anxiety as late as 1980, thirty years after Bonner's monograph:⁸⁴

While it is tempting to conclude with Bonner that Abrasax is simply another magical word of power, not a personal name, and not a word that bears any necessary relationship to the iconographic convention, this conclusion is premature. First the sources must be collected, published, classified, and dated, however provisionally. Why does the word appear so often in conjunction with the image, and why do the heresiologists make the word the personification of a Basilidian archon?

Although, I have already argued that Abraxas can not be considered merely a word of power, the statistics do bear out Bonner's conclusion that the Anguipede should not be called "Abraxas." While the correlation between Abraxas and the Anguipede is statistically significant it is, in fact, only because of the even stronger link between Abraxas and Iaô. Although all of the *p* values concerned are extremely small, only 32%

⁸² Bonner, *Magical Amulets*, 133-34.

⁸³ John G. Gager, *Curse Tablets and Binding Spells from the Ancient World* (New York: Oxford University Press, 1992), 65; Alicia Walker, "A Reconsideration of Early Byzantine Marriage Rings," in *Between Magic and Religion: Interdisciplinary Studies in Ancient Mediterranean Religion and Society* (ed. Sulochana R. Asirvatham, Corinne Ondine Pache, and John Watrous; New York: Rowman & Littlefield, 2001), 161; Simón, "Abraxas," 486-501, regularly refers to the Anguipede as "Abraxas;" Gilles Quispel, "Hermann Hesse and Gnosis," in *Gnostica, Judaica, Catholica: Collected Essays of Gilles Quispel* (ed. Johannes van Oort; NHMS 55; Leiden: E. J. Brill, 2008), 251, originally published in *Gnosis. Festschrift für Hans Jonas* (Göttingen: 1978), 492-507.

⁸⁴ Paul Corby Finney, "Did the Gnostics Make Pictures?," in *The Rediscovery of Gnosticism* (ed. Bentley Layton; Leiden: E. J. Brill, 1980), 463.

of instances of the name Abraxas share an Anguipede, while 60% coincide with Iaô. Furthermore, in 46% of cases where Iaô is present with the Anguipede the name Abraxas is missing and only 14% of Anguipede gems have both Iaô and Abraxas. Even more importantly, only 8 gems in our corpus attest to Abraxas where Iaô is missing. It is, therefore, clear that Iaô is the essential factor that accounts for the high incidence of Abraxas with the Anguipede.

The claim that the Anguipede primarily has solar connections has been based on two types of analyses: an analytic breakdown of the components of the Anguipede and an associative argument, that the Anguipede is typically paired with other solar divinities. In the analytical approach, Bonner and Nilsson observe that the cock has strong solar associations,⁸⁵ and Bonner (as Michel much later) sees the whip as that of Helios the charioteer.⁸⁶ Although, Bonner and Nilsson pause at the snake legs and see primarily chthonic associations,⁸⁷ Goodenough points out the serpent's strong solar connections both in Hellenistic and Egyptian contexts.⁸⁸ I will not deny that the Anguipede can be understood in this analytic manner as a solar deity, but it is striking that the strongest correlations (Table 4) are with the Iaô cluster. The only correlations that hint at something solar are *ablanathanalba*, which is shared between the Astral and Iaô clusters; the material heliotrope, whose only two strong correlations are with Helios ($p = 0.039$) and the Anguipede—although more strongly with the latter ($p = 0.021$), not only in terms

⁸⁵ Nilsson, "The Anguipede," 62; Bonner, *Magical Amulets*, 127. See also Goodenough, *Jewish Symbols* (v. 2), 247.

⁸⁶ Simone Michel, *Die magischen Gemmen im Britischen Museum* (2 vols.; vol. 1; London: The British Museum Press, 2001), 116; Bonner, *Magical Amulets*, 128.

⁸⁷ Nilsson, "The Anguipede," 63; Bonner, *Magical Amulets*, 128. The chthonic associations are, of course, due to the depictions of the mythical giants as snake-legged from the fourth century BCE onward. See Daniel Ogden, *Drakon: Dragon Myth and Serpent Cult in the Greek and Roman Worlds* (Oxford: Oxford University Press, 2013), 83-86. Cf. Quispel, "Hesse," 251.

⁸⁸ Goodenough, *Jewish Symbols* (v. 2), 127-248.

of statistical significance but also in frequency distribution (12% vs. 28%); and, very weakly, the *vox magica*, *semesilam*. *Semesilam* likely has already lost its solar link, despite its etymology (see §4.b below), and therefore will not be considered further here (see discussion below). *Ablanathanalba* and the material heliotrope do suggest some solar understanding of the creature, at least some of the time, and speak to the multilayered, polyvalent nature of the Anguipede, but its primary association seems to be with the Hebrew God.

More recently, the argument put forth by Yvan Koenig—and foreshadowed by John Coleman Darnell and other Egyptologists—deserves attention.⁸⁹ Once again, this is an analytic argument, focusing on the tripartite nature of the Anguipede, but brings to bear interesting Egyptian evidence. Koenig compares the tripartite nature of the Anguipede with the so-called "pantheistic trigrams" from the Ramesside period. These trigrams consist of three sequential symbols corresponding to three periods of the sun: morning, midday and night. He argues that the Anguipede's rooster head corresponds to the morning sun, the armored torso to the peak midday sun and the serpent legs to the evening sun, when it is about to descend into the underworld. Koenig further cites a striking figure that appears in corridor G of the tomb of Ramesses VI. It is a snake-legged mummiform torso with solar disk for head. The accompanying hieroglyphic text allows one to conclude this is a depiction of the unified god Re-Osiris.⁹⁰ While this tripartite figure is evocative of the Anguipede of magical gems, there are important differences as well. This figure is depicted as armless and the hieroglyphic text states that his arms are

⁸⁹ Koenig, "Des «trigrammes panthéistes» ramessides," 315-20; Darnell, *Enigmatic Netherworld Books*, 387-89 and also see ns. 64 and 65 on 87 for earlier literature.

⁹⁰ Darnell, *Enigmatic Netherworld Books*, 231-70, 385-86.

hidden in the solar disk⁹¹—neither of these states (being armless or arms hidden in the solar disk) account for the whip and shield-wielding arms of the Anguipede. Furthermore, the torso of the Egyptian figure is mummified whereas that of the Anguipede is armored. The only common elements between these two creatures are the snake legs and tripartite structure. Structurally, it is a sort of antecedent of the Roman-Era Anguipede, but a genetic relationship is far from clear. The two figures are separated by nearly 1,400 years and, unlike the snaked-legged giants of the Hellenistic period which Bonner used as a point of departure, the anguiform Re-Osiris is both unique and relatively inaccessible (located in a royal tomb).⁹² It is difficult to imagine the path of transmission that would have informed a Roman-Era magician of this Egyptian figure, not so much in terms of conceptual (in)compatibility, how he would ever have become familiar with it, especially given the 1,400 year gap in which it appears nowhere else. Without this link, the significance of the adduced "pantheistic trigrams" cited by Koenig is no longer evident since *just* having a tripartite structure is not evidence of continuity, influence or genetic relationship between two objects.

When we come to the associative argument, the statistics are even clearer. Bonner's observation that the Anguipede is often combined with other solar figures has been widely followed,⁹³ but, in fact, none of those associations are statistically significant: Chnoubis ($p = 0.999$), Cynocephalus ($p = 0.813$), Harpocrates ($p = 0.976$), Heliorus ($p = 0.501$), and Helios ($p = 0.685$) are all very weakly correlated. The number

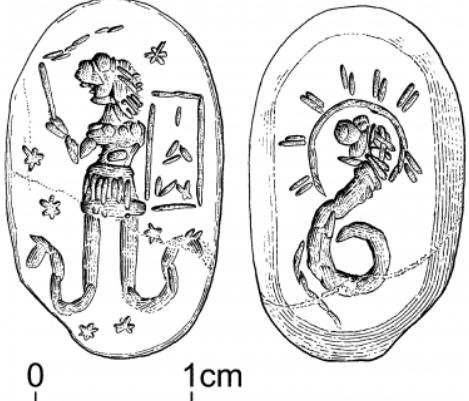
⁹¹ Darnell, *Enigmatic Netherworld Books*, 231.

⁹² Here I take the inverse position of Darnell, *Enigmatic Netherworld Books*, 388, who considers this Egyptian figure as the long sought-for Egyptian parallel that Bonner had failed to encounter and therefore the preferred point of departure for understanding the Roman-Era Anguipede.

⁹³ Bonner, *Magical Amulets*, 132-33, 282. See Pleše, *Poetics of the Gnostic Universe*, 188, n. 42; Consentino, "Il dio anguipede," 589-90; Nagy, "Figuring out the Anguipede," 169.

of incidents between these solar-themed icons and the Anguipede, and their corresponding probabilities, are even less significant than those for the name Abraxas (see above).

With the above result, the solar hypothesis—that the Anguipede should be primarily understood as a solar divinity—is difficult to defend. The solar association is certainly secondary and is best expressed in a few gems where the engraver has deviated from its standard visual depiction. In 15 cases the head is that of another animal (once that of a human in Michigan 93), of which 8 are a lion's head. Illustration 11, below, is a fine example of a leonine Anguipede. The lion's solar connections have long been recognized⁹⁴—especially in Egypt, where the animal was closely associated with Horus⁹⁵—and in our gem corpus it is significantly correlated with Helios ($p = 0.0309$).

Illustration 11. British Museum 395	Illustration 12. Anguipede in Quadriga
 <p>SOURCE: Michel 2001. Reproduced by courtesy of the Trustees of the British Museum.</p>	 <p>SOURCE: King, Plate 12.1</p>

A very different type of Anguipede gem warrants comment due to its singular uniqueness, a drawing of which is found in King's *Handbook of Engraved Gems* (London: 1885), pl. 12.1, (Illustration 12). Here, the Anguipede is in Helios' chariot seat

⁹⁴ Bonner, *Magical Amulets*, 150-51.

⁹⁵ Howard M. Jackson, *The Lion Becomes Man: The Gnostic Leontomorphic Creator and the Platonic Tradition* (SBLDS 81; Atlanta: Scholars Press, 1985), 112-13.

controlling the reins of the quadriga with his snake legs. It is difficult to know how faithful the drawing is to the now-lost gem, but its style strongly suggests an early modern forgery.

There is no doubt that in these few examples, the Anguipede's solar connections are being emphasized as much as their Yahwistic ones (note the prominent Iaô inscribed in the shield in Illustration 11), if not more. But, the leonine alloform of the Anguipede is rare, on only 3% of cases. Likewise, the Anguipede coincides with the *vox magica*, *ablanathanalba*, only 23 times, the material heliotrope 21 times, and the Anguipede in quadriga is attested only once, giving a total of 54 cases (20%) where the creature's solar attributes are being emphasized.

This leaves about 80% of Anguipedes emphasizing their Yahwistic association and compels me to focus on the hypotheses positing a Jewish origin or understanding of the icon's design, namely, the work of Goodenough, Philonenko, Zwierlein-Diehl, and Nagy. Goodenough's position is circumspect enough, arguing that the Anguipede—and every other image with which the name Iaô is paired—shows not Iao himself, but some one or other of his powers.⁹⁶ He suggests that the Anguipede's sudden popularity with "no ancestry or development" could only be the result of the figure being invented and given currency in a group that "was most probably a large and important one... whose central interest was in such names as Iao, Iao Sabaoth, Iao Sabaoth Adonai, Michael, and other similar ones, since... these are the names which appear in overwhelming frequency with the anguipede."⁹⁷ This group, he argues, must have been Jewish.⁹⁸ Of the names he cites, Iaô and Sabaôth are, indeed, significantly correlated with the Anguipede, and the

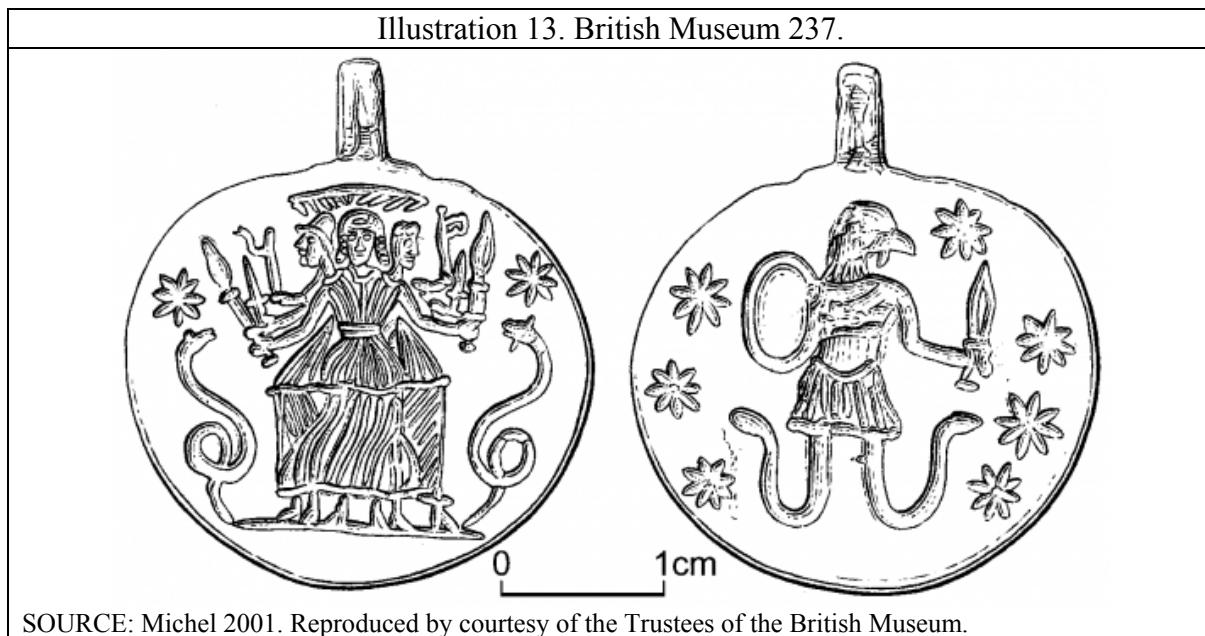
⁹⁶ Goodenough, *Jewish Symbols* (v. 2), 252.

⁹⁷ Goodenough, *Jewish Symbols* (v. 2), 250.

⁹⁸ Goodenough, *Jewish Symbols* (v. 2), 250.

suggestion that the image's sudden popularity is due to its wide currency among Jews, from whose religion magicians so frequently borrowed, is tempting but can only be confirmed archaeologically by identifying Anguipede gems in Jewish contexts—something which has not yet happened.⁹⁹

Philonenko argues for a triple syncretism in the Anguipede (Greek, Egyptian and Jewish).¹⁰⁰ He uses as a point of departure an anguipede Hecate depicted on a gem mentioned by Goodenough (vol. 2, 255) and suggests that this was the model for the



Anguipede. The cock's head he argues derives from a misreading of the tetragrammaton, which occasionally was transcribed as ΠΙΠΙ (see discussion at the beginning of chapter) in order to visually conform to its Hebrew appearance (יהי). ΠΙΠΙ sounds like Demotic

⁹⁹ S. Agady, et al., "Byzantine Shops in the Street of the Monuments at Bet Shean (Scythopolis)," in *What Athens has to do with Jerusalem: Essays on Classical, Jewish, and Early Christian Art and Archaeology in Honor of Gideon Foerster* (ed. Leonard V. Rutgers; Leuven: Peeters, 2002), 496-97, argue that sixth century glass weights found in a complex of five shops in the Street of the Monuments in Beth Shean (Scythopolis) point to a Jewish community, despite the Christian character of some finds; among the finds was an Anguipede gem (501-504). Unfortunately, it was found in shop 3 whereas the weights were found in shop 4.

¹⁰⁰ Philonenko, "L'anguipède," 199ff.

ppj and Coptic $\pi \alpha \pi o \iota$, which he claims mean "rooster." Nagy, however, argues that the meaning of "rooster" for the Egyptian word is not securely attested and, more critically, the anguipede Hecate cited by Philonenko is a modern forgery.¹⁰¹ The closest ancient example I can find is BM 237 (Illustration 13), but this is not a true anguipede—the serpents on either side of Hecate do not seem to be part of her body.

Zwierlein-Diehl argues that the Anguipede represents Yahweh as "A great Sun-God,"¹⁰² with his snake legs referring to the god who runs with strong legs over the sky,¹⁰³ the sun's endless motion.¹⁰⁴ Like Nagy, I find this interpretation unconvincing.¹⁰⁵ It does not account for the human torso and why the cock should have been specifically chosen for the head and paired with a giant's lower torso—which she, however, denies has any chthonic character in the Anguipede.¹⁰⁶ King's gem of the Anguipede in quadriga, already mentioned, is the crucial design facilitating the link between two snake legs and the sun's unending motion. But, it is a unique design and, as already mentioned, its style is strongly reminiscent of an early modern provenance.

Arpad Nagy argues that rather than representing an image of the Hebrew God, the Anguipede is the result of plays on the Hebrew root גַּבָּר (*GBR*) and constitutes an image of a *name* of God.¹⁰⁷ In Deut. 10:17 one finds גַּבָּר (*gibbor*), an adjective meaning "strong"

¹⁰¹ Nagy, "Figuring out the Anguipede," 163.

¹⁰² Zwierlein-Diehl, *Magische Amulette*, 34.

¹⁰³ Zwierlein-Diehl, *Antike Gemmen*, 223.

¹⁰⁴ Zwierlein-Diehl, *Magische Amulette*, 32.

¹⁰⁵ Nagy, "Figuring out the Anguipede," 163.

¹⁰⁶ Zwierlein-Diehl, *Antike Gemmen*, 222-23.

¹⁰⁷ Nagy, "Figuring out the Anguipede," 159-72. In two later Jewish mystical texts, the *Merkavah Rabbah* (eighth to tenth centuries) and *Ma'aseh Merkavah* (seventh to ninth centuries), "name" and "might" (גַּבִּירָה = *gibburah*) are equated: "He [is] ' is his name, and his name is '[he is]'" (*Merkavah Rabbah* §655); "His countenance [is] his name, and his name [is] his countenance, and the utterances of his lips [are] his name" (*Ma'aseh Merkavah* §588); see Peter Schäfer, *The Hidden and Manifest God: Some Major Themes in Early Jewish Mysticism* (SSJ; New York: State University of New York Press, 1992), 77-81, 97-99. For recensions and dating see Davila, *Hekhalot Literature in Translation*, 247-48, 302-05.

or "mighty," as an epithet of Yahweh. The Hebrew noun **גִּבְעָרָה** (*gibburah*) too is based on this root, meaning "strength" or "might," and is often more specifically the "mighty deeds of God" (Ps. 21:14). In Ps. 19:6 (= LXX 18:6) one finds **גִּבְעָר** translated by the LXX with the word **γίγας** (= "giant," e.g., Is. 3:2, 49:25; Ez. 39:20). The connection here between the Hellenistic depiction of giants with serpent legs, as on the second century CE Pergamon altar, and the word **גִּבְעָר** had already been suggested by Bonner,¹⁰⁸ but when one ventures outside scripture to Middle Hebrew¹ a tantalizing usage is found, that of **גִּבְרָה** meaning "rooster."¹⁰⁹ When this is combined with another typical LXX translation of **גִּבְעָר** as **μαχητής** (= "warrior", e.g. Jer. 26:12, Zech 9:13),¹¹⁰ one finds in the root **GBR** (**גִּבְרָה**) the three principal elements that distinguish the anguipede: rooster head, the armored torso of a warrior and snake legs—the Anguipede is a visual pun based on an epithet of Yahweh. Nagy's solution is compelling both for its simplicity (all visual aspects of the Anguipede can be accounted for by a triple pun on a single Hebrew root, *GBR*) and its consistency with the statistical correlations in the Iaô cluster—just like *GBR*, most of the attributes correlated to Iaô can be understood as epithets of Yahweh.

If Nagy's analysis is correct and the Anguipede is simply another (visual) epithet of Yahweh, his line of argumentation offers an interesting opportunity, and one not taken

¹⁰⁸ Bonner, *Magical Amulets*, 128.

¹⁰⁹ Middle Hebrew is the Hebrew used in the Mishnah and Talmud, further subdivided as Middle Hebrew¹ and Middle Hebrew², with an example of the former being the Hebrew of the Mishnah, i.e., "Mishnaic Hebrew." Whereas the former was a spoken vernacular, the latter was a written, academic tongue. See William David Davies and Louis Finkelstein, *The Cambridge History of Judaism: The Late Roman-Rabbinic Period* (vol. 4; Cambridge: Cambridge University Press, 1989), 81-98 and William David Davies and Louis Finkelstein, *The Cambridge History of Judaism: The Hellenistic Age* (vol. 2; Cambridge: Cambridge University Press, 1989), 81-98. See also Miguel Pérez Fernández, *An Introductory Grammar of Rabbinic Hebrew* (Leiden: E. J. Brill, 1999), 1-15.

¹¹⁰ Hans Kosmala, "The Term *Geber* in the Old Testament and in the Scrolls," in *Congress Volume, Rome, April 15-19, 1968* (VTSup 17; Leiden: E. J. Brill, 1969), 160, states: "...a *geber* is a man who distinguishes himself from others by his strength, or courage, or uprightness, or some other quality." The extension of this to specifically mean "warrior" is an easy step.

by him.¹¹¹ Unlike גּוֹרֵגּ / גּוֹרֵגּ / μαχητής, both rooted in Biblical Hebrew, גּוֹרֵגּ / "rooster" entails a lexical development from the Tannaitic period, namely, the first two centuries CE.¹¹² This presents the possibility of positing a *terminus post quem* for the development of the Anguipede iconography. In the Mishnah, *Yoma* (hereafter *M. Yoma*) 1.8, one reads that the ashes from the altar at the temple in Jerusalem were removed at the period of קְרִיאַת הַגּוֹרֵגּ, "the call of גּוֹרֵגּ," which can either mean "call of the man/crier" or "rooster crow." גּוֹרֵגּ traditionally means "young, strong man" and is cognate with the Aramaic גּוֹבְּרָא, "man."¹¹³ The word's development into meaning "rooster" is unsurprising and no doubt a euphemism for the *membrum virile*,¹¹⁴ a phenomenon not restricted to Hebrew, as seen in the English usage of the term "cock." Confusion between the two usages is made evident in the debates recounted in the corresponding section in the Babylonian Talmud, *Yoma* (hereafter *T. Yoma*) 20b—i.e. whether הַגּוֹרֵגּ refers to "man" or "rooster." That this confusion should arise in the Babylonian Talmud as to the meaning of גּוֹרֵגּ suggests that the commentators were too far removed in time and place from the original *Sitz im Leben* of the Mishnaic phrase קְרִיאַת הַגּוֹרֵגּ found in *M. Yoma* 1.8.

A strong hint that the phrase should, in fact, mean "rooster crow" comes from an unlikely place, the *Gospel of Mark* 13:35, where we find ἀλεκτοροφωνίας ("rooster

¹¹¹ He mentions simply that בָּבָר as "rooster" first occurs in a Talmudic context (Nagy, "Figuring out the Anguiped," 166, n. 43), but this could potentially disqualify the meaning from his analysis of the Anguiped since the redactions of the Jerusalem and Babylonian Talmuds reached completion no earlier than the 5th century CE. One must demonstrate that the meaning of בָּבָר as "rooster" dates to the earliest stratum of the Talmud, i.e., the Mishnah.

¹¹² Tannaitic refers to the period of the Tannaim, the first two centuries CE during which the traditions of the Mishnah were compiled and redacted around 220 CE by R. Yehudah HaNasi. Mishnaic Hebrew largely reflects the Hebrew spoken at the time. See, M. H. Segal, *Mišnaic Hebrew and its Relation to Biblical Hebrew and to Aramaic, a Grammatical Study* (Oxford: H. Hart, 1909). Hebrew finally died as the vernacular in Palestine around 200 CE. See, Philip S. Alexander, "How did the Rabbis Learn Hebrew?," (ed. William Horbury; Edinburgh: T&T Clark Ltd., 1999), 75.

¹¹³ See note 110.

¹¹⁴ Kosmala, "The Term *Geber* in the Old Testament and in the Scrolls," 159; John P. Peters, "The Cock," *JAOS* 33 (1913): 366.

crow") as the third night watch. If the watches in *M. Yoma* 1.8 (= *T. Yoma* 20) correspond to the those in Mark 13:35, which, in turn, correspond to the first three of the widely used four-watch system of the Roman period—as seems to be the case¹¹⁵—then נֶכֶר in the Mishnaic phrase must mean "rooster" and Jewish practice must have referred to the third watch as "rooster crow" at least as far back as composition of Mark in the second half of the first century CE.¹¹⁶ Since the tractate *M. Yoma* is concerned with the maintenance of the temple cult in Jerusalem, it constitutes one of the earliest strata of the Mishnah and may date well before the temple was destroyed in 70 CE.¹¹⁷ However, there are reasons to suspect that the exact formulations of *M. Yoma* do not date before 70 CE,¹¹⁸ therefore, I will maintain a conservative estimate and posit the end of the first century as the *terminus post quem* for the meaning of נֶכֶר as "rooster" and, consequently, the possibility for the complex punning Nagy's hypothesis requires. A late first century *terminus post quem* is further substantiated by the fact that not a single Anguipede gem has been securely dated to the first century or earlier (although a number are given a date range of first to second century CE, which simply reflects the imprecision that plagues the dating of these objects).

Can the period during which the Anguipede imagery was designed be narrowed further with a *terminus ad quem*? The dating of numerous magical gems with the

¹¹⁵ Rose, "Jahwe," 685-701, especially 694-6.

¹¹⁶ The debate concerning the exact date of the Gospel of Mark is too complex to engage here and unnecessary. General consensus agrees that the gospel likely dates sometime between 65 and 75 CE, but opinions are split roughly half and half whether the gospel should be dated before the destruction of the temple (70 CE) or after. See Adam Winn, *The Purpose of Mark's Gospel: An Early Christian Response to Roman Imperial Propaganda* (WUNT 245; Tübingen: Mohr Siebeck, 2008), 43-91, especially 56, nn. 32-33 for bibliography on pre/post-70 CE debate.

¹¹⁷ Herbert Danby, *The Mishnah: Translated from the Hebrew with Introduction and Brief Explanatory Notes* (Oxford: Oxford University Press, 1989 [1933]), xxii.

¹¹⁸ Daniel Stökl Ben Ezra, *The Impact of Yom Kippur on Early Christianity: The Day of Atonement from Second Temple Judaism to the Fifth Century* (WUNT 163; Tübingen: Mohr Siebeck, 2003), 19-28; Louis Ginzberg, "Tamid: The Oldest Treatise of the Mishnah," *JJLP* 1.1 (1919): 266, n. 66.

Anguipede to the third century provides the obvious terminal point, but the dating of these objects is notoriously difficult and a more precise terminal point can be adduced—the disappearance of the Hebrew vernacular in Palestine. The significance of this only becomes apparent when one reflects on the fact that גָּבָר for "rooster" is a highly idiomatic usage in Mishnaic Hebrew and no longer the typical word for "man,"¹¹⁹ unlike its Aramaic cognate, which, incidentally, is never attested with the meaning of "rooster."¹²⁰ It is unlikely that the punning on גָּבָר would have occurred after vernacular Hebrew died out by the end of the second century because then one would have to posit someone from the Rabbinic circles created the Anguipede, a problematic supposition given the strongly aniconic nature of Talmudic Judaism. Rather, the creator was likely someone whose vernacular was Middle Hebrew¹, while also familiar with Hellenistic culture, as familiarity with the depictions of anguipede giants from the Hellenistic period would require. Already during the Bar Kochba revolt (132-135 CE), only a minority of the letters written by Bar Kochba's lieutenants are in Hebrew.¹²¹ Hebrew is best attested in the late second and early third century in the necropolis of Beth Shearim, where most of the inscriptions are Hebrew and most of those interned seem to come from the rabbinate, if the well-attested epithet of "Rabbi" is any indication.¹²² The trend is clear: the more we move towards the end of the second century the less likely we are to encounter the

¹¹⁹ The typical Middle Hebrew term for rooster is תְּרֵנְגֵל. See Peters, "The Cock," 370. Kosmala, "The Term *Geber* in the Old Testament and in the Scrolls," 159, states "In the Mishnah *geber* is almost always the word for 'cock.'" גָּבָר is used for "rooster" four times: *M. Shekalim* 5.1, *M. Tamid* 1.2, *M. Yoma* 1.8, and *M. Sukkah* 5.4; תְּרֵנְגֵל is used once (*M. Abodah Zarah* 1.5). Twice גָּבָר is used to mean "man" (e.g. *M. Peah* 8.9, *M. Gittin* 9.2) and once *membrum virile* (*M. Bekhorot* 7.5).

¹²⁰ s.v. גָּבָר in Michael Sokoloff, ed., *A Dictionary of Jewish Babylonian Aramaic of the Talmudic and Geonic Periods* (Baltimore: The Johns Hopkins University Press, 2002), 258-59; גָּבָר in Ludwig Koehler and Walter Baumgartner, *The Hebrew and Aramaic Lexicon of the Old Testament* (2 vols.; vol. 2; Leiden: Brill, 2001), 1841-42 and Marcus Jastrow, ed., *A Dictionary of the Targumim, the Talmud Babli and Yerushalmi, and the Midrashic Literature* (London: Luzac & Co., 1903), 208.

¹²¹ Nicholas de Lange, "The Revival of the Hebrew Language in the Third Century CE," *JSQ* 3.4 (1996): 344.

¹²² Lange, "Revival of the Hebrew Language," 349-50.

Anguipede's creator. The *terminus ad quem*, therefore, can probably be set at the end of the second or beginning of the third century, with the strongest likelihood of finding our mysterious Hellenized Jew in or near the first half of the second century. He likely lived in Palestine, where most Hebrew speakers are attested from antiquity, or was an immigrant therefrom.

4. The "Voices Magicae" Yellow Subgroup

This subgroup involves 99 gems. Three of its *voices magicae* are closely associated with Iaô: *ablanathanalba*, *akramachamari* and *sesengenbarpharanges*; while an addition two attributes, the material carnelian and the *vox Aianagba*, constitute outliers.

a. ablanathanalba, akramachamari and sesengenbarpharanges

Ablanathanalba may be best understood as an epithet of Iaô even if the palindrome's derivation is completely uncertain and hitherto proposed Hebrew solutions have been unsatisfactory.¹²³ It makes its appearance in later Jewish amulets,¹²⁴ but also is found in the Greek Magical Papyri, often as part of a string of names invoking the God of

¹²³ See: Martinez, *P. Mich. 6925*, 150; for skepticism of Hebrew derivation, see: Bonner, *Magical Amulets*, 191 n.1, 202; Gershom Scholem, *Jewish Gnosticism, Merkabah Mysticism, and Talmudic Tradition* (New York: The Jewish Theological Seminary of America, 1965 [1960]), 94. Attempts to find Hebrew derivations for *voices magicae* have often been misguidedly overzealous; see Gideon Bohak, "Hebrew, Hebrew Everywhere? Notes on the Interpretation of *Voices Magicae*," in *Prayer, Magic and the Stars in the Ancient and Late Antique World* (ed. Scott Noegel, Joel Walker, and Brannon Wheeler; Magic in History Series; University Park: Pennsylvania State University Press, 2003), 69-82.

¹²⁴ Joseph Naveh and Shaked, *Amulets and Magic Bowls*, amulet 4.

Israel.¹²⁵ *Papyri Graecae Magicae* (PGM) V.475 ups the ante by explicitly referring to *ablanathanalba abrisilao* as the Hebrew for the name of the "Great God." The *vox*, of course, is not Hebrew, but the claim may suggest that it was originally borrowed from Jewish—or what was thought to be Jewish—magical practice.¹²⁶

Akramachamari, like *ablanathanalba*, also occurs in long strings invoking Iaô.¹²⁷ While discussing PGM XXXV, a text with numerous Jewish elements, Wolfgang Fauth refers to *akramachamari* and *ablanathanalba* (lines 22-23) as ciphers for the Iaô-assimilated-Sun God ("Chiffren für den dem Jao assimilierten Sonnengott...").¹²⁸ Of these *voices*, it is the first one of two with a convincing Semitic derivation, meaning something like "uproot the magic spells," as proposed by Scholem.¹²⁹ It seems to be based on two Aramaic words, the verb *'aqar* (עֲקַע), meaning "to uproot," and the noun *makhmari* (מְכַמֵּרִי), generically meaning "nets," with a technical meaning of "magic spells" in magical texts. *'aqar* is attested on magic bowls in the context of destroying evil spirits.¹³⁰

The *Shi'ur Qomah*, a Jewish mystical text cataloguing God's bodily limbs,¹³¹ makes mention of *sesengenbarpharanges* in perhaps the strangest of the references to attributes correlated with Iaô, for it appears as an epithet for the right thigh of God.¹³² The

¹²⁵ E.g. PGM VII.311, PGM VIII.60-61, PGM XII.63. See Morton Smith, "The Jewish Elements in the Magical Papyri," in *Studies in the Cult of Yahweh* (ed. Shaye J. D. Cohen; Leiden: E. J. Brill, 1996), 245-49.

¹²⁶ Richard Gordon, "Aelian's peony: the location of magic in Graeco-Roman tradition," in *Comparative Criticism* (ed. E. S. Shaffer: Cambridge University Press, 1987), 87-88.

¹²⁷ PGM VIII.60-61.

¹²⁸ Fauth, *Helios Megistos*, 95. For his views on the complex relationship and assimilation between Iaô and Helios in the PGM, *ibid.* 73-74, 90-118.

¹²⁹ Scholem, *Jewish Gnosticism*, 97.

¹³⁰ Scholem, *Jewish Gnosticism*, 97, n. 13.

¹³¹ Like *Hekhalot Zutarti*, *Shi'ur Qomah* belongs to the body of Hekhalot literature.

¹³² Scholem, *Jewish Gnosticism*, 98.

vox also appears on Palestinian Jewish amulets,¹³³ but the context of each instance does not offer enough information to clarify the import of the *vox*. A number of spelling variants are attested and three principal derivations have been suggested.¹³⁴ The earliest analysis, that by M. Kopp, divided the *vox* into four parts: "ses", "engen," "bar," and "pharanges."¹³⁵ For "Ses" he suggested the Hebrew שׁשׁ ("six"), but for "engen" he was at a loss. For "bar pharanges" he took Josephus (*Jewish War* 7.6.3) as his point of departure, reading "Baaras" for "Bar," the name of a valley in which grew a plant used in the cult of Hecate, and φάραγξ ("valley") for "pharanges." Kropp, Hopfner and most recently Gager have followed Kopp in the analysis of "barpharanges."¹³⁶ Scholem, in turn, found this analysis unconvincing and instead offered the more obvious interpretation for "bar" as בֶּן (Aramaic for "son"), and therefore, "Sesengen son of Pharanges" which, following Montogomery, he suspected may be a Persian name.¹³⁷ In 1928, Perdrizet suggested that "sesengenbar" be derived from שְׁשִׁים גִּבְּרִים, *sisim gibborim*, the "sixty mighty men" who accompany Solomon's litter in Song 3:7, and "pharanges" possibly from "pharaoh." This Scholem found fantastical.¹³⁸ The reference (Song 3:7) is obscure and the phonetic gymnastics required to arrive at "pharanges" from "pharaoh" are formidable. Even if both derivations were correct, it is far from clear why the two should have been conjoined. That Scholem was on the right track is suggested by a Hebrew incantation from about the seventh century BCE in which an ancient deity named *Ssm* son of *Pdrsh* is invoked in

¹³³ Amulet 7a, l. 10 in Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 7.

¹³⁴ See Brashear, "The Greek Magical Papyri," 3598-99; for variants, see Martinez, *P. Mich.* 6925, 105-06.

¹³⁵ U. F. Kopp, *Palaeographia Critica* (4 vols.; vol. 3; Mannheim: Kopp, 1829), 671-81.

¹³⁶ Gager, *Curse Tablets*, 269; T. Hopfner, *Griechisch-Ägyptischer Offenbarungszauber* (SPP; vol. 1; Amsterdam: Adolf M. Hakkert, 1974), 289-91; A. Kropp, *Ausgewählte koptische Zaubertexte Bd. III: Einleitung in koptische Zaubertexte* (Brussels: Edition de la Fondation égyptologique reine Elisabeth, 1930), §211.

¹³⁷ Scholem, *Jewish Gnosticism*, 96-100; see also Martinez, *P. Mich.* 6925, 105-07.

¹³⁸ Scholem, *Jewish Gnosticism*, 97, n. 15.

order to protect against night demons.¹³⁹ Both the N son of N designation and some of the consonantal correspondences suggest the tempting scenario that "Sesengen son of Pharanges" is an Aramaicized and corrupted version of "Sesem son of Pederesh" hailing from the previous millennium.¹⁴⁰

Even if *ablanathanalba*, *akramachamari* and *sesengenbarpharanges* are at times best understood as epithets of Iaô, it is important to keep in mind that they also appear as separate hypostasized entities, as in the case of Sabaôth. PGM. XII.183-185a reads, Αρσενοφρη, ὁ βασιλεὺς τῶν οὐρανίων θεῶν, Αβ]λαναθαναλβα, ὁ τὸ δίκαιον ἔχων, Ακραμμαχαμαρει, ὁ ἐπίχαρις θε[ός, σανκ]ανθαρα, ὁ τῆς φύσεως ἡγεμών. Since magical gems offer little space for such textual elaboration, there is no way to know how these *voices* are to be understood in a given case, whether as epithets of Iaô or separate entities, but both possibilities must be kept in mind.

I am compelled to follow Scholem's skepticism over Bonner's claims for solar connections with *sesengenbarpharanges* and *akramachamari*.¹⁴¹ Their suggested etymologies (see above) betray no solar origins and they are not statistically correlated with any solar attribute in our corpus of gems.

¹³⁹ H. Torczyner, "A Hebrew Incantation against Night-Demons from Biblical Times," *JNES* 6.1 (1947): 21-29; Wolfgang Fauth, "SSM BN PDRŠŠA," *ZDMG* 120 (1970): 229-56.

¹⁴⁰ A. A. Barb, "Three Elusive Amulets," *JournWarburgInst* 27 (1964): 15.

¹⁴¹ See Scholem, *Jewish Gnosticism*, 95; Bonner, *Magical Amulets*, 201-02.

b. Semesilam

Semesilam (also found as *semeseilam* and *semeseilamps*) is a divine epithet and is widely agreed to derive from a Semitic phrase meaning "eternal sun" (שֶׁמֶשׁ עַלְםָ) (שֶׁמֶשׁ עַלְםָ).¹⁴² Scholem at first concurred, but in the second edition of *Jewish Gnosticism, Merkabah Mysticism, and Talmudic Tradition* he reversed course and suggested an Aramaic derivation meaning "my name is peace" (שְׁמֵי שְׁלָמָ).¹⁴³ However, it is already present as a divine epithet in Phoenician inscriptions and therefore his objection that it does not conform to a proper Hebrew etymology is moot—"eternal sun" is most certainly correct.¹⁴⁴ *Lailam* must be mentioned in conjunction with *semesilam* since it is clearly derived from the Hebrew prepositional phrase "for eternity" (לְעוָלָם) and likely derived from the above "eternal sun" (שֶׁמֶשׁ עַלְםָ). While its use suggests it was understood as an epithet, similar to *semesilam*, it does not coincide with the name Iaô in any significant way, which suggests its derivative nature.

The original meaning of "eternal sun" seems to have been lost by the time it was appropriated into the magical tradition. First, its statistical correlation with other allegedly solar attributes is very weak: Chnoubis ($p = 0.22$), Cynocephalus ($p = 0.51$), Harpocrates ($p = 0.64$) and Helios ($p = 0.357$) and there is no correlation with Heliorus—so much for claims that it is frequently associated with solar symbols.¹⁴⁵ Second, it is

¹⁴² Bohak, *Ancient Jewish Magic*, 198; Reimund Leicht, "Qedushah and Prayer to Helios: A New Hebrew Version of an Apocryphal Prayer of Jacob," *JSQ* 6.2 (1999): 159; Marvin Meyer and Richard Smith, eds., *Ancient Christian Magic, Coptic Texts of Ritual Power* (Princeton: Princeton University Press, 1994), 392; Goodenough, *Jewish Symbols* (v. 2), 251-52, 63; Bonner, *Magical Amulets*, 187.

¹⁴³ Scholem, *Jewish Gnosticism*, 76, 134. Brashear, "The Greek Magical Papyri," 3427-28, 37, too hastily follows this revised etymology..

¹⁴⁴ F. M. Cross, *Canaanite Myth and Hebrew Epic: Essays in the History of the Religion of Israel* (Cambridge: Harvard University Press, 1997 [1973]), 18, especially n. 33.

¹⁴⁵ See Sperber, *Magic and Folklore*, 83, 91, who approvingly quotes Bonner, *Magical Amulets*, 187.

often replaced by its variant *semeseilamps* where the second half of the *vox* has been confused with the stem –λαμψ, meaning "light" or "brightness" (as in λάμψις, ἔκλαμψις).¹⁴⁶ It is possible that this notion of "light" hints at a solar understanding of the *vox*, but, given the above statistics, I can not admit but a small possibility of this. The *vox*, *lailam*, which we have seen is derived from מִלְעָל ("forever"), and constitutes the second half of *semesilam*, too has suffered similar confusion.¹⁴⁷

c. Carnelian and aiangba

The only statistically significant link that carnelian has with the rest of this subgroup and, indeed, with the rest of the gem network map, is with the *vox* *sesengenbarpharanges*, but this only occurs on nine gems. Most uses of carnelian—the rest of the 238 carnelian gems—seem to be due to other reasons, perhaps color. *Aiangba* is an infrequent *vox* appearing only sixteen times in our database and having its only statistically significant link with carnelian. Little can be said as to the significance of this connection due to the small number of gems and the otherwise inscrutable etymology of *aiangba*. Attempts to divine its significance from the many, effectively random, formulae and *characteres* that accompany *aiangba* remain unconvincing. Sorin Nemeti analyzing an opal gem with a lengthy inscription observes:

The formula *Aianagba-Logos* is associated with a great number of cryptic inscriptions, magical characteres and symbols; the most frequently associated

¹⁴⁶ σεμεσιλαμψ: Michigan 108; Paris 309, 393, 653; σεμεσειλαμψ: Paris 677; σεμεσολαμψ: Paris 427.

¹⁴⁷ λαιλαμψ: Paris 583.

names are Iaô, Sabaoth, Meithras, the ablanathanalba palindrome, or *formulae* like Soumarta and Sesengerbarpharanges.¹⁴⁸

This list of coinciding attributes is unlikely to be helpful since all except one (*sesengerbarpharanges*) are statistically insignificant, which is to say, they are effectively random coincidences—random not in the sense of sand grains falling where they may, but in that their connection with *aianagba* is at best generic in the most unhelpful way, all of these *voces* and divine names being strung together simply because they are perceived as words of power.¹⁴⁹

5. *The "Angel" Purple Sub-Group*

As has already been mentioned, the purple sub-group consists of Jewish angelic names and this subgroup involves the fewest number of gems (62). Gabriël, Michaël, Rafaël, Souriël, and Uriël. Of these, three (Gabriël, Michaël and Raphaël) are the archangels most often mentioned in Talmudic literature, and of these, Michaël and Gabriël were the two most popular angels by far,¹⁵⁰ which may account for why Raphaël is not significantly correlated with Iaô, and only occurs seven times in our corpus.¹⁵¹ The angel that Michaël and Gabriël more often are correlated with in the corpus is that of Uriël (11 times for the trio). This reflects Uriël's rise and importance in certain intertestamental traditions. Uriël plays a significant role in 1Enoch, guiding him through the heavens (1Enoch 10). He is given governorship of the entire created world (1Enoch

¹⁴⁸ Sorin Nemeti, "Magical Practice in Dacia and Moesia Inferior," in *Jupiter on Your Side: Gods and Humans in Antiquity in the Lower Danube Area* (ed. Cristina-Georgeta Alexandrescu; Bucharest: Masterprint SuperOffset, 2013), 148.

¹⁴⁹ See more examples and discussion in Michel, *Die Magischen Gemmen*, 134ff.

¹⁵⁰ Fossum, *The Name of God*, 259ff.

¹⁵¹ But Raphaël is strongly correlated with Michaël (86% of the time).

82.7-8) and is listed second among the archangels (1Enoch 9.1). In Jewish magical texts, he appears in a Palestinian amulet and three Geniza texts.¹⁵² Finally, Sourîêl is strongly linked with both Uriêl and Gabriêl and occurs in our gem corpus eight times. Sariêl is mentioned in 1 and 2 Enoch and, among the Dead Sea Scrolls, in the War Scroll (1QM 9.15-16), where it is the name inscribed on the shields of the third tower. Two variant spellings occur as well: Suriêl and Suriahêl. Suriêl occurs in amulets from the Cairo Genizah (T-S A.S. 143-229 2.4; T-S K1.68 14; T-S K1.70 1.3; T-S K1.168 56, 89; T-S K169 verso 1)¹⁵³ and Suriahêl in T-S K1.73 2.4. The Greek Σουριηλ is found in P.Berol. inv. 21165 (= Supp. Mag. 10), dating to the third or fourth centuries CE.

The very fact that any of these angels is mentioned at all is a late- and post-biblical phenomenon. Of these, only three find their way into any biblical text. Gabriel is mentioned once, in Daniel 8:16, Michael three times in Daniel 10:13, 21 and 12:1 and Raphael in the late apocryphal book of Tobit. The literature surrounding the dating and composition of Daniel is immense and contentious,¹⁵⁴ but consensus has generally situated Daniel in the Maccabean period, especially Daniel 8-12.¹⁵⁵ Tobit is an even later composition whose complete text only survives in a Greek recension.¹⁵⁶ When angels are mentioned in the Hebrew Bible they are typically referred to as an undifferentiated

¹⁵² Amulet 11 in Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 91; Geniza 15, 18 and 20 in Naveh and Shaked, *Magic Spells and Formulae*, 173, 202, 13.

¹⁵³ Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 219, 25, 31 and Lawrence H. Schiffman and Swartz, eds., *Hebrew and Aramaic Incantation Texts*, 125, 52-53, 63.

¹⁵⁴ See survey of theories in Jan-Wim Wesselius, "The Writing of Daniel," in *The Book of Daniel: Composition and Reception* (ed. John J. Collins and Peter W. Flint; Leiden: Brill, 2002), 291-99. Much of the debate has surrounded the Aramaic portion (Dan 2:4-7:28). A concise history of the debate can be found in Zdravko Stefanovic, *The Aramaic of Daniel in Light of Old Aramaic* (JSOT 129; Sheffield: Sheffield Academic Press, 1992), 13-27.

¹⁵⁵ Timothy McLay, "The Old Greek Translation of Daniel IV-VI and the Formation of the Book of Daniel," *VT* 55.3 (2005): 320; C. L. Seow, *Daniel* (WBC; Louisville: Westminster John Knox Press, 2003), 116-18.

¹⁵⁶ Hebrew and Aramaic fragments of Tobit were among the Dead Sea Scrolls (4Q196-200).

retinue,¹⁵⁷ but from roughly the period of 165 B.C.E. through 100 C.E.—with Daniel and Tobit reflecting the very earliest stages—a complex Jewish angelology developed,¹⁵⁸ reaching its apex in the body of Late-Antique mystical Jewish literature termed Hekhalot.¹⁵⁹

It is not surprising that the angels found in this sub-group are those most often referenced in intertestamental literature such as 1Enoch, and they are often cited in pairs or larger groups. Surprisingly, however, only Gabriël and Michaël ever coincide with Iaô. For the designers of magical gems, it was more important to group the angels together than to mention Iaô along with them. As Jewish angelology developed, the powers of Iaô were increasingly portioned out to a variety of angelic powers and greater interest developed in them than in Yahweh himself since the angels are the ones revealed to adepts of Jewish mysticism.¹⁶⁰ Gabriël and Michaël, however, date early enough to when focus was still primarily on Yahweh and not the angelic powers beside him, accounting for the direct correlation found between these two angels and instances of Iaô. Although Raphaël occurs in the book of Tobit, a late text, he appears nowhere else, whereas Gabriël and Michaël make their way into the New Testament.¹⁶¹

¹⁵⁷ Olyan, *A Thousand Thousands Served Him*, 15-18.

¹⁵⁸ Harold B. Kuhn, "The Angelology of the Non-Canonical Jewish Apocalypses," *JBL* 67.3 (1948): 217-19.

¹⁵⁹ A class of ancient Jewish mystical writing, Hekhalot literature is so called because, among other things, it is concerned with the seven-tiered heaven, containing seven *hekhalot* ("palaces"). For introduction see, Davila, *Hekhalot Literature in Translation*, 1-36, especially 3-8 for a list of major text groups. Rachel Elior, "Mysticism, Magic, and Angelology: The Perception of Angels in Hekhalot Literature," *JSQ* 1.1 (1993/94): 17-53.

¹⁶⁰ Elior, "Mysticism, Magic, and Angelology," 28.

¹⁶¹ Gabriël in Luke 1:19, 26 and Michaël in Jude 1:9 and Rev 12:7.

6. Aniconism, Judaism and Magic

If the earlier analysis concerning the Anguipede is correct, and its origins must be Jewish (*pace* Bohak¹⁶²), what is to be made of traditional Jewish aniconism? Referring to the Anguipede, McDonough clearly states the problem and condemnation: "For our purposes, it is sufficient to point out that the appearance of the name Iao with such a figure constitutes a fairly egregious violation of the common Jewish prohibition of divine images."¹⁶³ Here come to mind the biblical prohibitions against graven images (Exo 20:4-5, Lev 26:1, Deut 4:16-19). Bohak rightly emphasizes the acute absence of images on Hebrew and Aramaic amulets from Palestine and later the Cairo Genizah.¹⁶⁴ A simple statistical check demonstrates that this is not merely sample bias. Taking the Greek Magical Papyri published by Betz¹⁶⁵ and those he omits from *Supplementum Magicum*¹⁶⁶ we arrive at a total of 165 texts. Of these 20 have a drawing of an anthropomorphic figure or animal—12%. With the 32 texts from Palestine in Naveh and Shaked (1985, 1993) one would expect that at least three ($32 \times 12\% = 3.94$) have similar iconographic depictions, but none do. When a Fisher Exact test is computed to determine whether this difference is statistically significant, we find that $p = 0.050003$, sufficiently close to the 95% significance level ($p \leq 0.05$) to conclude that the absence of images in the above sample sets is statistically significant.

¹⁶² Bohak, *Ancient Jewish Magic*, 197.

¹⁶³ McDonough, *YHWH at Patmos*, 97.

¹⁶⁴ Bohak, *Ancient Jewish Magic*, 280-81.

¹⁶⁵ Hans Dieter Betz, ed., *The Greek Magical Papyri in Translation, Including the Demotic Spells* (Chicago: The University of Chicago Press, 1986).

¹⁶⁶ 37-9, 41-2, 45-51, 59-62 in F. Maltomini R. W. Daniel, ed., *Supplementum Magicum* (2 vols.; Opladen: Westdeutscher Verlag, 1990, 1992).

But, the understanding of the Anguipede being put forth here is that of a visual pun on a *name* of God, a visual epithet of sorts. I must agree with Nagy that, viewed from this perspective, the Anguipede did not necessarily transgress the law.¹⁶⁷ However, if the image is interpreted from a Hellenistic point of view, one may easily be led to see it as an icon of a syncretistic god, and it is quite possible that certain Jewish circles would have viewed askance at such an object for this very reason—but, to what extent and when? There is an important difference between a typical second century CE Hellenistic Jew and the evidence adduced by Bohak—almost all of the amulets published by Naveh and Shaked date from the sixth century CE or later. Therefore, the dearth of images may be accounted for in the following way: (1) the Palestinian amulets, and especially the Cairo Genizah material, date from the later rabbinic period when aniconism had already been well (re?)established, while in the second century the nascent rabbinic movement can still be classified as minor and sectarian.¹⁶⁸ (2) Material is identified as "Jewish" primarily due to linguistic consideration, being written in Hebrew or Aramaic. To the extent that this is a secure assumption,¹⁶⁹ one may speculate that scribes sufficiently well-trained for these sorts of compositions would have, at least during the period to which the published texts tend to date, attained their education in a Rabbi-controlled synagogue-associated school and therefore indoctrinated into aniconism.¹⁷⁰

¹⁶⁷ Nagy, "Figuring out the Anguipede," 170.

¹⁶⁸ William David Davies and Finkelstein, *History of Judaism*, 206-29.

¹⁶⁹ While Aramaic was used widely outside Jewish circles, Jewish and non-Jewish use of Aramaic can largely be distinguished by the former's use of the square script and the latter's use of various Syriac scripts.

¹⁷⁰ The spread of elementary schools in the Amoraic period was encouraged by Rabbis and were linked with synagogues. See Catherine Hezser, "Jewish Literacy and the Use of Writing in Late Roman Palestine," in *Jewish Culture and Society Under the Christian Roman Empire* (ed. Richard Lee Kalmin and Seth Schwartz; ISACR 3; Leuven: Peeters, 2003), 192-93.

Jewish art provides a case in point of the dramatic disjunction between rabbinic condemnations of figural art and actual practice, at least until the sixth century.¹⁷¹ The earliest examples come from the third century synagogue of Dura Europos (destroyed 256 CE), where on a number of ceiling tiles one finds depicted apotropaic eyes (10 times), the sun (9 times), and astrological symbols.¹⁷² The mosaic floor of the fourth century Hammat Tiberias synagogue depicts Helios holding sphere and staff and that of the sixth century Leontis synagogue depicts the river god Nile in a Nilotic scene.¹⁷³ Most dramatic, however, are the zodiacs with Helios at the center found in six synagogues: Hammat Tiberias (fourth century), Sepphoris and Susiya (fifth century), Bet Alpha, Na'aran and Huseifa (sixth century).¹⁷⁴ What these pagan motifs are intended to mean has been the subject of much debate,¹⁷⁵ but suffice it to say, if justification and acceptance of such imagery could be accomplished in a synagogue, especially in Hammat Tiberias, which was the home of the Jewish Patriarchate and a major rabbinic school, there is no *a priori* reason a second century CE Hellenistic Jew should not be responsible for the Anguipede imagery.

¹⁷¹ For general discussion see Lee I. Levine, *Visual Judaism in Late Antiquity: Historical Contexts of Jewish Art* (New Haven: Yale University Press, 2012), 410-34.

¹⁷² Levine, *Visual Judaism*, 101.

¹⁷³ Levine, *Visual Judaism*, 319, 441.

¹⁷⁴ Levine, *Visual Judaism*, 317-36. See also R. S. Kraemer, *When Aseneth Met Joseph: A Late Antique Tale of the Patriarch and His Egyptian Wife, Reconsidered* (Oxford: Oxford University Press, 1998), 157-63.

¹⁷⁵ The classic position is laid out in E. R. Goodenough's magisterial series *Jewish Symbols in the Greco-Roman Period*, vol 1-12); although his hard-line conception of an anti-Rabbinic mystical Judaism was likely too extreme—see Morton Smith, "Goodenough's Jewish Symbols in Retrospect," *JBL* (1967): 53-68. For a more nuanced position see Jodi Magness, "Heaven on Earth: Helios and the Zodiac Cycle in Ancient Palestinian Synagogues," *DOP* 59 (2005): 1-52. It should be noted that even if Smith's criticisms of Goodenough are accepted whole-cloth, the widespread influence and use of images is nonetheless admitted: "There are many elements in the haggadah which may have either produced or resulted from pictures." (Smith, "Goodenough's Jewish Symbols," 64). I find simple and compelling the socio-political interpretation of the Zodiacs in Levine, *Visual Judaism*, 329-36.

If the Anguipede was the creation of a Hellenistic Jewish context its widespread use suggests a rapid appropriation by the culture at large. Its penetration and popularity did not attenuate the perception that it had a Jewish pedigree, as clearly indicated by its strong statistical correlation with not only the name Iaô but the Iaô cluster in general. However, this line of argumentation requires that Iaô was widely understood in antiquity to signify the Jewish God. The evidence for this I first laid out briefly at the beginning of this chapter, but the question is important enough that it warrants revisiting in a more decisive manner since a widespread view is that Iaô, in its many appearances in magical texts and gems, was understood to be merely a word of power. This view persists despite the positive evidence (above) that the name was understood to refer to Yahweh. The "word of power" hypothesis seems to originate from the use of Iaô in magical contexts and regular collocation with other divine names and *voices magicae*.

In his chapter on the Anguipede Bonner approvingly quotes Ganschinietz on the status of Iaô:¹⁷⁶

Iao war für den Magier nicht Gott sondern Name. Der Name war eine Dynamis; er bedeutete nichts für das religiöse Leben des Magiers, er schuf keine religiösen und ethischen Werte, er war Besitz und machte ihn reich; also ein äusslicher, kein innerlicher Zuwachs, wie es doch jede Religion ist oder sein soll.

The opinion of Ganschinietz seems to be rooted in no small part in a theory of religion (wie es doch jede Religion ist oder sein soll, "what every religion is or ought to be") in which the possession and manipulation of an outward object (like a divine name) for magical praxis divests the object of its erstwhile religious content.¹⁷⁷ But, it is

¹⁷⁶ Bonner, *Magical Amulets*, 135; Ganschinietz, s.v. "Iao," 715. Cf. discussion in Goodenough, *Jewish Symbols* (v. 2), 252-54.

¹⁷⁷ I cannot help but detect a parallel with anti-Catholic polemics from the sixteenth century onward which attempted to divest religious ritual of its significance. See Jonathan Z. Smith, *To Take Place: Toward*

something else that primarily concerns Bonner. Right before quoting Ganschinietz he states, "Furthermore, Iao is inscribed on a great variety of magical designs, many of which have no easily imaginable connection with the cock-headed anguipede, while others are perhaps related, but only because they represent solar deities."¹⁷⁸ The problem, then, is that the name is widely used and not strongly enough correlated with the Anguipede, or any one particular type of gem, for that matter. Bonner continues,¹⁷⁹

The names Iao, Abrasax, which were supposed to belong to him [i.e. the Anguipede] are words of power often found associated with other types, and the most that can be affirmed about them is that they may belong to a syncretistic deity who includes among his manifestations the cock-headed god, and many others also. This deity seems to have solar attributes.

A similar view was echoed by Perdrizet a quarter of a century earlier: "*Iaô. Ne pas croire qu'il s'agisse ici du Dieu des Juifs, Iaô-Iahvé...* Comme on le verra par la suite, c'est en réalité au grand Dieu du syncrétisme solaire que s'adresse le magician."¹⁸⁰ More recently, Sean McDonough, in his study on the name of Yahweh in Hellenistic Jewish and Christian settings, also finds the various combinations of Iaô with other divinities, at times in a subordinate role, deeply problematic.¹⁸¹

All of this makes it unlikely that the magicians were generally aware that Iao was connected with the "secret" tetragrammaton, and that this is the reason it appears so frequently in the magical texts... While at certain points in the tradition (particularly in its early development) the name Iao may have been linked with the tetragrammaton and acquired an air of mystery, at other times it was simply regarded as a potent name for the God of the Jews, if not indeed the name of some subordinate deity.

Theory in Ritual (Chicago: University of Chicago Press, 1987), 96-103. For the impact of anti-Catholic polemics on modern academic discourse in general, see Jonathan Z. Smith, *Drudgery Divine: On the Comparison of Early Christianities and the Religions of Late Antiquity* (Chicago: University of Chicago Press, 1990), especially 1-36.

¹⁷⁸ Bonner, *Magical Amulets*, 134-35.

¹⁷⁹ Bonner, *Magical Amulets*, 135.

¹⁸⁰ Paul Perdrizet, "Amulettes grecques trouvée en Syrie," *REG* 41 (1928): 76.

¹⁸¹ McDonough, *YHWH at Patmos*, 96.

In sum, then, the obdurate nature of the "name of power" hypothesis is rooted in a mistaken impression of how Iaô does or does not correlate with other elements, be it in the PGM or magical gems. It stems from the lack of a firm quantitative basis for any of the quoted observations. While I have already demonstrated that, in fact, Iaô is strongly correlated with a number of other gem attributes, many of them clearly or arguably Jewish—either in origin or due to late-antique appropriation or innovation—Morton Smith had already blazed the way for a quantitative approach for Iaô in the PGM. He notes only 19 passages where Iaô appears unaccompanied by another Hebrew Bible (HB) name or *vox* considered to be Jewish, 94 passages have Iaô accompanied by one, the other, or both.¹⁸² He goes on to state: "This tends to discredit the common belief that it was *usually* a mere word of power or collection of vowels, without any thought of its OT reference."

Another problem emerges specifically from McDonough's concern over Iaô sometimes being invoked in hierarchically subordinate positions. What is implicit in McDonough's concern is that the divine hierarchies and order found in magical texts should reflect that which is found in the mythology of the respective religious tradition to which the god belongs. He is, therefore, accordingly troubled when he discovers Iaô being invoked as the first angel of Zeus (PGM I.300).¹⁸³ But, what to make of PGM VI.1471-1495 where one finds Isis and Zeus being adjured by Iaô Sabaôth (followed by a long string of *voces*); does this indicate that the magician is unaware of the traditional status of Zeus as king of the gods? A magical bowl at the Hebrew University of

¹⁸² Smith, "The Jewish Elements in the Magical Papyri," 246-47.

¹⁸³ McDonough, *YHWH at Patmos*, 96. It may be more likely that it is Apollo here being invoked as the "first angel of Zeus," not Iaô, but it is not the correct reading of the prayer but rather the theoretical concern by McDonough that is of note here. See Martinez, "Papyrology (OHAGR)," 137.

Jerusalem adjures by the name of three divine entities, the first two Betiêl and Yequtiêl, and the third Yahweh, abbreviated with triple yod.¹⁸⁴ But, not only is Yahweh here the last of three entities, he is understood as an angel ("and in the name of yyy the Great, the angel"). Unexpected divine combinations and inversions are a typical feature of magical texts and need not indicate that the magicians behind them are not familiar with the status and role afforded particular deities by the surrounding culture and its mythologies. As Morton Smith observed long ago, "prayer and praise are usually directed to one god at a time," and:¹⁸⁵

The god being worshiped is regularly flattered—that is to say, exalted. Though he may occupy a minor position in the preserved mythological works, yet in the worship addressed to him he is regularly represented as greater than all other gods. It is often said that he created not only the world, but also the other gods. He is the only true god; sometimes, even when worshiped in close connection with other deities, the only god.

The, at times, puzzling hierarchies reflected in divine invocations in magical texts should be seen in this light, and one can only expect them to be more unusual when divine entities are brought together from multiple cultures in the absence of an overall framework guiding what the hierarchies between Greek, Roman, Egyptian and Semitic deities should be. This is not to say that mythological content never exists in magical texts—on the contrary, the well-known phenomenon of the *historiola*, a summarized recounting of a story concerning the life of a particular god or gods imbedded in magical texts, is precisely such content. But, while a *historiola* often connects to a known

¹⁸⁴ Joseph Naveh and Shaked, *Amulets and Magic Bowls*, 135-5, l. 6. For abbreviations of the tetragrammaton in general, see Jacob Z. Lauterbach, "Substitutes for the Tetragrammaton," *PAAJR* 2 (1930-1031): 39-67, and three yods specifically, 52-55.

¹⁸⁵ Morton Smith, "The Common Theology of the Ancient Near East," *JBL* 71.3 (1952): 137-39.

mythological narrative, the order and hierarchy in which divine elements are invoked in a prayer/incantation may be completely idiosyncratic.¹⁸⁶

What is critical is the sheer pervasiveness of Iaô in the magical traditions of Late Antiquity. This, by itself, speaks to the importance of the Jewish God, that the authors of these texts so often felt compelled to at least *mention* Iaô, even if in a context and manner a rabbinic Jew may find deeply problematic. The collocation of other Old Testament figures and especially the word Sabaôth, which accompanies Iaô 79% of the time on magical gems, combined with the evidence for widespread knowledge that Iaô was the God of the Jews and regular attempts to approximate the pronunciation of the tetragrammaton, all point to the strong likelihood that an invocation of Iaô in the PGM, or on magical gems, was a conscious attempt to invoke Yahweh, whether he was perceived to be the most high or not. That he is often in the company of other divinities speaks to the likely non-Jewish authorship of these texts, but betrays a desire to "Judaize" the magic to some extent.¹⁸⁷

¹⁸⁶ See the observations on "orden desordenado" in ancient magic in Sabino Perea Yébenes, "Amuletos griegos, una mitología extravagante, una fe alternativa. El ejemplo de Tántalo, *el bebedor de sangre*," in *Officium Magicum: Estudios de magia, teúrgia, necromancia, supersticiones, milagros y demonología en el mundo greco-romano* (ed. Sabino Perea Yébenes; TM 6; Madrid: Signifer Libros, 2014), 207-08.

¹⁸⁷ What precisely in this context is meant by "Jewish" or "Judaize" is a pertinent question. Bohak, *Ancient Jewish Magic*, 295-96 argues, "What seems to be "Jewish" might in fact be a common phenomenon which also happens to be attested among Jews, and what is not "Jewish" in one period could easily become "Jewish" in the next. Thus, when we wish to look at the "Jewish" components of late-antique Jewish magic, we must look for those elements within it that *at that point in time* may be considered *exclusively Jewish*." He goes on to note that many elements which are ubiquitously found in Jewish magic, and originally of Jewish provenance, are also found in non-Jewish magic, such as angelic names, Adônai, Sabaôth, biblical verses and so on. For these he makes an exception (296). For Bohak, foreign elements may be "Judaized," which is to say, made to appear to have a Jewish provenance, as in the example he gives of Abraxas in a formula from the Cario Genizah (249). I use "Judaize" in a related manner—to describe a process whereby a text is given elements with an originally Jewish provenance, or which the author believes to have a Jewish provenance, in order lend it the appearance and the performative power evocative of a Jewish origin. My departure from Bohak is the second qualifier: allowing "Judaize" to include elements that the author of a magical text believes to be Jewish even if they are not. By this I wish to emphasize the rationale for choosing certain religio-magical elements, in a sense "cognitivizing" the question of Jewish influence.

But there is more to this than just Iaô. The Anguipede, as I have already argued, is likely an eclectic creation of a Jew in the first century C.E. Sabaôth as a hypostasized entity reaches full development in the Christian Gnostic texts *The Hypostasis of the Archons* (CG II, 4) and *On the Origin of the World* (CG II, 5), but there is already early evidence from *Hekhalot Zutarti* that Jewish Mysticism was prepared to treat the term Sabaôth more loosely than just the second word in the bound construction of the biblical phrase. At some point between the first and third centuries, these elements, along with the "angelic" and "voces magicae" sub-groups were brought together into a cluster of attributes for use on magical gems. The specificity of media was so clearly intended and adumbrated that the one iconographic element, the Anguipede, is found virtually nowhere else.

7. Conclusion

Many questions remain unanswered and the dearth of context often makes interpreting the significance of a particular magical gem difficult, but the patterns observed in statistically significant links among various attributes and subjected to a rigorous historical-critical analysis, have yielded some important results. First of all, the Iaô cluster consists of a number of arguable Jewish elements and they coincide with each other with great consistency, especially Iaô and Sabaôth. As with Smith's cautious conclusion for Iaô in the PGM, this is evidence against Iaô being merely a "word of power," but rather a conscious invocation of the Jewish God. Both the widespread

familiarity in antiquity with Iaô as the name of the Jewish God and occasional attempts to approximate the pronunciation of the tetragrammaton strengthen the likelihood of this.

Second, most of the attributes in the Iaô cluster have weak statistical associations with other solar attributes. By and large, the name Abraxas, the Anguipede and the various *voces* in the cluster have very weak or no connection with other attributes widely agreed to be solar. The perceived frequency with which the Anguipede coincides with Harpocrates, Helios or any other solar figure has hitherto been grossly overstated. That Abraxas' isopsephic value has solar implications can be understood within the Iaô-Helios complex analyzed by Fauth, specifically the second category, where Yahweh is understood as the supreme God and Helios as a subordinate angelic force.

Finally, despite much debate and consternation, a Jewish origin of the Anguipede seems most likely. Nagy's explanation offers the simplest account (a visual pun on an epithet of the Jewish God) and is consistent with the observation that most other attributes in the Iaô cluster are also epithets. Contra Bonner and those who have followed his lead in raising doubts over the uneven distribution of the name Iaô and the figure of the Anguipede, their correlation is statistically significant far past the 99% probability level. The same is true of the name Abraxas, but while observing how it and Iaô overlap on the Anguipede gems, it is clear that its statistically significant link with the Anguipede is solely a consequence of its own statistically significant link with Iaô. When Abraxas appears on an Anguipede gem it is because Iaô is there too; rarely, does it occur without Iaô.

Chapter 3. Hematite and Magical Gems

1. Preliminary Considerations

The most populous attribute cluster (232 gems) in which the material (unlike in the case of jasper) seems to play an important role in the meaning and use of gem amulets is the "hematite" cluster consisting of the following attributes: Anubis, Bes, gray (color), hematite, Isis, key, Nephthys, *orōriouth*, Osiris, the ouroboros, and the *Soroor* formula. I have named the cluster the "hematite" cluster since it is the cluster's most widely connected and widely attested attribute. Literally "bloodstone" (*Lat. haematites*, from *Gk. αίματίτης*),¹ hematite is an iron oxide (Fe_2O_3) and typically ranges in color from "steel gray to iron black."² It was used for beads and amulets since the Pre-Dynastic period and during the Roman period was mined in the eastern desert of Egypt.³ In Bronze Age Troy hematite was the preferred material for weights.⁴ Due to the material's hardness, and therefore both its durability and increased difficulty to carve, hematite was the preferred

¹ Pliny the Elder mentions two stones similarly named: "haematites" (*Nat. Hist.* 36.25, 37-38) and "haematitis" (*Nat. Hist.* 37.60). Both stones are described as having the "color of blood" ("sanguinei coloris" and "sanguineo colore," respectively), and for the former Pliny adds that "when bruised, yields a tint like that of blood" ("sanguinemque reddens, si teratur," *Nat. Hist.* 36.25). This is certainly what happens with modern hematite, which when pulverized turns from near black to blood red, but the descriptions of the stone as naturally the "color of blood" is not consistent with the near black, steel appearance of most hematite. Earle R. Caley and Richards, *Theophrastus On Stones*, 138-39, choose to identify "haematitis" with the *αίματίτης* found in Theophrastus, which they argue is to be identified with modern red jasper since Theophrastus seems to construe *ξανθή*, likely yellow jasper, as a variety of the same stone as *άιματίτης*. Robert Halleux and Schamp, *Les Lapidaires Grecs*, 319-20, concur that the description in Theophrastus does not correspond to our hematite and connect the *άιματίτης* in the Orphic *lithica* (*l. 662*) and the *kerygma* of the Orphic *lithica* (22.1) with Pliny 36.25.

² George Rapp, *Archaeominerology* (Berlin: Springer, 2009), 114.

³ Rapp, *Archaeominerology*, 113-14; Richard A. Lobban, *Historical Dictionary of Ancient and Medieval Nubia* (Lanham: Scarecrow Press, 2004), 193; Nicholson and Shaw, *Ancient Egyptian materials and technology*, 38.

⁴ A. Bobokhyan, "Trading implements in early Troy: In memoriam Professor Manfred Korfmann," *AS* 59 (2009): 19-50.

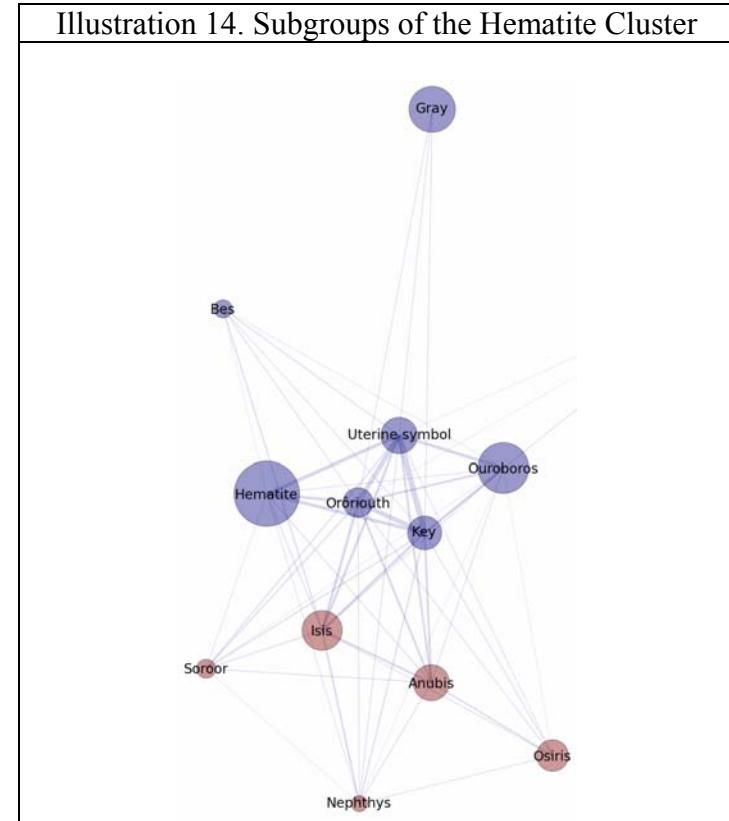
material for seals during the Old Babylonian period.⁵ Its widespread use for a variety of purposes made it a desirable material and the second most common material for magical gems. Table 5 lists all of the statistically significant links to hematite within this cluster.

Table 5. Statistically Significant Links with Hematite				
% of gems	p-value	% of gems with Hematite	p-value	gems
Hematite (24%)	0.000000	Uterine symbol (77%)	0.000000	111
Hematite (21%)	0.000000	key (78%)	0.000000	98
Hematite (18%)	0.000000	<i>Orôriouth</i> (84%)	0.000000	81
Hematite (18%)	0.002888	Ouroboros (31%)	0.004086	85
Hematite (15%)	0.000350	Isis (39%)	0.000848	68
Hematite (13%)	0.000246	Anubis (42%)	0.000721	60
Hematite (5%)	0.004639	<i>Soroor</i> formula (56%)	0.013343	22
Hematite (4%)	0.012363	Bes (50%)	0.027100	18

An interesting feature of hematite is that it is not only attested among gems whose attributes come exclusively from the "hematite" cluster, but it is also widely used on gems whose attributes otherwise come from other attribute clusters (see §4). For instance, while the figure of the reaper is classified in a separate attribute cluster, 81% of gems with the reaper are made of hematite (see §4c). The crocodile ($p = 0.000852$), falcon ($p = 0.011853$), goat ($p = 0.011568$) and scarab ($p = 0.006059$), attested both as animal triplets with Harpocrates or otherwise individually, are also highly correlated with the material hematite (see §4b). Finally, the so-called "Solomon" rider gems are 75% hematite (see §4a). In total, hematite is shared in four different clusters, although, this cluster, the "hematite" cluster, accounts for the greatest number.

⁵ Leonard Gorelick and A. John Gwinnett, "The Ancient Near Eastern Cylinder Seal as Social Emblem and Status Symbol," *JNES* 49.1 (1990): 53-55.

When the Louvain algorithm is run on this cluster, two subgroups are identified and color-coded in Illustration 14. The most populous subgroup centers around the material hematite and the uterine symbol (161 gems). It is color-coded purple and contains the following attributes: hematite, the uterine symbol, the color gray, *orōriouth*, the key, Bes, and the ouroboros. Many gem catalogs do not indicate a color for hematite, but a few specify the color gray, which accounts for its presence here. Section §2 of this chapter will analyze this subgroup, finding strong reasons to support the hypothesis that the gems comprising this subgroup underwent an evolutionary process from simple designs depicting the uterine symbol to more sophisticated Egyptianized ones.

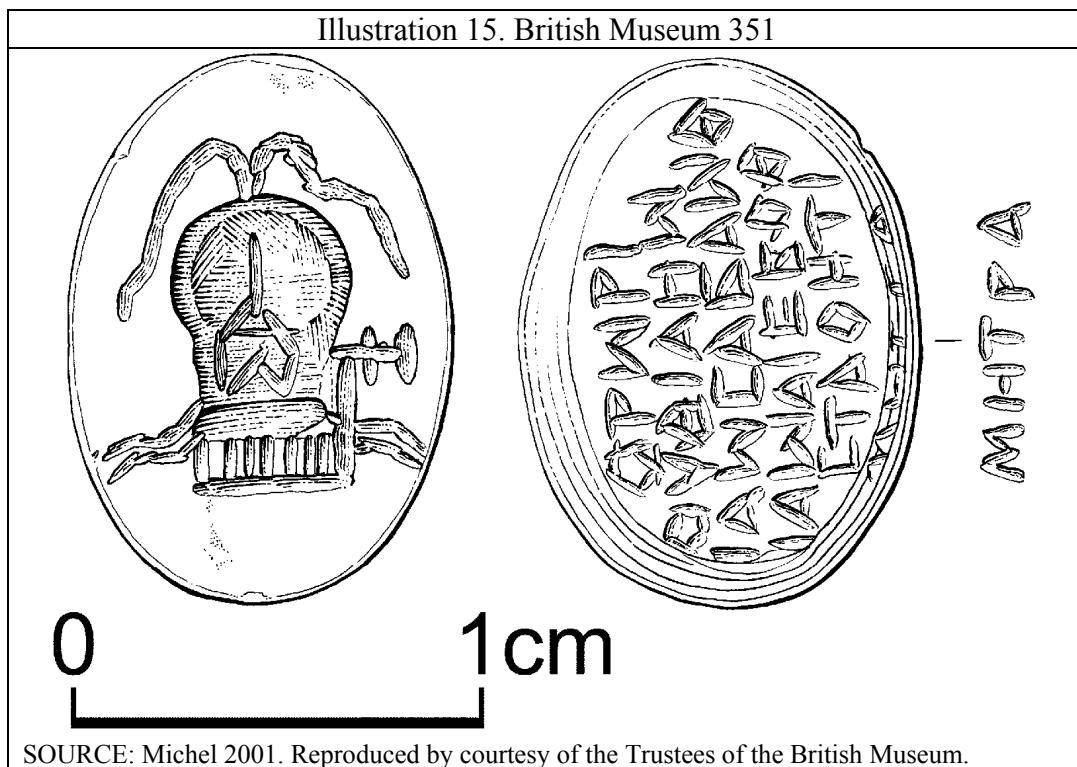


The second subgroup (color-coded red, 91 gems), contains Isis, Anubis, the *Soroor* formula, Osiris, and Nephthys. Section §3 will delve into the issues surrounding this cluster of Egyptian deities, finding that this tightly knit group seems to have appeared on uterine amulets as a single unit in their Egyptianizing process. Their close association with maternal matters, including but not limited to the birthing process and protection of children, play an important role in understanding the import of the most sophisticated

"Egyptianized" uterine gems. The celestial (solar and lunar) valences of these gods have often been central to understanding these gems, but in sub-section §3.1 I will argue that the statistics seem to undermine this perspective and delve into some of the analytical shortcomings inherent in the "solar" hypothesis.

2. The "Hematite-Uterine" Subgroup (purple)

The most distinctive iconographic elements of the purple subgroup are the uterine symbol and Greek key. Illustration 15 shows a typical example. In 1623 Nicholas Claude Fabri de Peiresc first identified the object roughly resembling an inverted jug as that of a



uterus,⁶ but this identification did not become widely accepted until the work of A. Delatte in 1914.⁷ The toothed object located under it is a stylized depiction of a Greek door-key, the identification of which is also largely indebted to Delatte.⁸ The placement of the key at the mouth of the uterus suggests that control of the organ is the aim. Campbell Bonner, following Delatte, opined that it "might be to check any moribund condition, to prevent conception, or to favor it and facilitate parturition."⁹ Subsequent interpretations have followed suit, understanding these amulets as fundamentally concerned with the opening or closing of the womb.¹⁰ Apart from the question of conception or facilitating birth, a "moribund" condition that often needed addressing was the uterus' hyperactive *wandering* in the body. Since at least Plato's day, the womb was understood to have the ability to move in the body and as a result precipitate illness,¹¹ and the uterine gems were likely in part concerned with this potential malady.¹² The reverse of BM 351 (Illustration 15) contains the command "stop uterus!" (στάθητι μήτρα). A more elaborate incantation survives in PGM VII.260-71 where the womb is adjured "[by the] one established over the Abyss" to

⁶ Bonner, *Magical Amulets*, 80-81.

⁷ Robert K. Ritner, "A Uterine Amulet in the Oriental Institute Collection," *JNES* 43.3 (1984): 209-10; Bonner, *Magical Amulets*, 83-85.

⁸ Ritner, "A Uterine Amulet," 210. Bonner, *Magical Amulets*, 85, notes that the key was correctly identified a century earlier by François Lenormant, but failed to make it generally known.

⁹ Bonner, *Magical Amulets*, 87; A. Delatte and Derchain, *Les intailles magiques*, 245; A. Delatte, "Etudes sur la magie grecques IV. Amulettes inédites des Musées d'Athènes," *Musée Belge* 18 (1914): 75-88.

¹⁰ Faraone, "Text, Image and Medium," 56; Michel, *Die Magischen Gemmen*, 185-86; Michel, *Die Magischen Gemmen im Britischen Museum*, 20-221; Ann Ellis Hanson, "Uterine Amulets and Greek Uterine Medicine," *MediSec* 7 (1995): 285-86; Ritner, "A Uterine Amulet," 212-15.

¹¹ Christopher A. Faraone, "Magical and Medical Approaches to the Wandering Womb in the Ancient Greek World," *CA* 30.1 (2011): 1-9. See also Christopher A. Faraone, "New Light on Ancient Greek Exorcisms of the Wandering Womb," *ZPE* 144 (2003): 189-97; Hanson, "Uterine Amulets," 284-85; Jean-Jacques Aubert, "Threatened Wombs: Aspects of Ancient Uterine Magic," *GRBS* 30.3 (1989): 423-25.

Mark J. Adair, "Plato's View of the 'Wandering Uterus,'" *CJ* 91.2 (1996): 153-63, following a close reading of *Timaeus* 91b-c, argues that Plato did not believe that the womb itself moves but rather that a "lust-based psychological force moves... and makes its appetite and frustration felt in far quarters of the body" (162).

¹² Faraone, "Wandering Womb," 19-22.

return again to your seat, and that you do not turn [to one side] into the right part of the ribs, or into the left part of the ribs, and that you do not gnaw into the heart like a dog, but remain indeed in your own intended and proper place...¹³

Here, the womb's movements are more restricted, conforming to later medical understanding where the womb cannot wander freely but is limited to twisting and dislodging in a narrowly circumscribed area.¹⁴ While Christopher Faraone is largely right to observe that "the commands on the hematite gems imply that the womb is already causing problems and therefore needs to stop or contract,"¹⁵ very few gems in fact issue such commands. In addition to the two gems originally discussed by Delatte,¹⁶ the command "contract, uterus!" (στάλητι μήτρα) is found on Princeton 70-78, BM 379 and Berlin 110.¹⁷ Paris 212 contains the ambivalent non-command "uterine therapy" (μητρικ<ἢ>ν θ<η>ραπ(ε)ίαν). Six uterine gems have a variation of the Tantalus formula presented in a *Schwindschema*.¹⁸ Bonner read the formula as "Tantalus-viper, drink blood!" (διψᾶς Τάνταλε αἴμα πίε),¹⁹ but more recently the reading "You are thirsty Tantalus, drink blood!" (διψᾶς Τάνταλε αἴμα πίε) has won favor.²⁰ Five of the aforementioned gems present the formula in this disappearing mechanic, while Perugia 26 simply has "drink Tantalus!" (πίε Τάνταλε). The formula's command, when combined with the uterine symbol, has been understood to either curb menorrhagia or,²¹ through the disappearing mechanic of the *Schwindschema*, symbolically allow for the

¹³ Translation from Betz, ed., *The Greek Magical Papyri in Translation, Including the Demotic Spells*, 124. For a similar text found on a lamella see Attilio Mastrocicque, "Amuleto per l'utero dal territorio di Gela," *ZPE* 152 (2005): 168-70.

¹⁴ Faraone, "Wandering Womb," 21-22.

¹⁵ Faraone, "Wandering Womb," 20.

¹⁶ Delatte, "la magie grecques IV," 75-87, nos. 33 and 34.

¹⁷ Paris 648, in a rare example of Hebrew, contains שְׁמַרְתְּךָ אֶת-מִזְבֵּחַ, "stop uterus!" but has no uterine symbol.

¹⁸ BM 382-4; Paris 353, 354; Perugia 26.

¹⁹ Bonner, *Magical Amulets*, 88.

²⁰ Christopher A. Faraone, "Does Tantalus Drink the Blood, or Not? An Enigmatic Series of Inscribed Hematite Gemstones," in *Antike Mythen: Medien, Transformationen und Konstruktionen* (ed. Christine Walde and Ueli Dill; Berlin: Walter de Gruyter, 2009), 215.

²¹ Bonner, *Magical Amulets*, 88-89.

return of normal menstrual flow.²² In either case, the command is addressing a preexisting condition that requires a response. Altogether, the above twelve cases are the only instances on uterine gems that issue a command to address a clearly preexisting condition—that is, less than 9% of uterine gems are clearly curative. Two other gems further make it evident that a curative purpose should not be assumed for all uterine gems since these two contain clear protective formulas (Paris 224: κύριοι θεοί, φυλάσσετε τὴν τοῦτο φορούσην, Paris 232: φύλαξον Σελευκίαν... παντὸς μὴ τείκου).

Nonetheless, it seems certain that, whether curative or protective, uterine gems were primarily concerned with regulation of the womb. Michigan 72, inexplicably

Table 6. Statistically Significant Links with the Uterine Symbol				
% of gems	<i>p</i> -value	% of gems with Iaô	<i>p</i> -value	gems
U. Symbol (79%)	0.000000	Key (92%)	0.000000	115
U. Symbol (77%)	0.000000	Hematite (24%)	0.000000	111
U. Symbol (63%)	0.000000	<i>orōriouth</i> (96%)	0.000000	92
U. Symbol (57%)	0.000000	ouroborus (30%)	0.000000	83
U. Symbol (42%)	0.000000	Isis (35%)	0.000000	61
U. Symbol (39%)	0.000000	Chnoubis (27%)	0.000000	56
U. Symbol (34%)	0.000000	Anubis (35%)	0.000000	50
U. Symbol (16%)	0.001902	Osiris (21%)	0.002188	23
U. Symbol (15%)	0.000035	<i>Soroor</i> formula (56%)	0.000144	22
U. Symbol (13%)	0.000182	Bes (53%)	0.000588	19
U. Symbol (12%)	0.000540	Nephthys (61%)	0.001861	17

designated "for the feet" (ἐπιποδία), seems to be the exception that proves the rule. The close association of the uterine symbol with the material hematite only further reinforces the above interpretation. 77% of uterine symbols occur on gems made of hematite, one of

²² Faraone, "Does Tantalus Drink the Blood, or Not?," 203-28. Michel, *Die Magischen Gemmen*, 153, raises the possibility that these gems may not have been limited to use by women, arguing that the Tantalus formula may also have applied to men suffering from hemorrhages.

whose medical applications in antiquity was stopping bleeding,²³ perhaps because of its visual similarity to coagulated blood.²⁴ Opening/closing of the womb and control of bleeding (in its various incarnations such as menorrhagia, miscarriage or simply normal menstruation as an indicator of fertility, let alone hemorrhaging in general) seem to go hand-in-hand.

a. The vox magica orōriouth and the ouroboros

In a diachronic typology recently put forward by Faraone, a three-step process is proposed for the evolution of uterine gems.²⁵ The first phase was the use of uninscribed hematite for gynecological problems. The second phase added the uterine symbol and key and the final phase brought in Egyptian elements to enhance the power of the uterus-key symbolism. The suggestion that hematite was first used unadorned for gynecological distress is feasible given the classical attestation for its medical use. Several statistics (See Table 6), some already mentioned, can now be brought to bear on the question of the proposed second and third phases. Apart from hematite (77%), the most commonly associated attributes with the uterine symbol are the key (79%), the *vox orōriouth* (63%) and the ouroboros (57%). Instances of the uterine symbol without the key generally fall into two categories: (1) the octopus-like uterus (e.g. reverse of BM 376, 377)²⁶ and (2)

²³ Michel, *Die Magischen Gemmen*, 154; Hanson, "Uterine Amulets," 290-92; Aubert, "Threatened Wombs," 434-35; Ritner, "A Uterine Amulet," 213; Alphonse A. Barb, "Bois due sang, Tantale," *Syria* 29.3/4 (1952): 279-80.

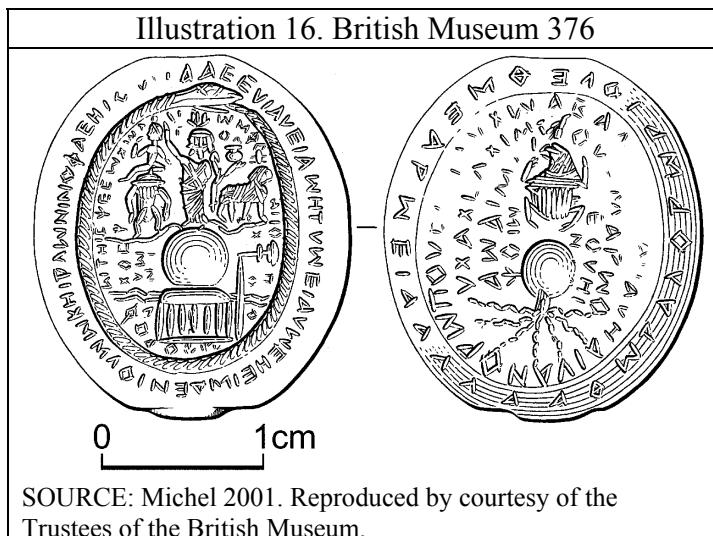
²⁴ ἔχοι γε μὲν αῖμα πεπηγός, Orphic *lithica* 21, l. 659 (Robert Halleux and Schamp, *Les Lapidaires Grecs*, 117) See Mastrocinque, "Colours," 62.

²⁵ Faraone, "Text, Image and Medium," 56-57.

²⁶ Bonner, *Magical Amulets*, 90-91. The belief in the octopus-like form of the uterus survived in Chios and transformed into folklore about the afterbirth being both alive and the shape of an octopus, capable of

highly schematic renditions bereft of most common details (e.g. BM 418-423), both of which seem to be secondary developments from an original uterine-key pairing. Both the key and *orōriouth* are almost exclusively associated with the uterine symbol (92% and 96% respectively). Unlike hematite and the ouroboros, both of which are also used outside the context of uterine amulets, the key and *orōriouth* must be understood as attributes coterminous with the use of the uterine symbol.

While the key is clearly an intrinsic part of the opening and closing symbolism of the uterus, the meaning of *orōriouth* is more opaque. Brashear lists three possible derivations:²⁷ (1) Bonner suggested that it may be a secret name for Artemis-Selene-Hecate, implicating the traditional lunar association with the functions of women,²⁸ (2) Stricker suggested the Egyptian derivation *w'r.t* (= uterus),²⁹ and (3) Vincent back in 1850 suggested the Hebrew אֹרֶת *orēt*, "light of lights."³⁰ The appeal of the Hebrew derivation in large part depends on a solar



climbing up the mother and choking her if not properly attended to; see Campbell Bonner, "Amulets Chiefly in the British Museum," *Hesperia* 20 (1951): 315.

²⁷ Brashear, "The Greek Magical Papyri," 3595.

²⁸ Bonner, *Magical Amulets*, 199.

²⁹ Bruno Hugo Stricker, *De geboorte van Horus* (vol. 1; Leiden: E. J. Brill, 1963), 81.

³⁰ A. J. H. Vincent, *Essai d'explication de quelques pierres gnostiques* (Extrait des Mémoires de la Société des Antiquaires de France 20, 1850), 450. אֹרֶת < MHb. f. pl. of אֹרֶה ("light, dawn") since the pl. of אֹרֶת is אֹרִיָּה. See Ludwig Koehler and Walter Baumgartner, *The Hebrew and Aramaic Lexicon of the Old Testament* (2 vols.; vol. 1; Leiden: Brill, 2001), 25. A. A. Barb, "Diva Matrix: A Faked Gnostic Intaglio in the Possession of P. P. Rubens and the Iconology of a Symbol," *JWCI* 16.3/4 (1953): 202, and György Németh and Isabel Canós i Villena, "ΟΡΩΡΙΟΥΘ in Vilabertran," *ZPE* 130 (2000): 141, consider this the most likely derivation of the *vox magica*.

interpretation of the octopus-like variant of the uterine symbol due to its schematic similarity to a radiant sun (Illustration 16, reverse).³¹ This does not, however, account for why *orōriouth* would be strongly correlated with all forms of the uterine symbol, not just the octopus-like form; nor would it account for why the *vox* is almost exclusively linked to the uterine symbol since a solar meaning would make it amenable to other contexts as well. Bonner's suggestion that *orōriouth* is a "secret name" for Artemis-Selene-Hecate fails to account for why explicitly lunar symbolism is not correlated with the either the *vox* or the uterine symbol.³² Finally, The Egyptian derivation seems the most probable of the three since its specificity ("uterus") accounts for the nearly exclusive association between the *vox* and the symbol.³³ Next to the uterus-key combination, *orōriouth* is the most likely candidate among the attributes in the purple subgroup to claim early presence on uterine amulets. Its nearly exclusive connection with the uterine symbol (96% are found on uterine amulets), its high rate of incidence (63% of uterine gems have the *vox*) and its proposed Egyptian meaning ("uterus") all suggest an integral role in the early uterine gem schema.

The ouroboros, a circling serpent biting its own tail (Illustration 16, obverse), and typically found surrounding the uterine symbol and its attending Egyptian entourage, is the next most significant attribute in the purple subgroup, occurring on 57% of uterine amulets. Conventional descriptions of uterine gems often include it as an integral element

³¹ György Németh and Villena, "OPΩPIOYΘ," 141; Barb, "Diva Matrix," 202.

³² There are no known example where a full or crescent moon is present with *orōriouth* and only five instances where stars are present ($p = 0.998001$).

³³ Hanson, "Uterine Amulets," 293 endorses the Egyptian derivation, but her final statement that the high frequency with which Iaô occurs on these gems may make a Hebrew derivation more attractive can not be supported. Iaô, in fact, does not have a statistically significant correlation with the uterine symbol ($p = 0.187089$) and its presence on 25% of these gems is only slightly greater than the divine name's presence on magical gems in general (19%), a rate which does not rise to the level of statistical significance.

of the design.³⁴ The name derives from a Greek calque of an Egyptian phrase:

οὐροβόρος < οὐρα + βόρος ("tail-devourer") < Eg. *sd-m-r3* ("tail-in-the-mouth"),³⁵

although the older Egyptian name for this serpent is *Mhn*, "the coiled one."³⁶ It first appears in the Eighteenth Dynasty, in Tutankhamun's second gold shrine.³⁷ Although its use was widespread on magical gems, it occurs most often in conjunction with hematite and the uterine symbol (31% and 30% of its use, respectively) at a rate which rises to statistical significance ($p = 0.002323$ and $p < 0.000000$, respectively). These two gem attributes, along with the *vox magica orōriouth*, are the most closely correlated with the ouroboros. 57% of uterine symbols have an accompanying ouroboros. All except four of the statistically significant correlations with the ouroboros are found in the "hematite" cluster.³⁸ Although Delatte had already observed long before that the uterine symbol "est presque toujours accompagnée d'un serpent ourobore,"³⁹ Bonner's negative evaluation of the symbol seems to have set the stage for the dearth of attention paid to the icon:

Though it is extremely common on magical amulets, there is nothing in the designs and inscriptions that occur with it to suggest a definite meaning for it; it seems to have become little more than a conventional border for such stones.⁴⁰

³⁴ Carla Sfameni, "Fra religione e magia: temi isiaci nelle gemme di età imperiale," in *Isis en Occident: Actes du IIème Colloque international sur les études isiaques, Lyon III 16-17 mai 2002* (ed. Laurent Bricault; Leiden: Brill, 2004), 395; Hanson, "Uterine Amulets," 281; Aubert, "Threatened Wombs," 443; P. J. Sijpesteijn, "Remarks on Some Magical Gems," *Aegyptus* 69.1/2 (1989): 120. On the other hand, it is omitted in Faraone, "Wandering Womb," 20; Michel, *Die Magischen Gemmen im Britischen Museum*, 220; and A. Delatte and Derchain, *Les intailles magiques*, 245. Faraone, "Text, Image and Medium," 56 only mentions it in connection with "more complex versions" of the uterine amulet design.

³⁵ Patricia A. Bochi, "Images of Time in Ancient Egyptian Art," *JARCE* 31 (1994): 58.

³⁶ Erik Hornung, *Conceptions of God in Ancient Egypt: The One and the Many* (Ithaca: Cornell University Press, 1996 [1971]), 179 n. 33; Ritner, "A Uterine Amulet," 219.

³⁷ Bochi, "Images of Time," 58.

³⁸ These three are Chnoubis ($p = 0.020411$), the pantheistic deity ($p = 0.000302$), the scarab ($p = 0.000968$) and the triple Z-shaped sign ($p = 0.000325$). Of these four, Chnoubis is the least surprising since, although it is not part of the hematite cluster, it is statistically linked with the uterine symbol, occurring 39% of the time as one of the gods surmounting the uterus.

³⁹ Delatte, "la magie grecques IV," 77.

⁴⁰ Bonner, *Magical Amulets*, 250.

Simone Michel scarcely mentions the ouroboros in her monograph, and the one moment where she discusses an association with it, it is in conjunction with Sarapis,⁴¹ with which it has no statistically significant correlation ($p = 0.676222$). In fact, the statistically significant correlations the ouroboros does have with the hematite cluster suggest it had a special role within the context of uterine gems and it is precisely here where a meaning for it should be sought.

In examining a uterine amulet from the Oriental Institute at the University of Chicago, Robert Ritner's observation that "Far from being a mere conventionalized border, the ouroboros retains its symbolism upon Hellenistic Egyptian gems as an image of protection and containment"⁴² has come closer to the mark, even specifying two other correlations (the Pantheistic deity and the scarab) which have statistically significant links with the uterine symbol.⁴³ His short survey of the symbol's Egyptian background bears out its two possible functions "to create an enclosure for either protection or imprisonment."⁴⁴ Maria Grazia Lancellotti in her essay dedicated to the icon comes to a similar conclusion: "la sua iconografia ne sottolinea la funzione principale di circondare e di ricavare al suo interno uno spazio delimitato e diverso rispetto all'esterno."⁴⁵ Late Antique speculation tended to ascribe to the ouroboros cosmic attributes such as the cosmic sky, eternity/Aion, or the annual cycle,⁴⁶ but these do not seem to be reflected in

⁴¹ Michel, *Die Magischen Gemmen*, 58.

⁴² Ritner, "A Uterine Amulet," 220.

⁴³ See n. 28 above.

⁴⁴ Ritner, "A Uterine Amulet," 220. See also W. Deonna, "Ouroboros," *Artibus Asiae* 15.1/2 (1952): 165-67, for further Egyptian examples as well as Roman (164-5).

⁴⁵ Maria Grazia Lancellotti, "Il Serpente Ouroboros Nelle Gemme Magiche," in *Gemme Gnostiche E Cultura Ellenistica* (ed. Attilio Mastrocicinque; Bologna: Pàtron Editore, 2002), 84.

⁴⁶ Lancellotti, "Il Serpente Ouroboros," 74-75; Deonna, "Ouroboros," 167-68. Anthony van der Sluijs and Anthony L. Peratt, "The Ouroboros as an Aural Phenomenon," *JFR* 46.1 (2009): 4-9, see more solar and cosmic features in the earlier Egyptian evidence and argue that the Late Antique speculation was a survival and not innovation. See also Bochi, "Images of Time," 58-59.

the tradition underlying magical gems insofar as typical cosmic features (the sun, moon, stars, zodiac, etc) are not significantly correlated with the uterine symbol or the material hematite, let alone the ouroboros (see §4).

The rates of incidence with both the *vox orōriouth* and the ouroboros are far greater than any of the rates of incidence with Egyptian gods. Isis appears on 42% of uterine gems, Chnoubis 39%, Anubis 34%, Bes 13% and Nephthys only 12%.⁴⁷ In addition, except for Bes, the clustering algorithm assigned the Egyptian gods to a separate subgroup (red). By observing the rate of incidence of the ouroboros and *orōriouth* on gems with and without Egyptian gods, one may arrive at an indication of their relative arrival in the uterine schema. A majority (59%) of uterine gems with no Egyptian deities have the *vox orōriouth*, while only about a third (35%) have the ouroboros. Of those uterine gems that have Egyptian deities, three-quarters (75%) have the ouroboros and slightly less (70%) have *orōriouth*. This increase in the rate of appearance of the ouroboros from 35% to 75% when the Egyptian deities are present seems more than accidental. When I computed a Fisher Exact test to determine whether this correlation between the occurrence of Egyptian deities and the ouroboros is significant I found that the probability value passes ($p = 0.0212$). For *orōriouth*, however, the correlation with Egyptian deities is not statistically significant ($p = 0.5648$). This indicates that the presence of any Egyptian deities is strongly correlated with the presence of the ouroboros, but not with the *vox*. I surmise that if the presence of the Egyptian deities on uterine gems is a secondary development (see §3 below for further discussion), then this development influenced the presence of the ouroboros, but not *orōriouth*. This suggests that the *vox*, so widely found on these gems, was an earlier development, more

⁴⁷ An otherwise uncertain deity occurs 8% of the time.

closely associated with the original uterine amulet schema, whereas the ouroboros, although perhaps present on some of the earliest uterine gems as well, became much more common after the introduction of the Egyptian deities. I should note that this is a hypothetical relative chronology. The dating of magical gems is so fraught with uncertainty and the date ranges typically spanning one to two centuries that a precise chronology can not easily be determined purely on art-historical grounds. But, I believe that by analyzing the internal "grammar" of the constituent iconographic components one can, at times, as in this case, suggest the proper evolution of the design.

b. Bes

The final attribute present in the purple subgroup is that of Bes, a front-facing squat figure with leonine facial features which, by the Late and Ptolemaic periods, was often depicted ithyphallic with attributes of several gods, leading to the moniker "Bes Pantheos."⁴⁸ Figurines of Bes are often labeled with the names of other gods (e.g. Amun, Min, or Horus) and in spells he is sometimes invoked as a hypostasis of Amun-Ra.⁴⁹ It has been argued that the dwarf-like appearance of Bes may have originated in his identity with a premature birth, resulting in his role as protector of childbirth.⁵⁰ It is important to

⁴⁸ Véronique Dasen, "Magic and Medicine," in *'Gems of Heaven:' Recent Research on Engraved Gemstones in Late Antiquity c.AD 200-600* (ed. Chris Entwistle and Noël Adams; BMRP 177; London: The British Museum Press, 2011), 65-66. For the origin of the Bes-image as originally a lion-man see James F. Romano, "The Origin of the Bes-Image," *BES* 2 (1980): 39-56.

⁴⁹ Dasen, "Magic and Medicine," 65.

⁵⁰ Youri Volokhine, "Quelques aspects de Bès dans les temples égyptiens de l'époque gréco-romaine," in *Isis on the Nile: Egyptian Gods in Hellenistic and Roman Egypt. Proceedings of the IVth International Conference of Isis Studies, Liège, November 27-29 2008* (ed. Laurent Bricault and Miguel John Versluys; Leiden: Brill, 2010), 235; Dimitri Meeks, "Le nom du dieu Bès et ses implications mythologiques," in *The Intellectual Heritage of Egypt: Studies presented to László Kákosy* (ed. U. Luft; StAeg 14; Budapest: La chaire d'Egyptologie, 1992), 424-29.

distinguish between the more elaborate, "pantheistic" Bes, which is typically referred to as simply Pantheos or "the pantheistic deity," replete with multiple arms, wings and heads, and the simpler leonine squat figure found accompanying the uterine symbol.⁵¹ Both manifestations are found on magical gems, but rarely is Bes Pantheos found on uterine amulets.

Bes is the only Egyptian god who appears in the purple subgroup, the remainder clustering separately in the red subgroup. While Bes appears on only 13% of uterine gems this accounts for more than half (53%) of his instances on magical gems. Furthermore, all of his statistically significant correlations are with attributes in the hematite cluster. This close association with hematite and uterine amulets reveals the tenacity with which the god's old Dynastic powers of domestic protection, especially women and childbirth, held on into Late Antiquity.⁵² Bes was also active in other domains (sleep, warfare, protection of the dead, and celebration of music, dance and wine),⁵³ but his close association with uterine gems suggests those roles, if at all active, were minimized on magical gems. In addition, one may surmise that the uterine gems with Bes emphasize a role in pregnancy as opposed to general protection against

⁵¹ Discussion of the complex typology for Bes attested in the earlier Egyptian evidence is obviated by the fact that by the Roman period the bifurcation between Pantheos and Bes had largely been effected and most instances on magical gems fall within these two distinct categories. In fact, A. Delatte and Derchain, *Les intailles magiques*, 130-31 argued that Pantheos was never specifically associated with one deity in particular. Olaf E. Kaper, *The Egyptian God Tutu: A Study of the Sphinx-God and Master of Demons with a Corpus of Monuments* (OrientLovan 119; Leuven: Peeters, 2003), 104 has come to a similar conclusion, although the history of research into Pantheos has yet to reach much consensus on the meaning of the figure (Kaper, *The Egyptian God Tutu*, 91-99). For more general comments see Grazyna Bakowska, "Bes Pantheos. Some Remarks Concerning his Representation on Magical Gems," in *Proceedings of the First Central European Conference of Young Egyptologists. Egypt 1999: Perspectives of Research, Warsaw 7-9 June 1999* (ed. Joanna Popielska-Grzybowska; Warsaw: Institute of Archaeology Warsaw University, 2001), 11-14.

⁵² Dasen, "Magic and Medicine," 67-75; Michel, *Die Magischen Gemmen*, 187, especially n. 973; Ritner, "A Uterine Amulet," 217. For Late Antique popularity of Bes, see David Frankfurter, *Religion in Roman Egypt: Assimilation and Resistance* (Princeton: Princeton University Press, 1998), 124-31.

⁵³ Dasen, "Magic and Medicine," 75-80.

gynecological dysfunction. The command "Contract, uterus, lest Typhon seize you!" on BM 379 (and perhaps likewise on other gems with the same or similar command, but without Bes) may therefore be understood for the preservation of pregnancy against the threatening role of Seth/Typhon for inducing abortions.⁵⁴

The close connection between Bes and maternal matters, the clustering of Bes within the purple subgroup and his high rate of incidence may suggest that Bes, like the *vox magica orōriouth*, played an early role—earlier than the other Egyptian gods that appear on these gems—in the composition of these amulets. However, in only one instance does Bes appear unaccompanied by other gods (Berlin 112). Bes is significantly correlated with the goddess Isis ($p = 0.000072$), accompanied by her in 67% of all cases and on uterine gems specifically in 91% of all cases. Therefore, Bes must be understood within the broader context of the appearance of Egyptian deities on these gems and not as an Egyptian god uniquely early in their evolution.

3. The "Egyptian" Subgroup (red)

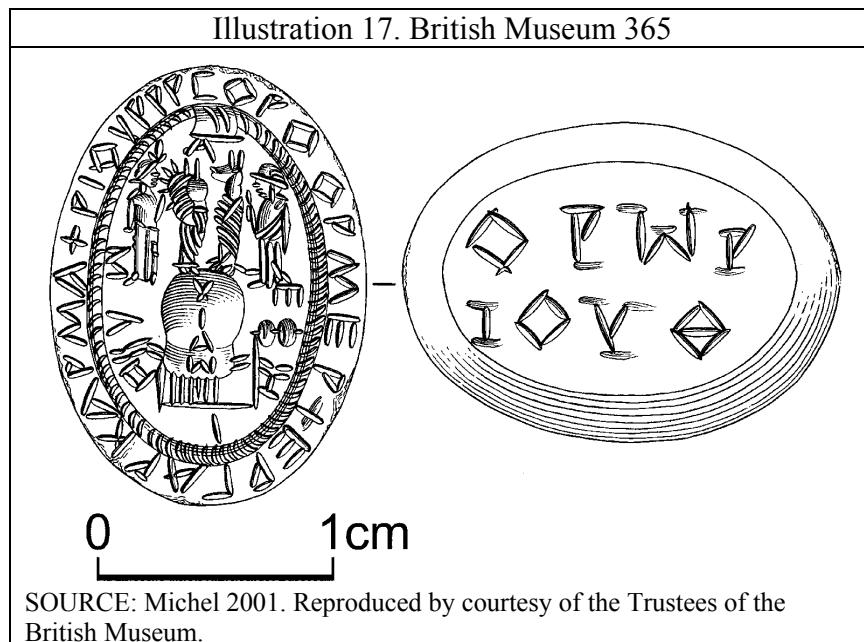
Four Egyptian gods (Anubis, Isis, Osiris and Nephthys) appear in this subgroup, along with the *Soroor* formula (See Illustration 17). The clustering algorithm grouped Isis, Anubis, Osiris and Nephthys in a separate subgroup (red) precisely because they are more closely tied to each other than with attributes in the purple subgroup. The most obvious take-away from this observation is the fact that they usually are present or absent as a unit on uterine gems. Of the 61 uterine gems on which Isis appears, only 14 times

⁵⁴ Ritner, "A Uterine Amulet," 214. The equivalence of Seth and Typhon is already evident in Plutarch, *de Iside et Osiride*, where it is Typhon who is the brother and husband of Nephthys (355F-356A), who sealed Osiris in the coffin (356C) and later dismembered his body (358A).

(23%) is she present without any of the other three gods in the subgroup.⁵⁵ Anubis appears only three times without the other three gods (6%), Osiris three times (13%) and Nephthys none.

Chnoubis appears unaccompanied by any Egyptian deities on uterine gems six times (11%) and Bes appears alone only once (5%). These rates of incidence suggest that the Egyptian deities

most closely tied to uterine gems are as a group a secondary development, brought in *en masse* at some point. Had this development been early on in the evolution of the



uterine amulet design one would expect a higher rate of occurrence on these gems. Anubis, Bes, Isis, Nephthys and Osiris are absent on nearly half of them (43%). When Chnoubis is taken into consideration, then a third of them (34%) are bereft of any of the Egyptian deities statistically correlated with the uterine symbol.

⁵⁵ And when Bes, Harpocrates and Chnoubis are taken into account, i.e. the remaining possible Egyptian deities, she is never observed to appear alone.

a. Isis and Nephthys

Isis (*Gk.* Ἰσις < *Eg.* ȝst) is the most frequently appearing divinity on uterine gems (42%), with her stylized throne crown, from which her name is derived (ȝst, "place, seat"),⁵⁶ often being the only feature distinguishing her from Nephthys as the spatial constraints for depicting multiple gods atop the uterine symbol do not allow for much detail.⁵⁷ This place of privilege is no doubt due to her crucial role as wife and mother in the Osirian triad, protectress of all matters maternal.⁵⁸ In the Isis aretalogy⁵⁹ from Cyme she is presented as the goddess, or patroness, of women: Ἐγώ εἰμι ἡ παρὰ γυναιξὶ θεὸς.⁶⁰ Her association, even assimilation, with the goddess Bubastis (Bastet),⁶¹ one of whose essential roles was as goddess of maternity, as well as Hathor,⁶² further increased the importance of Isis as protectress of pregnant women. In Ovid, *Metamorphoses* 9.687-694, Isis appears to Telethusa, pregnant and near term, accompanied by Anubis, Apis, Bubastis and Osiris in order assuage her fears over the threat from her husband, Lygdus,

⁵⁶ J. Gwyn Griffiths, s.v. "Isis," *The Ancient Gods Speak: A Guide to Egyptian Religion* (Oxford: Oxford University Press, 2002), 169; Penelope Wilson, s.v. "st," *A Ptolemaic Lexikon: A Lexicographical Study of the Texts in the Temple of Edfu* (Leuven: Uitgeverij Peeters en Department Oosterse Studies, 1997), 946-47; Hans Bonnet, *Reallexikon der Ägyptischen Religionsgeschichte* (Berlin: Walter de Gruyter, 1952), 326.

⁵⁷ Apparently Osiris himself could not tell them apart and having laid with Nephthys by accident sired Anubis (Plutarch, *de Iside et Osiride*, 356F).

⁵⁸ Aubert, "Threatened Wombs," 428-29; Sharon Kelly Heyob, *The Cult of Isis among Women in the Graeco-Roman World* (Leiden: Brill, 1975), 38-44, 70-75; Drexler, s.v. "Isis," *Ausführliches Lexicon der Griechischen und Römischen Mythologie* (Leipzig: Teubner, 1890-1894), 501-02.

⁵⁹ For general discussion of the Isiac aretalogies see Garth Fowden, *The Egyptian Hermes, A Historical Approach to the Late Pagan Mind* (Cambridge: Cambridge University Press, 1986), 46-52; Heyob, *The Cult of Isis*, 45-52.

⁶⁰ Yves Grandjean, *Une nouvelle arétopologie d'Isis à Maronée* (Leiden: Brill, 1975), 122, l. 10. See discussion in Heyob, *The Cult of Isis*, 48.

⁶¹ Heyob, *The Cult of Isis*, 50-51; Grandjean, *Une nouvelle arétopologie*, 99-100.

⁶² Vincent Arieh Tobin, "Isis and Demeter: Symbols of Divine Motherhood," *JARCE* 28 (1991): 193; Heyob, *The Cult of Isis*, 48-49.

that if the child is born a female he will not suffer that it lives.⁶³ Such a request could be part of the stark reality of the time, as demonstrated by Hilarion's request of his sister that if she bears a male child to keep it, but if it is female to cast it out (ἐὰν πολλὰ πολλῶν τέκης ἐὰν ἦν ἄρσενον ἄφεις, ἐὰν ἦν θήλεα ἐκβαλεῖ) in the first century BCE papyrus P.Oxy. 744.8-10.

Nephthys (Gk. Νέφθυς < Eg. *Nb-hwt*) is the sister of Isis, her name meaning "Mistress of the mansion."⁶⁴ Her headdress consists of a rectangular house topped with a basket, often the only element distinguishing her from Isis. She has a fairly high correlation with hematite ($p = 0.013137$) and the uterine symbol ($p = 0.001861$), but it is with Isis that we find her strongest association ($p = 0.000028$)—indeed, she is never seen outside the company of Isis on any magical gem, and most of the time (61%) accompanies Isis on uterine gems. This suggests that her presence on uterine gems has more to do with the presence of her sister than with her own divine attributes. One of her most ancient roles was as co-mourner accompanying Isis after the disappearance of Osiris,⁶⁵ as well as aid in the resurrection process where Nephthys held the hand of Osiris.⁶⁶ In Plutarch (*de. Is.* 357) Isis is the sole mourner, but her ancient association with Nephthys had not been forgotten; furthermore, Nephthys' new mythological role as the true mother of Anubis through her mistaken tryst with Osiris (*de. Is.* 356F) gave new

⁶³ Il. 687-8 read: Inachis ante torum, pompa comitata sacrorum, aut stetit aut visa est. While the title Inachis (< Gk. Ἰνάχη), literally "child of Inochus" i.e. Io, is used, the entourage and context require us to understand it here as a nickname for Isis, which is also attested elsewhere. See Drexler, s.v. "Isis," 439-40.

⁶⁴ Drexler, s.v. "Nephthys," *Ausführliches Lexicon der Griechischen und Römischen Mythologie* (Leipzig: Teubner, 1890-1894), 189.

⁶⁵ Tobin, "Isis and Demeter," 194-95; C. J. Bleeker, "Isis and Nephthys as Wailing Women," *Numen* 5.1 (1958): 1-17.

⁶⁶ Tobin, "Isis and Demeter," 195.

impetus for her presence in the closest entourage of Isis.⁶⁷ Another less emphasized role was in childbirth, which was shared with two other goddesses, Nekhbet and Wadjet, but this latter pair never appears on any magical gem since the goddesses had been assimilated with Isis and Nephthys by the Roman period.⁶⁸

All of the statistically significant correlations with Isis are found in the "hematite" cluster. Despite her other divine attributes apportioned to her as her Hellenistic cult spread throughout the Mediterranean,⁶⁹ transforming into a veritable Isis Panthea,⁷⁰ the magical gem tradition seems to reflect most strongly her role as protector of mothers, motherhood and pregnancy. This is not to say that Isis can not often be found in other contexts. In fact, 65% of the time Isis is found on non-uterine gems, but her presence there is never statistically significantly correlated with any other attributes (except in the few cases where Nephthys accompanies her outside of the uterine gems) and seems to be effectively random—which is to say, her role there is idiosyncratic to the purposes and desires of the designers of those particular gems, and does not reflect presence in a more widespread *system* or *formula*, as it does in the case of uterine gems.

⁶⁷ There is some indication that her affair with Osiris was not a wholly new development of the Hellenistic period; see Frank Feder, "Nephthys - Die Gefährtin im Unrecht Die spät(zeitlich) Enthüllung einer göttlichen Sünde," *ZPE* 37 (2008): 69-83.

⁶⁸ Ali Radwan, "Nekhbet with Wadjet or Isis with Nephthys: The Lasting Concept of Two Goddesses in Ancient Egypt," in *Hommages à Fayza Haikal* (ed. Nicolas Grimal, Amr Kamel, and Cynthia May-Sheikholeslami; Cairo: Institut Français d'archéologie orientale, 2003), 217-21.

⁶⁹ Thomas Allen Brady, "The Reception of the Egyptian Cults by the Greeks (330-30 B.C.)," *UMS* 10.1 (1935): 33-43.

⁷⁰ For Isis Panthea, see Drusus Pollini, "A Bronze Statuette of Isis-Fortuna Panthea: A Syncretistic Goddess of Prosperity and Good Fortune," *Latomus* 62.4 (2003): 875-82; Michael Lipka, *Roman Gods: A Conceptual Approach* (Leiden: Brill, 2009), 96; Drexler, s.v. "Isis," 546-47.

b. Osiris

Osiris (Gk. Ὀσίρις < Eg. *Wsir*) appears on uterine gems relatively infrequently (16%) and only Nephthys (13%) and Bes (12%) are less common. He is an ancient mortuary god (Having supplanted Anubis in the Middle Kingdom), the husband and brother of Isis, often depicted mummiform, and always wearing either the White or *atef* crowns and holding crook and flail.⁷¹ The famous etiological myth concerning his death and resurrection, conveyed most vividly by Plutarch (*de Iside et Osiride* 356B-358E),⁷² has Osiris tricked and entombed in a casket by Seth, later found by Isis and Nephthys (Plutarch reserves this role only for Isis), only to have his body dismembered by Seth. Isis reconstitutes his body, except for his phallus, which is magically substituted. Following this Osiris becomes lord of the underworld, while Horus and Seth engaged in an epic battle, with the latter ultimately vanquished.

The relatively infrequent appearance of Osiris on uterine gems, and even less common occurrence of Harpocrates, suggests a departure from the traditional Egyptian triad Osiris-Isis-Horus.⁷³ In fact, the three appear together on only one uterine gem (BM 379) and on only two others in general (BM 90, 122). The reason for this is not clear: it does not seem to have anything to do with the rise of Sarapis since he and Isis are not strongly correlated ($p = 0.235848$), and the new god never makes a debut on uterine amulets. This fact is interesting in itself since it shows a certain traditionalism being

⁷¹ For general discussion see J. Gwyn Griffiths, s.v. "Osiris," *The Ancient Gods Speak: A Guide to Egyptian Religion* (Oxford: Oxford University Press, 2002), 302-07; Bonnet, *Reallexikon*, 568-76; Pauli-Fiesel, s.v. "Usire," *Ausführliches Lexicon der Griechischen und Römischen Mythologie* (Leipzig: Teubner, 1890-1894), 125-40.

⁷² Pauli-Fiesel, s.v. "Usire," 128-29.

⁷³ On Egyptian divine triads, see Hornung, *Conceptions of God*, 218-19; H. te Velde, "Some Remarks on the Structure of Egyptian Divine Triads," *JEA* 57 (1971): 80-86.

reflected on these gems, even if imperfectly and in a limited way. Osiris is strongly correlated with Isis, but not with Harpocrates, and his presence here must be accounted for simply by his being brother and husband of Isis.

c. Anubis

Anubis (Gk. Ἀνυβίς < Eg. *Inpw*) was the principal mortuary god before being supplanted by Osiris.⁷⁴ Typically depicted with a dog (or jackal) head, he is the lord of graves and patron of embalmers.⁷⁵ He occurs on a third (34%) of uterine gems, twice that of Osiris, and is most closely affiliated with hematite, 42% of the gems on which he appears being made of that material. His appearance on uterine gems may at first seem unexpected since his role as embalmer and lord of graves does not seem amenable to gynecological issues. His aiding the embalming and mummification of Osiris following his death does not seem to be the principal reason for his presence on these gems since more than half the time (62%) Osiris is absent. Anubis is sometimes described as holder of the keys to Hades,⁷⁶ and this key symbolism might have been related to the uterine-key iconography on these gems, but I suspect this primarily has to do with his role as embalmer.

Rather, I find that the answer is to be found in Diodorus Siculus, where he states that dogs are useful for hunting and protection and that for this reason Anubis was the

⁷⁴ Denise M. Doxey, s.v. "Anubis," *The Ancient Gods Speak: A Guide to Egyptian Religion* (Oxford: Oxford University Press, 2002), 22.

⁷⁵ For general discussion see Bonnet, *Reallexikon*, 40-45; Meyer, s.v. "Anubis," *Ausführliches Lexicon der Griechischen und Römischen Mythologie* (Leipzig: Teubner, 1890-1894), 386-87.

⁷⁶ David G. Martinez, *P. Michigan XVI: A Greek Love Charm from Egypt* (P. Mich. 757) (ASPop 30; Atlanta: Scholars Press, 1991), 45.

bodyguard (σωματοφύλαξ) of Osiris and Isis (1.87.2). The triad Sarapis-Isis-Anubis was, indeed, more common than Sarapis-Isis-Horus/Harpocrates in the Roman period.⁷⁷ In Ovid (*Met.* 9.690) Anubis is described as "barker" (latrator), which no doubt alludes to his role as protection dog.

d. Chnoubis

Chnoubis (< *Gk. Χνοῦβις*), although classified in a separate cluster, makes frequent appearance on these gems due to a close correlation with Anubis, Isis, the *vox orōriouth* and *Soroor*-formula, and the Uterine symbol and key. The polyvalent nature of Chnoubis is emphasized by the fact that he not only appears on gems in which he is the central icon (i.e., the Chnoubis gems, usually not made of hematite), but he also happens to be the second most common Egyptian god found on uterine gems (39%). On this point Ritner was mistaken to claim that Khnum, the Ram-headed god, here in his Hellenistic guise as the Chnoubis serpent is the most frequent Egyptian deity on uterine gems, although he was not far off the mark.⁷⁸ The role of Khnum as "opener" in the birthing process may have informed the frequent use of his serpentine incarnation on these gems,⁷⁹ although there are not insignificant philological problems with identifying the

⁷⁷ Heyob, *The Cult of Isis*, 77; V. W. Yorke, "Excavations at Abae and Hyampolis in Phocis," *JHS* 16 (1896): 294. A temple to Isis and Anubis was dedicated at Maamourah in the early third century BCE (Irwin L. Merker, "The Ptolemaic Officials and the League of Islanders," *HistZeit* 19.2 (1970): 154-55).

⁷⁸ Ritner, "A Uterine Amulet," 215, 17, especially n. 60. For general discussion of the origins and ancient literary attestations of the figure, see Drexler, s.v. "Knuphis," *Ausführliches Lexicon der Griechischen und Römischen Mythologie* (Leipzig: Teubner, 1890-1894), 1258-64.

⁷⁹ See Ritner, "A Uterine Amulet," 215, especially n. 42. The name Khnum (= *Hnm*) means both vessel and builder and therefore Khnum was associated with both the flow of the Nile and the fashioning of the world, especially mankind (Penelope Wilson, *A Ptolemaic Lexikon: A Lexicographical Study of the Texts in the Temple of Edfu* (Orientalia Lovaniensia Analecta; vol. 78; Leuven: Uitgeverij Peeters en Department

name Χνοῦβις with Khnum.⁸⁰ The name "Chnoubis" (Χνοῦβις) itself, often present on gems where Chnoubis is the central icon (i.e. the so-called Chnoubis gems), seems to resemble "Khnum" (Χνοῦμ) in the variant spelling "Chnoumis" (Χνοῦμις).⁸¹ On at least one gem the Chnoubis figure is called Χνοῦμ (BM 337). In the following chapter (4.§2) I delve into the complex issues involved in the etymology of the name "Chnoubis," its relationship to Khnum and the Egyptian decanal system which has received much attention for the presence of the decanal god *Knm.(t)* and associated depictions of lion-headed and serpentine gods as a possible origins for the Chnoubis iconography.

Overall, 27% of all instances of Chnoubis appear on Uterine gems, with most of the rest appearing on the so-called Chnoubis gems, where the serpentine figure is the central device on the obverse and is often accompanied by the so-called Chnoubis sign and name on the reverse. Most of the icon's most statistically significant correlations and attributes with the highest rates of incidence are not found in the Hematite cluster. It is evident that despite Chnoubis being the second most common Egyptian god on the uterine gems, these gems are not the primary locus of his utilization and his presence must certainly be construed as a secondary development.

Oosterse Studies, 1997), 768-69); therefore, Khnum could be understood to fashion the child in the womb. See Zwierlein-Diehl, *Antike Gemmen*, 228; Bonnet, *Reallexikon*, 137.

⁸⁰ The Egyptian decan from which the name Χνοῦβις derives is *Knm.(t)*, but the Egyptian god Khnum is *Hnm*. Both are rendered in Greek with a chi, but the underlying Egyptian consonant is different, which led Drexler, s.v. "Knuphis," 1260 to declare "In Wirklichkeit ist der Chnoumis dieser Gemmen nicht der alte kosmogonische Gott Chnum, sondern vielmehr eine ägyptische Dekangottheit." See extensive discussion in Jackson, *The Lion Becomes Man*, 101-03 n. 78.

⁸¹ The variant is attested on: Berlin 61, 62; BM 156, 306, 307, 315, 321, 322, 324, 336, 584; Kassel 30, 34; Michigan 46; Paris 242, 243, 244, 247, 256, 607; Schwartz ANS 14.

e. The *Soroor*-formula

The *Soroor*-formula, the complete form of which is Σοροορμεπφεργαρβαρμαφριουριγξ,⁸² occurs on 16% of uterine gems, which accounts for 56% of the instances of this formula.⁸³ Delatte suggested that comparing gems with this formula to its occasions in the PGM demonstrates that it was an invocation to a solar deity,⁸⁴ but he did not lay out the argument. Outside of magical gems the *vox* is fairly rare, appearing three times in the PGM (PGM IV.1567, XII.172-3,⁸⁵ XIXa.10) and twice on *defixiones* (Audollent 252.24, 253.34).⁸⁶ The argument put forth by Ritner that the *vox* is concerned with "opening" and complements the role of the ouroboros is more convincing.⁸⁷ The *vox* is significantly correlated with Anubis ($p = 0.001999$), Isis ($p = 0.000766$) and Nephthys ($p = 0.020038$) and on uterine gems is accompanied 91% of the time by Isis. This clearly demonstrates that the formula is a later addition to the uterine schema, having arrived with the addition of the Egyptian gods.

3.1 Celestial Connections with Uterine Gems

Speculation over solar and lunar connections with various elements of the uterine

⁸² Bonner, *Magical Amulets*, 206; Delatte, "la magie grecques IV," 79.

⁸³ The frequency of the formula's occurrence is sometimes overstated, as in Sijpesteijn, "Remarks," 120, who states that it is often enclosed by the ouroboros. It is, in fact, enclosed 36% of the time, which only brings us to 6% of the uterine gems.

⁸⁴ Delatte, "la magie grecques IV," 80.

⁸⁵ A typographical error in Brashear, "The Greek Magical Papyri," 3559 identifies this as PGM VII.

⁸⁶ Audollent, ed., *Defixionum Tabellae*.

⁸⁷ Ritner, "A Uterine Amulet," 218-19. Brashear, "The Greek Magical Papyri," 3599 and Michel, *Die Magischen Gemmen*, 487 follow him.

amulets has already been mentioned in passing and merits closer examination. Delatte championed the solar hypothesis, observing:

La plupart des divinités qu'on voit près de la matrice pour la protéger sont des divinités solaires. Il y a naturellement aussi des divinités féminines, telle Isis, spécialement proposée à la protection de la vie des femmes. On y voit d'ordinaire le bust du soleil, le dieu Bésa, Horus, Osiris et surtout le serpent léontocéphale Chnubis. Mais la figure presque inseparable de ce genre d'amulettes est celle du serpent ourobole qui représente le cercle décrit par la course du soleil.⁸⁸

Bonner emphasized a lunar connection, in part due to the association between the inscription Ἀκτιωφι Ἔρεσχιγαλ Νεβουτοσουαληθ (Michigan 77) and Artemis-Selene-Hekate, but more generally because "The traditional connection of moon deities with the function of women is well known."⁸⁹ More recently, Jean-Jacques Aubert and Michel have endorsed the lunar hypothesis, although for somewhat different reasons.⁹⁰ Both agree with Bonner that Greek lunar divinities are often associated with childbirth,⁹¹ but then pursue different avenues to the same end. Aubert, while acknowledging that several of the divinities present on uterine gems had solar backgrounds, points out that in Plutarch (*de Is.* 368C) Osiris has a lunar association, the ouroboros (ἀκρουροβόρε) is invoked in a lunar spell (PGM VII.896-7) and the "key" is mentioned as a symbol of the moon in PGM IV.2293.⁹² This last point is the weakest since the line reads "τοῦτο γὰρ σου σύμβολον, τὸ σάνδαλόν σου ἔκρυψα καὶ κλεῖδα κρατῶ" (= "I have hidden this symbol of yours, your sandal, and possess a key," 2292-3). τοῦτο ... σύμβολον is singular and cannot refer to both of the objects named, "sandal" and "key." There are two verbs, each with its own object—the "sandal" is what was hidden (ἔκρυψα), and therefore

⁸⁸ Delatte, "la magie grecques IV," 86.

⁸⁹ Bonner, *Magical Amulets*, 199.

⁹⁰ Michel, *Die Magischen Gemmen*, 190-202; Aubert, "Threatened Wombs," 443-47.

⁹¹ Michel, *Die Magischen Gemmen*, 190-92; Aubert, "Threatened Wombs," 444.

⁹² Aubert, "Threatened Wombs," 444-46.

the "symbol," and the "key" is an additional thing being held (κρατῶ) in order to open the gates of Tartarus, mentioned in the following line. Moreover, in the final lines of the spell, the foe against whom the spell is to be directed is described as the enemy of the gods of heaven, Helios-Osiris and Isis (2340-2). Therefore, although the spell is directed at Selene, the lunar and solar forces are not construed as mutually exclusive.

The line of reasoning employed by Michel is more circuitous. She begins by pointing out that in the PGM the deities most representative of lunar power are Hekate, Artemis and the Gorgon—Selene, on the other hand, rarely appears on magical gems.⁹³ She then turns to a curious triangular hematite gem with στῆσον τὸ αἷμα, "stop the blood!" inscribed on its edge.⁹⁴ On the obverse three figures (Thoth, Helioros and Anubis) stand on three Sphinxes and Eros flies above them. On the reverse an anchor is in the center. She argues that the *voices magicae* on the reverse are associated with Hekate and the command to stop blood deals with uterine matters (the anchor on the reverse also acting as a metaphor for the same), and therefore, the gem is a uterine amulet linked with Hekate and the power of the moon.⁹⁵ She then turns her attention to Thoth—citing an amulet inscription which implicates the Egyptian moon god Khonsu in remedying a wandering womb,⁹⁶ she argues that the close relationship between Khonsu and Thoth bring the latter into the ambit of uterine amulets.⁹⁷ She then turns to another gem which has a uterine scene on the obverse but an Ibis tied to an altar (another well-known scene)

⁹³ Michel, *Die Magischen Gemmen*, 190-92.

⁹⁴ Michel, *Die Magischen Gemmen*, Taf. 79.1.

⁹⁵ Michel, *Die Magischen Gemmen*, 193-94.

⁹⁶ This gem is discussed by Bonner, *Magical Amulets*, 81, and was published by Du Molinet, but its present location is unknown. The inscription is given as τάσσον τὴν μήτραν τῆς δεῖνα εἰς τὸν ἴδιον τόπον ὁ τὸν κύκλον τοῦ ἥλειν. The reference to the one who lifts the sun disk is likely Khonsu (*cf.* PGM VII.300).

⁹⁷ Michel, *Die Magischen Gemmen*, 198-99.

on the reverse.⁹⁸ Using this gem to suggest a link between the Ibis (and consequently Thoth) and protection of the womb, she notes that the Ibis is a Hieroglyphic sign for the heart and observes that in antiquity there was some confusion among terms for the heart, stomach and womb.⁹⁹ Finally, citing a remedy from the London Medical Papyrus which invokes Thoth for stopping blood,¹⁰⁰ she closes the circle: having connected Hekate and the powers of the moon with Thoth, the Ibis and womb, she declares: "Der Mond—auf den Amuletten als zweigeschlechtliche und ambivalente Macht geschildert—erweis sich als Herr über den Uterus und die Fruchtbarkeit."¹⁰¹

This tortured line of reasoning has several weak points. It is not obvious that the inscription to stop the blood on the triangular hematite gem specifically refers to uterine matters. Likewise, the Egyptian remedy in the London Magical Papyrus does not specify a gynecological problem, but simply bleeding, and states at the end of the recipe (which Michel omits in her quotation) "die gegeben ist an der After," followed by a line-break and then resuming "oder der Frau."¹⁰² In addition, it states that the incantation must be spoken over Carnelian, a material which is not attested for any uterine amulet. Finally, although Thoth and Khonsu were sometimes associated with each other,¹⁰³ and Thoth at times presented as a lunar deity,¹⁰⁴ it is a leap of logic to suggest that uterine spells specifically naming Khonsu must also be consequential for the role of Thoth. If the suggested connection between the Ibis gems, Thoth and uterine magic is correct, one would expect a significant correlation between these and conventional uterine scenes. In

⁹⁸ Michel, *Die Magischen Gemmen*, Taf. 74.1.

⁹⁹ Michel, *Die Magischen Gemmen*, 200.

¹⁰⁰ Michel, *Die Magischen Gemmen*, 200-01.

¹⁰¹ Michel, *Die Magischen Gemmen*, 202.

¹⁰² Wolfhart Westendorf, "Beiträge aus und zu den medizinischen Texten," *ZÄS* 92.1-2 (1966): 144.

¹⁰³ Bonnet, *Reallexikon*, 141.

¹⁰⁴ Patrick Boylan, *Thoth The Hermes of Egypt, A Study of Some Aspects of Theological Thought in Ancient Egypt* (New York: Oxford University Press, [1922] 1999), 62-75.

fact, Thoth is never found on a gem with the uterine symbol and his correlation with hematite, the preferred material for uterine amulets, is not significant ($p = 0.410214$). The Ibis is found in conjunction with the uterine symbol only six times and the statistical correlation is weak ($p = 0.271769$).

The above analysis is not intended to argue against the lunar hypothesis in favor of the solar one. Indeed, some lunar associations with Osiris and Isis do exist. In addition to the already cited passage in Plutarch regarding the lunar character of Osiris, the Osirian epithet "beloved" (Eg. *mrjty*) seemed to have begun developing a lunar association already in the Late Kingdom.¹⁰⁵ In a stele of Ramesses IV dedicated to Osiris he is declared to be "the moon in the sky"—the lunar aspects of Osiris seem to have arisen out of the shared notion of rebirth, just as Osiris was reborn so the moon rejuvenates during its cycle.¹⁰⁶ In some scenes, Anubis is seen bending over Osiris-as-Moon in an action parallel to the typical depictions of embalming.¹⁰⁷ Several bronze statuettes survive depicting Osiris with the solar disk and crescent, attributes seemingly borrowed from Khonsu.¹⁰⁸ Prior to the Hellenistic period Isis was often identified with Hathor and not infrequently appeared with cow's horns,¹⁰⁹ but the horns' lunar association was most often made during the Graeco-Roman period.¹¹⁰ In the passage from Ovid already cited, she is described as having lunar horns ("Inerant lunaria fronti cornua," *Met.* 9.688-9). Diodorus flatly asserts that Isis is the moon (1.11.1).

¹⁰⁵ Pierre P. Koemoth, *Osiris-MRJTJ (Le) Bien-Aimé: Contribution à l'étude d'Osiris sélénisé* (CSEG 9; Geneva: Société d'Égyptologie, 2009), especially 21-28.

¹⁰⁶ Robert K. Ritner, "Anubis and the Lunar Disc," *JEA* 71 (1985): 152.

¹⁰⁷ Ritner, "Anubis," 152-55.

¹⁰⁸ J. Gwyn Griffiths, "Osiris and the Moon in Iconography," *JEA* 62 (1976): 153-59.

¹⁰⁹ Drexler, s.v. "Isis," 362-63.

¹¹⁰ See Heyob, *The Cult of Isis*, 49. Cf. Diodorus 1.111-4. Drexler, s.v. "Isis," 437. Plutarch states that after Horus knocked off her diadem Hermes replaced it with a crown of cow horns (*de Is.* 358D).

The issue at hand, rather, is two-fold: (1) should solar and lunar forces be construed as mutually exclusive and (2) can solar and/or lunar associations be detected in the composition of uterine gems. On the first point several considerations lead me to view mutual exclusivity between solar and lunar forces to be a misguided intuition.¹¹¹ The spell to Selene already cited in connection with Aubert's argument (PGM IV.2241-2358) indicates at its end that the enemy of Selene, against whom the incantation is to be used, is also the enemy of Helios-Osiris and Isis. When comparing the lunar-Osirian tradition in Plutarch and the reference to Helios-Osiris in PGM VI.2342, Aubert finds tension (solar versus lunar) and opines that:

This passage shows the contamination of two traditions, the one retaining the old association of Osiris with the sun, and the other adopting his subsequent rôle as a lunar god....¹¹²

But, as has been shown above, Osiris begins to take on lunar attributes long before Plutarch. Furthermore, the unification between Osiris and Re which began in the New Kingdom in the eighteenth dynasty carried with it important implications for a solar-lunar symbiosis. Solar-Osirian unity is promulgated in a set of texts called the *Netherworld Books* found in the tombs of Tutankhamun, Ramesses VI and Ramesses IX.¹¹³ A bipartite tableau first appearing in the nineteenth dynasty cenotaph of Sety I, depicting the awakening of Osiris by Horus, seems to convey a similar Re-Osiris unification.¹¹⁴ Among the various depictions showing or implying the unified Re-Osiris is a scene in the tomb of Ramesses VI in which the solar disk is placed within a lunar crescent,

¹¹¹ With regard to the ouroboros Martinez, *P. Michigan XVI*, 38, detects that in the PGM it can be associated with both solar and lunar forces.

¹¹² Aubert, "Threatened Wombs," 445.

¹¹³ Darnell, *Enigmatic Netherworld Books*.

¹¹⁴ Joshua Aaron Roberson, *The Awakening of Osiris and the Transit of the Solar Barques: Royal Apotheosis in a Most Concise Book of the Underworld and Sky* (OBO 262; Fribourg: Academic Press Fribourg, 2013), 128-40.

suggesting the alternation of sun and moon, day and night, symbolizing the solar cycle.¹¹⁵

The perpetual rejuvenation of Osiris is paralleled by the daily rebirth of Re who appears each morning as Horus and "emerges from the body of his father" (*Hr pr=f m h3.t*

it=f),¹¹⁶ who is to be understood as Osiris.¹¹⁷ The solar cycle implies a perpetual

rejuvenation of Re-Osiris—one occurring on the diurnal side and the other on the nocturnal side of the solar barque's journey—and the nightly appearance of the moon.

That such a symbiotic, as opposed to exclusivist or even hostile, understanding of the relation between lunar and solar forces may have informed the repertoire on magical gems is suggested by the fact that statistically significant correlations can be observed between the sun ($p = 0.028152$) and moon ($p = 0.012354$), Helios ($p = 0.000049$) and Selene ($p = 0.000301$), Harpocrates ($p = 0.042421$) and the moon ($p = 0.040717$), and Helios ($p = 0.051510$) and the moon ($p = 0.042655$).¹¹⁸ Although the crescent moon and stars often appear without the accompaniment of a solar disk, when the solar disk does appear it tends to be accompanied 58% of the time.

The statistics concerning the sun and moon, Helios and Selene, reveal something else as well, pertaining to the second question, which is that none of the divinities or devices occurring on these amulets is strongly correlated with any of these celestial icons. The uterine symbol coincides with either the lunar crescent or the sun disk exactly once, both on the same gem (Michigan 67), and never with any of the incarnations of Helios

¹¹⁵ Darnell, *Enigmatic Netherworld Books*, 224, Pl. 27.

¹¹⁶ Darnell, *Enigmatic Netherworld Books*, 244.

¹¹⁷ This identification is made explicitly in Roberson, *The Awakening of Osiris*, 56-61, 131. cf. Darnell, *Enigmatic Netherworld Books*, 101.

¹¹⁸ The p -value for Helios correlated with the moon is slightly below the 95% probability level, but given that the moon's p -value for this association is below 0.05 the correlation is included. This may be interpreted as Helios occurring sufficiently often with the moon that the association is statistically significant for the moon, but given how commonly the crescent moon occurs on gems this rate is not quite high enough for its presence with Helios to be considered statistically significant.

(his bust, standing figure, as rider, Heliorus, etc) or Selene. Isis has weak correlations with the sun ($p = 0.750716$), moon ($p = 0.573117$), Helios ($p = 0.907423$) and Selene ($p = 0.750716$). Neither is she even significantly correlated with Harpocrates ($p = 0.201674$),¹¹⁹ who primarily plays a solar role on magical gems and does not emphasize his membership in the Isis-Osiris-Horus triad.¹²⁰ The same result obtains for Anubis,¹²¹ Bes,¹²² Nephthys¹²³ and Osiris.¹²⁴ Perhaps most surprising is that Chnoubis, despite the obvious solar allusion in his radiate crown, is not significantly correlated with any of these icons either.¹²⁵

In summary, solar and lunar icons have a mutual statistical correlation that speaks against the exclusivity that often attends analyses of these objects where it is assumed that there must be solar *or* lunar associations, or that one must dominate the other. Secondly, solar and lunar icons are both absent from most uterine gems and none of the divinities and devices most commonly found on uterine gems have a strong correlation with them. This indicates that instead of attempting to find some loftier cosmic valences operating in uterine gems, one should be satisfied with the plain meaning and use of these objects, which is to heal or protect against gynecological maladies and deal with pregnancy. The Egyptian divinities (although secondary additions in the design's evolution) do not primarily bring in cosmic elements but rather emphasize family and maternity. Isis as wife and mother is accompanied by her consort, Osiris. Nephthys, the twin sister of Isis, is accompanied by her son, Anubis, who is also the family's protector.

¹¹⁹ It should be noted that the correlation between Harpocrates and Isis is much stronger than with Osiris, which is not surprising, but it does not reach our standard of significance ($p < 0.05$).

¹²⁰ Harpocrates appears together with Isis and Osiris on only three gems (BM 90, 122, 379).

¹²¹ Sun (0.750877), moon (0.851550), Helios (0.983884) and Anubis never occurs with Selene.

¹²² Moon (0.384749), Helios (0.753425), Selene (0.506849). Bes is never accompanied by the solar disk.

¹²³ Nephthys never occurs with the sun, moon, Helios or Selene.

¹²⁴ His correlation with the moon is 0.508017 and he never occurs with the sun, Helios or Selene.

¹²⁵ Sun (0.751121), moon (0.999012), Helios (0.995902), Selene (0.875002).

Harpocrates, the son of Isis and Osiris, while he does occur on some uterine gems, has no statistically significant link with them,¹²⁶ but when he does appear his role as *child* is emphasized. On over half of the uterine gems that attest his presence, he is depicted as seated atop Bes,¹²⁷ and the interpretation that seems most likely is that here the child is being placed into the care of the protector of childbirth. On another gem (Michigan 77) Harpocrates is seated atop the uterus in a manner evocative of his many lotus gems¹²⁸—the lotus, symbol of the morning sun and the agent of its rebirth,¹²⁹ is here replaced with the uterus, thus signifying not the rebirth of the sun but the coming of the child from the womb.

4. Hematite and Other Attribute Clusters

a. "Solomon"

No discussion of the role of hematite on magical gems would be complete without briefly discussing the other clusters to which hematite has a statistically significant connection. The most populous of these is the "Solomon" rider cluster (51 gems), consisting of the following attributes: a male rider stabbing a prostrate figure, the name Solomon, the phrase "Seal of God" (σφραγίς θεοῦ) and various permutations of the "One God" (εἷς θεός) invocation (See Illustration 18). Most of these gems are made of hematite

¹²⁶ The correlation between Harpocrates and the uterine symbol is completely random ($p = 0.925476$).

¹²⁷ BM 765-8, Torino Egizio 2, Paris 227.

¹²⁸ Harpocrates seated on a lotus, sometimes in the solar barque, is his most common depiction, but there are other attested types as well such as Harpocrates of Pelusium. For typology see Domingo Saura, "Un caso de integración iconográfica: las representaciones de Harpócrates en gemas mágicas y en acuñaciones nomádicas de Egipto en época imperial," in *Formas de integración en el mundo romano* (ed. Gonzalo Bravo and Raúl González Salinero; Signifer 32; Madrid: Signifer Libros, 2009), 270-78.

¹²⁹ A. M. El-Khachab, "Some Gem-Amulets Depicting Harpocrates Seated on a Lotus Flower: To the Memory of My Great Friend Dr. Alexandre Piankoff," *JEA* 57 (1971): 138-45.

(75%), followed by bronze (20%), with only 5% made of some other material. The name Solomon is found almost exclusively on these gems, which has led to the common conclusion that the depicted rider is actually the biblical king, Solomon.¹³⁰ This is not unreasonable given the intertestamental Jewish tradition of Solomon as exorcist (*Testament* 1:7; cf. Josephus, *Ant.* 8.2.5).¹³¹ The gems, however, date from a later period—likely the fifth century CE—sharing various stylistic features with later Christian amulets.¹³² The prostrate/trampled figure has typically been identified as Lilith,¹³³ a female demon of Jewish lore especially concerned with harming children,¹³⁴ which also had a Greek counterpart in the class of child-haunting demons called *aorai*, such as Gello, Lamia and Mormo.¹³⁵ The common inscription "Seal of God" no doubt principally refers to the name of God, the tetragrammaton.¹³⁶ However, Véronique Dasen has

¹³⁰ Michel, *Die Magischen Gemmen*, 146-47; Michel, *Die Magischen Gemmen im Britischen Museum*, 268; Christopher Walter, "The Intaglio of Solomon in the Benaki Museum and the Origins of the Iconography of Warrior Saints," in *Pictures as Language: How the Byzantines Exploited Them* (ed. Christopher Walter; London: The Pindar Press, 2000), 397; Christopher Walter, "Some Unpublished Intaglios of Solomon in the British Museum, London," in *Pictures as Language: How the Byzantines Exploited Them* (ed. Christopher Walter; London: The Pindar Press, 2000), 421; Suzanne Lewis, "The Iconography of the Coptic Horseman in Byzantine Egypt," *JARCE* 10 (1973): 50; Bonner, *Magical Amulets*, 209; A. Delatte and Derchain, *Les intailles magiques*, 261.

¹³¹ For general discussion see Peter Busch, *Das Testament Salomos: Die älteste christliche Dämonologie, kommentiert und in deutscher Erstübersetzung* (TUU 153; Berlin: Walter de Gruyter, 2006), 88-91. In a 6th century Christian amulet (PGM P10.30) all of the spirits "who have sworn before Solomon" are adjured. In another 5th-6th century text (PGM p17.10) the "exorcism of Solomon" is invoked—see Marvin Meyer and Smith, eds., *Ancient Christian Magic*, 44-46; Karl Preisendanz, ed., *Papyri Graecae Magicae, Die Griechischen Zauberpapyri* (2 vols.; Vol. 2; Stuttgart: Teubner, 1974), P10, P17 (218-19, 26-27).

¹³² Jeffrey Spier, *Late Antique and Early Christian Gems* (Weisbaden: Reichert, 2007), 84; Jeffrey Spier, "Medieval Byzantine Magical Amulets and Their Tradition," *JWCI* 56 (1993): 36.

¹³³ Spier, "Byzantine Magical Amulets," 34; Lewis, "Iconography of the Coptic Horseman," 51; Bonner, *Magical Amulets*, 210.

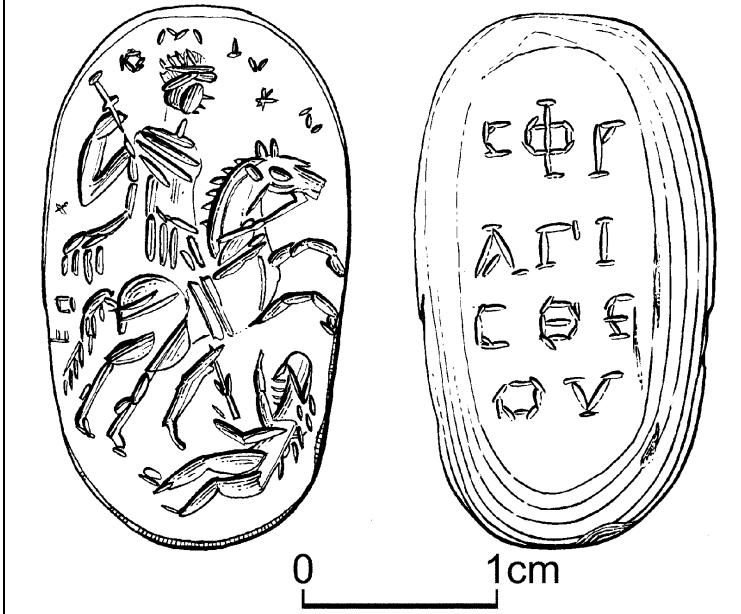
¹³⁴ The demon has a long history and derives from the *lilû* demons of Mesopotamia, later entering Jewish tradition. See J. A. Scurlock, "Baby-Snatching Demons, Restless Souls and the Dangers of Childbirth: Medico-Magical Means of Dealing with Some of the Perils of Motherhood in Ancient Mesopotamia," *Incognita* 2 (1991): 151-53.

¹³⁵ Sarah Johnston, *Restless Dead: Encounters between the Living and the Dead in Ancient Greece* (Berkeley: University of California Press, 1999), 169-80.

¹³⁶ André L. Chevitarese and Gabriele Cornelli, *Judaísmo, Cristianismo e Helenismo: Ensaios Acerca das Interações Culturais no Mediterrâneo Antigo* (HAM; São Paulo: Annablume, 2007), 76-77; Bonner, *Magical Amulets*, 210; Scholem, *Jewish Gnosticism*, 133.

pointed out an interesting double use of the term σφραγίς (Lat. *sphragis*), not only meaning a stamp or seal, but also a medicinal object, a stamped pill.¹³⁷ She has furthermore suggested that the frequent use of the phrase "seal of God" found on Solomon rider gems may

Illustration 18. British Museum 430



SOURCE: Michel 2001. Reproduced by courtesy of the Trustees of the British Museum.

indicate that the gems themselves were used medicinally by scraping edges off to be pulverized and used as a drug.¹³⁸ There is no way to verify this drug-use hypothesis, but the double use of the term σφραγίς may certainly have informed the magical use of these gems, being understood as a spiritual "medicine" against the evil forces causing harm.

If the identification of the victim as Lilith is correct, then this may indicate a use for these gems complementary to that of the uterine gems—whereas the uterine gems are often used to protect a pregnancy, defense against Lilith pertains to infants once they are born. There is also some indication of another use. On BM 447 the reverse contains the inscription στομάχου ("for the stomach"). This may simply indicate that the gem was intended for gastrointestinal ailments, but the term στόμαχος may also refer to the neck of the uterus, as used by Hippocrates as a synonym for στόμα τῶν ὑστερέων (*De morbis mulierum* 1.18; cf. *De morbis mulierum* 3.217). Furthermore, the terms for belly

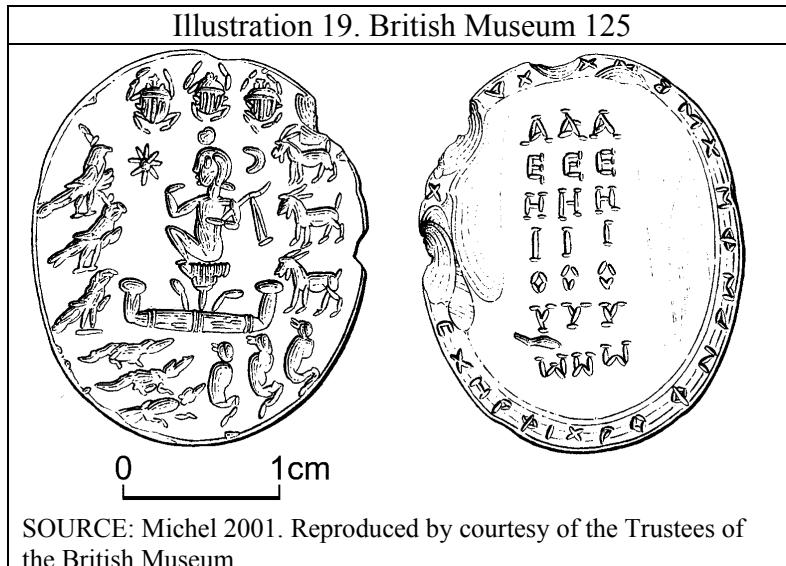
¹³⁷ Dasen, "Magic and Medicine," 69-73.

¹³⁸ Dasen, "Magic and Medicine," 72.

(γαστήρ) and womb (μήτρα) were occasionally confused in antiquity, no doubt due to the proximity of the organs and perhaps some confusion as to the origin of discomfort.¹³⁹ This suggests a certain semantic fluidity for terms dealing with the uterus and belly and may lend this gem utility for gynecological matters as well.

b. The Animal-Circuit

Some of the hematite gems on which Harpocrates appears have already been discussed in connection with the uterine gem type, but Harpocrates and hematite coincide four times more often on non-uterine gems. This is not because of Harpocrates, per se, as it has already



been observed that Harpocrates and hematite do not have a statistically significant correlation. Rather, it is due to the animals, usually in triplets (signifying plurality), that accompany Harpocrates on many gems (Illustration 19). Hematite is strongly correlated with the crocodile ($p = 0.000852$), falcon ($p = 0.011853$), goat ($p = 0.011568$) and scarab ($p = 0.006059$). Less than half the time (44%) they accompany Harpocrates; more often (56%) they appear alone or with other icons.

¹³⁹ Barb, "Diva Matrix," 222-23 n. 105.

Although the animal-circuit has been mostly understood in conjunction with Harpocrates and studied in terms of its solar and zodiacal valences,¹⁴⁰ it may be better to treat it as a cohesive feature-set that sometimes is paired with Harpocrates, sometimes with other attributes, with a specific use-case in mind. When the animal-circuit on hematite does not accompany Harpocrates it is often affiliated with digestion and stomach aid. Almost half the time (41%) the word πέπτε/πέσσε ("digest!") is found on the reverse and a quarter of the time (23%) the word στομάχου ("for the stomach"). On most of these πέπτε/πέσσε gems the animal-circuit surrounds a phoenix; likewise twice in the case of στομάχου (BM 402, 403). On one gem the animal-circuit surrounds a uterine symbol (BM 350), although no digestion terms are present. These digestion terms are also found on hematites without the presence of the animal-circuit: the Anguipede is found in conjunction with πέπτε/πέσσε three times (BM 400; Michigan 94, 96) and with στομάχου four times (BM 396, 397, 399; Paris 319).

In contrast, when the animal-circuit accompanies Harpocrates no digestion terms are found. Might there be something intrinsic in Harpocrates that suggests digestive aid when combined with the animal-circuit and hematite obviating the need for such an inscription? One of the diagnostic features of Harpocrates is his finger to mouth, the so-called *signum harpocraticum*.¹⁴¹ In fact, the gesture should be understood with the finger inside the mouth, that is, suckling his finger, an indication of childhood.¹⁴² His name

¹⁴⁰ Michel, *Die Magischen Gemmen*, 154-65; Michel, *Die Magischen Gemmen im Britischen Museum*, 82-83; Bonner, *Magical Amulets*, 140-41.

¹⁴¹ Philippe Matthey, "«Chut!» Le signe d'Harpocrate et l'invitation au silence," in *Dans le laboratoire de l'historien des religions: Mélanges offerts à Philippe Borgeaud* (ed. Francesca Prescendi and Youri Volokhine; Paris: Labor et Fides, 2011), 542.

¹⁴² See bibliography and discussion in Michel Malaise, *A la découverte d'Harpocrate à travers son historiographie* (Mémoire de la Classe des Lettres ser. 3 v. 57; Académie royale de Belgique, 2011), 16 n. 12.

means "Horus the child" (Eg. *Hr-p3-hrd* > Gk. Ἀρποκράτης,¹⁴³ and *Pyramid Text* §663c gives the long epithet "Horus, child whose finger is in the mouth" (*Hr-hrd-nhn-db3.f-m-r3.f*).¹⁴⁴ The determinative for "child" has the same gesture (▷).¹⁴⁵ But, Roman and Greek depictions preferred to have the finger touch the lips and this was understood as beckoning silence,¹⁴⁶ in part to ameliorate the association of childhood with divinity. Plutarch (*de Is.* 378C) extracts an allegorized interpretation of this, explaining that Harpocrates is not to be considered an infant god but as a corrector of imperfect reasoning among men about the gods (τοῦ περὶ θεῶν ἐν ἀνθρώποις λόγου νεαροῦ καὶ ἀτελοῦς καὶ ἀδιαρθρώτου προστάτην καὶ σωφρονιστήν) and "because of this he keeps his finger on his mouth, as a symbol of silence and restraint" (διὸ τῷ στόματι τὸν δάκτυλον ἔχει προσκείμενον ἔχεμυθίας καὶ σιοπῆς σύμβολον). The forth century CE rhetorician Decimus Ausonius alludes to him as "Sigalion Aegyptius," "the Egyptian god of silence" (*Epist.* 24.28).

This interpretation of the gesture is Graeco-Roman and not Egyptian. For the Egyptian, the finger-to-mouth gesture meant to eat or drink.¹⁴⁷ It is the determinative (▷) for *wnm* ("eat"),¹⁴⁸ *hkr* ("hungry"), *swrī* ("drink"); the same determinative was also used

¹⁴³ Malaise, *la découverte d'Harpocrate*, 16; Emma Swan Hall, "Harpocrates and Other Child Deities in Ancient Egyptian Sculpture," *JARCE* 14 (1977): 55.

¹⁴⁴ Malaise, *la découverte d'Harpocrate*, 40. El-Khachab, "Harpocrates Seated on a Lotus Flower," 133.

¹⁴⁵ Alan Gardiner, *Egyptian Grammar: Being an Introduction to the Study of Hieroglyphs* (Oxford: Griffith Institute, 1999 [1927]), 443.

¹⁴⁶ Matthey, "Le signe d'Harpocrate," 556; El-Khachab, "Harpocrates Seated on a Lotus Flower," 133; Raymond B. Waddington, "The Iconography of Silence and Chapman's Hercules," *JWarb* 33 (1970): 256. This understanding of Harpocrates continued long into the Renaissance and beyond. See Waddington, "Iconography of Silence," 256-68.

¹⁴⁷ El-Khachab, "Harpocrates Seated on a Lotus Flower," 134; Matthey, "Le signe d'Harpocrate," 542-45.

¹⁴⁸ Adolf Erman and Hermann Grapow, *Wörterbuch der aegyptischen Sprache* (5 vols.; vol. 1; Berlin: Akademie-Verlag, 1971), 320-21.

for words relating to speech, thought and feelings.¹⁴⁹ This meaning of the gesture seems to have survived into late antiquity, for in the fifth century C.E. Horapollo (*Hieroglyphica* 2.6) gives us the following definition for a hieroglyphic "finger:" Τί δάκτυλον· Ἀνθρώπου στόμαχον δηλοῖ δάκτυλος ("What is a finger? A finger signifies a man's stomach"). For all of the fanciful meanings attributed to hieroglyphs in Horapollo, this definition seems to echo the determinative (𓁵) and gesture under discussion. Therefore, one of the possible valences of the figure of Harpocrates may have been as gesturing to eat or drink. Understood like this, his presence on the hematite gems with animal-circuit may have sufficiently conveyed the digestive use of the amulet and did not require any explicit indication (e.g. πέπτε/πέσσε, στομάχου). This crypto-meaning, interpreting Harpocrates as an ideogram, and understanding 𓁵 for 𓁴 because of the Graeco-Roman penchant for depicting Harpocrates as having finger-to-mouth as opposed to finger-in-mouth, is fully within the ambit of Egyptian hieroglyphic-cryptographic methods.¹⁵⁰ In fact, such cryptographic games became much more common during the Graeco-Roman period, as the eminent Egyptologist Jan Assman notes:

Until the Late Period, cryptography is a very rare variant of hieroglyphic, used predominantly for aesthetic purposes.... But in the Greco-Roman period, an age of foreign domination, the methods of cryptography were integrated into the monumental script of hieroglyphics; this created enormous complexity and turned the whole writing system into a kind of cryptography.¹⁵¹

While the above line of reasoning suggesting that the gesture by Harpocrates could have been interpreted as a digestive command may seem too abstruse, it should be kept in

¹⁴⁹ James P. Allen, *Middle Egyptian: An Introduction to the Language and Culture of Hieroglyphs* (Cambridge: Cambridge University Press, 2000), 423; Gardiner, *Egyptian Grammar*, 442.

¹⁵⁰ Darnell, *Enigmatic Netherworld Books*, 14ff.

¹⁵¹ Jan Assman, *Moses the Egyptian: The Memory of Egypt in Western Monotheism* (Cambridge: Harvard University Press, 1997), 108.

mind that it primarily concerns a social habit—finger to lips indicating eating or desire to eat—that the typical Egyptian would have been familiar with and an understanding of the icon he may have jumped to as easily as the Greek mind saw "silence" in the same gesture. It helps explain why the animal-circuit on hematite gems is so strongly associated with digestive commands, except when paired with Harpocrates.

c. Reaper

Hematite is strongly correlated with the reaper icon ($p = 0.000539$). It appears on 25 gems, 81% of which are made of hematite, and is in its own cluster consisting of the reaper icon, grain and tree. The iconography is consistent across the gems in this group (Illustration 20), depicting a reaper at work with scythe in hand cutting wheat and a tree behind him. On 68% of these gems the reverse has the inscription $\Sigma\chi\omega\eta$, an aphaeretic form of $\iota\sigma\chi\iota\omega\nu$, "for the hips."¹⁵² One gem has



SOURCE: Michel 2001. Reproduced by courtesy of the Trustees of the British Museum.

$\pi\acute{\epsilon}\pi\tau\epsilon$ (BM 427). Two others have the sentence $\acute{\epsilon}\rho\gamma\acute{\alpha}\zeta\eta\mu\alpha\iota\ k\alpha\iota\ o\iota\ \pi\eta\omega$, "I work and do not suffer" (Paris 463, 464). Bonner,¹⁵³ following Seyrig,¹⁵⁴ speculated that the image of

¹⁵² Michel, *Die Magischen Gemmen*, 176, n. 907; Bonner, *Magical Amulets*, 72.

¹⁵³ Bonner, *Magical Amulets*, 73.

the reaper was chosen for amulets dealing with hip pain because reapers, bent at the hip for long hours in the field, seemed immune to hip problems. Festugière was not content with this explanation, wondering why one never sees "un pur tableau de genre" on magical gems, except here, and without any reference to the (supernatural) power being invoked or involved.¹⁵⁵ He proposes that, in fact, the supernatural power is not missing in the reaper scene, but that the reaper must be correctly interpreted as Cronos. He cites astrological texts that associate Cronos/Saturn with sciatica, and then in turn other texts which link Saturn with farmers,¹⁵⁶ concluding that on these gems we can "voir dans notre moissonneur le dieu Kronos."¹⁵⁷ More recently, Michel has doubted the direct identification of the reaper with Cronos, but sees aspects of healing astrology ("Iatromathematik") in these amulets due to a sympathetic link between hematite and Saturn.¹⁵⁸

Festugière, however, overstated his case as there are several gems that help assuage his concerns. On Michigan 62 we find ΣΑΒΑΩ(Θ) and on Schwartz ANS 54 we find ΘΕΟΣ. On Bonn 6 we find the ouroboros and on Paris 459 we find the so-called Chnoubis symbol (SSS). The reaper gems, then, are not completely devoid of reference to supernatural actors. Secondly, parallels can be drawn between these gems and the less complex uterine gems which simply display the uterus and a *vox magica* (*orōriouth*) meaning "uterus." In both cases, the body part needing address is depicted with an inscription naming it and the healing efficacy is imparted by the gem material, hematite.

¹⁵⁴ Henri Seyrig, "Invidiae Medici," *Berytus* 1 (1934): 11.

¹⁵⁵ A. J. Festugière, "Amulettes magiques a propos d'un ouvrage recent," *CP* 46.2 (1951): 84.

¹⁵⁶ Festugière, "Amulettes magiques," 84-85.

¹⁵⁷ Festugière, "Amulettes magiques," 86.

¹⁵⁸ Michel, *Die Magischen Gemmen*, 177, especially n. 914.

Astrological valances, therefore, seem unnecessary and, while their absence can not be proven, they are not needed to help account for the reaper gem scheme.

5. Conclusion

In this chapter I have sought to investigate the various contexts in which hematite amulets were used. By analyzing the gem attributes statistically linked with hematite, several conclusions have emerged. In the case of uterine gems, the evolutionary development proposed by Faraone has been largely confirmed, with one difference: the *vox magica orōriouth* was likely present very early in the gem's evolution and its Egyptian meaning as "uterus" was the first step in Egyptianizing these gems. The ouroboros was less integral to the gem design than many have assumed, and while it may have been present on some uterine gems at an early stage, I suggest that it began to appear far more often when Egyptian gods were introduced into the design.

Anubis, Isis, Nephthys and Osiris are present on other gems, but their statistically significant correlation is primarily with uterine gems. Furthermore, they form a sub-group within the hematite cluster, indicating that they tend to be more closely statistically linked with each other than with the uterine symbol or other icons. This suggests that they were introduced to the uterine design at some point as a cohesive unit. The lack of explicit solar or lunar associations on these gems suggests that the primary valence that Isis and her cohort express is that of motherhood, family and protection. Attempts to find solar and lunar connotations with these gods and the ouroboros have been commonplace, perhaps in part to the pervasive solar imagery found in their most significant comparanda,

the PGM. Yet, to say that an Egyptian god is solar is to say everything and nothing, since most gods were brought into relationship with the sun in some way. Furthermore, the moon, contrary to what is often assumed, is not in a mutually exclusive relationship with the sun, but in a dynamic interrelationship. This is not only evident in Egyptian theological thought but also in the fact that solar and lunar icons are closely statistically linked on these and other gem amulets. Identifying these icons as primarily solar (or lunar) is of little heuristic value when studying these objects—it can easily blind one to the possibility that other valences are being emphasized (as in the case of uterine gems) and even compel one to chase after solar (or lunar) meanings through convoluted argumentation despite evidence to the contrary. In her introduction to uterine gems in *Die magischen Gemmen im Britischen Museum* Michel surmises that "Die Siebenzahl der Schlüsselzähne impliziert solare Aspekte" (221), despite the fact that most depictions of the Greek key do not have seven teeth; and even if it were the case, such numerological hunting is greatly subject to the ghosts of one's own imagination.

The more general desire to find astrological connotations can no less lead to difficulties, even unintentional self-contradiction as in the case of the reaper gems. Here, in her desire to show sympathy to the attempts by Festugière to identify an astrological meaning to the icon, Michel agrees that hematite and Saturn stand in *Sympathieverbindung*.¹⁵⁹ But only a few pages earlier she claims the same relationship between hematite and the astrological sign Aries and the planet Mars.¹⁶⁰ Is it both? This interpretive tension is never resolved.

¹⁵⁹ Michel, *Die Magischen Gemmen*, 177.

¹⁶⁰ Michel, *Die Magischen Gemmen*, 154.

This is not to deny the presence of solar/lunar and generally astrological connotations of many divinities and devices found on magical gems and in motifs in antique religions in general, but to privilege this connection when statistical evidence points to the primacy of another valence for an icon or set of icons on a particular gem or class of gems leads to untenable positions. In some ways, the impulse to hunt out astrological connections is reminiscent of the great savant Charles François Dupuis and his *Origine de tous cultes, ou religion universelle* (1795) where he compared all religions on which he could locate information and interpreted their gods and heroes, especially Jesus of the New Testament, as solar deities—and indeed valences of the same singular solar deity.¹⁶¹ When it comes to magical gems, the demise of the Gnostic hypothesis was followed by the rise of the solar/astrological hypothesis. Although no scholar today would go down the same rabbit hole as Dupuis, this was not the case a century ago, about which Jonathan Z. Smith quipped, "What a mad farrago of notions confronts the observer's gaze!" when looking at New Testament scholarship from the first decade of the twentieth century.¹⁶² Yet, the impulse to still privilege celestial/astrological meanings for magical gem iconography, in my opinion, betrays some shadow of Dupuis' comparative method.¹⁶³

¹⁶¹ N. M. Swerdlow, "Review Article: On the Cosmical Mysteries of Mithras," *CP* 86.1 (1991): 54-55.

¹⁶² Smith, *Drudgery Divine*, 87.

¹⁶³ It would be remiss not to mention Jean-Baptiste Pérès who, in response to the fantastic conclusions of Dupuis' comparative method, penned in 1827 a satirical and polemical pamphlet "proving" that Napoleon never existed by applying Dupuis' astrological, numerological and etymological methods. See Albert Sonnenfield, "Napoleon as Sun Myth," *YFS* 26 (1960): 32-36.

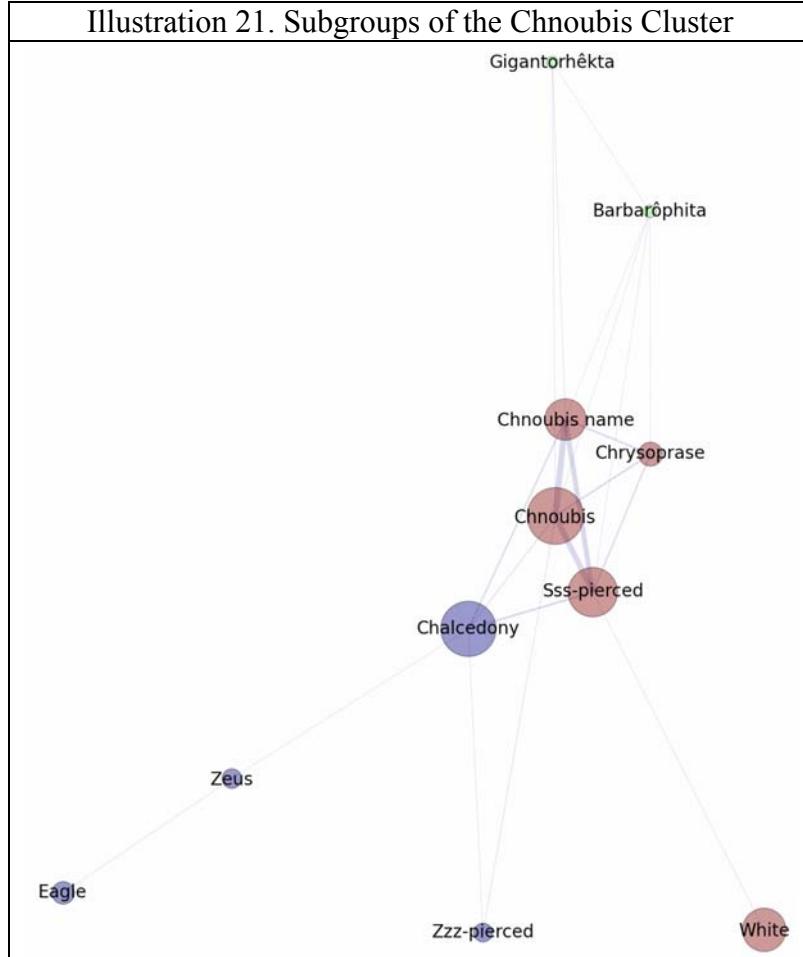
Chapter 4. Chnoubis, Origins and Use on Magical Gems

1. Preliminary Considerations

The figure of Chnoubis, the radiate lion-headed serpent (see below §2, §2.3, §4 for discussion of the icon's elements), has already been discussed briefly in connection with uterine amulets (Chapter 3.§3.b), but the figure also appears alone on the obverse, typically accompanied by the inscription Χνοῦβις (or Χνοῦμις, discussed in §2) and the so-called Chnoubis

so-called Chnoubis symbol (sss and zzz, discussed below in §2, §2.4; see §3 for other inscriptional elements) on the reverse. Like the uterine amulets, Chnoubis gems seem to have been primarily used for healing in the abdominal area (see §5). It is this design, the so-called "Chnoubis gem" on which most instances of the icon are to be

Illustration 21. Subgroups of the Chnoubis Cluster



found. Accordingly, the Louvain algorithm identifies an independent cluster, referred to here as the "Chnoubis" cluster, with three subgroups (Illustration 21). Most of the extant

gems date to about the third century CE and the design seems to have emerged in the second century CE (§2.2). Table 7 lists all of the statistically significant links to the Chnoubis icon within this cluster.

Table 7. Statistically Significant Links with Chnoubis					
% of gems	<i>p</i> -value		% of gems with Chnoubis	<i>p</i> -value	gems
Chnoubis (51%)	0.000000		SSS + ZZZ (57%)	0.000000	104
Chnoubis (45%)	0.000000		Chnoubis name (83%)	0.000000	92
Chnoubis (19%)	0.003425		Chalcedony (19%)	0.003479	38
Chnoubis (13%)	0.000014		Chrysoprase (70%)	0.000116	26
Chnoubis (5%)	0.006536		Barbarôphita (100%)	0.025986	10
Chnoubis (4%)	0.020927		Gigantorhêkta (89%)	0.057056	8

The first subgroup (red, 142 gems) consists of Chnoubis, the Chnoubis name, the Chnoubis symbol (SSS), the material chrysoprase and the color white. The second subgroup (purple, 22 gems) consists of the material chalcedony, a variant Chnoubis symbol (ZZZ) and the figures Zeus and the eagle. The final subgroup (green) consists of the the *voces magicae barbarôphita* and *gigantorhêkta*. This second subgroup is rather peculiar since Zeus has no statistical correlation with Chnoubis (in fact, the two never appear together on the same gem). Unlike SSS, which has statistically significant connections with several attributes in the red subgroup, the variant symbol ZZZ is only significantly linked with Chnoubis and chalcedony and the Louvain algorithm placed it in the purple subgroup. However, it never coincides with Zeus or the eagle on any gem and therefore its inclusion in the purple subgroup is misleading. Ten of the gems in this subgroup share the attributes of ZZZ and chalcedony, while the remaining 12 are concerned with combinations among chalcedony, Zeus and the eagle. The reason Zeus and the eagle were included in this cluster at all is an anomalous result of the clustering algorithm itself. The minimum number of attributes a cluster can contain is three. Since

Zeus and the eagle have no statistically significant correlations with any other attribute apart from chalcedony, they were necessarily grouped with it, and since chalcedony is more strongly linked to Chnoubis, Zeus and the eagle were included in this cluster as opposed to forming an independent chalcedony-Zeus-eagle cluster.

The distinction between chalcedony and chrysoprase is potentially misleading and reflects the complexities of gemological classification. Chrysoprase is, in fact, a subtype of chalcedony, a cryptocrystalline silicon dioxide (SiO_2), which also contains nickel, giving it a green color.¹ The correlation between Zeus and "chalcedony" rather than the more specific chrysoprase, then, implies that Zeus gems are more closely associated with non-green chalcedonies, and, indeed, Zeus gem are virtually never green.² The green quality of chrysoprase highlights another curious correlation, that of the color "white" in the red subgroup as opposed to the color green. Nearly 28% of Chnoubis gems are green, but due to the abundance of green jaspers, this does not rise to the level of statistical significance and the color green is instead found in the Iaô cluster along with jasper (see chapter 2 §1). However, green chalcedony in the form of chrysoprase is strongly correlated with Chnoubis ($p = 0.000014$) and is almost always used only for Chnoubis gems (70%). Furthermore, the name "Chnoubis" is significantly linked with the color green ($p = 0.033107$), coinciding with this color 41% of the time. Of the 122 magical gems in the entire corpus which are white (or nearly so) only 18 evince a statistically significance correlation with another gem attribute, and this is with the Chnoubis symbol

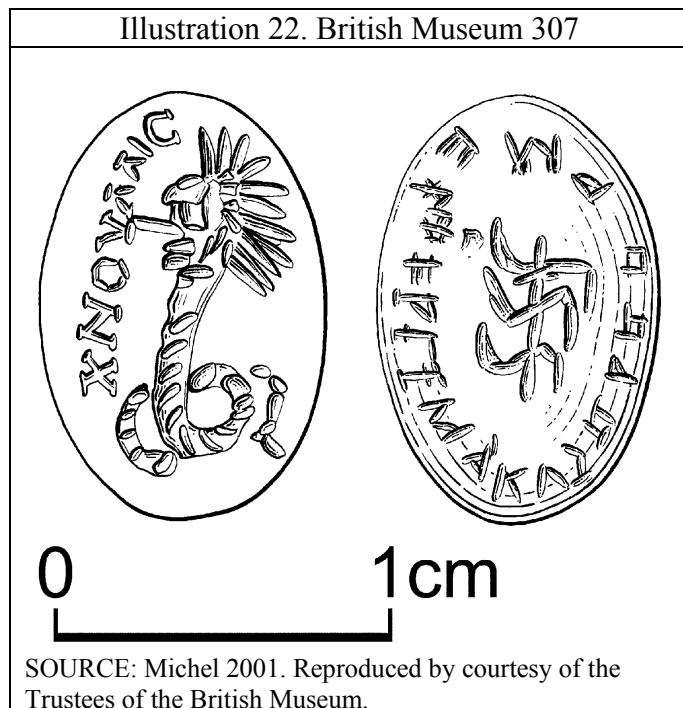
¹ Christopher Rowland and Morray-Jones, *The Mystery of God*, 43.

² Cologne 32 is made of a slightly greenish quartz.

($p = 0.026773$). Except for three (Michigan 50, Schwartz ANS 15 and Kassel 34), these are all made of chalcedony.³

2. Chnoubis, Χνοῦβις and the Chnoubis symbol

The appellative "Chnoubis" for the radiate lion-headed serpent derives from the frequently accompanying name (45%), Χνοῦβις, with a significant variant being Χνοῦμις (see Illustration 22).⁴ The name is almost exclusively associated with the Chnoubis serpent (83%). In part based on the variant Χνοῦμις, it has often been assumed that Chnoubis' name derives from the old Egyptian god Khnum (Gk. Χνοῦμ < Eg. *Hnm*) even though Khnum is never depicted with a lion head.⁵ A variant, Χνοῦμ, found on a single Chnoubis gem (BM 337) would seem to support this hypothesis. However, another possibility was already recognized over a century ago by Drexler



³ BM 304, 538; Firenz 57, 106, 107; Paris 240, 265-7, 559, 576, 606-9, 668.

⁴ The variant is attested on: Berlin 61, 62; BM 156, 306, 307, 315, 321, 322, 324, 336, 584; Kassel 30, 34; Michigan 46; Paris 242, 243, 244, 247, 256, 607; Schwartz ANS 14.

⁵ Mastrocinque, *Jewish Magic to Gnosticism*, 62-63; Brashear, "The Greek Magical Papyri," 3602; Zsolt Kiss, s.v. "Chnoubis," *Lexicon Iconographicum Mythologiae Classicae* (Zürich: Artemis, 1986), 272-73; Ritner, "A Uterine Amulet," 214-15, 17; Bonnet, *Reallexikon*, 139-40.

based on zodiacal-decan lists found in Late Antique sources, especially the fifth century text *Apotelesmatica* by Hephaestion of Thebes.⁶ The decans were originally thirty-six star groups which by their risings or transits were used from the Middle Kingdom onward to indicate the time of the night, and by the Hellenistic period were assimilated to the newly developed zodiac system where three decans were assigned to each zodiacal sign (see §6 for further discussion).⁷ In Hephaestion one finds χνουμίς and χαρχνούμις for the third decan of Cancer and the first decan of Leo, respectively.⁸ The Hermetic text the *Holy Book of Hermes to Asclepius* preserves a similar tradition: χνοῦφος and χνοῦμος for third Cancer and first Leo, respectively.⁹ While the manuscripts for this text are all medieval, it likely dates much earlier,¹⁰ perhaps as early as the Ptolemaic period.¹¹ Drexler concluded "In Wirklichkeit ist der Chnoumis dieser Gemmen nicht der alte kosmogonische Gott Chnum, sondern vielmehr eine ägyptische Dekangottheit."¹²

The second century Greek philosopher Celsus (Origen, *Contra Celsum* 8.58) confirms that the decan list was known and in circulation at the time, explicitly attributing it to Egyptian sources, although he does not inform us under which zodiacal sign each decan falls. He states:

⁶ Drexler, s.v. "Knuphis," 1260-62. See also Michel, *Die Magischen Gemmen*, 165-68; Michel, *Die Magischen Gemmen im Britischen Museum*, 194.

⁷ O. Neugebauer and Richard A. Parker, *Egyptian Astronomical Texts: I. The Early Decans* (BES 4; Providence: Brown University Press, 1960), 95-107.

⁸ David Pingree, *Hephaestionis Thebani Apotelesmaticorum Libri Tres* (vol. 1; Leipzig: Teubner, 1973), 11.§69, 13.§89 = August Engelbrecht, *Hephaestion von Theben und sein astrologisches Compendium* (Vienna: Carl Konegen, 1887), 52.26, 54.15. Wilhelm Gundel, *Dekane und Dekansternbilder: Ein Beitrag zur Geschichte der Sternbilder der Kulturvölker* (SBW 19; Glückstadt: J. J. Augustin, 1936), 77-81, very conveniently provides the names of the decans as given in Hephaestion and various other late antique, Byzantine and early modern astrological texts.

⁹ C. E. Ruelle, "Hermès Trismégiste, Le livre sacré sur les décans. Texte, variantes et traduction française," *RevPhil* 32.4 (1908): 258.98 and 60.105; Gundel, *Dekane und Dekansternbilder*, 79.

¹⁰ Grant Adamson, "Astrological Medicine in Gnostic Traditions," in *Practicing Gnosis : ritual, magic, theurgy, and liturgy in Nag Hammadi, Manichaean and other ancient literature : essays in honor of Birger A. Pearson* (ed. April D. DeConick, Gregory Shaw, and John D. Turner; Leiden: Brill, 2013), 338-39.

¹¹ Gundel, *Dekane und Dekansternbilder*, 43-45.

¹² Drexler, s.v. "Knuphis," 1260.

"Οτι μὴν ἐν τοῖσδε μέχρι τῶν ἐλαχίστων ἔστιν ὅτῳ δέδοται ἔξουσία, μάθοι τις ἀν ἔξ ὅν Αἰγύπτιοι λέγουσιν, ὅτι ἄρα τοῦ ἀνθρώπου τὸ σῶμα ἔξ καὶ τριάκοντα διειληφότες δαίμονες ἢ θεοί τινες αἰθέριοι εἰς τοσαῦτα μέρη νενεμημένον (οἱ δὲ καὶ πολὺ πλείους λέγουσιν), ἄλλος ἄλλο τι αὐτοῦ νέμειν ἐπιτέτακται. Καὶ τῶν δαιμόνων ἵσσαι τὰ ὄνόματα ἐπιχωρίω φωνῇ, ὡσπερ Χνουμὴν καὶ Χναχουμὴν καὶ Κνάτ καὶ Σικάτ καὶ Βιοὺ καὶ Ἐροὺ καὶ Ἐρεβίου καὶ Ραμανὸρ καὶ Ρειανοὸρ ὅσα τε ἄλλα τῇ ἑαυτῶν γλώσσῃ ὄνομάζουσι.¹³

That life is under the control of the gods one can see from the writings of the Egyptians. They say that a man's body is under the power of thirty-six demons (or gods of some sort) who divide it among themselves, one for each part of the body. The demons are known under various names: Chnoumen, Chnachnoumen, Knat, Sikat, Biou, Erou, Erebiou, Rhamanoor, Rheianoor, and all the other names that they use in their language.¹⁴

His Χνουμὴν and Χναχουμὴν are easily recognizable as Χνοῦμις and Χαρχνούμις, as found in Hephaestion, despite the slightly aberrant spellings.

Analysis of older Egyptian decan lists further supports the claim that the above lists (in Hephaestion, the Hermetic tradition and Celsus) preserve earlier Egyptian tradition.¹⁵ The decan-lists group into several "families," not all of which survived into the Hellenistic and Roman periods. Two list families which did, Seti I B and Tanis, seem to have been spliced together to form the tradition we find in Hephaestion.¹⁶ In the Seti I B family, the two corresponding decans for third Cancer and first Leo are named *knm.(t)* and *hr (hpd) knm.(t)*, respectively.¹⁷ The feminine suffix *t* fell out by the Hellenistic period and the word *hpd* was sometimes omitted which resulted in *hr knm* and therefore Χαρχνούμις in Hephaestion.¹⁸ *KnM* became Χνοῦμις, so the argument goes. Howard

¹³ Text is that of M. Marcovich, ed., *Origenes Contra Celsum: libri VIII* (VCSupp 54; Leiden: Brill, 2001), 574-75.

¹⁴ Translation is that of R. Joseph Hoffmann, *Celsus, On the True Doctrine, A Discourse Against the Christians* (Oxford: Oxford University Press, 1987), 122-23.

¹⁵ For discussion of the list in Celsus see Gundel, *Dekane und Dekansternbilder*, 45-48.

¹⁶ O. Neugebauer and Richard A. Parker, *Egyptian Astronomical Texts: III. Decans, Planets, Constellations and Zodiacs* (BES 4; Providence: Brown University Press, 1969), 168-71.

¹⁷ O. Neugebauer and Parker, *Egyptian Astronomical Texts III*, 170.

¹⁸ This name accounts for the attested variants χολχνούμις where a common vocalic interchange between the liquids /r/ and /l/ took place. See Bonner, *Magical Amulets*, 55. On the interchange of /l/ and /r/ in Late

Jackson has been one of the most forceful advocates of this derivation for the name of Chnoubis.¹⁹

The correspondence in names isn't the only point of evidence favoring this derivation.

The *Holy Book of Hermes to Asclepius* describes the animal for first Leo (κνοῦμος) as a radiate lion-headed serpent.²⁰ The Egyptian decanal lists in the Seti I B family tend to depict the decans as either lion-headed goddesses or serpents. Specifically, the depiction of the third decan, *knm.(t)*, is a vertical serpent with three horizontal serpents crossing it, a precise analog to the so-called Chnoubis symbol (SSS).²¹ The fourth decan, *hr (hp)* *knm.(t)*, is depicted as a lion-headed goddess²²—the salient features of the two decans, lion head and serpent, when combined, nicely account for the figure of Chnoubis.²³

A recent examination of Chnoubis gems by Véronique Dasen and Árpád M. Nagy has incorporated another piece of important evidence, two partial zodiac tablets furnishing decan names and their images found in a sanctuary in the village of Grand, France.²⁴ For Cancer and Leo the names closely match those found in Hephaestion and the images are similar to the descriptions found in the *Holy Book*. The destruction of both tablets dates to about 170 CE,²⁵ which further demonstrates that Hephaestion and the *Holy Book*, although late texts, do in fact reflect an earlier Graeco-Roman tradition. The

Egyptian and Coptic see James P. Allen, *The Ancient Egyptian Language: An Historical Study* (Cambridge: Cambridge University Press, 2013), 39; Francis Thomas Gignac, *A Grammar of the Greek Papyri of the Roman and Byzantine Periods, Volume I: Phonology* (Testi e Documenti per lo Studio Dell'Antichità LV; Milan: Instituto Editoriale Cisalpino-La Goliardica, 1976), 102-07.

¹⁹ Jackson, *The Lion Becomes Man*, 81-89.

²⁰ Gundel, *Dekane und Dekansternbilder*, 376.

²¹ O. Neugebauer and Parker, *Egyptian Astronomical Texts III*, 135.

²² O. Neugebauer and Parker, *Egyptian Astronomical Texts III*, 135.

²³ See Jackson, *The Lion Becomes Man*, 101-03, especially discussion in n. 78, for discussion and additional bibliography concerning the assumed identity between Chnoubis and Khnum.

²⁴ Véronique Dasen and Árpád M. Nagy, "Le serpent léontocéphale Chnoubis et la magie de l'époque romaine impériale," *Anthropozoologica* 47.1 (2012): 291-314, especially 296-98.

²⁵ Jean-Paul Bertaux, "La découverte des tablettes: les données archéologiques," in *Les tablettes astrologiques de Grand (Vosges) et l'astrologie en Gaule romaine* (ed. J. H. Abry; Lyon: De Boccard, 1993), 44.

third decan of Cancer is depicted as a two-faced bust atop a pedestal mounted on a pillar and named ΧΟΥΜΙΣ, which corresponds to the χνουμίς in Hephaestion (In diptych A only ΟΥΜΙΣ survives). In the *Holy Book* a two-faced bust atop a pedestal is also described. The first decan of Leo is depicted as a lion-headed serpent, as described in the *Holy Book* (except for the figure on the diptych not being radiate), and is labeled as ΧΠΑΧΝΟΥΜΙΣ, corresponding to the χραχνούμις in Hephaestion (only ΧΠΑΧ survives in diptych A). On the basis of these correspondences Dasen and Nagy propose a new interpretation of an unusual Chnoubis gem (Firenze 66) where the obverse has a two-faced bust atop a pedestal and the reverse has the radiate lion-headed serpent: the gem actually presents two decans, the radiate lion-headed serpent is the first decan of Leo, *Chrachnoumis*, and the two-faced bust is *Chnoumis*, the third decan of Cancer.²⁶ Although Dasen and Nagy do not generalize this interpretation to understand all depictions of the lion-headed serpent as *Chrachnoumis*, their interpretation is pregnant with this possibility. Most Chnoubis gem designs, instead of the two-faced bust, may simply have satisfied themselves with writing out the name. The evidence in the *Holy Book* may support this. There, the first decan of Cancer (the two-faced bust) is called Χνοῦφος and the first decan of Leo (the lion-headed serpent) is called Χνοῦμος, and most Chnoubis gems have Χνοῦβις, of which Χνοῦφος is perhaps a phonetic corruption (more on this below, §a.1).

The works of Jackson, Dasen and Nagy, building off of Drexler, present a strong argument in favor of an affiliation between Chnoubis gem imagery, the name itself and the Egyptian decans, third Cancer and first Leo. It seems clear that Bonner's hypothesis

²⁶ Dasen, "Magic and Medicine," 298.

that the Chnoubis imagery derived from the god Khnum and the Greek *Agathos Daimon* cannot stand (although, it is certainly possible that Chnoubis and *Agathos Daimon* were secondarily associated).²⁷ However, a problem remains with the spelling of the name, and a closer investigation suggests that, although the Chnoubis imagery is beholden to the decanal tradition, the name itself may, in fact, be associated with the god Khnum.

The Egyptian decanal tradition, both the Seti I B lists and its later preservations in the French zodiacal tablets, as well as the literary evidence (Hephaestion and Hermetic sources) utilize the spelling with *mu* (Χνοῦμις); yet it is the spelling with beta (Χνοῦβις) that is significantly more popular on magical gems. Jackson sidesteps the issue by talking about *Chnoumis* gems.²⁸

The PGM evidence (Table 8) also seems to prefer non-*mu* spellings, where most of these have a *phi* for the third consonant and the first

Table 8. Chnoubis variants in the PGM			
1	PGM III.561-2	άρπονκνουφι	3 rd -4 th c. CE
2	PGM IV.2433	άρπονκνουφι	3 rd -4 th c. CE
3	PGM IV.1576	χνουφ	"
4	PGM IV.2192	άρπενχνουβι	"
5	PGM VII.1023-4	άρπο[.]χν[.....]	3 rd -4 th c. CE
6	PGM XIII.1059	χνουβ	4 th c. CE
7	PGM XXXVI.219	άρπ[.]νκνουφι	3 rd -4 th c. CE
8	PGM XXXVI.349	τετοχνουφι	"

consonant has turned into *kappa*, but these variants are also attested in the manuscripts of the *Holy Book of Hermes to Asclepius*: κνουφόβ and κνοῦφ.²⁹ This may suggest that κνουφ- goes back early in the textual tradition. However, even the earliest of these (PGM VII, PGM XXXVI) date to the 3rd/4th century, essentially contemporaneous with and greatly outnumbered by χνουβ/μ- on magical gems. A more general search of papyrus evidence on <http://papyri.info>, an aggregate database search that allows queries to simultaneously search the major papyrological databases available online (APIS,

²⁷ Bonner, *Magical Amulets*, 162.

²⁸ Jackson, *The Lion Becomes Man*, 74ff.

²⁹ See the app. crit. in Ruelle, "Hermès Trismégiste," 258.

DDbDP, HGV and DP), reveals only one instance of a κνουφ- spelling, attested in the personal name Πακνοῦφις Μουχίτης (P.Petaus 117, l. 68).³⁰ The rarity of this spelling is further supported by a search on the Packard Humanities inscriptional database. A search for Chnoubis name variations reveals that χνουβ- and χνουμ- spellings are both attested (19 and 15 inscriptions, respectively), some going back to the second century BCE, but no instances of *kappa* κνουβ- or κνουμ- spellings are extant.³¹ This strongly indicates that the *kappa* spellings attested in later witnesses are due to a phonetic interchange, an aspirated velar shifting to voiceless before or after a nasal, χ > κ.³² Since many of the instances in the PGM are prefixed with ὁρπον, the aspirated velar squeezed between two nasal consonants would have been even more likely to experience the interchange. A similar interchange of β > φ may be posited to account for the prevalence of *phi* in the PGM spellings,³³ although, as Francis Gignac notes, the evidence for the interchange of aspirated and voiced stops is limited.³⁴

For χνουβ- and χνουμ- both the inscriptional and papyrus evidence reveal an interesting pattern. Both spellings are predominantly found in theophoric personal names such as Παχνοῦβις, Ταχνοῦβις, Παχνοῦμις and Ταχνοῦμις. They are attested from the early third century BCE onward. χνουβ- spellings attested on papyri mostly come from the vicinity of Elephantine (55%), whereas χνουμ- variants are more widely distributed, only 18% coming from Elephantine. The inscriptional evidence reveals a similar pattern, with most χνουβ- inscriptions coming from Elephantine,³⁵ while many χνουμ- variants

³⁰ <http://papyri.info> accessed 10-6-2015.

³¹ <http://epigraphy.packhum.org>, accessed 3-27-2015.

³² Gignac, *A Grammar* (Vol. 1), 89-90.

³³ Gignac, *A Grammar* (Vol. 1), 98.

³⁴ Gignac, *A Grammar* (Vol. 1), 96.

³⁵ Thèbes à Syène 242, 243, 244, 246, 303, 319.

come from Koptos or nearby.³⁶ These statistics indicate that the *χνουβ-* variants had a special connection with Elephantine. One particularly important inscription that helps shed light on this association comes from a stele in Elephantine, OGIS 1.168 (= Thèbes à Syène 244 = SB 5.8883), dating to 115 BCE. It comprises ten documents pertaining to communication between local district officials and Ptolemy IX Soter II.³⁷ Here we discover that there are "priests of Great Chnoubis" (ἱερεῦσι τοῦ Χνούβω Νεβιήβ,³⁸ IV.32)³⁹ and temples to Chnoubis and Satis (Χνουβιείου καὶ Σ[ατιείου], II.23). This can only be Khnum and Satis, the principle gods of Elephantine.⁴⁰ Even more intriguing is document VIII (l. 59) of this stele where we find mention of Χνουμῶ Νεβιήβ. Evidently, spellings with both *beta* and *mu* are attested as Hellenized names of Khnum at Elephantine in the late second century BCE, although the *mu* spelling is found in only one of the ten documents on the stele. The name is also eponymously connected with another town, mentioned by the astronomer Ptolemy in the second century CE. He mentions a town called Χνοῦβις in the Theban nome in upper Egypt (*Geographica* 4.5.73). Finally, a fragment of the Hellenistic Egyptian Historian Manetho mentions a legendary King of Thebes, Chnoubos Gneuros;⁴¹ the exact passage is again found in a

³⁶ Koptos à Kosseirr 42, 53, 66, 74, 80, 88, 114, 126.

³⁷ For discussion of the stele see J. P. Mahaffy, "A Stele from Aswân in the British Museum," *Hermathena* 9 (1896): 273ff.

³⁸ Νεβιήβ < *nb* ȝ, "great lord"? Mahaffy, "A Stele from Aswân," 275, translates as "Great Khnum, lord of Elephantine."

³⁹ The minor difference in spelling between Χνούβω and Χνοῦβις should not disturb us. The *iota-sigma* ending is no doubt a later assimilation to Greek morphology, where as the *omega* ending is an indeclinable form along with many other Egyptian names. See Gignac, *A Grammar* (Vol. 1), 103. The ending in *iota-sigma* is treated along the lines of two different consonantal stem nouns, sometimes as a dental plosive along the lines of ἀσπίς, as in Thèbes à Syène 242, where we find the dative Χνούβιδι, and sometimes along the lines of πόλις, as in Thèbes à Syène 243, where we find Χνούβει.

⁴⁰ For Khnum, see Bonnet, *Reallexikon*, 135; for Satis, Bonnet, *Reallexikon*, 670-71.

⁴¹ Θηβαίων Αίγυπτίων ιβ' ἐβασίλευσε Χνοῦβος Γνευρὸς, Karl Müller, *Fragmenta Historicorum Graecorum* II (Paris: Didot, 1848), 545, frag. 13.23.

fragment of Apollodorus of Athens a century later.⁴² It is difficult to know what exactly to make of these references, but when considered together with the Elephantine evidence, they suggest that the name Χνοῦβις/Χνοῦβος was already circulating in the third century BCE, somehow connected with the general area of Thebes, and by the second century BCE most certainly connected with Elephantine as the Greek rendering of the god Khnum. There is no reason to discount the possibility that both the name of the aforementioned legendary king and the town find their origins in the name of the god Khnum as well.

The name Χνοῦβις, then, is in fact Hellenized spellings for Khnum in use from the early Hellenistic period onward. At the same time, the evidence of the Seti I B decan lists combined with that found in Hephaestion and the description of the third decan of Cancer in the *Holy Book of Hermes to Asclepius* as a radiate lion-headed serpent clearly indicates that the iconography for Chnoubis was derived from the decans *knm* and *hr knm*. But, the Khnum hypothesis and the decanal hypothesis are not mutually exclusive. Each solves part of the puzzle behind Chnoubis gems, with the decanal hypothesis accounting for the *χνοῦβ*-spelling (with a *beta*) of the name. Both Egyptian sources (the decans and the Elephantine worship of Khnum) became intertwined as a result of a phonetic phenomenon making the two indistinguishable to the Greek ear.

When the decans *knm* and *hr knm* were rendered into Greek the initial consonant, an unvoiced velar stop (/k/), had essentially two options, one unaspirated (*kappa*, /k/) and

⁴² Karl Müller, *Fragmenta Historicorum Graecorum I* (Paris: Didot, 1841), 441, frag. 70.45.

one aspirated (*chi*, /k^h/).⁴³ But, in Late Egyptian aspiration was not distinguished in /k/,⁴⁴ therefore either letter would be adequate. In the case of *Hnm* (= Khnum) the choice had already been made to render the unvoiced fricative (/x/) with *chi*,⁴⁵ and this spelling was completely adequate for *knm*. My contention is that the similarity in pronunciation of these names (*knm* and *hr knm*) and the god Khnum (*Hnm*) was the impetus for redeploying one of the Greek names for Khnum (Χνοῦμις) for the Greek rendering of these two decans. Once this nominal association was made, it was a simple step for the Graeco-Roman mind to link these two decans, their depictions (the lion-headed serpent and the three crossed serpents) and the god Khnum. The decanal tradition as reflected in Hephaestion and the Hermetic tradition, as well as the French zodiacal tablets, retained the *mu* spelling. I further suggest that the magical tradition on gems, making the link with the god Khnum more explicit, preferred the *beta* spelling because it was the spelling most strongly linked to Khnum in Elephantine, his center of worship.

2.1. One Decan or Two?

The study by Dasen and Nagy has left us with the possibility that, irrespective of whether the Chnoubis name also refers to the god Khnum, these gems may be explicitly invoking the powers of both decans for third Cancer and first Leo. Here the lion-headed serpent represents only one decan (third Cancer, i.e. *Charchnoumis*). The name

⁴³ For discussion of interchanges due to this see Gignac, *A Grammar* (Vol. 1), 95; also T. Eric Peet, "Reviewed Work: Coptic Sounds. Part I: The Main Currents of Their History," *JEA* 20.1/2 (1934): 111-12.

⁴⁴ Allen, *Ancient Egyptian*, 18, 53.

⁴⁵ *Chi* was the closest approximation to the unvoiced velar fricative *h*. For the Egyptian phonology of *h*, see Allen, *Ancient Egyptian*, 20, 45, 50. The only fricative available in second century BCE Greek was the glottal /h/ represented by aspirated initial vowels, which was not an option here.

Χνοῦβις/Χνοῦμις refers to another decan, first Leo. Gems that sport both the lion-headed serpent and the name Χνοῦβις (as most do) may be representing two decans, one by icon and the other by name.

This interpretive possibility is enticing, but quickly runs into trouble when one considers the Chnoubis symbol. The third decan in the Seti I B list is three serpents crossed by a fourth, the source of the SSS symbol, and the fourth decan is a seated lion-headed goddess. These two decans respectively correspond to third Cancer and first Leo. If the Chnoubis name and the Chnoubis symbol both correspond to the third decan of Cancer then gems which contain both—as many do—would seem to redundantly invoke the third decan of Cancer. Secondly, under this interpretation, third Cancer can be invoked both inscriptionally (with the Chnoubis name) and iconographically (the Chnoubis symbol), yet the same is not true for the first decan of Leo. The name χαρχνούμις is virtually absent from the gem evidence. Why should only the third decan of Cancer evince flexibility in its invocation on magical gems?

I suggest, in fact, that most Chnoubis gems are not separately invoking two decans (although this made be true in the case of Firenze 66). Instead, the lion-headed serpent in itself combines both decans. In the Seti I B lists, first Leo is represented by a lion-headed goddess and third cancer by three serpents crossed by a third; the lion-headed serpent combines the salient features of each of these and is later redeployed for just one of the decans in the later Graeco-Roman tradition. Furthermore, the lion-headed serpent can be construed as representing the entire decanal system itself. Over a third (35%) of

the figures associated with the decans in the Seti I B list are serpents.⁴⁶ Most of the rest (42% of the decans) have a lion-headed god(dess). Next, the phonetic similarity of the Egyptian decanal names (*knm* and *hr knm*) to the Egyptian god Khnum seems to have inspired a Graeco-Roman link between the two and so the presence of the names Χνοῦβις or Χνοῦμις is perhaps best understood as principally referring to the god Khnum. When this equivalence may have occurred is not certain, but the literary evidence, as limited as it is, suggests that both the name and the Chnoubis symbol were later additions to the design.

2.2. *The Earliest Gems*

Most Chnoubis gem date from the third century CE onward, although a gem found in a controlled excavation in Tel Dor has been dated to the second century CE.⁴⁷ The earliest literary evidence that a radiate serpent (although no lion head is mentioned) is associated with green gems used for treatment of stomach ailments too dates to the second century CE, in Galen, *Simp. Med.* 207. Here he relates the folk remedy that recommends green "jasper" inscribed with a radiate serpent (*ll. 5-6: γλύφουσιν ἐν αὐτῷ τὸν τὰς ἀκτῖνας ἔχοντα δράκοντα*).⁴⁸ The Chnoubis name is not mentioned, neither in

⁴⁶ There are a total of eleven individual lists in the Seti I B family and not all agree completely. When counting the representative figures for each decan I chose the figure attested by the majority of lists as given in O. Neugebauer and Parker, *Egyptian Astronomical Texts III*, 134-39.

⁴⁷ Ephraim Stern and Ilan Sharon, "Te Dor, 1993: Preliminary Report," *IEJ* 45.1 (1995): 32. See also Roy Kotansky, "The Chnoubis Gem from Tel Dor," *IEJ* 47.3/4 (1997): 257-60. Gideon Bohak, "A Note on the Chnoubis Gem from Tel Dor," *IEJ* 47.3/4 (1997): 255, has suggested that although a second century date is plausible, it may also date somewhat later.

⁴⁸ Although ἴασπις and "jasper" are etymologically related, it is nearly certain that the ἴασπις of the ancient sources does not refer to what is now called jasper. When ancient authors refer to ἴασπις they speak of a translucent or transparent green stone, whereas modern jasper is an opaque stone. See Earle R. Caley and Richards, *Theophrastus On Stones*, 107.

terms of an accompanying inscription or what the serpent may be called (if anything).

The color green and the use against stomach ailments, however, correspond well with the extant Chnoubis gems. Galen immediately notes that the serpent icon is recommended in the fourteenth book of Nechepso (*ll. 6-8*: καθάπερ καὶ ὁ βασιλεὺς Νεχεψώς ἔγραψεν ἐν τῇ τεσσαρακαὶδεκάτῃ βίβλῳ). This is a reference to the famous astrological treatise by Petosiris, probably written in the middle of the second century BCE.⁴⁹ This would then push the use of green "jasper" with an inscribed radiate serpent into the Hellenistic period. It is also possible that, as Bonner suspected,⁵⁰ Galen's lack of interest in the engraving led him to neglect mentioning the lion-head. The fourth century CE medical writer Marcellus Empiricus seems to refer to the same type of gem when he preserves a remedy for the stomach, describing a radiate serpent engraved on "jasper" (*De. Med.* 20.98: *in lapide iaspide exculpe draconem radiatum*). There is no mention of the lion-head even though the Chnoubis type gems would have been in wide circulation and as a medical writer he would have been familiar with it. The above evidence suggests the end of the second century (Galen having died *c.* 200 CE) as a *terminus post quem* for the use of the Chnoubis name and Chnoubis symbol on these gems.

⁴⁹ Petosiris was closely associated with another legendary author, Nechepso, and they were often treated as a pair, although, as in this case, they were sometimes cited separately, making the relationship between the works attributed to them difficult to determine. See Briant Bohleke, "In Terms of Fate: A Survey of the Indigenous Egyptian Contribution to Ancient Astrology in Light of Papyrus CtYBR inv. 1132(B)," *SAK* 23 (1996): 19, especially n. 46; Jim Tester, *A History of Western Astrology* (Woodbridge: The Boydell Press, 1987), 22; P. M. Fraser, *Ptolemaic Alexandria* (3 vols.; vol. 1; Oxford: Clarendon Press, 1972), 437. The fragments of Nechepso-Petosiris were originally collected by Ernst Riess, "Nechepsonis et Petosiridis Fragmenta Magica," *Philologus* supp. 6 (1891-3): 325-94. For him, the likely date of composition was between 80 and 60 BCE since the author(s) did not seem to be familiar with the famous second/early first century BCE astronomer Posidonius (329).

⁵⁰ Bonner, *Magical Amulets*, 54.

2.3. *The Radiate Nimbus*

According to Marcellus Empiricus, the standard design calls for seven rays, presumably in the nimbus ("ut habeat septem radios," *De. Med.* 20.98). A hand count of rays in the nimbi found on Chnoubis gems in the British Museum collection yields the following values: (12 rays) 3; (11 rays) 2; (9 rays) 3; (8 rays) 1; (7 rays) 19; (6 rays) 6; (3 rays): 1. While seven is the most common number, there are enough deviations that only 54% of Chnoubis icons have a seven-rayed nimbus.

The radiate nimbus is the one characteristic of Chnoubis' form that does not have an Egyptian genealogy. It is perhaps best associated with Helios, who is represented with it in Greek art from the fifth century BCE onward.⁵¹ While it usually is taken to indicate solar connections, it may also be used to indicate the radiance associated with supernatural beings,⁵² as is evident from Ludolf Stephani's long list of heroes and gods depicted, at times, with a radiate nimbus but who are not otherwise normally considered to have solar attributes, such as Kronos,⁵³ Adonis,⁵⁴ Demeter⁵⁵ and Selene.⁵⁶ Nevertheless, the derivation of the lion-headed serpent iconography from the Egyptian decanal system can reasonably lead one to conclude that Chnoubis does, in fact, have solar association. Michel observes:

⁵¹ Ludolf Stephani, *Nimbus und Strahlenkranz in den Werken der alten Kunst* (St. Petersburg: Kaiserlichen Akademie der Wissenschaften, 1859), 25-29; R. Van den Broek, *The Myth of the Phoenix: According to Classical and Early Christian Traditions* (Leiden: Brill, 1972), 327.

⁵² Stephani, *Nimbus und Strahlenkranz*, 3-13.

⁵³ Stephani, *Nimbus und Strahlenkranz*, 29.

⁵⁴ Stephani, *Nimbus und Strahlenkranz*, 30-31.

⁵⁵ Stephani, *Nimbus und Strahlenkranz*, 47.

⁵⁶ Stephani, *Nimbus und Strahlenkranz*, 57-59.

Chnoubis ist also zugleich auch Sonnengott, was wiederum der Gleichstellung der Dekane mit dem Sonnengott und seinen verschiedenen Erscheinungsformen entspricht.⁵⁷

And Bonner states:

It should not be forgotten that the very numerous "Chnoubis" stones, with a radiate lion-headed serpent as their chief subject, are to be counted among solar amulets, although they were often, perhaps usually, applied to a medical purpose, the cure of stomach ailments.⁵⁸

But, he goes on to say: "In fact, it is safe to say that a considerable majority of all Graeco-Egyptian amulets were made under the influence of a solar religion of highly syncretistic character."⁵⁹ This calls into question the heuristic value of primarily classifying these gems as "solar" or calling the figure of Chnoubis a *Sonnengott*: if most Graeco-Egyptian amulets are the result of a syncretistic solar religion then to say that an icon is "solar" does not say much at all (see also chapter 3: §3.1, §5). But, this is not simply an issue of heuristic value and taxonomy. Neither the Chnoubis icon nor the name are significantly statistically correlated with other icons that are understood to have primarily solar or celestial connotations. For the Chnoubis icon the probability value for its correlation with certain solar icons is as follows: Harpocrates ($p = 0.990356$), Helios ($p = 0.968059$), sun ($p = 0.501829$), star ($p = 0.957037$), moon ($p = 0.999012$), which is to say, the chance for each of these correlations being random is very high (a p value under 0.05 is considered statistically significant). Similar values are witnessed for the Chnoubis name (consult Appendix A).

One may respond that the presence of these icons on a Chnoubis gem would be redundant if Chnoubis is inherently a solar deity, but I would point to the case of Helios

⁵⁷ Michel, *Die Magischen Gemmen im Britischen Museum*, 194.

⁵⁸ Bonner, *Magical Amulets*, 154.

⁵⁹ Bonner, *loc. cit.*

and Harpocrates as instructive. As was observed in chapter 3 (§3.1), the sun and moon are closely correlated on magical gems. This celestial solar-lunar linkage is reflected in the correlations that both Helios and Harpocrates reflect. Although neither of these icons, which are inherently "solar," has a significant correlation with the solar disc icon, they both have a significant correlation with the moon, $p = 0.051510$ and $p = 0.042421$, respectively. Helios is also closely correlated with the star icon ($p = 0.073305$). The lotus too, closely associated with Harpocrates, and an Egyptian symbol of the morning sun, has a strong correlation with the moon icon ($p = 0.062952$). Although the absence of such correlations for Chnoubis can not categorically rule out all solar associations—and, indeed, this would be well nigh impossible for any Egyptian deity—it should give one pause before "sun god" or "solar amulet" are determined to be the primary *taxa* in which Chnoubis is to be pigeon-holed. One ought to keep in mind that Chnoubis is intimately associated with both the functions and the icons of the uterine gems, and those gems, as seen in chapter 3, cannot unproblematically be categorized as primarily "solar" or "astrological."

2.4. *SSS, ZZZ and Yahweh*

The Chnoubis symbol has two variants, a triple S crossed by a line (SSS) and a triple Z crossed by a line (ZZZ). Of the first variant 62% appear with Chnoubis and 48% of the second variant, but the first variant is far more common, appearing on 98 gems with Chnoubis as opposed to 11 gems for the ZZZ variant (there are a total of 23 instances of this variant across all gems). A single crossed Z (Z) also appears by itself

and in combination with various *characteres* on a number of gems, but has no statistically significant correlation with Chnoubis.

In examining a now lost gem, recorded by Nicolas-Claude Fabri de Pieresc in a letter from 1629, Roy Kotansky and Jeffrey Spier published for the first time the transcription of the text found on it:

ὁ Ἰασηνουαυη, / ὁ Βακαζιχυχ, ὁ Κ/ερατάγρας, οὗτος / ἐστιν ὁ πρωτοπάτ/ωρ, ὁ τοῦ σώματος μ/όνος ὄν, διὰ πάν/των πορευ<ό>μενος. Σο/λομῶντος {ι}σφραγί/ς *ZZZ [fig.] ὁ δρα/κών ἔστω / λεοντοκέφ/-αλος.⁶⁰

Pertinent to the present discussion in the mention of *ZZZ as the seal of Solomon (Σολομῶντος {ι}σφραγίς) in conjunction with the lion-headed serpent (ὁ δρακών ... λεοντοκέφαλος). The seal of Solomon is generally understood as the tetragrammaton,⁶¹ and leads Kotansky and Spier to recognize *ZZZ as a cipher for the tetragrammaton, specifically observing that the Z symbol is derived from "a paleo-Hebrew version of the ineffable name (with the three Z-like symbols equaling "" a common cipher for God's name)." ⁶² The statement that the symbol derives from "a paleo-Hebrew version of the ineffable name" is not exactly correct, and what Kotansky and Pier must mean is that it derives from the paleo-Hebrew form of the letter *yod*.⁶³ This is precisely what Mastrocinque argues, following the lead set by Kotansky and Spier, that not only ZZZ but SSS as well is derived from three paleo-Hebrew *yods* acting as a cipher for the

⁶⁰ Roy Kotansky and Spier, "The "Horned Hunter"," 317.

⁶¹ Roy Kotansky and Spier, "The "Horned Hunter"," 324; Scholem, *Jewish Gnosticism*, 133.

⁶² Roy Kotansky and Spier, "The "Horned Hunter"," 325.

⁶³ "Paleo-Hebrew" refers to the Hebrew script used prior to the adoption of the "square" or Aramaic script during the Persian Period, which survived in some limited way on Hasmonean coins and some manuscripts among the Dead Sea Scrolls. See Joseph Naveh, *Early History of the Alphabet: An Introduction to the West Semitic Epigraphy and Palaeography* (Skokie: Varda Books, 2005 [1997]), 112-24; Hanson, "Uterine Amulets," 26-42.

tetragrammaton.⁶⁴ Kotansky and Spier specifically exclude **sss** from the same interpretation.⁶⁵ Insofar as **Z** is concerned, it does bear a certain similarity to the paleo-Hebrew *yod* (**ז**) and *yod, heh* and their combinations are attested in texts as substitutes for writing out Yahweh from the Talmudic period onward.⁶⁶ In an inscription from a fifth century church at 'Evron, three paleo-Hebrew *yods* have been identified as a cipher for the name of God.⁶⁷ This seems to be the earliest archaeologically attested use of the triple *yod* as a substitute for Yahweh, although the use of a single *yod* or in combination with the second letter of the tetragrammaton, *heh*, is attested earlier.⁶⁸

Mastrocinque's absolute position that the both **sss** and **zzz** must be understood as such ciphers flatly contradicts the earlier analysis of **sss** as deriving from the serpent figure found in the Seti I B family of decanal lists, but this elides an important difference in many instances of the **zzz** symbol. In many cases, the crossbar is not continuous, indicating that three distinct symbols are being collocated in sequence, as opposed to **sss** which almost always has a continuous crossbar. This is supported by the observation that a single **Z** (either alone or in combination with other *characteres*) is attested 77 times, but a single **S** is unattested. It would seem that the symbol **sss** is generally construed as a single unit whereas **Z** alone is the atomic unit. This is nicely illustrated in Paris 244 where three rows of symbols are given on the reverse. Each **Z** corresponds to a complete

⁶⁴ Mastrocinque, *Jewish Magic to Gnosticism*, 69, 151-52.

⁶⁵ "The symbols are similar to, but not to be confused with, the three-barred S's often found on Chnoubis gems," Roy Kotansky and Spier, "The 'Horned Hunter,'" 325.

⁶⁶ For three *yod* see Lauterbach, "Substitutes," 52-55, variant nos. 31-61.

⁶⁷ Vassilios Tzaferis, "The Greek Inscriptions from the Early Christian Church at 'Evron,'" *EI* 19 (1987): 50, no. 11.

⁶⁸ Lauterbach, "Substitutes," 41, 46. A double paleo-Hebrew *yod* is attested as a substitute in a third century text (P. Oxy. 1007); see Bonner, *Magical Amulets*, 53.

SSS. Therefore, the analysis by Mastrocinque which conflates SSS and ZZZ into a single problem is unjustified.

In the gem recorded by Pieresc it is clear that *ZZZ is meant to stand for the tetragrammaton, but if this were a general association as opposed to an idiosyncratic use on a few gems, one would suspect that the divine name Iaô should also be found with some significant frequency alongside ZZZ under the generally observed principle that divine epithets tend to be multiplied in magical texts. Yet, ZZZ and Iaô only coincide on eight gems, which is far from statistically significant ($p = 0.196287$). Z alone or in combination with other *characteres* is attested with Iaô on only a few more gems (21 total) and is similarly statistically insignificant ($p = 0.208458$). One may respond that if ZZZ by its very nature is a general substitute for the tetragrammaton then not only would Iaô be redundant, but would defeat the very purpose of using a cipher. However, one would still expect statistically significant links to other attributes in the Iaô cluster, but this is found completely wanting. The sign does not have a statistically significant correlation with any of the attributes found in the Iaô cluster.⁶⁹ If the original introduction of the triple Z was meant to represent the paleo-Hebrew *yod* (ז) as a cipher for the divine name, as seems possible from the evidence surveyed above, this meaning seems to have been quickly lost as the symbol proliferated on magical gems, resulting in the weak statistical links with attributes in the Iaô cluster. At the same time, such a usage would be the earliest attested for the three-*yod* cipher for Yahweh, predating the 'Evron church example by a century or two.

⁶⁹ For instance, Abraxas ($p = 0.688429$), ablanathanalba ($p = 0.504262$), Adônai ($p = 0.752000$), Sabaôth ($p = 0.502799$), semesilamps ($p = 0.068422$).

There is one small exception to the above observations, and that is the statistically significant link between **ZZZ** and chalcedony, the green variant of which is mostly associated with Chnoubis (see §1 above). We have already observed that the color green is part of the Iaô cluster (see chapter 2, §3.a). This, along with **ZZZ** as a cipher for Yahweh, lends some plausibility to Mastrocinque's hypothesis that Chnoubis could be identified with the Hebrew god,⁷⁰ but, as stated above, the otherwise weak links with attributes in the Iaô cluster suggests that such an identification, if made early in the tradition, was quickly forgotten. This may have been due to the obscurity of **ZZZ** as a cipher, requiring familiarity both with Jewish writing conventions and the paleo-Hebrew script itself.

3. Barbarôphita and Gigantorhêkta

The two *voces magicae*, *Barbarôphita* and *Gigantorhêkta*, are rare (each found on nine gems) and virtually exclusive to Chnoubis gems (89% and 100%, respectively). On six Chnoubis gems they occur together (Michigan 53, 54; Paris 244, 249, 251 and 253). They are significantly linked ($p = 0.034783$), two-thirds of the time occurring together on the same gem, forming their own subgroup. Neither *vox* is mentioned in the PGM—both going unmentioned by W. M. Brashear, but several similar ones formed off the stem βαρβαρ- are listed: βαρβαραδωναιαι, βαρβαραυω, βαρβαριαω, and βαρβαριθω.⁷¹ The sequence "αρβα" found in all of these may point to a connection with the Hebrew word 'rb^ca (עַבְרָא), meaning "four," understood as referring to the four letters of the

⁷⁰ Mastrocinque, *Jewish Magic to Gnosticism*, 65.

⁷¹ Brashear, "The Greek Magical Papyri," 3582.

tetragrammaton,⁷² as in the name Abraxas.⁷³ One of these names, βαρβαραδωναιαι, seems to explicitly make this connection, with αδωναιαι (= Adônai) being the typical reverential periphrasis for Yahweh.⁷⁴ It is also possible that the reduplication in *Barbarôphita* is a secondary phenomenon under the influence of other βαρβαρ- *voces* and that the common variant *Barôphita* is, in fact, the original, formed from βαρεῖν and ὄφις which, according to Bonner, may mean something like "crusher of serpents."⁷⁵

Gigantorhêkta is the vocative of γιγαντορήκτης, "breaker of giants."⁷⁶ For Mastrocinque it is explained through the identity of Chnoubis with the Hebrew God in light of Genesis 6:4-7, the story of the Nephilim, the offspring of the "sons of God" and human women, who sowed wickedness and led God to regret the creation of man and decide to send the great flood to cleanse the earth.⁷⁷ "Nephilim" is translated in the Septuagint as οἱ γίγαστες, "the giants," which then allows Mastrocinque to explain the epithet as arising from Yahweh's role as destroyer of the Nephilim, i.e. the "giants." The suggestion that Chnoubis is to be identified with Yahweh is not a new one,⁷⁸ with the origins of the identification typically sourced to the Jewish settlement at Elephantine,⁷⁹ which was also one of the two chief sites for the worship of Khnum (*supra* §2).

⁷² Martinez, *P. Mich.* 6925, 100-01.

⁷³ See discussion in chapter 2, §2.1.b.

⁷⁴ See chapter 2, §2.1.a, also discussion in Martinez, *P. Mich.* 6925, 52.

⁷⁵ Bonner, *Magical Amulets*, 169. Bonner notes that the verb βαρεῖν normally means "depress" or "trouble" but surmises that the sense of "crush," although not otherwise attested, may have been a natural development. See also Faraone, "Text, Image and Medium," 51.

⁷⁶ Bonner, *Magical Amulets*, 168-69; Mastrocinque, *Jewish Magic to Gnosticism*, 64-65}; Faraone, "Text, Image and Medium," 51.

⁷⁷ Mastrocinque, *Jewish Magic to Gnosticism*, 65-66.

⁷⁸ H. Gressmann, "Die Aufgaben der Wissenschaft des nachbiblischen Judentums," *ZAW* 2 (1925): 14; Goodenough, *Jewish Symbols* (v. 2), 261-67; Barb, "Abraxas-Studien," 76. For Jackson, *The Lion Becomes Man*, 104, Chnoubis is an Egyptian-Jewish synthesis.

⁷⁹ Gressmann, *sup. loc. cit.*; Mastrocinque, *Jewish Magic to Gnosticism*, 65.

At the same time, the lion-headed serpent, the Chnoubis name and the **sss** have a clearly Egyptian origin, as discussed in the previous section, which implies that any association with the Jewish God is a secondary development. This would include the presence of the triple **z**, if it is indeed to be read as the paleo-Hebrew **ZZZ**. As the Chnoubis name, figure and **sss** have no statistically significant link with the Iaô cluster, and **ZZZ** is relatively infrequent, I am compelled to conclude that Chnoubis gems first began to circulate prior to any Judaizing accretion. This is consistent with the facts that (1) **ZZZ** and the two *voices magicae* are grouped by the Louvain algorithm in subgroups independent of the icon, its name and the **sss** symbol (the purple and green subgroups, respectively; see §1 above) and (2) both the *voices* and the **ZZZ** symbol are relatively uncommon on these gems. Judaizing a Chnoubis gem may have certainly involved the inscription of Iaô, Sabaôth and other epithets and *voices* from the Iaô cluster. One such Chnoubis gem is singled out by Goodenough, which includes both Iaô and Sabaôth, as well as Mousê (= Moses).⁸⁰ The lukewarm response by John G. Gager to this hypothesis is quite reasonable ("*Iaô* and *Sabaôth* were in wide circulation in magical circles, and even the name of Moses had become almost common property."),⁸¹ but these are precisely the features to be expected in a Judaized gem, whether the user is himself Jewish or not.

Furthermore, the *voices Barbarôphita* and *Gigantorhêkta*, need not necessarily be understood as epithets of Yahweh. Another inspiration for the epithet of "crusher of serpents" (if one follows Bonner's hypothesized meaning) and, perhaps, "breaker of giants"—if "giant" here is understood through a Hellenistic lens, imagining them with

⁸⁰ Goodenough, *Jewish Symbols* (v. 2), 266.

⁸¹ John G. Gager, *Moses in Graeco-Roman Paganism* (Society of Biblical Literature, Monograph Series; Nashville: Abingdon Press, 1973), 156.

serpentine legs—may be found in the Pharaonic and Graeco-Roman *cippi* depicting Horus trampling and spearing a crocodile.⁸² One would, however, here have to presume functional equivalence between a crocodile and serpent. Later Byzantine depictions of the cavalier spearing a serpentine enemy (which are also to be related to the Solomonic rider gems; see chapter 3 §4.a)—if a development of the earlier Horus depictions⁸³—make clear that such an equivalence between crocodile and serpent was eventually made, although, the figure of the cavalier spearing a serpent may date no earlier than Constantine.⁸⁴

The Egyptian god Khnum sharing in the role of destroyer of Seth is already evinced on a Ptolemaic (or earlier?) stele from the Field Museum, in Chicago (no. 31737). On this stele, among other things, Khnum is depicted as spearing Seth in the form of a crocodile.⁸⁵ This is possible precedent for Chnoubis—as a later hypostasis of Khnum—taking on the role as destroyer of serpent and giants. Furthermore, these epithets may refer not to the crocodilian Seth but to the evil serpent Apep. In the Bremner-Rhind papyrus III, Horus is described as taking up an iron spear against the foes of Re, among whom the principal one is Apep (22.10ff).⁸⁶ Among the gods enlisted to aid Horus is Khnum (26.15).⁸⁷

This Egyptian hypothesis is more tempting than the Yahweh hypothesis for two reasons: (1) one or both epithets—depending on how "giant" is to be imagined here—can

⁸² Lewis, "Iconography of the Coptic Horseman," 55. See also Robert K. Ritner, "Horus on the Crocodile: A Juncture of Religion and Magic in Late Dynastic Egypt," in *Religion and Philosophy in Ancient Egypt* (YES 3; New Haven: Yale Egyptological Seminar, 1989), 103-16.

⁸³ Sarah Iles Johnston, "Riders in the Sky: Gods and Theurgic Salvation in the Second Century A.D.," *CP* 87.4 (1992): 308-09; cf. Goodenough, *Jewish Symbols* (v. 2), 230

⁸⁴ Lewis, "Iconography of the Coptic Horseman," 54-55.

⁸⁵ Ritner, "Horus on the Crocodile: A Juncture of Religion and Magic in Late Dynastic Egypt," 110.

⁸⁶ R. O. Faulkner, "The Bremner-Rhind Papyrus III: D. The Book of Overthrowing 'Apep,'" *JEA* 23.2 (1937): 167.

⁸⁷ Faulkner, "Book of Overthrowing 'Apep," 172.

be accounted for by the same cultural source that is responsible for the Chnoubis image, name and SSS (Egypt); (2) nowhere, as far as I can tell, are either epithet, or any variation or periphrasis of it, associated with the Jewish God in biblical or extra-biblical sources. Neither is Yahweh ever depicted in any protective or vengeful act as crushing serpents. Genesis 3:15, the so-called protoevangelium, condemns the offspring of the serpent to have its head struck by the progeny of Eve and not God himself. The "giants" of Genesis 6:4 are, three verses later, slated to be wiped off the planet, but they are not specifically targeted—all animal life is to be "expunged" (ἀπαλείφω):

καὶ εἶπεν ὁ θεός Ἐπαλείψω τὸν ἄνθρωπον, ὃν ἐποίησα, ἀπὸ προσώπου τῆς γῆς ἀπὸ ἀνθρώπου ἔως κτήνους καὶ ἀπὸ ἑρπετῶν ἔως τῶν πετεινῶν τοῦ οὐρανοῦ, ὅτι ἐθυμώθην ὅτι ἐποίησα αὐτούς.⁸⁸

So the LORD said, "I will blot out from the earth the human beings I have created-- people together with animals and creeping things and birds of the air, for I am sorry that I have made them." (Genesis 6:7).⁸⁹

The epithet *Gigantorhēkta* is specific, not only in what is to be destroyed, but that it is to be "broken" (ρήγνυμι). In Egyptian tradition, Apep, as the great arch-serpent, is regularly singled out and, among the many acts of violence to be done to him, "the Children of Horus break thee up," he falls because "thou hast been broken" and "he who should be broken is broken and his deeds shall not succeed."⁹⁰

3.1. Chnoubis in Jewish Hands?

If the above line of reasoning is accepted and the identification of Chnoubis with

⁸⁸ Alfred Rahlfs, ed., *Septuaginta* (Stuttgart: C. H. Beck, 1979 [1935]), 8.

⁸⁹ Michael D. Coogan, ed., *The New Oxford Annotated Bible* (Oxford: Oxford University Press, 1991), 19.

⁹⁰ Faulkner, "Book of Overthrowing 'Apep,'" 169.

Yahweh has not been established in the general case, this should in no way preclude the possibility that self-identifying Jews made use of this icon and gems inscribed therewith. There is clear evidence that by the second century CE Chnoubis gems were circulating in Palestine, as proven by such a gem being unearthed at an excavation site in Tel Dor, as well as others from Caesarea Maritima.⁹¹ The gem from Tel Dor, dated to the second century CE, seems to be the earliest such example and this dating is consistent for the conclusion arrived at above (§2.2.), that the end of the second century CE is the likely *terminus post quem* for the rise of Chnoubis-pattern gems. In discussing the Tel Dor Chnoubis gem, Bohak notes that there are several Rabbinic reference to the image in the Mishnah, Tosefta and Talmud.⁹² It is usually simply referred to as **דְּרָקִים** (= δράκων), that is, "dragon," but Tosefta *Abodah Zarah* (hereafter AZ) 5.2 clarifies that this dragon has rays coming out of its neck, which seems to point to Chnoubis. In the Babylonian Talmud AZ 42a-b, 43a there is a lengthy discussion concerning the conditions under which this image is forbidden. In 43a there is an anecdote concerning R. Eleazar Hakappar who, while on the road, found a ring with a figure of a "dragon" and asked a gentile passerby to annul/desecrate it, presumably to be able to make use of it as a non-religious object.⁹³

The requirement that, if an image of the sun, moon or "dragon" is found, it must be thrown into the Dead Sea (Mishnah AZ 3.3) may suggest that these specific images were in circulation among Jews, or, at least, in such close proximity that it was

⁹¹ Kotansky, "Chnoubis Gem," 257-60.

⁹² Bohak, "Chnoubis Gem," 256. See also Bohak, *Ancient Jewish Magic*, 388. For a survey of the "dragon" in Rabbinic sources, see Hadas-Lebel, "Le paganisme à travers les sources rabbiniques," 417-20.

⁹³ In Mishnah AZ 4.4 one reads: "A gentile can desecrate his own or his fellow's idol, but an Israelite cannot desecrate a gentile's idol." Danby, *The Mishnah*, 442; cf. Babylonian Talmud AZ 42a. See also comments in Bohak, *Ancient Jewish Magic*, 388-89.

reasonable to suspect that some Jews may be tempted to make use of them. In B. AZ 43a it is noted that an idol in the possession of a Jew—which, presumably, had not been annulled prior to coming into his possession—can never be annulled, thus being permanently unclean. That this special case should be discussed at all further suggests that there were Jews who possessed illicit images, which either through accident or intention were acquired with no heed being given to their potentially forbidden nature, and therefore a more stringent condition would have to obtain, disallowing them to *ex post facto* annul the object. Certainly, Goodenough was convinced that "Chnoubis was apparently one of the favorite magical symbols among Jews."⁹⁴ Moving from *appearance* and *possibility* to *probability* can be notoriously dangerous and the evidence here presented, although tantalizing, falls short of Goodenough's strong conclusion about "one of the favorite magical symbols," but the prevalence of Chnoubis gems in the Levant and the specific warnings in Rabbinic sources does seem to make it probable that the image was circulating in the *wrong* hands sufficiently widely for the Tannaim and Amoraim to take note.

4. Healing and Serpents

The use of Chnoubis gems for digestive ailments has already been mentioned above (§2.2.) as attested by both Galen (*Simp. Med.* 207) and Marcellus Empiricus (*De. Med.* 20.98-9). Shortly after his list of Egyptian decanal gods (*supra* §2), Celsus states: καὶ δὴ ἐπικαλοῦντες αὐτοὺς ἰῶνται τῶν μερῶν τὰ παθήματα, "By invoking these names they heal the afflictions of their members." For Chnoubis, that part of the body

⁹⁴ Goodenough, *Jewish Symbols* (v. 2), 261.

seems to be the stomach, but his healing power may also apply to the uterus. In the lapidary of Socrates and Dionysus a radiate lion-headed serpent is recommended on "onyx" for stomach pains (sec. 35) but this is immediately followed by another recommendation of "onyx" for "pregnant women and those nursing" (ταῖς ἐν γαστρὶ ἔχούσαις καὶ ταῖς θηλαζούσαις) which involves inscribing a three-headed serpent called Χνούβιος (sec. 36).⁹⁵ Whether the recommendation is for protective purposes or for addressing complications already present is not specified in the text, but I see little reason why the gem's use would not extend to both. A three-headed Chnoubis is nowhere attested on the extant gems, but this "Chnoubios" can be none other than Chnoubis.

The contradiction between the use of onyx for stomach ailments and matters of the womb is more apparent than real. Notice that the term here used is γαστήρ (belly) and not μήτρα (womb). As already discussed in chapter 2.§4.a., the two were occasionally confused in antiquity,⁹⁶ no doubt due to their proximity one to the other, which could lead to the two terms being used interchangeably. In sec. 35 the word there used for stomach is στόμαχος, which in Hippocrates is used as a synonym for στόμα τῶν οὐτερέων, "neck of the uterus" (*De morbis mulierum* 1.18; cf. *De morbis mulierum* 3.217). Applied *pars pro toto* it may, then, be used to refer to the entire uterus. Chnoubis, therefore, works for the general abdominal area, for both gastrointestinal and uterine matters.

The requirement for "onyx" also seems to contradict the extant gem evidence. Section sec. 35 requires "white onyx" (όνυχίτης ... λευκὸς) and §36 requires "black onyx" black onyx (όνυχίτης ... μέλας). While onyx is used only once for Chnoubis gems

⁹⁵ Robert Halleux and Schamp, *Les Lapidaires Grecs*, 170-71.

⁹⁶ Barb, "Diva Matrix," 222-23 n. 105.

(Paris 234), the term ὄνυχίτης is more general, encompassing stones that would today be classified as onyx, banded chalcedony and agate.⁹⁷ That sec. 35 and sec. 36 in Socrates and Dionysius classify solid-colored stones (white and black) as ὄνυχίτης suggests that the term could even extend to un-banded chalcedony. White chalcedony is certainly attested for Chnoubis gems as well as black serpentine (BM 408, 416) and obsidian (Bologna 6, Perugia 11). Nonetheless, the lapidary is still inconsistent with the fact that green chalcedony is the most common material for these gems. As for the requirement for "green jasper" found in Galen and Marcellus, when ancient authors refer to ἄσπις they speak of a translucent or transparent green stone,⁹⁸ quite distinct from our modern opaque "jasper," but consistent with green chalcedony.

Apart from these ancient attestations, Chnoubis gems themselves sometimes reveal that they were used for stomach matters. On Michigan 43 we read πέσσε πέσσε, "digest! digest!" On Berkeley 1 we find a longer invocation: ἀποστρέψαται πᾶσαν ἀπεψί/αν πᾶν πόνον/ στομάχου ἀπό λουλιανοῦ ὄν / ἔτεκεν / Νόννα, "Avert all tension, all indigestion, all pain of the stomach from Julianus, whom Nonna bore." A number of other Chnoubis gems attest to this role.⁹⁹ Chnoubis is also significantly linked with the *Soroor* formula ($p = 0.000025$), a formula which likely has to do with the opening of the womb (see discussion in chapter 3, §3.e). This is in part due to his close association with uterine gems, appearing on them 27% of the time (see discussion in chapter 3, §3.d). But this association with gynecological matters seems to extend beyond the context of uterine gems since the *Soroor* formula also appears on gems in which the

⁹⁷ See Robert Halleux and Schamp, *Les Lapidaires Grecs*, 330-31; also see the discussion for ὄνυχιον in Earle R. Caley and Richards, *Theophrastus On Stones*, 127-28.

⁹⁸ See Earle R. Caley and Richards, *Theophrastus On Stones*, 107.

⁹⁹ Michigan 145; Paris 239, 260, 550; BM 338.

figure Chnoubis is the central icon (e.g. Michigan 53, 54; BM 307, 316). Or, one may say that the category of uterine gems should not be conceptualized as just encompassing hematite gems bearing the uterine symbol (discussed in chapter 2) but may also involve Chnoubis gems with the *Soroor* formula.

Although the leontomorphic serpentine form of Chnoubis has a wholly Egyptian origin, its nearly exclusive role in healing should seem surprising considering the dread with which Egyptians regarded snakes.¹⁰⁰ Here, as with the nimbus (*supra* §2.3.), it is necessary to turn to Graeco-Roman culture and the significant place it afforded the motif of the healing snake.¹⁰¹ There is first, and foremost, the example of the god Asclepius,¹⁰² who not only possessed a staff with serpent coiled about, but could take the form of a giant serpent himself (Ovid, *Meta.* 15:659-662, 669-672). His daughter, Hygieia, "health," too was associated with a serpent, often holding it, but also present with her avatar in other positions (coiled at her feet, coiled around a tree against which she leans, etc).¹⁰³ In the fifth century CE work *The Life of Proclus, or On Happiness*, Marinus of Neapolis mentions that Proclus not only wrote hymns to the Greek gods but also, among others, to Ἀσκληπιὸν Λεοντοῦχον Ἀσκαλωνίτην, "Asclepius Λεοντοῦχος of Ashkelon" (*l.* 481). The term λεοντοῦχος is listed in the LSJ as a meaning "holding a lion," which Joseph Geiger seems to have rightly reinterpreted as referring to a type of snake called λέων (LSJ s.v. "λέων" III).¹⁰⁴ As there are Chnoubis gems attested from other areas in the southern Levant near Ashkelon, I cannot help but wonder if Chnoubis

¹⁰⁰ John F. Nunn, *Ancient Egyptian Medicine* (Oklahoma: University of Oklahoma Press, 2002), 107.

¹⁰¹ It is possible that among Jews who made use of the gem (see *supra* §3.1) they detected something of the Jewish God in light of the story in Numbers 21.4-9 where God commands Moses to make a serpent figure on a pole so that those who had been bitten by snakes may be healed.

¹⁰² Ogden, *Drakon*, 310-17.

¹⁰³ Ogden, *Drakon*, 317-21.

¹⁰⁴ Joseph Geiger, "Asclepius Λεοντοῦχος," *Mnemosyne* 65.2 (2012): 315-16.

was at times re-imagined as Asclepius Λεοντοῦχος, only here understood as a serpent having a lion head. At least one commentator on the work by Marinus has also understood this title to mean "lion-headed,"¹⁰⁵ and on at least one gem Chnoubis and Asclepius (along with Hygieia) are brought together on opposite sides (BM 319).

In the second century CE another contender emerged, the human-headed serpent Glykon.¹⁰⁶ The creation of a self-proclaimed prophet, Alexander of Abonouteichos, the origin and development of this cult was famously immortalized in the narrative by Lucian of Samosata, *Alexander the False Prophet*. Despite Lucian's critical evaluation, the cult spread and on one gem syncretized with Chnoubis. On Paris 258 next to the Chnoubis figure, and along with the inscriptions XNOYBΙΣ and IAΩ we find ΓΛΥΚΩΝΑ.¹⁰⁷

Long before Glykon, however, there was a better known human-headed serpent: Agathos Daimon (= Ἀγαθός Δαίμων, "Good Spirit").¹⁰⁸ He is generally associated with the founding of Alexandria,¹⁰⁹ and although he was known before the city's founding—in anthropomorphic form¹¹⁰—he is generally thought to have acquired his serpentine form only afterwards, through identification with the Egyptian serpent god of destiny, Saï (Eg. š3y).¹¹¹ The deity appears on several gems¹¹² and on one of these is conflated with

¹⁰⁵ Mark Edwards, *Neoplatonic Saints: The Lives of Plotinus and Proclus by their Students* (Liverpool: Liverpool University Press, 2000), 87.

¹⁰⁶ Ogden, *Drakon*, 325-31; Gabriella Bordenache Battaglia, s.v. "Glykon," *Lexicon Iconographicum Mythologiae Classicae (LIMC) IV.I* (Zürich: Artemis, 1981), 278-83.

¹⁰⁷ See discussion in Mastrocinque, *Jewish Magic to Gnosticism*, 132-35.

¹⁰⁸ See Françoise Dunand, s.v. "Agathodaimon," *Lexicon Iconographicum Mythologiae Classicae (LIMC) I.I* (Zürich: Artemis, 1981), 277-82 for general discussion.

¹⁰⁹ Lily Ross Taylor, "The Cult of Alexander at Alexandria," *CP* 22.2 (1927): 164; Daniel Ogden, "Alexander, Agathos Daimon, and Ptolemy: The Alexandrian Foundation Myth in Dialogue," in *Foundation Myths in Ancient Societies: Dialogues and Discourses* (ed. Naoise Mac Sweeney, 2015), 134-35.

¹¹⁰ Ogden, "Agathos Daimon," 137; Dunand, s.v. "Agathodaimon," 278.

¹¹¹ Ogden, *Drakon*, 297. Ogden, *Drakon*, 298-305, however, dissents from the consensus and argues that Agathos Daimon received his serpentine form prior to the founding of Alexandria and identification with

Chnoubis (Aquileia 9). Here, the obverse depicts a human-headed serpent and the reverse the *ZZZ* sign, paralleling the standard format of regular Chnoubis gems.

5. Healing and Astrology

The association of parts of the body with certain signs of the zodiac likely first occurred sometime in the early Hellenistic period,¹¹³ and the notion that astronomy has an important place in medicine was already voiced by Hippocratic text *Airs, Waters, Places*: οὐκ ἐλάχιστον μέρος συμβάλλεται ἀστρονομίῃ ἐς ἰητρικήν, ἀλλὰ πάνυ πλεῖστον, "astronomy contributes not a little, but a very great deal, indeed, to medicine" (*Aer.* 2.16-18).¹¹⁴ The first century CE Roman astrologer Manilius attests to the fully developed idea that certain zodiacal signs are linked with specific parts of the body (*Astro.* 2.453-465). When the Egyptian decans were fused with the zodiac a similar role was assigned to them. Manilius has some notion of the decans, although he does not employ their names (*Astro.* 4.298-302). The original Egyptian role for the decans, however, was calendrical and, more specifically, for the use of night-time time-keeping with so-called "star clocks."¹¹⁵ Detailed discussion of the mechanics of these "star clocks" is outside the scope of this chapter, but suffice it to say that by observing when each decan's star

Saï; Jan Quaegebeur, *Le dieu égyptien Shaï dans la religion et l'onomastique* (Leuven: Leuven University Press, 1975), 111; Leslie S. Wilson, *The Serpent Symbol in the Ancient Near East: Nahash and Asherah: Death, Life, and Healing* (StJUD; Lanham: University Press of America, 2001), 171-80; Bonnet, *Reallexikon*, 672. For catalog of representations, see Dunand, s.v. "Agathodaimon," 278-79.

¹¹² Aquileia 9, Bologna 4, Cologne 5, Perugia 11, Roma 19, Verona 7.

¹¹³ Tester, *Western Astrology*, 23; Gundel, *Dekane und Dekansternbilder*, 37-45.

¹¹⁴ Translation that of Francis Adams, *The Genuine Works of Hypocrates, Translated from the Greek with a Preliminary Discourse and Annotations* (2 vols.; vol. 1; New York: William Wood and Company, 1886), 157.

¹¹⁵ O. Neugebauer and Parker, *Egyptian Astronomical Texts I*, 95-121.

constellation rose or made a transit one was able to determine "when an hour of night ended and the next began."¹¹⁶

After the Egyptian decanal system was joined with the Greek zodiac, two transformations occurred: (1) their original astronomical role largely disappeared as they simply became one third of a zodiac sign's arc (i.e. 10 degrees), and (2) within a broader construct of "cosmic sympathy" they were assigned to specific parts of the body, as reflected in the passage of Celsus cited above (Origen, *Contra Celsum* 8.58). "Cosmic sympathy" was the Stoic notion that all parts of the universe are inter-connected and physically separated entities can affect one another, the most famous exponent of which was Posidonius.¹¹⁷ One of the beneficiaries of this cosmic model was medicine in the form of *iatromathematika*, i.e. "astrological medicine." It found its way into the technical *Hermetica* as evinced by the now-lost text *Myriogenesis*, cited by Firmicus Maternus (*Math.* 3.1.2, 5.1.36-38, 8.1.10, 8.18).¹¹⁸ Cosmic sympathy also figured into debates over "astral determinism,"¹¹⁹ especially in the early Church within the context of astrology.¹²⁰

¹¹⁶ O. Neugebauer and Parker, *Egyptian Astronomical Texts I*, 96.

¹¹⁷ Cicero, *De Divinatione* 2.33-5 (= F106, L. Edelstein and I. G. Kidd, eds., *Posidonius I. The Fragments* (Cambridge: Cambridge University Press, 1989), 107-08), attributes to Chrysippus, Antipater and Posidonius the notion of a cosmic "sympathy," translating it variously as "contagio rerum," "coniunctio naturae," "consensus," and finally citing the Greek term itself (*l.* 17: *quam συμπάθειαν Graeci appellant*). See also John Dillon, *The Middle Platonists, A Study of Platonism 80 B.C. to A.D. 220* (London: Gerald Duckworth & Company Limited, 1977), 106-07; Tester, *Western Astrology*, 52-53; Keimpe Algra, s.v. "Posidonius d'Apamée," *Dictionnaire des Philosophes Antiques* (Paris, 2012), 1493-94.

¹¹⁸ See Tester, *Western Astrology*, 137-39; Brian P. Copenhaver, *Hermetica: The Greek Corpus Hermeticum and the Latin Asclepius in a new English translation with notes and introduction* (Cambridge: Cambridge University Press, 1992), xxxiii. For a more general discussion of fate and astrology in the *Hermetica* see Nicola F. Denzey, *Cosmology and Fate in Gnosticism and Graeco-Roman Antiquity: Under Pitiless Skies* (Leiden: Brill, 2013), 103-26.

¹¹⁹ ¹²⁰ For general discussion, see Tamsyn S. Barton, *Power and Knowledge: Astrology, Physiognomics, and Medicine Under the Roman Empire* (Michigan: University of Michigan Press, 1994), 27-94.

¹²⁰ Nicole Kelley, *Knowledge and Religious Authority in the Pseudo-Clementines: Situating the 'Recognitions' in Fourth Century Syria* (WUNT II 213; Tübingen: Mohr Siebeck, 2006), 82-134; Barton, *Power and Knowledge*, 62ff.

For Christianity, the notion of astral determinism was fundamentally problematic since it would seem to leave no role for God's sovereignty. Augustine asks rhetorically in *City of God* 5.1: *quale deinde iudicium de hominum factis deo relinquitur, quibus caelestis necessitas adhibetur, cum dominus ille sit et siderum et hominum?* ("Moreover, what scope is left to the judgment of God, who is Lord of both stars and men, in relation to the deeds of men, if a celestial necessity is assigned to those deeds?").¹²¹ Christian writers from the fourth century onward often locate their arguments against astrology within more general discussions of fatalism.¹²² But, evidently, not all pious Christians viewed astrology with equal disdain, since canon 36 of the Council of Laodicea (ca. 363) specifically forbids members of the clergy from dabbling in magic and astrology—a proscription that would seem unnecessary were there not Christian clergy involved with them. Nonetheless, the chronological distribution of cast Greek horoscopes compiled by Otto Neugebauer reveals a precipitous decline in the early sixth century CE.¹²³ Knowledge of astrology, however, was not forgotten, and it was specifically the potential of *iatromathematika* that inspired a letter from Paul the Deacon to Lucas, the patriarch of Constantinople, in the middle of the twelfth century, defending an interest in astrology.¹²⁴

Chnoubis gems, then, fall squarely within the Late Antique tradition of medical astrology, at least in their inception, even if some or most users of these gems did not make the conscious connection between the icon and the decans mentioned in Celsus.

¹²¹ Translation that of R. W. Dyson, *Augustine: The City of God Against the Pagans, Books 1-13* (CTHPT; Cambridge: Cambridge University Press, 1998), 188.

¹²² Barton, *Power and Knowledge*, 64-65. Anti-astrological rhetoric also had other theological points of departure. See Time Hegedus, *Early Christianity and Ancient Astrology* (PS 6; New York: Peter Lang, 2007), 157-82.

¹²³ O. Neugebauer and H. B. Van Hoesen, *Greek Horoscopes* (Memoirs of the American Philosophical Society Held at Philadelphia for Promoting Useful Knowledge; vol. 48; Philadelphia: The American Philosophical Society, 1959), 161.

¹²⁴ Tester, *Western Astrology*, 95.

The widely recognized healing role of serpents may have easily eclipsed the astrological valence of the Chnoubis icon and the serpent's role in abdominal matters simply became an *idée fixe* within popular culture without much reflection as to its genealogy.

6. Conclusion

This chapter has sought to unpack the complex evidence surrounding the enigmatic figure of Chnoubis, the radiate lion-headed serpent so popular on magical gems. The name, Χνοῦβις (or Χνοῦμις), points simultaneously to the Egyptian god Khnum and the decanal gods *knm* and *hr knm*. Although the first consonant of these decans and the god Khnum are distinct in the Egyptian language, I have argued (§2) that adaptation to Greek phonology allowed Greek speakers to conflate both, which led to a fusion of decanal imagery and traits otherwise linked to Khnum. Although the name is primarily attested in two variants, the more popular one, Χνοῦβις, was likely chosen for two reasons: (1) it was the Greek rendering most associated with Khnum in his principal center of worship at Elephantine and (2) during the early Roman period the variant Χνοῦμις became more popular in theophoric names and therefore may have led to some confusion, where the name inscribed on these gems may have been construed as the name of the owner of the gem and not the god himself. There is some indication (§2.1) that on at least one gem both decans, third Cancer and first Leo, are being represented (Firenze 66), but there are several unresolved questions that problematize the notion that the Chnoubis icon and the SSS symbol each reference a separate decan and not both (*knm* and *hr knm*) together. Firstly, the third Cancer would seem to be redundantly represented,

with both icon and name. Secondly, the proper Hellenized name for first Leo, χαρχνούμις, is virtually absent from the gem evidence, which begs the question as to why third Cancer should have redundant representation but first Leo limited to the ~~sss~~ symbol. Rather, surveying the entire Egyptian decanal system and observing that lion-headed divinities and serpents are the two most common entities in general, it seems probable that the Chnoubis icon, name and ~~sss~~ symbol were not just a conflation of the two decans *knm* and *hr knm*, but could be conceptualized as representing the entire decanal system itself.

Next, the presence of the rayed nimbus on the Chnoubis snake is the only iconographic element on these gems which can not be accounted for by Egyptian origins. It is, rather, a likely adaptation from Graeco-Roman depictions of the divine and supernatural. While the nimbus is most often associated with Helios, and therefore conveys solar connotations, it was quite within the ambit of Graeco-Roman artistic depictions to use the nimbus for deities not otherwise associated with the sun, representing, rather, the divine light—not necessarily solar—that accompanies supernatural entities. This, combined with the observation that Chnoubis does not share any statistically significant correlations with solar or celestial icons or inscriptions, may suggest that Chnoubis should not be primarily considered a solar divinity. Instead, the icon's close link with uterine gems and the general recommendation and use of Chnoubis gems to address abdominal problems assigns him squarely within the realm of medical magic. All celestial connotations, of course, cannot be shorn from his significance since he is in form much indebted to the Egyptian decans of third Cancer and first Leo, even if the original decanal system from which Chnoubis derives was primarily concerned with

calendrical and, more specifically, night-time time-keeping with so-called "star clocks."

The apportioning of the decans to parts of the human body, which they govern, has more to do with Hellenistic and Late Antique medical astrology and notions of astral determinism. It is this medical astrology that specifically informs the genesis and significance of the prophylactic use of Chnoubis on amulets focusing on abdominal issues.

Finally, the Jewish hypothesis was addressed in two sections (§2.4., §3). The ~~sss~~ symbol has a lesser attested cousin, ~~zzz~~, which it has been argued to represent the paleo-Hebrew ~~zzz~~, a cipher for Yahweh. While plausible given the extant evidence for such divine abbreviations in antiquity, if it is correct it must represent a secondary accretion in the Chnoubis tradition, both because it is attested on only a few gems and the genealogy of Chnoubis is otherwise clearly Hellenistic Egyptian. The two epithets closely attested with Chnoubis, *barbarôphita* and *gigantorhêkta*, have also provided fuel for scholarly speculation, principally by Mastrocinque, in linking Yahweh with Chnoubis. While the link is possible—and, indeed, it surely may be true for certain specific Chnoubis gems—the role of snake crusher and breaker seems more likely to have developed from the long Egyptian tradition of the overthrow of the arch-serpent Apep, a creature subjected to all manners of violence, including being broken by the allies of the sun god Re. It may have also been influenced by the depiction of Horus as the vanquisher of Seth-as-crocodile, an image that survived in various forms into Late Antiquity. The exact meaning of these *voices magicae*, however, remains elusive, and barring specific ancient evidence pertaining to their nearly meaning and nearly exclusive use on Chnoubis gems, the

verdict must remain indeterminate, even if the Jewish hypothesis seems the less likely possibility.

Chapter 5. Conclusion

1. Chapter Conclusion Summaries

In this dissertation I have sought to bring a new level of rigor into the study of inscribed magical gemstones from the Roman era. These objects, numbering in the thousands, have been examined in smaller collections for over a century, but the sheer number of them has made it difficult to effect studies treating them as a whole.

Traditional art-historical methods have inclined researchers to deal with these gems one by one or in small groups while intuitively developing a sense for general patterns and trends through the gradual familiarization of corpora over the course of a long period of time. Modern computing approaches, however, provide tools that can allow us to study these and other large collections of data in a more systematic and holistic way.

In my first chapter I provided the justification and methodological outline for applying network theory to the study of magical gems (1.§1-3). To an extent, this is more an innovation in the particular tools used, since all researchers, on a fundamental level, try to apprehend all of the connections between all of the attributes found on their objects of study, identify the patterns they fall into, and then endeavor to propose a meaning for these patterns. However, using a computational approach to devise such an attribute network substantially removes the inherent inconsistencies and biases that can plague even the most objective investigator. Furthermore, once I construed the attribute network for magical gems I filtered those results for only attribute links that were statistically significant (1.§4a-c). This was done by computing a Fisher Exact test to determine whether the occurrence of a particular attribute correlation is significantly higher than

what would be expected by random chance. This allowed me to have a consistent method by which to judge whether an association between any two given gem attributes was part of a larger, significant pattern. This approach is superior to what has traditionally been done, which is to simply observe the frequency with which two attributes coincide and arbitrarily decide whether this is significant or not, irrespective of the chances that the coinciding attributes may have randomly so occurred given the myriad of idiosyncratic preferences among gem designers using and reusing different icons, inscriptions and materials at different rates.

Finally, I did a cluster analysis using the "Louvain method" to determine how statistically significant attribute correlations group together (1.§4d). The cluster analysis was done in two iterations: first it was done on the entire attribute network and then each of these clusters was subject to another cluster analysis to find subgroups. The results of this two-part cluster analysis were the basis for my case studies in the subsequent three chapters. I have by no means exhausted all of the angles of analysis that the cluster analysis has provided; rather, by selecting three case studies I have shown the merits and, to some extent, the limits of this analytical approach, and how my results have corrected, modified or confirmed prior studies and conclusions.

The first of my case studies involved the so-called "Iaô" cluster consisting of all gem attributes significantly statistically linked with this divine name (chapter 2). This cluster of attributes is important for several reasons. It, firstly, is present on the greatest number of magical gems. The name Iaô is itself present on nearly one-fifth of all gems, thus being the most widely invoked divine force. Among the attributes most closely linked with Iaô are the famous name "Abraxas" (2.§2.1b) and the icon of the Anguipede

(2.§3b). Perhaps the most significant result of this chapter was to call into question the solar hypothesis underpinning much research on these three elements. By using probability values and not simply frequency values, I was able to demonstrate that the these three attributes have no statistically significant link with solar elements (such as Helios, the solar disc, and so on) on magical gems, which is to say, the rate at which they coincide with solar elements is within the limits of what could be considered random. This is not to say that Iaô, Abraxas and the Anguipede could not have solar valences which were especially exploited by individual gem designers, since this is precisely what happened in some cases, but that the solar association is not a systematic pattern across the entire corpus. One may also suggest that these three attributes are *intrinsically* solar on some level and therefore do not necessitate being paired with other solar elements in a gem design, but I question the heuristic value of this potential objection. Firstly, all deities invoked within the religious complex of Graeco-Egyptian culture could be construed as solar on some level, an observation I particularly drive home in chapter three.

Rather, what I wished to tease out of each observed cluster phenomenon is what aspects of an icon or inscription seem to be emphasized. Gems with Iaô attributes have the least overlap with attributes from other clusters and the most common thread across all of these attributes is some Jewish layer, sometimes rather overt (as in the case of the epithets Adônai and Sabaôth or the Jewish angels Gabriël, Michaël, Rafaël, Sourîël, and Uriël), sometimes more obscure or controversial (Abraxas, the Anguipede, *Ablanathanalba* and *sesengenbarpharanges*). This has led me to conclude that attributes of the Iaô cluster primarily emphasize the Jewish high God and should be located within

the complex of Jewish magic broadly construed (2.§6). How the individual users of these gems self-identified is of secondary consideration. Similarly, whether they construed Yahweh monotheistically, henotheistically or somewhere lower on a divine continuum need not be a matter of consternation. I did, however, wish to reopen the possibility that at least some users of these gems were Jewish and to bolster the hypothesis that the Anguipede may have originated in Hellenistic Jewish circles. This last point, however, being speculative as it is, can rise or fall independently of the other previous points.

Whereas the second chapter focused on an attribute cluster surrounding an inscriptional element (Iaō), the third chapter analyzed one whose most connected attribute was a material: hematite. Most of the gems in this cluster fall into a type called "uterine gems" whose central device is a stylized depiction of a uterus and a Greek key (3.§2). Three smaller sets of gem types also predominantly use the material hematite: the Solomonic rider gems (3.§4a), the animal-circuit gems (3.§4b) and the reaper gems (3.§4c). The uterine gems especially have been the subject of "solar" and astrological speculation (3.§3), but my analysis has suggested that the Egyptian elements found on these gems more likely emphasize maternal and gynecological matters. The statistics indicate that the gods most often found on these gems (Isis, Nephthys, Osiris, Anubis) are likely a secondary introduction to the uterine gem design since they are most highly linked with each other and the Louvain algorithm identified them as a separate sub-group. The ouroboros too was likely a secondary accretion since its incidence on these gems increases significantly when the aforementioned Egyptian gods are present. While these gods and the ouroboros certainly have solar/celestial valences, what unites them with the uterine symbol and Greek key is the theme of maternity and family protection. Indeed, if

solar/celestial aspects had been emphasized one would have expected that these gods and the ouroboros would also have a statistically significant link to other solar iconography such as Helios, Selene, the solar disc, the moon, the star and so on, which here is not the case.

The final case study (chapter 4) focused on an iconographic element: Chnoubis. The evidence provides a complex picture, both iconographically and linguistically (4.§2). The depiction of Chnoubis as a radiate lion-headed serpent clearly seems to descend from the depictions of Egyptian decanal gods. The name, Chnoubis, simultaneously points to the decanal gods *knm* and *hr knm* and the god Khnum. Inscriptional evidence makes evident that a variation of the name (Chnoubo, sometimes Chnoumo) was being used for Khnum at Elephantine. The similarity of the decan names and the Hellenized rendering of Khnum likely resulted in this semantic overlap.

While Chnoubis owes much to traditional Egyptian origins, two aspects to Chnoubis gems necessarily expand the scope of investigation. Firstly, the Egyptian precursors for the icon do not bear a radiate nimbus (4.§2.3). This seems to have been introduced under Hellenistic influence. The parallel that foremost comes to mind is Helios, and this is why some scholars understood Chnoubis as a solar god. However, Greek art not infrequently depicts gods with a radiate nimbus who are not otherwise understood to have primarily solar connections. Furthermore, on these gems Chnoubis does not bear any statistically significant links with other solar icons. This suggests that the radiate nimbus may have been added to symbolize divinity in general and not specifically a solar deity. Secondly, the Chnoubis icon is frequently accompanied by another symbol:  (sometimes ). The more common variant is most likely derived

from the triple serpent figure found in the Seti I B family of decanal lists. The second variant (ZZZ) is more problematic in that it seems to have sometimes been understood as a cipher for the tetragrammaton (4.§2.4) and bears some resemblance to a paleo-Hebrew triple-yod (three *yods* being one of the many possible Hebrew ciphers for Yahweh). This has led to at least one scholar to argue that Chnoubis should be understood as a Jewish God. While it is fairly evident that some Jews did make use of Chnoubis amulets (4.§3.1), the ZZZ variant appears on a minority of gems and the otherwise clear Hellenistic Egyptian genealogy of the iconography and the SSS symbol suggests that the Jewish hypothesis at best represents a secondary accretion in the Chnoubis tradition.

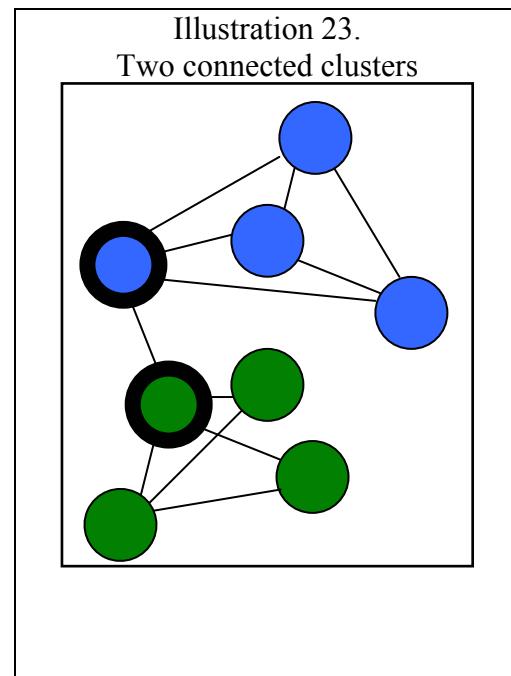
The purpose for which Chnoubis gems were employed is less problematic. They seem to have been primarily healing amulets for the abdomen (4.§4) and fall squarely within the tradition of medical astrology (4.§5). It is not any hypothesized solar aspects that inform this use but the sympathetic link between the Zodiac, decans and parts of the body.

2. Further Research

I can identify at least two avenues for further research. Similar case studies on other attribute clusters using the data provided in Appendix A can be done. The Louvain algorithm identified a total of twelve attribute clusters (or "feature sets," see Appendix B), although many comprise much smaller sets of gems. It may also be fruitful to apply a different clustering algorithm and observe whether any large attribute communities are defined in significantly different ways.

Another direction of research which has only been only partially addressed in this dissertation is the presence of attributes from multiple clusters on the same gem. Many gems share attributes from multiple feature sets and much work remains to properly address this phenomenon. In this dissertation I have addressed links between the Chnoubis and Hematite clusters (3.3.3d) as well as three smaller clusters which intersect with hematite (3.3.4). The prevalence of shared sets, however, should not be overstated. A third of gems (32.28%) have attributes from only a single feature set. Most of these (42%) have attributes from the Ia^o cluster. About one-fifth (21.1%) of gems share attributes from two feature sets and only 5.34% share three.

When multiple feature sets are shared on a gem it is due to a small set of attributes which are shared among those feature sets. In Illustration 23, two clusters are depicted, one green and the other blue. The nodes with black borders connect the two clusters. Conceptually, the attributes constituting these nodes are important since they suggest that these attributes share some quality of the two feature sets they connect and may be referred to as *polyvalent attributes*. Appendix C lists all 47 polyvalent attributes in the gem attribute network. I feel this avenue of research potentially will be highly fruitful since it may help penetrate the rather opaque issue of discerning different levels of meaning behind



different gem attributes or, conversely, reveal situations where two attributes from different feature sets share a common significance.

Network and cluster analysis can be applied to a wide range of data. The field of archaeology has already been using such modes of analysis for several years, and it is increasingly being applied in the study of a wide range of digitized literature. Apart from the specific conclusions that I have arrived at concerning the phenomenon of Roman-era inscribed magical gemstones, this dissertation is one further step in the spread of computational methodologies for the study of classical civilizations and I hope it encourages further interest in their application within both Classics and beyond.

Appendix A: Attribute Correlation Probabilities

Table 9. Probability Values for Gem Attribute Correlations						
	% of gems	p-value		% of gems	p-value	# of gems
Abelanathanalba	(41%)	0.010566	Iaô	(7%)	0.004830	36
Abelanathanalba	(41%)	0.043014	Green	(6%)	0.024839	36
Abelanathanalba	(28%)	0.012566	Anguipede	(9%)	0.008447	24
Abelanathanalba	(14%)	0.002442	Akramachamari	(48%)	0.004941	12
Abelanathanalba	(14%)	0.047196	Sabaôth	(9%)	0.044121	12
Abelanathanalba	(13%)	0.035185	Helios	(13%)	0.035263	11
Abelanathanalba	(9%)	0.022856	Sesengenpharanges	(32%)	0.031797	8
Abraxas	(56%)	0.000000	Iaô	(23%)	0.000000	112
Abraxas	(49%)	0.017308	Jasper	(12%)	0.008024	98
Abraxas	(38%)	0.016724	Green	(13%)	0.009915	76
Abraxas	(33%)	0.000009	Anguipede	(24%)	0.000005	66
Abraxas	(21%)	0.000010	Sabaôth	(32%)	0.000017	43
Abraxas	(9%)	0.004272	Adônai	(31%)	0.006933	19
Abraxas	(8%)	0.010258	Michaël	(25%)	0.014143	17
Abraxas	(6%)	0.042171	Semesilamps	(23%)	0.052977	12
Adônai	(66%)	0.000519	Iaô	(8%)	0.000063	41
Adônai	(56%)	0.000001	Sabaôth	(26%)	0.000000	35
Adônai	(31%)	0.006933	Abraxas	(9%)	0.004272	19
Adônai	(23%)	0.003694	Michaël	(20%)	0.003508	14
Adônai	(15%)	0.014133	Semesilamps	(17%)	0.014748	9
Aianagba	(56%)	0.025825	Carnelian	(4%)	0.011587	9
Akramachamari	(60%)	0.048605	Iaô	(3%)	0.021944	15
Akramachamari	(48%)	0.004941	Abelanathanalba	(14%)	0.002442	12
Akramachamari	(32%)	0.007243	Sesengenpharanges	(32%)	0.007243	8
Akramachamari	(32%)	0.031797	Sabaôth	(6%)	0.021686	8
Altar	(42%)	0.002513	Ibis	(19%)	0.001567	10
Anguipede	(58%)	0.000091	Jasper	(19%)	0.000012	157
Anguipede	(54%)	0.000000	Iaô	(30%)	0.000000	147
Anguipede	(52%)	0.000002	Green	(23%)	0.000000	141
Anguipede	(24%)	0.000005	Abraxas	(33%)	0.000009	66
Anguipede	(13%)	0.002870	Sabaôth	(26%)	0.004127	35
Anguipede	(10%)	0.002680	Heliotrope	(31%)	0.004663	27

Table 9. Probability Values for Gem Attribute Correlations cont'd

Anguipede	(9%)	0.008447	Abalanathanalba	(28%)	0.012566	24
Anubis	(42%)	0.000721	Hematite	(13%)	0.000246	60
Anubis	(38%)	0.000000	Isis	(31%)	0.000000	54
Anubis	(35%)	0.000000	Key	(39%)	0.000000	49
Anubis	(35%)	0.000000	Uterine symbol	(34%)	0.000000	50
Anubis	(30%)	0.000000	Orôriouth	(44%)	0.000000	42
Anubis	(29%)	0.001005	Ouroboros	(15%)	0.000622	41
Anubis	(25%)	0.000009	Osiris	(32%)	0.000013	35
Anubis	(25%)	0.000687	Chnoubis	(17%)	0.000530	35
Anubis	(11%)	0.000934	Nephthys	(57%)	0.002792	16
Anubis	(11%)	0.000934	Soroor	(41%)	0.001999	16
Aphrodite	(32%)	0.000022	Arrôriphrasis	(75%)	0.000083	21
Aphrodite	(21%)	0.010082	Blue	(13%)	0.008583	14
Aphrodite	(14%)	0.013917	Eros	(18%)	0.015005	9
Aphrodite	(11%)	0.018184	Ares	(50%)	0.028820	7
Ares	(50%)	0.028820	Aphrodite	(11%)	0.018184	7
Arrôriphrasis	(75%)	0.000083	Aphrodite	(32%)	0.000022	21
Arrôriphrasis	(43%)	0.004503	Blue	(11%)	0.002300	12
Arrôriphrasis	(21%)	0.021877	Lapislazuli	(20%)	0.021438	6
Baboon	(70%)	0.098219	Jasper	(2%)	0.047983	16
Bainchooch	(28%)	0.010170	Pantheistic deity	(10%)	0.007279	10
Barbarôphita	(100%)	0.025986	Chnoubis	(5%)	0.006536	10
Barbarôphita	(90%)	0.036896	SSS	(6%)	0.012025	9
Barbarôphita	(60%)	0.034783	Chnoubis name	(5%)	0.017129	6
Barbarôphita	(60%)	0.034783	Chrysoprase	(16%)	0.020288	6
Barbarôphita	(60%)	0.034783	Gigantorhêkta	(67%)	0.037185	6
Bes	(67%)	0.000072	Isis	(14%)	0.000010	24
Bes	(53%)	0.000588	Uterine symbol	(13%)	0.000182	19
Bes	(50%)	0.006928	Ouroboros	(6%)	0.002620	18
Bes	(50%)	0.027100	Hematite	(4%)	0.012363	18
Bes	(44%)	0.002154	Key	(13%)	0.000977	16
Bes	(39%)	0.001404	Orôriouth	(15%)	0.000761	14
Bes	(25%)	0.046733	Black	(6%)	0.035998	9
Bird	(32%)	0.005276	Snake	(9%)	0.002983	25
Bird	(27%)	0.002678	Scarab	(13%)	0.001858	21
Bird	(25%)	0.000577	Scorpion	(21%)	0.000500	20

Table 9. Probability Values for Gem Attribute Correlations cont'd

Bird	(23%)	0.001478	Crocodile	(17%)	0.001273	18
Bird	(8%)	0.017753	Phoenix	(40%)	0.027859	6
Black	(9%)	0.012771	Ibis	(25%)	0.017048	13
Black	(6%)	0.035998	Bes	(25%)	0.046733	9
Blue	(13%)	0.008583	Aphrodite	(21%)	0.010082	14
Blue	(13%)	0.019897	Pantheistic deity	(14%)	0.020177	14
Blue	(11%)	0.002300	Arrôriphrasis	(43%)	0.004503	12
Blue	(6%)	0.017201	Goose	(86%)	0.044272	6
Boat	(73%)	0.000003	Harpocrates	(19%)	0.000000	37
Boat	(57%)	0.000004	Falcon	(34%)	0.000002	29
Boat	(53%)	0.000042	Lotus	(19%)	0.000011	27
Boat	(43%)	0.000358	Scarab	(13%)	0.000136	22
Boat	(43%)	0.031076	Star	(5%)	0.016267	22
Boat	(41%)	0.000154	Crocodile	(20%)	0.000076	21
Boat	(39%)	0.005449	Snake	(7%)	0.002523	20
Boat	(37%)	0.000082	Goat	(35%)	0.000075	19
Boat	(31%)	0.023582	Moon	(7%)	0.015317	16
Bronze	(30%)	0.010617	Male rider stabbing prostrate female	(20%)	0.008785	10
Bronze	(15%)	0.038552	One god	(71%)	0.068111	5
Bull	(53%)	0.007266	Star	(6%)	0.002355	27
Bull	(49%)	0.000831	Moon	(11%)	0.000248	25
Bull	(43%)	0.000358	Lion	(13%)	0.000132	22
Bull	(24%)	0.053562	Yellow	(6%)	0.041892	12
Bull	(18%)	0.002926	Dog	(36%)	0.004174	9
Bull	(12%)	0.018964	Mithras	(75%)	0.040248	6
Butterfly	(64%)	0.032850	Eros	(14%)	0.019033	7
Carnelian	(7%)	0.036067	Z	(22%)	0.044960	17
Carnelian	(4%)	0.011587	Aianagba	(56%)	0.025825	9
Carnelian	(4%)	0.034762	Sesengenpharanges	(36%)	0.053186	9
Cerberus	(69%)	0.007045	Sarapis	(10%)	0.002453	9
Chabrac	(52%)	0.026312	Harpocrates	(6%)	0.012586	11
Chabrac	(38%)	0.034330	Falcon	(9%)	0.022896	8
Chabrac	(29%)	0.024122	Goat	(11%)	0.018713	6
Chalcedony	(25%)	0.000005	SSS	(31%)	0.000007	49
Chalcedony	(19%)	0.003479	Chnoubis	(19%)	0.003425	38

Table 9. Probability Values for Gem Attribute Correlations cont'd

Chalcedony	(17%)	0.000078	Chnoubis name	(31%)	0.000134	34
Chalcedony	(5%)	0.021149	Zeus	(40%)	0.035431	10
Chalcedony	(5%)	0.021149	ZZZ	(43%)	0.036961	10
Chnoubis name	(83%)	0.000000	Chnoubis	(45%)	0.000000	92
Chnoubis name	(73%)	0.000000	SSS	(51%)	0.000000	81
Chnoubis name	(41%)	0.033107	Green	(7%)	0.018833	45
Chnoubis name	(31%)	0.000134	Chalcedony	(17%)	0.000078	34
Chnoubis name	(21%)	0.000025	Chrysoprase	(62%)	0.000103	23
Chnoubis name	(11%)	0.008225	Soroor	(31%)	0.011985	12
Chnoubis name	(5%)	0.017129	Barbarôphita	(60%)	0.034783	6
Chnoubis name	(5%)	0.017129	Gigantorhêkta	(67%)	0.037185	6
Chnoubis	(48%)	0.000000	SSS	(62%)	0.000000	98
Chnoubis	(45%)	0.000000	Chnoubis name	(83%)	0.000000	92
Chnoubis	(27%)	0.000000	Uterine symbol	(39%)	0.000000	56
Chnoubis	(23%)	0.000003	Key	(37%)	0.000006	46
Chnoubis	(20%)	0.022473	Ouroboros	(14%)	0.020390	40
Chnoubis	(19%)	0.000008	Orôriouth	(41%)	0.000023	39
Chnoubis	(19%)	0.003425	Chalcedony	(19%)	0.003479	38
Chnoubis	(17%)	0.000530	Anubis	(25%)	0.000687	35
Chnoubis	(17%)	0.003240	Isis	(20%)	0.003513	35
Chnoubis	(13%)	0.000014	Chrysoprase	(70%)	0.000116	26
Chnoubis	(12%)	0.000025	Soroor	(64%)	0.000155	25
Chnoubis	(5%)	0.006536	Barbarôphita	(100%)	0.025986	10
Chnoubis	(5%)	0.012546	ZZZ	(48%)	0.024823	11
Chnoubis	(4%)	0.020927	Gigantorhêkta	(89%)	0.057056	8
Chrysoprase	(70%)	0.000116	Chnoubis	(13%)	0.000014	26
Chrysoprase	(62%)	0.000103	Chnoubis name	(21%)	0.000025	23
Chrysoprase	(59%)	0.000157	SSS	(14%)	0.000033	22
Chrysoprase	(16%)	0.020288	Barbarôphita	(60%)	0.034783	6
Club	(100%)	0.062296	Red	(2%)	0.020235	8
Club	(75%)	0.040248	Kkk	(25%)	0.022990	6
Cobra	(36%)	0.048994	Falcon	(6%)	0.034006	5
Cobra	(36%)	0.048994	Goat	(9%)	0.035585	5
Cornucopia	(47%)	0.009164	Tyche	(36%)	0.007778	8
Crocodile	(60%)	0.000000	Scarab	(38%)	0.000000	62

Table 9. Probability Values for Gem Attribute Correlations cont'd

Crocodile	(53%)	0.000001	Snake	(20%)	0.000000	55
Crocodile	(47%)	0.000634	Hematite	(11%)	0.000163	49
Crocodile	(40%)	0.000000	Falcon	(49%)	0.000000	42
Crocodile	(35%)	0.000066	Harpocrates	(18%)	0.000033	36
Crocodile	(32%)	0.000000	Goat	(60%)	0.000001	33
Crocodile	(26%)	0.000433	Lotus	(19%)	0.000347	27
Crocodile	(22%)	0.000354	Scorpion	(24%)	0.000373	23
Crocodile	(20%)	0.000076	Boat	(41%)	0.000154	21
Crocodile	(17%)	0.001273	Bird	(23%)	0.001478	18
Crocodile	(8%)	0.022300	Phoenix	(53%)	0.040876	8
Cynocephalus	(71%)	0.063735	Jasper	(3%)	0.026356	22
Cynocephalus	(29%)	0.049083	Harpocrates	(5%)	0.035179	9
Cynocephalus	(16%)	0.039036	Disk	(42%)	0.052107	5
Disk	(42%)	0.052107	Cynocephalus	(16%)	0.039036	5
Dog	(44%)	0.052447	Snake	(4%)	0.030676	11
Dog	(36%)	0.004174	Bull	(18%)	0.002926	9
Dog	(20%)	0.040965	Mithras	(62%)	0.063246	5
Eagle	(21%)	0.020882	Zeus	(28%)	0.022677	7
Eros	(18%)	0.015005	Aphrodite	(14%)	0.013917	9
Eros	(14%)	0.019033	Butterfly	(64%)	0.032850	7
Eros	(10%)	0.036027	Griffin	(23%)	0.042336	5
Eros	(10%)	0.036027	Psyche	(42%)	0.052107	5
Falcon	(55%)	0.000000	Scarab	(29%)	0.000000	47
Falcon	(49%)	0.000000	Crocodile	(40%)	0.000000	42
Falcon	(45%)	0.000011	Harpocrates	(20%)	0.000003	39
Falcon	(40%)	0.000403	Snake	(12%)	0.000148	34
Falcon	(40%)	0.011853	Hematite	(7%)	0.005789	34
Falcon	(37%)	0.000000	Goat	(58%)	0.000001	32
Falcon	(34%)	0.000002	Boat	(57%)	0.000004	29
Falcon	(34%)	0.000085	Lotus	(21%)	0.000051	29
Falcon	(21%)	0.051510	Moon	(8%)	0.042655	18
Falcon	(9%)	0.022896	Chabrac	(38%)	0.034330	8
Falcon	(6%)	0.034006	Cobra	(36%)	0.048994	5
Figure	(4%)	0.032924	Rider	(71%)	0.068111	5
Fish	(56%)	0.042391	Snake	(4%)	0.020602	10
Gabriêl	(68%)	0.000194	Michaël	(28%)	0.000059	19

Table 9. Probability Values for Gem Attribute Correlations cont'd

Gabriêl	(32%)	0.018751	Sabaôth	(7%)	0.012274	9
Gabriêl	(21%)	0.021877	Ouriêl	(60%)	0.034783	6
Gabriêl	(21%)	0.021877	Uriêl	(67%)	0.037185	6
Gabriêl	(18%)	0.039894	Souriêl	(62%)	0.063246	5
Gigantorhêkta	(89%)	0.057056	Chnoubis	(4%)	0.020927	8
Gigantorhêkta	(67%)	0.037185	Barbarôphita	(60%)	0.034783	6
Gigantorhêkta	(67%)	0.037185	Chnoubis name	(5%)	0.017129	6
Goat	(64%)	0.000001	Scarab	(21%)	0.000000	35
Goat	(60%)	0.000001	Crocodile	(32%)	0.000000	33
Goat	(58%)	0.000001	Falcon	(37%)	0.000000	32
Goat	(49%)	0.011568	Hematite	(6%)	0.004515	27
Goat	(47%)	0.001228	Snake	(9%)	0.000385	26
Goat	(44%)	0.000425	Harpocrates	(12%)	0.000149	24
Goat	(36%)	0.000789	Lotus	(14%)	0.000409	20
Goat	(35%)	0.000075	Boat	(37%)	0.000082	19
Goat	(11%)	0.018713	Chabrach	(29%)	0.024122	6
Goat	(9%)	0.035585	Cobra	(36%)	0.048994	5
Goose	(86%)	0.044272	Blue	(6%)	0.017201	6
Goose	(71%)	0.068111	Lapis lazuli	(8%)	0.034909	5
Grain	(67%)	0.011976	Reaper	(26%)	0.006517	8
Grain	(67%)	0.011976	Tree	(35%)	0.007582	8
Green	(27%)	0.003540	Iaô	(33%)	0.004195	165
Green	(23%)	0.000000	Anguipede	(52%)	0.000002	141
Green	(13%)	0.009915	Abraxas	(38%)	0.016724	76
Green	(8%)	0.042922	Lotus	(35%)	0.061720	49
Green	(7%)	0.018833	Chnoubis name	(41%)	0.033107	45
Green	(6%)	0.024839	Abianathanalba	(41%)	0.043014	36
Griffin	(23%)	0.042336	Eros	(10%)	0.036027	5
Harpocrates	(64%)	0.000000	Lotus	(91%)	0.000000	127
Harpocrates	(20%)	0.000003	Falcon	(45%)	0.000011	39
Harpocrates	(19%)	0.000000	Boat	(73%)	0.000003	37
Harpocrates	(19%)	0.000500	Scarab	(23%)	0.000576	37
Harpocrates	(19%)	0.033603	Snake	(13%)	0.030729	37
Harpocrates	(18%)	0.000033	Crocodile	(35%)	0.000066	36
Harpocrates	(16%)	0.042421	Moon	(13%)	0.040717	32
Harpocrates	(12%)	0.000149	Goat	(44%)	0.000425	24

Table 9. Probability Values for Gem Attribute Correlations cont'd

Harpocrates	(6%)	0.012586	Chabrach	(52%)	0.026312	11
Harpocrates	(5%)	0.035179	Cynocephalus	(29%)	0.049083	9
Helios	(22%)	0.000049	Selene	(86%)	0.000301	19
Helios	(21%)	0.051510	Moon	(8%)	0.042655	18
Helios	(19%)	0.035738	Lion	(9%)	0.030869	16
Helios	(13%)	0.035263	Abalanathanalba	(13%)	0.035185	11
Helios	(13%)	0.035263	Heliotrope	(13%)	0.035263	11
Helios	(12%)	0.001320	Quadriga	(100%)	0.006149	10
Helios	(6%)	0.034006	Zodiac	(71%)	0.068111	5
Heliotrope	(31%)	0.004663	Anguipede	(10%)	0.002680	27
Heliotrope	(13%)	0.035263	Helios	(13%)	0.035263	11
Hematite	(24%)	0.000000	Uterine symbol	(77%)	0.000000	111
Hematite	(21%)	0.000000	Key	(78%)	0.000000	98
Hematite	(19%)	0.002323	Ouroboros	(31%)	0.003335	86
Hematite	(18%)	0.000000	Orôriouth	(84%)	0.000000	81
Hematite	(15%)	0.000350	Isis	(39%)	0.000848	68
Hematite	(13%)	0.000246	Anubis	(42%)	0.000721	60
Hematite	(12%)	0.003366	Scarab	(34%)	0.006059	56
Hematite	(11%)	0.000163	Crocodile	(47%)	0.000634	49
Hematite	(8%)	0.000020	Male rider stabbing prostrate female	(75%)	0.000251	38
Hematite	(7%)	0.005789	Falcon	(40%)	0.011853	34
Hematite	(6%)	0.000026	Seal of god	(97%)	0.000513	29
Hematite	(6%)	0.004515	Goat	(49%)	0.011568	27
Hematite	(5%)	0.000539	Reaper	(81%)	0.003671	25
Hematite	(5%)	0.000548	Solomon name	(82%)	0.003767	23
Hematite	(5%)	0.004639	Soroor	(56%)	0.013343	22
Hematite	(4%)	0.003709	Nephthys	(68%)	0.013137	19
Hematite	(4%)	0.012363	Bes	(50%)	0.027100	18
Hematite	(3%)	0.018488	Phoenix	(80%)	0.051129	12
Heracles	(79%)	0.012898	Lion	(6%)	0.003709	11
Heracles	(79%)	0.035374	Red	(3%)	0.011890	11
Heracles	(50%)	0.028820	Kkk	(29%)	0.022990	7
Horse	(22%)	0.041838	Nemesis	(18%)	0.039894	5
Iaô	(33%)	0.004195	Green	(27%)	0.003540	165

Table 9. Probability Values for Gem Attribute Correlations cont'd

Iaô	(30%)	0.000000	Anguipede	(54%)	0.000000	147
Iaô	(23%)	0.000000	Abraxas	(56%)	0.000000	112
Iaô	(22%)	0.000000	Sabaôth	(80%)	0.000000	107
Iaô	(8%)	0.000063	Adônai	(66%)	0.000519	41
Iaô	(7%)	0.002809	Michaël	(48%)	0.007626	33
Iaô	(7%)	0.004830	Abalanathanalba	(41%)	0.010566	36
Iaô	(4%)	0.027256	Semesilamps	(42%)	0.047036	22
Iaô	(3%)	0.021944	Akramachamari	(60%)	0.048605	15
Iaô	(3%)	0.021944	Sesengenpharanges	(60%)	0.048605	15
Ibis	(36%)	0.015290	Snake	(7%)	0.008627	19
Ibis	(25%)	0.017048	Black	(9%)	0.012771	13
Ibis	(19%)	0.001567	Altar	(42%)	0.002513	10
Isis	(39%)	0.000848	Hematite	(15%)	0.000350	68
Isis	(35%)	0.000000	Uterine symbol	(42%)	0.000000	61
Isis	(33%)	0.000000	Key	(46%)	0.000000	57
Isis	(31%)	0.000000	Anubis	(38%)	0.000000	54
Isis	(29%)	0.000000	Orôriouth	(53%)	0.000000	51
Isis	(28%)	0.000778	Ouroboros	(17%)	0.000540	48
Isis	(20%)	0.003513	Chnoubis	(17%)	0.003240	35
Isis	(16%)	0.000001	Nephthys	(100%)	0.000028	28
Isis	(15%)	0.001104	Osiris	(24%)	0.001434	26
Isis	(14%)	0.000010	Bes	(67%)	0.000072	24
Isis	(12%)	0.000221	Soroor	(54%)	0.000766	21
Jasper	(19%)	0.000012	Anguipede	(58%)	0.000091	157
Jasper	(14%)	0.003842	Moon	(49%)	0.009101	117
Jasper	(12%)	0.008024	Abraxas	(49%)	0.017308	98
Jasper	(3%)	0.026356	Cynocephalus	(71%)	0.063735	22
Jasper	(2%)	0.047983	Baboon	(70%)	0.098219	16
Key	(92%)	0.000000	Uterine symbol	(79%)	0.000000	115
Key	(78%)	0.000000	Hematite	(21%)	0.000000	98
Key	(69%)	0.000000	Orôriouth	(90%)	0.000000	86
Key	(55%)	0.000000	Ouroboros	(25%)	0.000000	69
Key	(46%)	0.000000	Isis	(33%)	0.000000	57
Key	(39%)	0.000000	Anubis	(35%)	0.000000	49
Key	(37%)	0.000006	Chnoubis	(23%)	0.000003	46

Table 9. Probability Values for Gem Attribute Correlations cont'd

Key	(18%)	0.000858	Osiris	(21%)	0.000926	23
Key	(16%)	0.000114	Soroor	(51%)	0.000343	20
Key	(14%)	0.000121	Nephthys	(61%)	0.000464	17
Key	(13%)	0.000977	Bes	(44%)	0.002154	16
Kkk	(71%)	0.014329	Red	(4%)	0.004035	17
Kkk	(29%)	0.022990	Heracles	(50%)	0.028820	7
Kkk	(25%)	0.022990	Club	(75%)	0.040248	6
Lailam	(38%)	0.050426	Semesilamps	(9%)	0.035752	5
Lapis lazuli	(14%)	0.040347	Pantheistic deity	(9%)	0.037634	9
Lapis lazuli	(8%)	0.034909	Goose	(71%)	0.068111	5
Lapislazuli	(20%)	0.021438	Arrôriphrasis	(21%)	0.021877	6
Lion	(50%)	0.000009	Star	(18%)	0.000001	87
Lion	(31%)	0.000026	Moon	(22%)	0.000017	53
Lion	(13%)	0.000132	Bull	(43%)	0.000358	22
Lion	(9%)	0.030869	Helios	(19%)	0.035738	16
Lion	(6%)	0.003709	Heracles	(79%)	0.012898	11
Lion	(6%)	0.003709	Sigê	(79%)	0.012898	11
Lion	(3%)	0.016584	Rider	(86%)	0.044272	6
Lizard	(39%)	0.022109	Yellow	(5%)	0.012465	11
Lizard	(36%)	0.071767	Moon	(4%)	0.049090	10
Lotus	(91%)	0.000000	Harpocrates	(64%)	0.000000	127
Lotus	(35%)	0.061720	Green	(8%)	0.042922	49
Lotus	(21%)	0.000051	Falcon	(34%)	0.000085	29
Lotus	(21%)	0.001655	Scarab	(18%)	0.001510	29
Lotus	(19%)	0.000011	Boat	(53%)	0.000042	27
Lotus	(19%)	0.000347	Crocodile	(26%)	0.000433	27
Lotus	(14%)	0.000409	Goat	(36%)	0.000789	20
Male rider stabbing prostrate female	(75%)	0.000251	Hematite	(8%)	0.000020	38
Male rider stabbing prostrate female	(59%)	0.000000	Seal of god	(100%)	0.000002	30
Male rider stabbing prostrate female	(55%)	0.005386	Star	(6%)	0.001564	28
Male rider stabbing prostrate female	(47%)	0.000007	Solomon name	(86%)	0.000024	24
Male rider stabbing prostrate female	(20%)	0.008785	Bronze	(30%)	0.010617	10

Table 9. Probability Values for Gem Attribute Correlations cont'd

Male rider stabbing prostrate female	(14%)	0.018964	One god	(100%)	0.044272	7
Michaël	(48%)	0.007626	Iaô	(7%)	0.002809	33
Michaël	(39%)	0.037064	Star	(6%)	0.021602	27
Michaël	(32%)	0.000775	Sabaôth	(17%)	0.000485	22
Michaël	(28%)	0.000059	Gabriël	(68%)	0.000194	19
Michaël	(25%)	0.014143	Abraxas	(8%)	0.010258	17
Michaël	(20%)	0.003508	Adônai	(23%)	0.003694	14
Michaël	(13%)	0.013772	Semesilamps	(17%)	0.014748	9
Michaël	(13%)	0.013772	Sesengenpharanges	(36%)	0.019827	9
Michaël	(12%)	0.004995	Uriël	(89%)	0.015561	8
Michaël	(9%)	0.018070	Ouriël	(60%)	0.034783	6
Mithras	(75%)	0.040248	Bull	(12%)	0.018964	6
Mithras	(62%)	0.063246	Dog	(20%)	0.040965	5
Moon	(82%)	0.000000	Star	(41%)	0.000000	194
Moon	(49%)	0.009101	Jasper	(14%)	0.003842	117
Moon	(22%)	0.000017	Lion	(31%)	0.000026	53
Moon	(13%)	0.040717	Harpocrates	(16%)	0.042421	32
Moon	(11%)	0.000248	Bull	(49%)	0.000831	25
Moon	(8%)	0.042655	Falcon	(21%)	0.051510	18
Moon	(8%)	0.042655	Helios	(21%)	0.051510	18
Moon	(7%)	0.015317	Boat	(31%)	0.023582	16
Moon	(5%)	0.012354	Sun	(58%)	0.028152	11
Moon	(4%)	0.020832	Selene	(45%)	0.037837	10
Moon	(4%)	0.049090	Lizard	(36%)	0.071767	10
Mummy	(45%)	0.058940	Star	(4%)	0.033990	17
Nemesis	(29%)	0.006837	Wheel	(47%)	0.009164	8
Nemesis	(18%)	0.039894	Horse	(22%)	0.041838	5
Nephthys	(100%)	0.000028	Isis	(16%)	0.000001	28
Nephthys	(68%)	0.013137	Hematite	(4%)	0.003709	19
Nephthys	(61%)	0.000464	Key	(14%)	0.000121	17
Nephthys	(61%)	0.001861	Uterine symbol	(12%)	0.000540	17
Nephthys	(57%)	0.002792	Anubis	(11%)	0.000934	16
Nephthys	(50%)	0.001784	Orôriouth	(15%)	0.000761	14
Nephthys	(50%)	0.001784	Osiris	(13%)	0.000722	14
Nephthys	(43%)	0.034401	Ouroboros	(4%)	0.019100	12

Table 9. Probability Values for Gem Attribute Correlations cont'd

Nephthys	(25%)	0.021877	Soroor	(18%)	0.020038	7
Nicolo	(46%)	0.029941	Sarapis	(6%)	0.017407	6
One god	(100%)	0.044272	Male rider stabbing prostrate female	(14%)	0.018964	7
One god	(71%)	0.068111	Bronze	(15%)	0.038552	5
Orôriouth	(96%)	0.000000	Uterine symbol	(63%)	0.000000	92
Orôriouth	(90%)	0.000000	Key	(69%)	0.000000	86
Orôriouth	(84%)	0.000000	Hematite	(18%)	0.000000	81
Orôriouth	(61%)	0.000000	Ouroboros	(21%)	0.000000	59
Orôriouth	(53%)	0.000000	Isis	(29%)	0.000000	51
Orôriouth	(44%)	0.000000	Anubis	(30%)	0.000000	42
Orôriouth	(41%)	0.000023	Chnoubis	(19%)	0.000008	39
Orôriouth	(21%)	0.001473	Osiris	(18%)	0.001368	20
Orôriouth	(19%)	0.000079	Soroor	(46%)	0.000187	18
Orôriouth	(15%)	0.000761	Bes	(39%)	0.001404	14
Orôriouth	(15%)	0.000761	Nephthys	(50%)	0.001784	14
Osiris	(32%)	0.000013	Anubis	(25%)	0.000009	35
Osiris	(24%)	0.001434	Isis	(15%)	0.001104	26
Osiris	(24%)	0.026233	Ouroboros	(9%)	0.020354	26
Osiris	(21%)	0.000926	Key	(18%)	0.000858	23
Osiris	(21%)	0.002188	Uterine symbol	(16%)	0.001902	23
Osiris	(18%)	0.001368	Orôriouth	(21%)	0.001473	20
Osiris	(13%)	0.000722	Nephthys	(50%)	0.001784	14
Ouriêl	(60%)	0.034783	Gabriêl	(21%)	0.021877	6
Ouriêl	(60%)	0.034783	Michaêl	(9%)	0.018070	6
Ouriêl	(60%)	0.034783	Souriêl	(75%)	0.040248	6
Ouroboros	(31%)	0.003335	Hematite	(19%)	0.002323	86
Ouroboros	(30%)	0.000000	Uterine symbol	(58%)	0.000000	84
Ouroboros	(25%)	0.000000	Key	(55%)	0.000000	69
Ouroboros	(21%)	0.000000	Orôriouth	(61%)	0.000000	59
Ouroboros	(17%)	0.000540	Isis	(28%)	0.000778	48
Ouroboros	(15%)	0.000622	Anubis	(29%)	0.001005	41
Ouroboros	(15%)	0.000967	Scarab	(26%)	0.001381	43
Ouroboros	(14%)	0.020390	Chnoubis	(20%)	0.022473	40
Ouroboros	(13%)	0.000302	Pantheistic deity	(36%)	0.000675	36
Ouroboros	(11%)	0.000366	z	(39%)	0.000920	30

Table 9. Probability Values for Gem Attribute Correlations cont'd

Ouroboros	(9%)	0.020354	Osiris	(24%)	0.026233	26
Ouroboros	(6%)	0.002620	Bes	(50%)	0.006928	18
Ouroboros	(5%)	0.017091	Soroor	(36%)	0.028416	14
Ouroboros	(4%)	0.019100	Nephthys	(43%)	0.034401	12
Pantheistic deity	(36%)	0.000675	Ouroboros	(13%)	0.000302	36
Pantheistic deity	(14%)	0.020177	Blue	(13%)	0.019897	14
Pantheistic deity	(10%)	0.007279	Bainchoooch	(28%)	0.010170	10
Pantheistic deity	(9%)	0.037634	Lapis lazuli	(14%)	0.040347	9
Pantheistic deity	(8%)	0.022414	Tabula ansata	(29%)	0.030397	8
Phoenix	(80%)	0.051129	Hematite	(3%)	0.018488	12
Phoenix	(67%)	0.017964	Scarab	(6%)	0.006712	10
Phoenix	(60%)	0.026993	Scorpion	(9%)	0.012864	9
Phoenix	(53%)	0.040876	Crocodile	(8%)	0.022300	8
Phoenix	(40%)	0.027859	Bird	(8%)	0.017753	6
Psyche	(42%)	0.052107	Eros	(10%)	0.036027	5
Quadriga	(100%)	0.006149	Helios	(12%)	0.001320	10
Reaper	(81%)	0.003671	Hematite	(5%)	0.000539	25
Reaper	(45%)	0.000243	Tree	(61%)	0.000352	14
Reaper	(26%)	0.006517	Grain	(67%)	0.011976	8
Red	(4%)	0.004035	Kkk	(71%)	0.014329	17
Red	(3%)	0.011890	Heracles	(79%)	0.035374	11
Red	(3%)	0.018626	Tyche	(55%)	0.039510	12
Red	(2%)	0.020235	Club	(100%)	0.062296	8
Rider	(86%)	0.044272	Lion	(3%)	0.016584	6
Rider	(71%)	0.068111	Figure	(4%)	0.032924	5
Sabaôth	(80%)	0.000000	Iaô	(22%)	0.000000	107
Sabaôth	(32%)	0.000017	Abraxas	(21%)	0.000010	43
Sabaôth	(26%)	0.000000	Adônai	(56%)	0.000001	35
Sabaôth	(26%)	0.004127	Anguipede	(13%)	0.002870	35
Sabaôth	(17%)	0.000485	Michaêl	(32%)	0.000775	22
Sabaôth	(11%)	0.008106	Semesilamps	(26%)	0.011116	14
Sabaôth	(9%)	0.044121	Ablanathanalba	(14%)	0.047196	12
Sabaôth	(7%)	0.012274	Gabriêl	(32%)	0.018751	9
Sabaôth	(6%)	0.021686	Akramachamari	(32%)	0.031797	8
Sabaôth	(6%)	0.021686	Sesengenpharanges	(32%)	0.031797	8

Table 9. Probability Values for Gem Attribute Correlations cont'd

Sarapis	(10%)	0.002453	Cerberus	(69%)	0.007045	9
Sarapis	(6%)	0.017407	Nicolo	(46%)	0.029941	6
Scarab	(38%)	0.000000	Crocodile	(60%)	0.000000	62
Scarab	(34%)	0.006059	Hematite	(12%)	0.003366	56
Scarab	(31%)	0.000105	Snake	(18%)	0.000059	51
Scarab	(29%)	0.000000	Falcon	(55%)	0.000000	47
Scarab	(26%)	0.001381	Ouroboros	(15%)	0.000967	43
Scarab	(23%)	0.000576	Harpocrates	(19%)	0.000500	37
Scarab	(21%)	0.000000	Goat	(64%)	0.000001	35
Scarab	(18%)	0.001510	Lotus	(21%)	0.001655	29
Scarab	(15%)	0.001174	Scorpion	(25%)	0.001574	24
Scarab	(13%)	0.000136	Boat	(43%)	0.000358	22
Scarab	(13%)	0.001858	Bird	(27%)	0.002678	21
Scarab	(6%)	0.006712	Phoenix	(67%)	0.017964	10
Scorpion	(33%)	0.001433	Snake	(11%)	0.000728	32
Scorpion	(25%)	0.001574	Scarab	(15%)	0.001174	24
Scorpion	(24%)	0.000373	Crocodile	(22%)	0.000354	23
Scorpion	(21%)	0.000500	Bird	(25%)	0.000577	20
Scorpion	(19%)	0.049923	Yellow	(8%)	0.043133	18
Scorpion	(9%)	0.012864	Phoenix	(60%)	0.026993	9
Seal of god	(100%)	0.000002	Male rider stabbing prostrate female	(59%)	0.000000	30
Seal of god	(97%)	0.000513	Hematite	(6%)	0.000026	29
Seal of god	(70%)	0.000008	Solomon name	(75%)	0.000010	21
Seal of god	(60%)	0.030770	Star	(4%)	0.012328	18
Selene	(86%)	0.000301	Helios	(22%)	0.000049	19
Selene	(45%)	0.037837	Moon	(4%)	0.020832	10
Semesilamps	(42%)	0.047036	Iaô	(4%)	0.027256	22
Semesilamps	(26%)	0.011116	Sabaôth	(11%)	0.008106	14
Semesilamps	(23%)	0.052977	Abraxas	(6%)	0.042171	12
Semesilamps	(17%)	0.014748	Adônai	(15%)	0.014133	9
Semesilamps	(17%)	0.014748	Michaël	(13%)	0.013772	9
Semesilamps	(17%)	0.014748	Sesengenpharanges	(36%)	0.019827	9
Semesilamps	(9%)	0.035752	Lailam	(38%)	0.050426	5
Sesengenpharanges	(60%)	0.048605	Iaô	(3%)	0.021944	15
Sesengenpharanges	(36%)	0.019827	Michaël	(13%)	0.013772	9

Table 9. Probability Values for Gem Attribute Correlations cont'd

Sesengenpharanges	(36%)	0.019827	Semesilamps	(17%)	0.014748	9
Sesengenpharanges	(36%)	0.053186	Carnelian	(4%)	0.034762	9
Sesengenpharanges	(32%)	0.007243	Akramachamari	(32%)	0.007243	8
Sesengenpharanges	(32%)	0.031797	Abianathanalba	(9%)	0.022856	8
Sesengenpharanges	(32%)	0.031797	Sabaôth	(6%)	0.021686	8
Sigê	(79%)	0.012898	Lion	(6%)	0.003709	11
Sigê	(79%)	0.072477	Star	(2%)	0.029843	11
Sigê	(43%)	0.028820	Tabula ansata	(21%)	0.021877	6
Snake	(27%)	0.038811	Star	(16%)	0.032631	75
Snake	(20%)	0.000000	Crocodile	(53%)	0.000001	55
Snake	(18%)	0.000059	Scarab	(31%)	0.000105	51
Snake	(13%)	0.030729	Harpocrates	(19%)	0.033603	37
Snake	(12%)	0.000148	Falcon	(40%)	0.000403	34
Snake	(11%)	0.000728	Scorpion	(33%)	0.001433	32
Snake	(9%)	0.000385	Goat	(47%)	0.001228	26
Snake	(9%)	0.002983	Bird	(32%)	0.005276	25
Snake	(7%)	0.002523	Boat	(39%)	0.005449	20
Snake	(7%)	0.008627	Ibis	(36%)	0.015290	19
Snake	(4%)	0.020602	Fish	(56%)	0.042391	10
Snake	(4%)	0.030676	Dog	(44%)	0.052447	11
Solomon name	(86%)	0.000024	Male rider stabbing prostrate female	(47%)	0.000007	24
Solomon name	(82%)	0.003767	Hematite	(5%)	0.000548	23
Solomon name	(75%)	0.000010	Seal of god	(70%)	0.000008	21
Soroor	(64%)	0.000155	Chnoubis	(12%)	0.000025	25
Soroor	(56%)	0.000144	Uterine symbol	(15%)	0.000035	22
Soroor	(56%)	0.013343	Hematite	(5%)	0.004639	22
Soroor	(54%)	0.000766	Isis	(12%)	0.000221	21
Soroor	(51%)	0.000343	Key	(16%)	0.000114	20
Soroor	(46%)	0.000187	Orôriouth	(19%)	0.000079	18
Soroor	(41%)	0.001999	Anubis	(11%)	0.000934	16
Soroor	(36%)	0.028416	Ouroboros	(5%)	0.017091	14
Soroor	(33%)	0.007652	SSS	(8%)	0.004530	13
Soroor	(31%)	0.011985	Chnoubis name	(11%)	0.008225	12
Soroor	(18%)	0.020038	Nephthys	(25%)	0.021877	7
Souriêl	(75%)	0.040248	Ouriêl	(60%)	0.034783	6

Table 9. Probability Values for Gem Attribute Correlations cont'd

Souriêl	(62%)	0.063246	Gabriêl	(18%)	0.039894	5
SSS	(62%)	0.000000	Chnoubis	(48%)	0.000000	98
SSS	(51%)	0.000000	Chnoubis name	(73%)	0.000000	81
SSS	(31%)	0.000007	Chalcedony	(25%)	0.000005	49
SSS	(14%)	0.000033	Chrysoprase	(59%)	0.000157	22
SSS	(11%)	0.026706	White	(15%)	0.028259	18
SSS	(8%)	0.004530	Soroor	(33%)	0.007652	13
SSS	(6%)	0.012025	Barbarôphita	(90%)	0.036896	9
Star	(41%)	0.000000	Moon	(82%)	0.000000	194
Star	(18%)	0.000001	Lion	(50%)	0.000009	87
Star	(16%)	0.032631	Snake	(27%)	0.038811	75
Star	(6%)	0.001564	Male rider stabbing prostrate female	(55%)	0.005386	28
Star	(6%)	0.002355	Bull	(53%)	0.007266	27
Star	(6%)	0.021602	Michaêl	(39%)	0.037064	27
Star	(5%)	0.016267	Boat	(43%)	0.031076	22
Star	(4%)	0.012328	Seal of god	(60%)	0.030770	18
Star	(4%)	0.033990	Mummy	(45%)	0.058940	17
Star	(2%)	0.029843	Sigê	(79%)	0.072477	11
Sun	(58%)	0.028152	Moon	(5%)	0.012354	11
Tabula ansata	(29%)	0.030397	Pantheistic deity	(8%)	0.022414	8
Tabula ansata	(21%)	0.021877	Sigê	(43%)	0.028820	6
Tree	(61%)	0.000352	Reaper	(45%)	0.000243	14
Tree	(35%)	0.007582	Grain	(67%)	0.011976	8
Tyche	(55%)	0.039510	Red	(3%)	0.018626	12
Tyche	(36%)	0.007778	Cornucopia	(47%)	0.009164	8
Uriêl	(89%)	0.015561	Michaêl	(12%)	0.004995	8
Uriêl	(67%)	0.037185	Gabriêl	(21%)	0.021877	6
Uterine symbol	(79%)	0.000000	Key	(92%)	0.000000	115
Uterine symbol	(77%)	0.000000	Hematite	(24%)	0.000000	111
Uterine symbol	(63%)	0.000000	Orôriouth	(96%)	0.000000	92
Uterine symbol	(58%)	0.000000	Ouroboros	(30%)	0.000000	84
Uterine symbol	(42%)	0.000000	Isis	(35%)	0.000000	61
Uterine symbol	(39%)	0.000000	Chnoubis	(27%)	0.000000	56
Uterine symbol	(34%)	0.000000	Anubis	(35%)	0.000000	50
Uterine symbol	(16%)	0.001902	Osiris	(21%)	0.002188	23

Table 9. Probability Values for Gem Attribute Correlations cont'd

Uterine symbol	(15%)	0.000035	Soroor	(56%)	0.000144	22
Uterine symbol	(13%)	0.000182	Bes	(53%)	0.000588	19
Uterine symbol	(12%)	0.000540	Nephthys	(61%)	0.001861	17
Uterine symbol	(8%)	0.043643	Ζ	(16%)	0.048359	12
Wheel	(47%)	0.009164	Nemesis	(29%)	0.006837	8
White	(15%)	0.028259	SSS	(11%)	0.026706	18
Yellow	(8%)	0.043133	Scorpion	(19%)	0.049923	18
Yellow	(6%)	0.041892	Bull	(24%)	0.053562	12
Yellow	(5%)	0.012465	Lizard	(39%)	0.022109	11
Ζ	(39%)	0.000920	Ouroboros	(11%)	0.000366	30
Ζ	(22%)	0.044960	Carnelian	(7%)	0.036067	17
Ζ	(16%)	0.048359	Uterine symbol	(8%)	0.043643	12
Zeus	(40%)	0.035431	Chalcedony	(5%)	0.021149	10
Zeus	(28%)	0.022677	Eagle	(21%)	0.020882	7
Zodiac	(71%)	0.068111	Helios	(6%)	0.034006	5
ZZZ	(48%)	0.024823	Chnoubis	(5%)	0.012546	11
ZZZ	(43%)	0.036961	Chalcedony	(5%)	0.021149	10

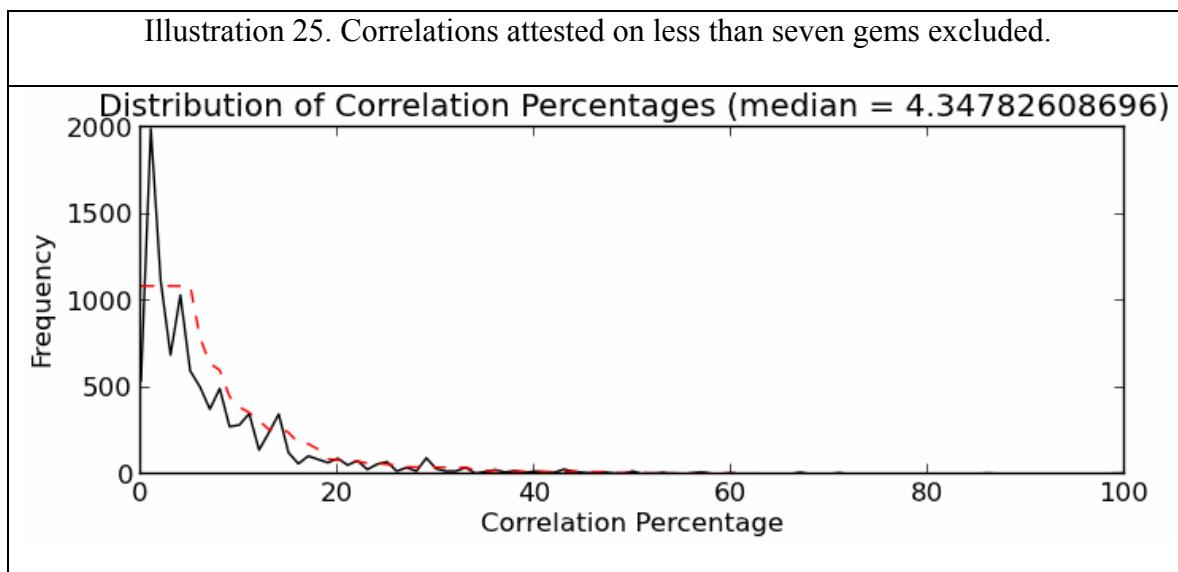
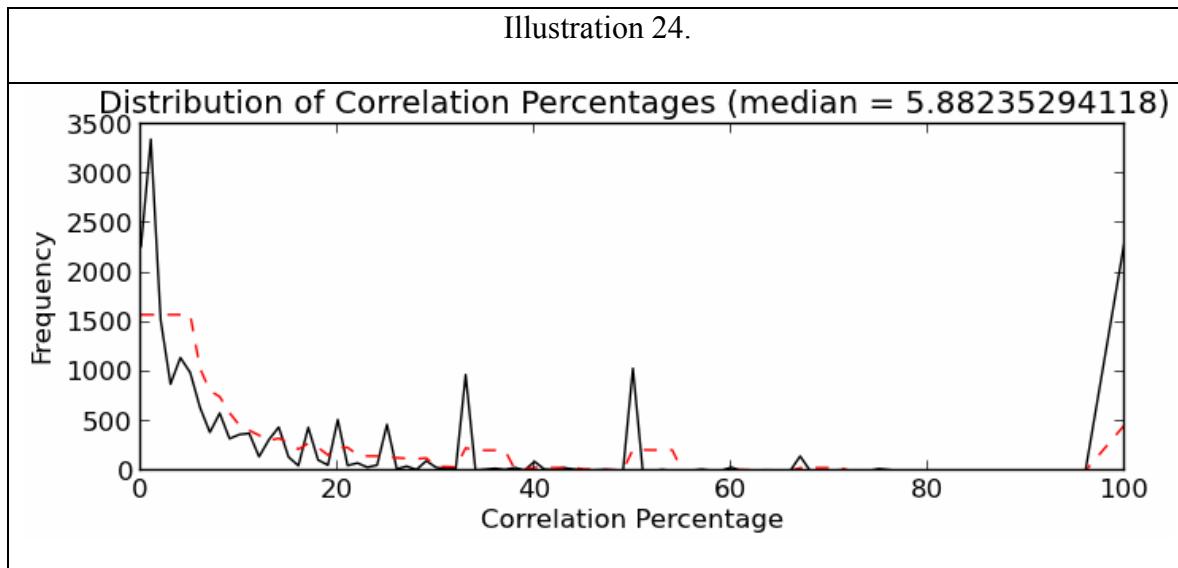
Appendix B: Clusters and Cluster Subgroups

Table 10. Clusters and Cluster Subgroups	
Cluster (Feature set) No.	Subgroup Members
1 (Iaô)	Subgroup 1: Gabriël, Ouriël, Sourîël, Michaël, Uriël Subgroup 2: Abraxas, Iaô, Adônai, Lailam, Semesilamps, Sabaôth Subgroup 3: Ablanathanalba, Sesengenpharanges, Carnelian, Aianagba, Akramachamari Subgroup 4: Anguipede, Baboon, Jasper, Heliotrope, Green, Disk, Cynocephalus
2	Subgroup 1: Blue, Tabula ansata, Goose, Lapis lazuli, Pantheistic deity, Bainchooch Subgroup 2: Arrôriphrasis, Aphrodite, Lapislazuli, Ares Subgroup 3: Psyche, Griffin, Butterfly, Eros
3 (Hematite)	Subgroup 1: Uterine symbol, Hematite, Orôriouth, Z-pierced, Key, Bes, Ouroboros Subgroup 2: Isis, Anubis, Soroor, Osiris, Nephthys
4 (Solomonic Rider)	Subgroup 1: "One god," Bronze Subgroup 2: Male rider stabbing prostrate female, Solomon name, Seal of god
5	Wheel, Horse, Nemesis
6	Subgroup 1: Helios, Quadriga, Selene, Zodiac Subgroup 2: Star, Mummy, Sun, Sigê, Moon, Lion Subgroup 3: Uncertain Figure, Rider Subgroup 4: Dog, Yellow, Lizard, Mithras, Bull
7	Subgroup 1: Cobra, Phoenix, Fish, Scorpion, Bird, Scarab, Crocodile, Snake, Chabrach, Falcon, Goat Subgroup 2: Lotus, Harpocrates, Boat
8 (Chnoubis)	Subgroup 1: Eagle, Zeus, Zzz-pierced, Chalcedony Subgroup 2: Barbarôphita, Gigantorhêkta Subgroup 3: Chrysoprase, Chnoubis, White, Chnoubis name, Sss-pierced
9	Subgroup 1: Tyche, Cornucopia Subgroup 2: Club, Kkk, Heracles, Red
10	Nicolo, Cerberus, Sarapis
11 (Reaper)	Grain, Reaper, Tree
12	Altar, Black, Ibis

Appendix C: Linked Clusters and Polyvalent Attributes

Table 11. Polyvalent Attributes.	
Linked Clusters (Feature sets)	Polyvalent Nodes Linked
3 and 2	Ouroboros--Pantheistic deity
3 and 4	Hematite--Seal of god, Hematite--Solomon name, Hematite--Male rider stabbing prostrate female
3 and 7	Hematite--Scarab, Hematite--Phoenix, Ouroboros--Scarab
3 and 8	Soroor--Sss-pierced, Anubis--Chnoubis
3 and 6	Male rider stabbing prostrate female--Star, Seal of god--Star
3 and 11	Hematite--Reaper
3 and 12	Bes--Black
6 and 1	Helios--Heliotrope
6 and 2	Sigê--Tabula ansata
6 and 7	Dog--Snake
7 and 3	Crocodile--Hematite, Goat--Hematite, Falcon--Hematite
7 and 6	Harpocrates--Moon, Boat--Star, Scorpion--Yellow, Snake--Star, Boat--Moon, Falcon--Moon
8 and 1	Chnoubis name--Green
8 and 3	Chnoubis--Soroor, Chnoubis--Ouroboros, Chnoubis--Orôriouth, Chnoubis name--Soroor, Chnoubis--Isis, Chnoubis--Uterine symbol, Chnoubis--Key
9 and 6	Heracles--Lion

Appendix D: Distributions of Attribute Correlations

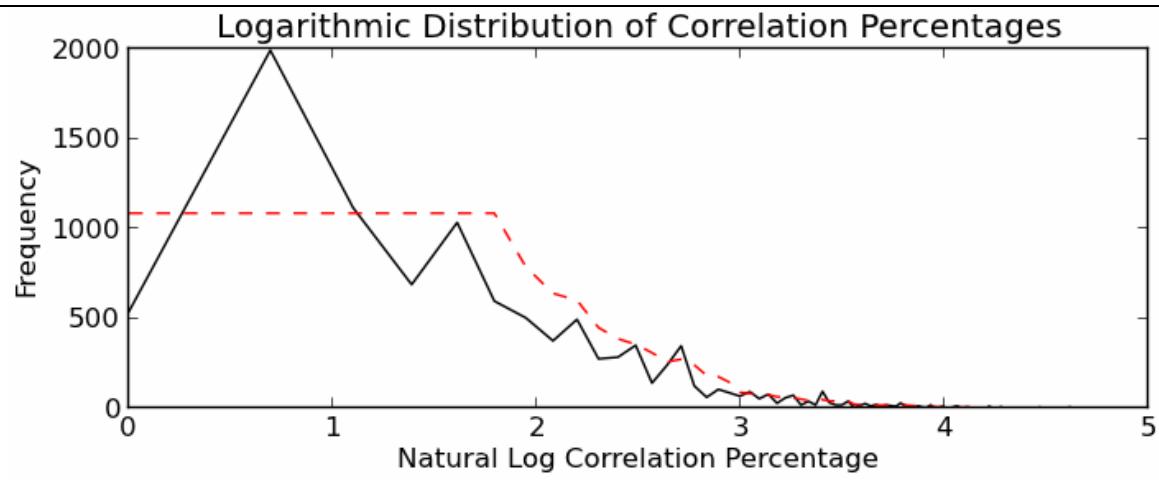


Since the distribution is highly skewed, typical methods for determining statistical significance (by using the standard deviation) cannot be applied as they are predicated on a "normal" (i.e. bell curve) distribution.¹ Some moderately skewed distributions are, in fact, lognormal, which means that when the logarithms of the x-axis values are computed

¹ Howell, *Fundamental Statistics*, 103-1118.

the distribution comes close to a bell curve. In our case, however, the skew is too extreme. Illustration 26 clearly reveals that even the logarithmic distribution of the correlation percentages does not approximate a bell curve.²

Illustration 26. The $\log x + 1$ to base e computed for each correlation percentage, where correlations attested on less than seven gems are excluded.



² In addition, because of the skewness of lognormal distributions sample sizes of 20,000 or more are desirable. See Brian E. Smith and Francis J. Merceret, "The Lognormal Distribution," *CMJ* 31.4 (2000): 261.

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