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A corpus of early Ionic capitals

by

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SUMMARY

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Degree	Philosophiae Doctor (Architecture)

Definition of the design evolution of the Hellenic Ionic Order and Ionic votive column typology is at present hampered by *lacunae* in knowledge regarding the Archaic Ionic capital in its foundational phase in architectural and glyptic art. The study identifies comprehensive contextually based typological knowledge of the Archaic Ionic capital as prerequisite to further understanding of its founding, in itself required to complete a design history of the Ionic Order and Ionic votive column. In this study this knowledge is represented in the form of a corpus where *lacunae* in current databases, typological ordering models and subsequent typological interpretations of the capital are filled through the inclusion of new data, integration of existing ordering models and through introducing new dimensions of interpretation. The study discloses style evolution as well as the design and making processes inherent to the early Ionic capital, and defines the early Ionic capital as one of the artifacts from which a particular focus of cultural endeavour in the Archaic Hellenic period may be reconstructed. Conclusions from the revisionary typological interpretation are employed in the formulation of a critical framework within which the achieved conclusions may be brought in relation with relevant contextual evidence and typological interpretations from other cultural enclaves, from which a history of the early Ionic capital may be constructed. The framework includes identification of existing interpretations and knowledge which have become irrelevant and the still required research, which may be brought in relation to existing knowledge. The achieved ordering model, typological interpretation and historiographical framework together act as open-ended reference, interpretive and explorative tools for further cross-disciplinary research into the evolution of the early Ionic capital as well as its architectural and artistic context. This is due to their integrative, comprehensive and contextual nature, as well as their formulation which accommodates changes emanating from future archaeological interpretation.



EKSERP

A corpus of early Ionic capitals.

deur

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Definisie van die ontwerpewolusie van die Helleense Ioniese Orde en Ioniese gedenkkolomtipologie word tans gehinder deur lakunes in kennis aangaande die Argaïese Ioniese kapiteel se vindingsfase in argitektuur en beeldhoukuns. Die studie identifiseer omvattende konteksgebaseerde tipologiese kennis van die Argaïese Ioniese kapiteel as voorvereiste vir verdere begrip van sy vinding, wat in sigself nodig is om 'n ontwerpgeskiedenis van die Ioniese Orde en Ioniese gedenkkolom te kan voltooi. In hierdie studie word die kennis verteenwoordig in die vorm van 'n corpus waar lakunes in resente databasisse, tipologiese ordeningsmodelle en daaruit vloeiende tipologiese interpretasies van die kapiteel ingevul word deur invoeging van nuwe data, integrasie van bestaande ordeningsmodelle en deur nuwe dimensies van interpretasie. Die studie openbaar stylevolusie sowel as die ontwerp en vervaardigingsproses inherent tot die vroeë Ioniese kapiteel, en identifiseer die vroeë Ioniese kapiteel as een van die artefakte waaruit rekonstruksie van die spesifieke fokus van kultuurbereiking in die Argaïes Helleense moontlik word. Afleidings vanuit die revisionêre tipologiese interpretasie word aangewend in die formulering van 'n kritiese raamwerk waarbinne die afleidings wat bereik is in verwantskap kan kom met word relevante kontekstuele getuienis en tipologiese interpretasies van ander kultuurenklave, waaruit 'n geskiedenis van die vroeë Ioniese kapiteel konstrueer kan word. Die raamwerk sluit identifikasie van bestaande interpretasies en kennis wat irrelevant geword het in, asook daardie benodigde navorsing wat met bestaande kennis in verwantskap gebring kan word. Die ordeningsmodel, tipologiese interpretasie en historiografiese raamwerk wat in die studie bereik is dien saam as nie-geslote verwysings, vertolkende en eksploratiewe werktuie vir verdere kruis-dissiplinêre navorsing oor die ewolusie van die vroeë Ioniese kapiteel sowel as die se argitektoniese en artistieke konteks. Hierdie eienskappe is te wyte aan hul integreerende, omvattende en kontekstuele aard, sowel as hul formulering wat veranderinge voortspruitend uit verdere argeologiese interpretasie akkommodeer.

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

The Ionic capital was an integral part of monumentalised Hellenic art and architecture, and has remained vital as a cultural symbol up to the present time. This study is concerned with the construction of a data base of Archaic Ionic capitals, with ordering data in terms of time and place, with gaining typological understanding of the early Ionic capital within its chronologically and geographically bounded built and artistic context, as well as understanding the form evolution of the capital from its pioneering to its foundational first generation phase, together providing critical elements for future construction of a founding theory for the Ionic capital and more comprehensive understanding of Archaic Ionic art and architecture.

1.2 THE IMPORTANCE OF THE STUDY

The importance of further research regarding the Ionic capital is related to the relevance of increased knowledge of the embryonic stage of Hellenic architecture. Hellenic architecture has been and is widely seen as an important foundation of the Western architectural tradition. The Modernist view of Classical architecture required that any direct reference to historical precedent was avoided in principle. Whilst tradition in architecture was eschewed, a dichotomous situation existed where certain Classical design principles, typologies and space-time sequences were covertly admired and utilised, and the Classical Orders (Doric in particular) were viewed as ready and authoritative etiology for functional form-making based on a structural rationale (as in the early writings of Le Corbusier (1985 [1923], p.45, 204), as well as currently by such Neo-modernists as Meier (See discussion in Jencks (1991, p.245)). This situation precluded a realistic, contextually based assessment of the values inherent in Classical architecture. In any questioning or re-reading of those values it remains important that there is acknowledgement of new advances in understanding of the tenets of Classical architecture and particularly its beginnings.

Important facets of the Postmodern architectural break with and opposition to Modernism are that tradition is acknowledged as an important cornerstone of the continuous process of architectural reinvention, and that the total architectural historical attainment is reinstated as a field of architectural reference (A view put by such Postmodern architects as Venturi (1977, p.14), the instigators of the First International Exhibition of Architecture at the Venice Biennale in 1980, and also recently by the Classicist Porphyrios (1991, p.85-100). The fact that this break can be traced to the later work of Le Corbusier is one of the more meaningful, albeit ironic, footnotes of architectural history.

Re-evaluation of the founding phase the Classical Orders and its meaning became pertinent in the Classicist Revivalist grouping emerging under the banner of the re-connection with history made possible by a Post-

Modern approach to architecture. Because the Archaic phase of Hellenic architecture (seen as the embryonic stage of our cultural heritage) reflects a conscious attempt at concretising a shared dialectic paradigm by means of a process of reinvention and abstract monumentalisation of traditional values within a changing paradigmatic context, it has particular significance to our time, which faces a similar condition. Historically probable knowledge of the process by which the Classical Orders were founded and also encoded with meaning will make a great contribution to the Postmodern yearning for creating meaningful architectures.

There are problems concerning the knowledge base from which this re-utilisation of Classical values proceeds. Architectural-historical works by Kostof (1985), Martin (1988) and Norberg-Schulz (1980) show that current research and insights into concrete and abstract aspects of the founding and monumentalising stage of Hellenic architecture in the Archaic era are not adequately reflected. Works emerging from a more neo-Classist category of inquiry include the synoptic inquiry into Classicism by Greenhalgh (1990), the incisive ontological interpretation of the Classist viewpoint by Porphyrios (1991), the philosophically inclined tome regarding the beginnings of the Orders by McEwen (1993) and the semantic interpretation of the Ordered column by Rykwert (1996). Again, there is either no or not adequate recognition and inclusion of the evolution of understanding of the emergence of the Orders, emanating from current research by the archaeological fraternity. There is little or no new realistic insight into the beginnings of the Orders, and the works rather serve to lead us away from the results of newer archaeological interpretation. Predominantly, in Postmodern literature, the morphology and syntax of Classical-Hellenic and later developments from that architecture (especially Mannerist) are put forward as inspiration for abstract-eclectic architectural semantics. (See Jencks (1981, p.5) and Rowe (1987, p.185-90)). The proposed Postmodern goal of introducing relevant meaning into architecture by means of abstract-eclecticism has not reached a satisfactory level of depth, clarity and 'fit' with the context of the current post-Newtonian paradigm. With Greenhalgh (1990, p.63) one may say that stylistic utilisation of Classical morphology without an understanding of the relevant syntax, actually impeded the formation of a currently meaningful referential architecture.

To understand the architecture of the Orders' founding era an architectural re-evaluation of their monumentalising phase is required, but re-evaluation departing from more fundamentally concrete assessments of the events. The realisation that the founding of the Orders are intimately intertwined with other Minor Arts should also be incorporated in the architectural perspective. Untrammelled by the fluctuations in architectural attention towards Classical architecture, the archaeological fraternity has steadily chiselled away at such concrete assessments, and in acknowledging the design interaction between art and architecture. The massive works by Jacob-Felsch (1969) and Wesenberg (1971) on column bases remain prominent in any current analyses. There has been a re-evaluation of the validity of Vitruvian interpretation of the origins of the Orders by Wesenberg (1996). After the valuable earlier works on Hellenic architectural syntax like that of Coulton (1975), much work has been done on the Hellenic approach to architectural design and to metrology (by Wesenberg (1983a,b), Hoepfner (1983), Schwandner (1983), Bankel (1983; 1984) and

Koenigs (1985; 1993)). We have seen the tomes on early Doric architecture by Howe (1985; Hereafter IDO) and Beyer (1972), both of which broke new conceptual barriers but may be criticised from various viewpoints.

An abundance of archaeological evidence about examples from the founding phase of the Hellenic Orders has lately become available. Detailed archaeological knowledge of Geometric and the earlier Archaic Ionic building works has increased rapidly from research and colloquiums during the last decade (too numerous to mention here). There is record of many more Ionic buildings, and many historically vexing examples (like the Naxian *Oikos* at Delos, the Hekatompedos and First Dipteros at Samos, the Archaic Artemision and Didymeion) now appear more sharply defined. Gruben's (1963) work on Ionic column slenderness ratio's has recently been revised by himself (1996, Fig. 17-8), and he (1991; 1997) and Ohnesorg (1993a) have cleared up many remaining issues regarding Archaic Cycladic architecture.

A critical assessment of existing studies of the meaning and origins of the Ionic Order and/or capital by, amongst others, Alzinger (1972-3), Andrae (1933), Braun-Vogelstein (1920), Dinsmoor (1973 [1927]), Durm (1910), Fletcher (1975 [1896]), Guhl (in his *Versuch über das Ionische Kapitäl* of 1845, as cited in Braun-Vogelstein [1920, p.2-3, Note 1, 6]), Hersey (1989), Hittorf (in his *Recueil des Monuments de Ségeste et de Sélinonte* of 1870, as cited in Braun-Vogelstein [1920, p.3-4, Note 7]), Lehmann-Haupt (1913), Palladio (1965 [1570]), Penrose (1902), Przyluski (1936), Puchstein (1887), Von Luschan (1912), Wurz and Wurz (1925) and Vitruvius (1955 [50 BC]), showed that the founding theories are inadequate due to incomplete databases, unreliable dating methods or the acceptance of spurious dating of artifacts and the constraints of non-contextual description and/or interpretation. Even though a contextual approach towards the architectural achievement of the Hellenic era has emerged (Amongst others in the works of Berve and Gruben (1961), Betancourt (1977), Boardman (1967), Coulton (1975; 1976; 1977), Doxiades (1972 [1937]), Drerup (1969), Howe (IDO), Kostof (1985), Mallwitz (1981), Maré and Rapanos (1984), Martiensen (1964 [1956]), Martin (1965; 1988 [1980]), Martini (1986), Norberg-Schulz (1980 [1974]), Porphyrrios (1991) and Scully (1979 [1962])), it remains true that there is no comprehensive contextual definition of the Ionic Order.

As yet, no definition of Ionic architecture exists which completely satisfies the vexing question surrounding the founding of the Ionic Order, namely whether it should be seen as innovation in stone, as skeuomorph stone imitation of timber antecedents or as imitation of existing non-architectural artifacts or architectural styles, and which clarifies the issue as to whether the Ionic capital itself should be seen as an innovation, evolution or as a skeuomorphic imitation of previously existing architectural or artistic elements.

Mace (1978) was the first to study a collection of specifically Archaic Ionic capitals as a formal type and from a comparative point of view. Although his study included aspects of the built context of the capitals and brought insight in terms of the morphological qualities of a group of capitals, his typological analysis and critical remarks regarding the founding history were inconclusive due to the small sample, problems with the

chronology and other methodological problems. More recently, Theodorescu (1980; Hereafter LCIG) and Kirchhoff (1988; Hereafter EIV) managed to bring a wide scope and detailed analysis which furthered insight tremendously, and whose founding histories demand serious attention. Unfortunately deficiencies in terms of method and *lacunae* in terms of data, which are dealt with in this study in great detail, also resulted in inadequacies. The insight into the Ionic capital gained by both Theodorescu (LCIG) and Kirchhoff (LCIG) is further diminished by the lack of inclusion in their analyses of the built context in which the capitals appear. Also, recent research has removed many of the examples employed by Kirchhoff as first actors in his founding narrative. Most of these mentioned deficiencies are taken up in the present study. After Hoepfner (1968) there has been renewed attention to the design of the systemised Hellenistic Ionic volute by Wesenberg (1983a), Büsing (1987) and Frey (1992) which demands a new perspective on earlier capitals.

This study attempts to bring insight into the Archaic Ionic capital, and in particular the earliest pioneering and foundational capitals up to 525 BC, by broadening the scope of the current data base, through enhancement of current typological inquiry, and through acknowledgement of the built context for which they were designed and manufactured. This is seen as a necessary prerequisite for combination with insights with respect to related artifacts for the formulation of a comprehensive founding history of the Ionic capital (and eventually the architecture and art in which it appeared) which explains the design evolution and the degree of 'fit' between the paradigmatic context and element.

1.3 THE STATEMENT OF THE PROBLEM

There is a need for a comprehensive *corpus* of early Ionic capitals suitable for the construction of a probable founding history.

1.4 THE MAIN HYPOTHESIS

Future construction of a probable founding history of the Ionic capital can only come from an understanding of its form evolution, based on a typological understanding of the artefact in its built context, and as emanating from an ordered data base.

1.5 THE SUB PROBLEMS

Sub problem 1 To describe and chronologically and geographically order relevant artifacts of the Archaic Ionic Order, Ionic votive column and their pre-forms.

Sub problem 2 To gain typological understanding of an ordered data base of relevant artifacts.

Sub problem 3 To describe the process of form-making during the founding process and to isolate those remaining aspects necessary for the construction of a probable founding narrative for the

early Ionic capital.

1.6 THE HYPOTHESES

- Hypothesis 1 Current data regarding a *corpus* of early Ionic capitals can be increased and augmented.
- Hypothesis 2 Interpretation of a *corpus* of early Ionic capitals from a typological perspective will alter and increase current interpretation.
- Hypothesis 3 Discernment of significant elements of the achieved ordering and analysis of the early Ionic capital and related artifacts will provide a more suitable basis for a future formulation of a probable founding narrative for the early Ionic capital.

1.7 THE APPROACH

This study requires an appropriate description and ordering of relevant artifacts from an identified relevant and representative archaeological record. In encountering the artefact, there is in this study primarily a realisation of its functional nature.

Most of the artifacts used, exist as reconstructions. The author does not rely on the primary sources for the description and analysis (with known exclusions). The secondary sources exist as text, but text which is not intended as a mere translation of or substitute to the artifacts, but rather a decoding from a base of knowledge and insight of aspects that are not to be read from mere sensory confrontation of the works, of the aspects that are hidden due to the nature of the process of their coming into being, and also of aspects that are not available for discovery because the artifacts have been decontextualised or the context has disappeared and exists mainly in texts from various scholarly disciplines. In this study the text is seen as additive to and supportive of the artifacts rather than in opposition to them, and written text is combined with drawings, diagrams, quantitative description and photographs to facilitate and enable multi-dimensional understanding.

It is required that, in the description of Archaic Ionic capitals and the monuments and architecture they form part of, as well as in the chronological, geographical and typological ordering of the capitals, there be an endeavour to integrate, augment and synthesise existing work in the field. Furthermore, the compilation of a data base should be comprehensive in its nature and its formulation, and be able to accommodate changes emanating from future archaeological interpretation, in order that it may incorporate feedback and may be used as an open-ended interpretive tool for further research.

Part of the approach to the subject is the disclosure of the nature of design process inherent to the formation of the Ionic capital and its stylistic content.

1.8 DEFINITION OF TERMS

- 1.8.1 '*Corpus*' refers to a body of existing and newly acquired thought which in this instance includes understanding on a typological level and within a described context.
- 1.8.2 'early Ionic capitals' refers to related capitals preceding the founding of the stone, Ionic 'standard' capital, as well as to related capitals following the datum, all within the Hellenic Geometric and Archaic periods. In this study a cut-off date of 489 BC is employed for purposes of constructing a representative data base and for chronologically based analyses, and 525 BC for chronologically and geographically based analyses.
- 1.8.3 'Ionic' has reference to: The Ionian cultural grouping; Any non-architectural artifacts that, through an interpretation of stylistic and regional attributes, are classified as being typical of that cultural enclave (For example an Ionic votive column); Any architectural interaction of forms that are viewed as being typical of the Ionian cultural enclave (For example the Massilian Treasury of Delphi or the First Dipteros of Samos) as well as experimental or non-canonical forms which are part of such interactions (For example the spira and torus base); The specific stylistic interrelationship of elements which as a whole is known as the canonic Ionic Order (For example the façade of the Athenaion, Priene) as well as the separate constituent elements (canonic Ionic base, column, etc).
- 1.8.4 'Ionic standard capital' refers to an artefact whose attributes include, at least, a horizontal element (*canalis*) which has depth [ie not flat like metal] and from which a volute descends on either side, and where that combination of elements occurs on top of a smooth or profiled egg- or leaf cyma echinus of various sections. 'Ionic non-standard capital' refers to timber and stone precursors of the Ionic standard capital which exists without echinus. 'Ionic column' refers to the combination of at least a column base, fluted or unfluted column shaft and Ionic non-standard or standard capital. 'Ionic Order' refers to combination of a stone or timber version of an Ionic column and rudimentary entablature (as minimum an architrave, frieze panel and cornice).
- 1.8.5 'Founding' refers to the process of coming into being of the Ionic standard capital and the subsequent foundational or formalising phase of the design and its application during a founding era. 'Founding era' refers to the time span during which the Ionic standard capital came into being, namely the build-up to the datum point, the datum, and following phases of interim forms through to its eventual canonical form. 'Founding context' in this study refers only to the artifacts 'Ionic architecture' and 'Ionic votive column' in which the 'Ionic capital' occurs. Other levels of context are excluded. 'Founding history' refers to a narrative in which a probable founding process is related which is supported by the effluent from archaeological endeavour.
- 1.8.6 The term 'votive column' rather than 'memorial column' is used to more accurately express its proper role in the specific cultural enclave (This term follows the nomenclature used in current study).
- 1.8.7 'Skeuomorph' refers to an artefact for which the technique of manufacture of a prototypic artefact is employed as source of styling, and the artefact is a mimic of the original (Steadman, 1979, p.112).

In this study there is reference to the possible mimicking of the detail of timber construction into stone, a process also known as 'xylolythic conversion', with such a stone element then being known as 'xylolythic skeuomorph' of the original timber prototype.

1.9 ASSUMPTIONS

- 1.9.1 Multidisciplinary inquiry is possible, valid and useful.
- 1.9.2 The study departs is approached within the discipline of architecture, and offered as an architectural artifact. In this study there is a realisation of the chasm that exists between current archaeological and architectural involvement and understanding of the field, and that the approach chosen should make that understanding more accessible to the practising architectural fraternity and for architectural pedagogy.
- 1.9.3 The author accepts the level of accuracy of secondary description of artifacts, in terms of their material, provenance, function and date of manufacture as being resultant from specialist archaeological knowledge and analyses. Whilst the author remains critical of the accuracy of such description and analyses, their accuracy remains a reflection on the science of archaeology rather than the knowledge of the user. It is accepted that, from an achieved understanding of the artifacts and their context, the author has a responsibility to be critical of those datings of Ionic capitals achieved by others, and to engage in such activity where required.
- 1.9.4 All capitals used by Kirchhoff (EIV) and Theodorescu (LCIG) which are deemed relevant may be included in the present study.
- 1.9.4 In a few instances, where the need existed and the possibility presented itself, the author has engaged in description and documentation of artifacts. Due to a lack of permission for the type of access to artifacts required for proper documentation, the description does not fully conform to the demands posed by the science of archaeology. The lesser validity of these documentations is indicated where applicable, and is acknowledged in all manipulations of such data. There is however a preliminary assumption that exclusion of such artifacts will reduce the possibility of a more comprehensive view.
- 1.9.5 It is accepted and deemed necessary that any conclusions come to in this study be reviewed and tested from an archaeological viewpoint.

1.10 DELIMITATIONS

- 1.10.1 Due to understandable reasons research in this field of study is specialised in nature and specifically focussed. Any participant should therefore be aware of its demands. As an architect the author is also aware of certain limitations in crossing the historically delineated professional boundaries which are still clearly delineated in this field. The author is not at liberty to be intimately involved in the physical realities of the sites that are involved in the field of study, and is removed from the collegially bound

network of foundational ideas, critical interrelationships and responses and often unspoken acceptances which accompany the evolving semantic understanding of the totality of the sites and their components. This study of necessity has to rely on secondary source material, which are deemed to be the fruits of the labours of the archaeological profession. Dating of artifacts other than Ionic capitals cannot be expected from the author: Where single datings are the case, these have to be accepted, but multiple and/or conflicting datings will be critically viewed. Whilst the secondary sources are viewed in a critical sense and responsibility is accepted for their employment, they are viewed and used from an architectural perspective.

- 1.10.2 Analysis of the founding era includes determining the relationship between Archaic Ionic capitals and the later achievement of a Classical canonic version of the Ionic capital. However, no re-examination of Classical capitals before and up to that canonic version is undertaken.
- 1.10.3 Although analysis of the typological evolution of the Archaic Ionic capital, in terms of manipulation of chronologically ordered data, is addressed for the whole Archaic period, this analysis, in terms of geographically ordered data, is restricted to a certain time-span deemed suitable for the purposes of this study. Whilst there is detailed description of the Archaic Ionic capital not necessarily employed in any arguments in the study, such description is deemed as being a responsible act in terms of a conservation paradigm. As residue of the study they are provided as tool for future access to and manipulation of the artifacts.

1.11 REFERENCE SYSTEM AND MEASURE CONVENTION

The University of Pretoria requires that theses employ the Harvard reference system and the ISO measure convention (Millimetres are used throughout, for example 5,20 metres is written as 5 200; 52 centimetres is written as 520; 5,20 centimetres is written as 52). These will be followed throughout this thesis.

1.12 THE STRUCTURE OF THE STUDY

Chapter 2 involves the compilation of a representative data base which results in a documentation of relevant capitals and their built contexts, and a base from which further analysis can proceed. The criteria for an a representative and ordered data base of relevant capitals and buildings is formulated, the data base is compiled and ordered chronologically and geographically. The problematic of at a future stage bringing the data base into relation with other artifacts is inquired into.

In Chapter 3 there is a typological analysis of the Archaic Ionic capital, based on the achieved ordered data base, and emanating from an understanding of the tectonic content of the artefact.

Chapter 4 deals with the construction of an evolutionary narrative of the form synthesis included in the early



Archaic Ionic capitals up to 525 BC, together with a critical framework for a future construction of a founding history of the Ionic capital.

Chapter 5 provides a recapitulation of the achievement included in the work, concluding remarks, and recommendations for application of the work as well as further research that may follow on or that is suggested from the study.

In Addendum 1 a quantitative and qualitative description of all Archaic Ionic capitals up to 489 BC and of Ionic buildings up to 525 BC is provided in spreadsheet format, together with data of relationships between elements of the capitals and buildings.

In Addendum 2 there is illustration of quantitative and qualitative aspects of the Archaic Ionic capitals.

CHAPTER 2 DESCRIPTION AND ORDERING OF RELEVANT ARTIFACTS

Sub problem 1: To describe and chronologically and geographically order relevant artifacts of the Archaic Ionic Order, Ionic votive column and their pre-forms.

Hypothesis 1: Current data regarding a *corpus* of early Ionic capitals may be increased and augmented.

2.1 INTRODUCTION

During the compilation of the catalogue of Archaic Ionic and other relevant capitals, together with data related to their immediate built or sculpted context, the author came deeply under the impression of the commitment to methodic completeness and accuracy that standard works of the likes of Drerup (1969), Jacob-Felsch (1969) and Wesenberg (1971) reflect, and how they keep on being rallying points from which one may venture further into uncharted territory. The usefulness that such tomes have, beyond addressing their authors' immediate pressing academic questions, precipitated in this present catalogue being both preservatory in nature, as well as being directed toward the current question which, if answered adequately, may yet lead to fruitful further interpretation. The desire to offer the catalogue for future use has brought about a description more rich than possibly needed for immediate application.

The process of compiling the catalogue have likewise impressed on the author the toils of earlier minds which, through their unflagging dedication and singlemindedness, have managed to produce the amount of documentation and interpretation which they did, making possible a rich analysis. Like with many artifacts past and present, it was found that some of the capitals have since their initial discovery faded into academic obscurity, whilst others have been the subject of such radical re-interpretation that their initial interpretations, which in a sense become part of the artifacts, are in danger of being forgotten. For this reason attention is given to past interpretation in the description. The author had to overcome an initial action threshold in order to propose alterations to Theodorescu's (LCIG) and Kirchhoff's (EIV) works. Both are impressive and encompassing tomes, but the scope of their work resulted in deficiencies which, through rectification, will hopefully bring their respective good labours to greater fruition. The author had through harsh, but wise, comment to be brought to the realisation that the rigorous pursuit of procedural correctness in the documentation and subsequent typological analyses are not only indispensable for any later connection with interpretations of other cultural endeavours, but the only way to move beyond the high standard of what has already been achieved in the field. If there are to be deviations from this correctness, it is solely due to the existence of current restrictions on the author in visiting the artifacts for rectification. With this in mind the catalogue is completed and offered in humility, in the knowledge of its limitations.

2.2 COMPILATION OF A REPRESENTATIVE DATA BASE

2.2.1 Organisational comments, remarks and assumptions

2.2.1.1 Organisational comments

In this Chapter the concern is the achievement of a model for successfully constructing a representative and ordered data base for analysis of the early Ionic capital, but one which in future work may also be suitable to mesh with and include any Ionic capital. In this process existing ordering models are critically viewed, integrated and augmented to achieve a single integrated model. Furthermore, there is the identification, description and ordering of those artifacts closely connected with the founding of the Ionic capital, which includes buildings, votive columns and capitals. Last entails the identification and description of hypothetically possible scenarios for the existence of a pre-form of the Ionic capital (In terms of the pioneering phase of Ionic architecture and/or the non-architectural form-references for either the whole of, or single elements of the Ionic capital), the few Ionic votive columns preceding those buildings where all the basic components of the Ionic votive column are used simultaneously, Ionic architecture of the so-called founding phase with the architectural Order present in that architecture, relevant contemporaneous Aeolic architecture, and lastly the Archaic Ionic capitals and the other relevant contemporaneous non-Ionic capitals.

The time frame of 625 - 489 BC, used for the detailed description of the Archaic Ionic capital, is based on the postulate that interim canonic form/s of the Ionic capital was/were reached in the the founding era of the Ionic capital between the datum point of a capital in which at least volute, canalis and echinus are combined, up to the achievement of the Classical canonic form thereof, but by the end of the Persian War (490 BC). Whilst the founding era includes the time span from the earliest hypothesised attempts at forming a voluted bracket capital in the early Seventh Century BC to the achievement of canonic form in the Classical period, the first extant stone Ionic non-standard and standard capitals appear in the last quarter of the Seventh century BC, and the capitals after 490 BC are well represented in Theodorescu (LCIG)] and need not be duplicated. For the detailed morphologic-typological study another time frame is used which allows only for the identification of interim canonic form reached in various regions after 75 years of monumental stone building (A so-called 'first generation' or founding phase of the Ionic Order), namely from the architectural datum of 600 BC up to 525 BC. Because it is accepted that various evolutionary types of Ionic buildings lead up to this phase, relevant Ionic pre-monumental buildings from 700 BC on precede this study. It is accepted that in the delineated time frame used in the description of Ionic monumental stone architecture and its capital, various interim canonic stages of the Ionic Order (In the Archaic era at least a column with base, fluted shaft and capital where canalis, volutes and echinus are combined, and various elements of an entablature) were achieved, but not necessarily the canonic form of the total Order.

The description of capitals is followed by a process of geographical and chronological ordering of capitals. Thereafter the immediate contexts of the capitals are introduced, followed by a description of non-Hellenic artefacts deemed to be relevant to the evolution of the early Ionic capital. This presents the body of artefacts from which all further interpretation will occur, and from which various interpretations may be brought in relation with one another. The interpretation of Geometric and Early Archaic architecture in which the evolution of the Ionic Style took place is limited to inquiry into those elements identified as being possible scenarios for the evolution to the Ionic non-standard capital and further to the standard capital.

2.2.1.2 Remarks and assumptions

Any researcher of Classical architecture cannot be but overwhelmed by the sheer vastness of the field of study that has preceded him, the amount of artifacts now available and still becoming available for study, as well as the amount of description and subsequent interpretative debate forthcoming from the archaeological fraternity in this field of study, whilst at the same time being only too aware and dismayed at the continuing dearth of information regarding certain artifacts or key aspects, as well as at the amount of excavation and description and interpretation that still needs to be done. The compilation of a detailed data base of Archaic Hellenic artifacts relevant to this topic is a mammoth task in itself, one mainly fraught with the problem of incompleteness. Although no data base of artistic and architectural elements from an historical era as far back as the Archaic Hellenic can ever be said to be complete (due to ignorance towards, the impossibility or lack of identification of, damage or loss of, avarice and non-availability of elements, etc), the data base in this study purports to be representative at best, although it tries to be as complete as is presently possible in that existing data bases (more specifically re buildings and capitals) are augmented through inclusion of elements/aspects intentionally or unintentionally omitted in existing studies, as well as through inclusion of current archaeological results or arguments. Detailed scrutiny of a very wide sampling of elements is a necessary step towards obtaining a probable, synthesising view, being the objective of this study. However, due to the vastness of the artifactual material that has to be dealt with, the level of detail of the description necessarily varies from item to item. The most detailed description is obviously that included in the *corpus* of Archaic Ionic capitals. The other artifacts are described at a level deemed adequate for the purpose at hand.

The author would like to bring to attention that this data base is the first that provides photographs and/or drawings of all the Ionic capitals, and also the first that provides the quantitative and qualitative description together with the quantitative and qualitative interpretation. The data are provided in full so that those researchers wanting to use it for detailed, geographically bound style recognition or for discerning fine typological trends may easily do so. Furthermore, the data are purposefully provided in a manipulable and open-ended format. The easily re-arrangeable computer spreadsheet format allows all feedback from future research to be introduced by means of re-arranging the chronology or by the re-assignment of capitals in

terms of geographical provenance. Importantly, the chosen format and nomenclature was expressly chosen to allow for the easy addition of Theodorescu's (EIV) data of Classical and Hellenistic capitals (and others') at a later stage, in order that a very wide picture may emerge (Because Theodorescu's abbreviations for capital elements are slightly abstract and not as descriptive as those used by Kirchhoff, his abbreviations are included in brackets [x]). Whilst the author uses many discrete aspects of this data base for interpretations deemed necessary in this study, many others are potentially present within the given format. Because of the author's intention that this work be used as a tool for many purposes, and that this document could be taken beyond its present format by scholars intimately involved with individual artifacts, the tabulated information included in the achieved data base is included in computer-disk format in Excel® 5.0a for MS Windows® 3.11/95 (and also for Apple Macintosh) at the front of the library copy of this study, so that the data can augmented or be reorganised in different sequences at a future date (The prevalently available spreadsheet programme used for the chronological, geographical and stylistic ordering, whilst presenting the author with its own idiosyncratic demands, was chosen in that it may readily be used in the research fraternity rather than those studies which are inaccessible due to cost, complexity of design and duplication (eg that of Theodorescu (LCIG)).

2.3 THE EARLY NON-STANDARD AND STANDARD IONIC CAPITALS

2.3.1 Achieving a representative and ordered data base of capitals

2.3.1.1 Towards achieving a representative and ordered data base of Ionic capitals

The description and geographical, chronological and typological ordering of artefacts are necessary prerequisites for any place- and time-framed inquiry into a specific artistic or architectural enclave, as well as for any related inquiry which involves artifacts from other artistic or architectural enclaves.

The typological ordering of Ionic capitals requires typological interpretation of the artefacts and, amongst others, acknowledgement of their respective form-space contexts - this includes their relationship with their stand [ie the column] and sculptural companion [ie the statue], or in the case of the architectural capitals, with the elements and organisation of their building of origin and, where required, with relevant aspects in their wider built environment [ie the *temenos*]. Because the two most comprehensive studies on the origins of the Ionic capital to date, namely that of Theodorescu (LCIG) and Kirchhoff (EIV), in themselves do not contain a suitably integrated ordering model, Bakker (1992, p.40-59) showed that such an integrated ordering model may be construed from critical evaluation of the validity and relevance of, a reaction to the advantages and disadvantages of, as well as through the addressing of the known *lacunae* in their work, and in addition also taking into account similar work surrounding the Doric Order by Howe (1985). Also, that Betancourt's (1977; hereafter: TES) chronologically and geographically ordered inventory of Aeolic capitals should be

augmented from current research. Assumptions for, and the evaluation, augmentation and integration of those models are here synoptically described.

2.3.1.2 Assumptions regarding datums and dates

It is assumed that there once were buildings in which elements, later deemed to be 'Ionic', were employed, until there was a building in which a group of elements were construed in a specific relationship, which relationship was later called the 'Ionic Style', and of which style the Ionic capital is seen as the 'index marker' of the style (In Modernity this observation was first made by Dinsmoor (1973, p.58)), and of which style the first standard format capital used in an architectural context is called the 'architectural datum'. It is accepted that Ionic buildings evolved through various phases, and that not only buildings with a fully fledged Ionic Order may be called Ionic. It is accepted that the capital of the 'Ionic Style' also appears in other artistic endeavours like votive columns and furniture, likewise having 'artistic datums' for any first appearance in a specific form. Many factors deem it necessary that 'interim datum' points occur in the evolution of the Ionic capital towards a point in which is achieved what is, by mutual definition and subsequent consensus, known as 'canonic form'. Due to the incompleteness of archeological remains claims to exclusive truth re an identified datum, interim datum and canonic form, in the areas of both architectural and artistic endeavour, must be relinquished and the probability of correctness of identified datums seen as relative to the available knowledge at any given point. There are however certain moments in any style development where there is no doubt regarding the factual status of a date of manufacture of an artefact (Due to correlation with factually unassailable or fairly certain extrinsic data), whereafter such a date is identified as an 'established date'. Identification of related precursors and followers of the architectural and/or artistic index marker datums, together with the identification of geographically and chronologically bound style relationships, remain relative to the datums and any established dates. Knowledge of such related precursors and followers is required for typological interpretation of the initiating or formative period of, and of subsequent phases in the style.

In order to increase the dependability and probability of any such interpretation, the chronological ordering of capitals must rely on the most dependable dating available. However, it is accepted that the state of knowledge regarding the subject (together with those with which it is brought into relation) makes the application of factually incorrect dates, with resultant inaccuracy in interpretation, unavoidable. Nevertheless, description in the study of all the motivated, interdependent dates (which dates may in future be improved upon), together with known differing opinions together with references to their sources, as well as clear indication of the few established dates amongst them, is deemed to be an essential part of bringing artefacts in a relation with one another in order that the process of interpretation may be repeatable and made subject to criticism in the continuing recursive process of research on this topic.

From a review of archaeological literature (Of which only some are cited as illustration), the main methods used for dating Ionic capitals up to present are:

- i Analogue comparison between capitals where only intrinsic quantitative criteria (eg Boardman, 1959, p.184; Bammer, 1972a, p.450; Puchstein, 1887, p.18) or qualitative criteria (Alzinger, 1972-3, p.196-211; Möbius, 1927, p.169; Mikocki, 1986, p.139-43; Wrede, 1930, p.197-200) are compared with those of others. Quantitative criteria only rely on 2-dimensional description (Boardman, 1959, p.184; Rodeck, 1896-7, p.93-7) and the qualitative criteria on the existence and form of only singular capital components (White, 1971, p.52).
- ii Contextual comparison between Ionic capitals and related artefacts other than capitals (Alzinger, 1972-3, p.181), inclusion of facts relating to the place of manufacture and/or site or building in which it was used (Wiegand, 1904b, p.257), together with inclusion of paleographic, epigraphic and/or prosopographic data in the correlations (Gruben, 1982b; Ohnesorg, 1982, p.272; Raubitschek, 1940, p.56).

The chance of incorrect dating through the use of method (i) is high (LCIG, p.87). Without external established points, dates drift in a time continuum without anchorage even though they are stylistically related and in chronological order (eg Durm, 1910, p.302; Lethaby, 1917, p.41; Rodeck, 1896-7, p.97). Many of the established points that have been used during the past, in terms of Ionic capitals, have never been re-evaluated in the light of new evidence and have often been used without consideration of extrinsic factors from contextual evidence, leading to unsatisfactory results (EIV, p.10). Because Kirchhoff (EIV, p.7) deems them unsuited to the quest for the origins of the Ionic capital he tries to improve their reliability through more comprehensive analysis. In the evaluation of the ordering models specific comment will be given regarding dating methodology and accuracy, after which further comment and a proposal will be put forward in the integration strategy.

2.3.2 Integration of relevant ordering models

Both Theodorescu's (LCIG) and Kirchhoff's (EIV) ordering models are evaluated in terms of their relevance to the study, representativeness of data, validity of and scientific standard of the framework, completeness, suitability and the extent of context relatedness of descriptive and interpretative criteria, type of and usefulness of interpretation method as well as any *lacunae*.

2.3.2.1 Evaluation of Theodorescu's ordering model

The emphasis in Theodorescu's model is on the geographical, chronological, morphological and eventually the typological ordering of Ionic capitals. His morphological inquiry rests on valid analytical methodology (LCIG, p.11, 165-175). The identification of morphological criteria and the implementation rests on objective standards of research (LCIG, p.5). The validity of the framework and ordering method may be

accepted. The data base is statistically representative of geographical and chronological demography of Classical and Hellenistic capitals (LCIG, p.7) but is lacking in terms of examples of the Archaic era. The quantitative and qualitative criteria try to bring all possible permutations of criteria relating to the capital elements into 3-dimensional relation, as such acknowledging the nature of the artefact (Aptly described in LCIG, p.3, 5; EIV, p.10). These criteria however do not include the relationship between decorative detail and form type, which Theodorescu (LCIG, p.77) indicates as diminishing the worth of his research. (Correlation between the abovementioned aspects may bring insight during identification of experimental and interim canonic types). Further criticism against his model is that the chosen criteria do not reflect the context of architectural capitals.

The most coherent correlations and trends are read from the relationship between intrinsic and typological criteria within a geographical and chronological framework (LCIG, Matrix 5, 7; Fig.4, 5), and also from the identification of trends in morphological development (LCIG, Plate 1, 2). Here one should note that extrinsic criteria may be useful to highlight fundamental differences between groupings. The large geographical zones used in his study (LCIG, Matrix 0, 7, 8) lead to contradictory results (LCIG, p.24). In order to indicate more accurate trends, Theodorescu (LCIG, p.93) indicates that ideally these zones will have to be subdivided into smaller entities, if possible, taking into account known contact between regional design 'schools' (LCIG, p.79, 93). Ordering according to intrinsic criteria within a geographic framework only (See LCIG, Matrix 0) is not suitable for an analysis of the whole, rather for bringing capitals from identified geographical zones into comparison (eg in terms of style identification). Chronological ordering clearly indicates the dominant founding centra connected to the developmental stadia of the capital.

Due to the immense variations between individual capitals the grouping of capitals, in terms of morphological-typological variations, cannot be applied in a rigid fashion. Patterns and results gained from individual groupings must be seen in the light of results gained from other groupings, rather than getting bogged down in the isolated analysis of sets of criteria. Theodorescu's results show a lack of linear typological development in capitals through time, similar to the findings by Howe (1985) for Hellenic architecture as a whole. The ordering of capitals rests solely on the manipulation and statistical compartmentalisation of the chosen criteria. Theodorescu (LCIG, p.79-80) himself acknowledges that there is need for a more complex model which acknowledges the reality [founding context] of the capitals.

In terms of dating of capitals, Theodorescu's (LCIG, p.161-4; Table 1) work shows that he accepted the originating dates of capitals as they were given by their respective modern archeological documentors at the time of their first publication, that he did not look at current re-datings and that he did not take any external factors or other evidence into account. Even though the dates used for many of the capitals may have remained intact over time, by not keeping track with evolving research dates employed by Theodorescu are disputable and demand re-evaluation of his findings. However, in fairness to Theodorescu, many of the capitals have only been dated once, at the time of discovery, and will have to be used similarly by the author.

2.3.2.2 Evaluation of Kirchhoff's ordering model

The emphasis in Kirchhoff's model is on the re-evaluation of existing dates of the capitals, followed by chronological ordering and a restricted morphological ordering. Like Theodorescu, Kirchhoff (EIV, p.10) also acknowledges the 3-dimensional character of the capitals in the analysis of the intrinsic criteria inherent in groupings of capitals from which an evolutionary strand may be shown (EIV, p.1; LCIG, p.vii). Kirchhoff's (EIV, p.236, Tabel 1-2) analysis of the quantitative aspects of intrinsic morphological criteria is less complete than that of Theodorescu (LCIG, Matrix 0), but he adds to the broth, in the sense of acknowledging the architectural context. Kirchhoff's deductions (EIV, p.206) from the analysis of east-Ionian capitals in architectural context (EIV, Table 5) shows the applicational worth in a study of the technical aspects present during the early phase of Ionic architecture.

The lack of comprehensive typological ordering of capitals detracts from the study. Kirchhoff only uses a few of the given dimension sets in the proportional analyses (EIV, Tables 1-5). He motivates this omission by the fact that the analysis was employed for the use of dating capitals, and that any chronological trends are adequately illustrated through the examples used. Kirchhoff's geographical grouping of capitals is very coarse grained. The inclusion of the west Ionic capitals with the Island/Cycladic Ionic group may hamper fruitful investigation of trends. His analysis of quantitative morphological criteria shows strong evolutionary trends in both the Island Ionian (EIV, p.65-72, Table 1) and east Ionian (EIV, p.128-133, Table 3) capitals. These results cannot be accepted due to the known inaccuracies in terms of dating.

His inventory purports to be the most encompassing yet (See EIV, p.1), but there are many omissions. The omitted Attic capitals may be included from Theodorescu's (LCIG, p.163-4) work, as well as from any additional research on the topic. An additional 22 capitals will be included from the work of Theodorescu (LCIG, p.161-4) together with those gathered by the author. (Capitals from Theodorescu deemed to be excluded due to re-dating are discussed under 2.3.3.7). However, Kirchhoff's inclusion of the early, non-monumental capitals (EIV, p.137-9), which were up to then mostly unpublished, is a major contribution to any research on the relationship between the early capital typology and search for possible prototypes (Mistakes in the dating of some of these are dealt with in the author's catalogue). Aeolic capitals are understandably not included in the morphological quantitative analysis, but it may be useful to chronologically and geographically compare the Aeolic and Ionic capitals in qualitative terms, in order to provide a check for the accuracy of the input of typological criteria into the dating procedure. The necessity of inclusion of both torus- and cyma capitals (EIV, p.193-202), as well as the Aeolicising capital types (EIV, p.213-9) in the chronologically ordered inventory is clear from Kirchhoff (EIV, p.202-7, 219-21), as well as from the author's (1992, Chapter 3.1, 3.4.3) earlier work.

In terms of dating Kirchhoff (EIV, p.1, 8), rather than summarily accepting the founding dates from the

archaeological literature like Theodorescu did, additionally tries to date and chronologically order every capital from the same overarching theoretical framework, after which he attempts to correlate the results with external criteria [if available, which is not often!]. Whilst his dating methodology shows up the importance of a broad data base, acknowledgement of context and the use circular feedback in the analytical process through re-interpretation of statistical results, he nevertheless does not follow this method when external criteria are not at hand at the time of ordering. Although one can surmise where he only relies on intrinsic qualitative or quantitative [eg Ion-38, -48, -56, -57, Iver -4] criteria for dating the capitals, he does not expressly indicate exactly what method he uses for which capital and what each capital's dating reliability status is. Also, in later deductions he should have been more aware of the non-factual quality of dates arrived at from such analysis. To show how the dating capitals exclusively from intrinsic criteria may fail, one only has to look at his (EIV, No.3, p.15, Note 58; No.16, p.30, Note 103) dating of the capital of the Naxian *Oikos* interior capital [Ion-24], the Sphinx column from Aphaia, Aegina [Ion-22] and the Naxian *Oikos's* *prostoôn* capital [Ion-5], which Kirchhoff identified as votive, and of which the inaccuracy of date and in function was indicated by Gruben (1989, p.168, Note 15) together with a reprimand around mathematical inaccuracies and the over-reliance on statistical results.

As was to be expected, a comparison of the dates of similar artifacts from both Theodorescu's and Kirchhoff's studies shows marked differences. However, the fact that many of the Early Archaic capitals had to be dated by Kirchhoff from qualitative and quantitative intrinsic criteria only (As stated in many cases the only recourse available), should be seen as at least furthering the debate, and does not diminish the overall worth of his work: he had to deal with the first examples of a style or type, and every researcher who faces this problem with other artifacts will know the difficulties involved - We must note that Kirchhoff's (EIV, p.137, Nr. A) dating of the oldest known stone Ionic capital [Ion-1] has since been vindicated by Gruben's (1989, p.164-9) dating from contextual and epigraphic evidence. The stated nature of Kirchhoff's dating method and its supporting criteria makes it a useable model, but because he could not always apply it fully many of the dates based on quantitative typological data only are not necessarily convincing (In the study dates thus conceived by him are so indicated). Kirchhoff's ascertaining of the datums of the pre-monumental and monumental votive column capitals, the architectural capital, as well as the ascertaining of developmental trends after the initial founding process, should nevertheless still be subjected to future correction from current, relevant research, including this study.

2.3.2.3 Integration of the ordering models

Kirchhoff's model leads to a chronological ordering based on intrinsic and extrinsic criteria of the capitals, but the useful results are not utilised in a system within which trends in the morphological evolutionary stages may be ascertained. Theodorescu's model starts off from a very restricted data base in terms of Archaic Hellenic capitals, together with a chronology gained from unquestioned datings. He does however construe

a very useful system to ascertain those trends. It is put that these two models show mutual 'fit', and may be unified to rectify the deficiencies in both.

Theodorescu's groupings may be used to analyse capitals that are of good standing in terms of their dating, and all undated capitals may be analysed from the results achieved. The two data bases may be joined and the known *lacunae* rectified. This unified, chronologically ordered data base will constitute an encompassing grouping method within which any newly described capital may be brought into relation with others in an objective, systemised and standardised way (Following the lines of Matrix 0 (LCIG)), from which base the morphological datum and evolutionary trends (Following the lines of Matrix 5 (LCIG)) and the typological datum and evolutionary trends (Following the lines of Matrix 7 (LCIG)) may be ascertained, all within the same chronological and geographical framework (Namely Fig.4-5 (LCIG)). Due to their relationship with the founding and evolution of the Ionic Order the known torus-, cyma- and Aeolicising capitals may be included in the chronologically ordered data base.

2.3.2.4 Rectification of *lacunae* in the ordering models

i Theodorescu's model

* *Lacunae* in terms of the small data base as well as the exclusion of extrinsic criteria may be dealt with through inclusion of Kirchhoff's inventory as well as further augmenting by the author, and by inclusion of Kirchhoff's and other's description of extrinsic criteria. Further elaboration in terms of the founding context is included in the body of the dissertation by the author.

* Description of intrinsic qualitative criteria (LCIG, Table 2) must be augmented from those of Kirchhoff (EIV, p.236), as well as from Gruben (1963, p.127, 148) and Koenigs (1979, p.198; 1980, p.66). Furthermore, the criteria must be augmented in terms of the detail description of decorative elements, and inclusion of any known form variants of the Ionic capital. For future integration of Archaic, Classical and Hellenistic capitals into one system it is decided to use Theodorescu's symbols even though they seem abstract.

* Description of intrinsic quantitative criteria (LCIG, Table 1) must be augmented from those of Kirchhoff, namely items 1, 3, 5 and 6 of Table 1 and 3 (EIV, p.237-8, 241-2). It is clear that only the most important dimensions in the capital lay-out need be investigated now. In this study the criteria identified for close scrutiny are: **B:A** [T {*Tiefe Polster insg.*}: L {*Gesamt Länge Kapitell*}], **L:B** [H {*Gesamt Höhe Kapitell - von oberes Kanalis zu unterem Auflager*}: T {*Tiefe Polster insg.*}], **D:E** [V {*Gesamt Länge Volute*}: Va {*Volutenabstand*}], **G:A** [H {*Gesamt Höhe Volute*}: L {*Gesamt Länge Kapitell*}], **H:C** [ød. *unteren Auflagers*: L {*Gesamt Länge oberes Auflagers*}], and **H:A** [ød. *unteren Auflagers*: L {*Gesamt Länge Kapitell*}]. Further criteria regarding the minor divisions of the capital and the volute element are included from relevant research in order to provide data for later research on the evolution of base dimensions in the totality of the capital design and volute construction.

* Geographic groupings (LCIG, Matrix 0, 8) may be divided into smaller zones which acknowledge cultural and political groupings. Capitals may be placed in the matrix according to place of origin rather than place of use.

ii Kirchhoff's model

Apart from those stipulated above, the following rectifications are necessary:

* The data base may be enlarged by identification, description and inclusion of all those capitals not included in abovementioned inventories. Where only certain quantitative data are at hand, hypothetical reconstructions may be attempted within the boundaries of known knowledge of the artefacts. Some hitherto unpublished capitals were photographed by the author with a scaled staff (the manner of their use is described later). Capitals of which no published dimensions or scaled photographs exist, cannot be included in the quantitative analysis. Capitals of which large portions are missing, will nevertheless be included into those parts of the qualitative analysis as is possible.

* The artistic (re votive columns) and architectural data base needs to be increased for contextual analysis of capitals.

* The qualitative criteria need to be enlarged to include aspects relating to the integrated functional or aesthetic nature of artistic or architectural capitals within their setting. (For this study this will be limited to intrinsic criteria).

Note: The above will provide the most comprehensive data base of Archaic Ionic capitals yet. In the spirit of a conservation ethic, in this study the data base will be documented comprehensively in this manner, especially to make it a working reference document for use by others. In the argumentation in the study however, all data will not necessarily be employed, as there will be an endeavour to work with the minimum data required to illustrate the hypotheses. Comment will also be passed re the usefulness or redundancy of certain criteria included in the description.

iii Augmentation of Betancourt's (1977) model for Aeolic capitals

Due to controversial conclusions regarding the relationship between the Aeolic and Ionic capital types as resulting from Betancourt's (1977) study, the author proposes that the Aeolic capitals are added to the chronological and geographical ordering of capitals. Another reason for their inclusion is to exclude the type of confusion surrounding the dating of Aeolic capitals prevalent in many existing founding theories for the Ionic capital, for the express benefit of further research regarding the Ionic capital which includes those same theories in their argumentation. Another reason is to provide the necessary information for any inquiry into the possible reasons for the gradual shortening of the Ionic capital length, as well into the evolution of the design typology construed for the capital-column shaft connection. His work on the typological development and the dates of capitals has to be augmented with that of Martin (1958), and his conclusions re-evaluated in terms of important work done by Kuhn (1986), Radt (1991) and Wiegartz (1994).

2.3.2.5 Approach regarding dating of capitals

As stated in Chapter 1, for the construction of the relative chronology, the author (Like in the work by Howe (IDO)) has to rely on the fruits of specialist evaluation from the archaeological profession as far as the accuracy of the dating of artefacts is concerned. However, like Howe (IDO, p.269), the author also believes that all dates should not be accepted without reserve, and that existing dating methodology should be refined through the use of feedback from typological analyses as well as from current dating from extrinsic contexts of the artefacts. This type of feedback from the archaeological fraternity has already impacted on a few of the incorrect dates that Kirchhoff reached without the benefit of his stated, more comprehensive method. The fact remains that there are very few established dates in terms of Archaic Ionic capitals (They are indicated in this study), and that in many cases the artefacts are completely isolated from a context which could provide dependable clues as to the date of manufacture. An aspect addressed in this study is that there is an attempt to see in which manner these artifacts may be approached and used so that they may be activated to still be useful in gaining further insight, rather than to discard them. In terms of the study at hand though, the author will sometimes have to rely on these type of dates from Kirchhoff's analyses, and also those provided by Theodorescu, where none other are available, but with caution and by trying to link the capitals with extrinsic data. The author will furthermore enter the dating arena (so to speak) by, throughout the ordering process, endeavouring to follow the historical and continuous debate regarding each capital's date of manufacture, and through evaluation (See the capital descriptions following below) search out the most reliable - where possible, in terms of the discussion above - dates for any given artefact, which will hopefully heighten the overall accuracy of the work. In the final discussion of the capitals in Chapter 4, the dating will be critically reviewed. Also, there will be discussion of a few currently undated artifacts, after the ordering process and typological analyses of the main body of capitals are complete. In the typological analyses to follow there will also be an evaluation of all measurable capitals, with a statistical evaluation of the nature and effect of contamination of the results emanating from inclusion of capitals with dimensions resulting from scholarly reconstruction, and those that are very approximate in nature. Where capital dates are contested by multiple researchers, the reader also has the benefit to enter the debate armed with the benefit of the results of the typological interpretation of a series of well dated, well measurable capitals.

2.3.3 Sources, description and dates of Ionic and relevant non-Ionic capitals to 490 BC

The catalogue that follows describes Archaic Ionic capitals up the 490 BC, together with relevant non-Ionic capitals in that time span, in terms of their description sources, accepted dates - accompanied with other dates previously accepted for the capitals concerned - and related debate and inquiry, material, place of provenience, place of current whereabouts, explanatory notes and accuracy status of dimensions. Whilst photographs and/or drawings of all capitals are provided in Appendix 2, the detailed qualitative and

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quantitative description of every Archaic Ionic standard capital is put in Table 2.1 and 2.2 in this chapter. (Exclusions of capitals due to damage, are clearly marked at top left in every Table). In order to provide understanding of the level of exactness of capital dimensions where we are dealing with damaged and reconstructed capitals, the author evaluates the physical state of each capital together with the methodology followed in the reconstruction process (where available), identifies the non-measurable, reconstructed dimensions and the reliability of the information, and proceeds to code the capitals in Chapter 2, Table 2.2 and Appendix 1, Table 1.1, as Green (Dimensions accurate and measurable from the artefact), Blue (Some dimensions not measurable but a responsible and accountable reconstruction), and Red (Too fragmentary or impossible to reconstruct to any degree of probable accuracy, or reconstructed dimensions approximate). Dimensions of capitals which were found to be incompletely documented (in terms of dimensions) are completed by the author where possible, again indicating the accuracy level. Where portions of capitals are missing, reconstruction of those that allow reconstructive work is attempted and included in the illustrations in Appendix 2 (This aspect is dealt with more fully under Chapter 2.3.4). In the case of the non-standard and non-Ionic capitals, limited relevant qualitative and quantitative description is provided in the catalogue text below. All references to sources obtained from the studies of Kirchoff (EIV) and Theodorescu (LCIG) have been checked for accuracy, and where necessary *errata* and possible misunderstandings in their references have been corrected here. Where comments by others pertain to the discussion, they are added. Where sources were unobtainable for use they are indicated with [~] and included in the catalogue, in order to enable further research. Capital types are abbreviated according to types, and are so used in the main body of text. An index for the catalogue of capitals is provided here to facilitate its use.

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2.3.3.1 Stone canalis-type Ionic precursors to the standard Ionic capital

Preion-1 Early Archaic trimmed and rough-hewn unfinished marble, canalis-type, non-standard Ionic capital, from a building [Possibly the Archaic Artemision 'E'; (Bld-14)], Delos. Presently at Delos. Site found: In the the base of the colossal Apollo *kouros* statue next to the Naxian *oikos*.

Origin: -

Date: Before 600 BC (Gruben, 1996, p.64).

Previously the date remained speculative due to the lack of detailed description (See Kirchoff, 1988,

p.176, Note 630), Courby (1921, p.237, Fig.5), Picard *et al* (1924, p.234)).

Description references: Merrit, 1982, p.82-92, Fig.1-2, Plate 12.a-f; Courby, 1921, p.237, Fig.5 [Dimensioned drawing]; Picard *et al*, 1924, p.234; Gruben, 1996, p.64, Fig.4 [3-dimensional scaled sketch].

Notes: According to Courbin (1980, p.29; 1987, p.67, Note 15) the base of the Apollo statue, in which the capital was used as building block, is from 590-80 BC and, to him, was in place by the time the Naxian *Oikos* was built. Courbin does not indicate whether the capital was built into this original statue base [the capital would then be older than 590 BC], or whether it was re-used to fix up the base in later years, but there

is no current research that can prove that the capital was inserted later. Gruben (1996, p.64) is of the opinion that it was in the original base, which helps him (1996, p.64) to date the capital as of before 600 BC.

- According to Courby it was part of the interior of the *Oikos*, but as was shown by Kaster (in Gruben, 1963, p.178), the bearing diameter does not tally with the column top diameter, nor does it tally with the dimensions of the capitals of the *prostoon* (Ion-5), nor with any other known Archaic Ionic architectural capital on the island. The width of the capital is 450, against the 260 of that of the interior of the *Oikos*. It clearly sat on a rectangular column. Wesenberg (1970, p.301) is also sure it did not belong to the *Oikos*.

- Kirchhoff (1988, p.176, Notes: 262) argues in favour of a very early architectural use, namely for an anta/pilaster capital.

- Gruben (1996, p.64) now cautiously apportions it to the supposed prostyle of the Early Archaic Artemision [E] on Delos. However, according to Kalpaxis (1976, p.76) this addition harks from just after 600 BC (Also see Vallois, 1966b, p.48-9); Gallet de Santerre (1958, p.253, 278)), which means possibly in the time between 600-590 BC, which makes for a short lifespan for the Artemision [E], that this was a discarded capital, or that the piece was deemed as important enough to build into the base. In any event the capital indicates that rectangular timber columns were used even at this late time, and that timber and stone were used together quite comfortably.

- The non-standard capital has no echinus, but the intention of painting the echinus on may have existed, but would have no logical reason.

- The capital's narrow bearing plane and its transverse direction precludes it from having carried a sphinx statue.

- The state of completion of the capital and the lack of detailed dimensions precludes the use in any detailed quantified comparative analysis in this study.

Preion-2 Poros non-standard Ionic capital with volutes, positioned on a rectangular timber column of an unknown building, Didyma (Bld-13). Present location unknown. Original Description Register No PM5360.

Site found: Didyma

Origin: Didyma

Date: Ca 600 BC. Gruben (1996, p.63, Note 13) sees the volute angle palmette as very similar to the votive column capital from Sangri (See Ion-1). This he dated to the end of the Seventh Cent BC (Kirchhoff (1988, p.137) also places Ion-1 in the Seventh Cent BC).

Description references: Wiegand, 1941a, Plate 213, F662.A; Wiegand, 1941b, p.149 No.h, piece A; Gruben, 1963, Fig.31, p.138-9, Frgmt.29; Gruben, 1996, p.63, Fig.3 [Scaled drawing *cum* photo - reconstruction]. Also see section 1.2.1 below.

Notes: This fragment of a voluted poros capital was first assigned as Ionic capital from Didyma by Wiegand (1941a, No. A, Fig.F662A; 1941b, p.149). Wiegand saw this capital as being the oldest, known Ionic capital, and previously Gruben (1963, p.139-40)

mentioned that this idea could still be possible. Wiegand believed that the capital had a separate echinus. Even though Gruben (1963, p.140) initially thought that it could have been used on a column, he nevertheless put forward, as more probable, the idea of it being the roof *acroterion* of the *Naiskos I*, or part of a console or stair wall edge. Gruben then dated the capital around or before 550 BC, much later than Wiegand's description as "...höchst altertümlicher.." (1941a, p.149).

- The surface of the volute is flat with a inscribed volute line terminating in a round, sunken but convex eye. From the photograph it is already clear that a cutting compass was used in the execution of the volute line, and that the volute was constructed with 90° arcs. - Gruben's (1996, p.63) latest assignation of the capital, ie as voluted canalis member on a rectangular timber column, is very important and this capital should therefore be seen as a pre-form of the Ionic standard capital.

2.3.3.2 Archaic Ionic standard capitals

Photographs and drawings are provided in Appendix 2.

Full quantitative and qualitative description is found in Appendix 1.

Important note: There are no capitals Ion-2, -3, -8, -33, -47, -49, -70, -71, -79.

Ion-1 Local Naxian marble Ionic capital of a votive column (Col-1) dedicated to Apollo, from the Demeter and Apollo sanctuary, [at Marmaria (now Gyroula), close to] Sangri, Naxos. Naxos Museum, item No.8. Site found: Prothesis of Ag Georgios Lathrinos, Garoula [Sangri], Naxos.

Origin: Naxos

Date: At the end of the Seventh Cent BC (Gruben (1989, p.164) states that he accepts the statements on the epigraphical evidence by Kontoleon [apparently as confirmed by Wörrle]). This is therefore an established date. Other dates: Still in the 7th Cent BC (Orlandos in Kirchhoff, 1988, p.137).

Description references: Picard (*École Française d'Athènes*), 1955, p.293, Fig 18; Gruben, 1989, Column No.A, p.161-5, Fig. 1, 2, Plate 19; Kirchhoff, 1988, p.137, No.A, Fig.3.1; Kontoleon, 1954, p.337, Fig. 11.

Dimensions: Gruben, 1989, Fig.1-2 (Due to the irregular form of the capital the dimensions on the left and right sides, as well as in the plan dimension, differ: An average between the two is used for comparative purposes. The right hand volute D=157, G=193, 1¹=113, 1²=90, 1³=80, 1⁴=67, and the length is taken in the middle of the capital. [In the design there is a search for a design module, seen as an intended, rather than an executed module]).

Notes: Proportion of width:length of capital is *ca* 1:2:3 according to Gruben (1989, p.161). However, a length dimension taken on the capital midline on Gruben's (1989) drawing results in a relationship of 1:2:6, letting us assume that 1:2:5 was possibly the general aim in terms of visual proportion, but that the

metrication was loosely applied.

- The inscription, the date of the end of the Seventh Cent BC (as confirmed by the inscription dating), together with the discovery of the column nearby the Demeter and Apollo sanctuary, the method of erection of the column and the identification of the erection spot, fixes the place of erection as the Demeter and Apollo sanctuary, [Marmaria, close to] Sangri (Gruben, 1989, p.170), and Apollo as the recipient of the dedication (Walter-Karydi, 1994, p.128, Note 9).
Column: See Col-1 in 2.4.1.2.

Ion-4 Fragment of a Naxian marble Ionic capital of a votive column (Col-4). Delos Museum.

Site found: [Delos]

Origin: Naxos

Date: Early Sixth Cent BC (On the basis of the echinus detail and proportional analysis (Kirchhoff, 1988, p.13)).

Description references: Ducat, 1971, Plate 131; Kirchhoff, 1988, p.13, No.1, Fig.1,1; Martin, 1973, p.385, No.6, Fig.12, 13; Vallois, 1966b, p.170, No.7. Dimensions: From Martin's (1973, Fig.13) reconstruction. The total length [A], echinus [Q] and bottom bearing [H] diameter and top bearing length [C] are reconstructed and not reliable, whereas the other dimensions are measurable.

Notes: Ducat (1971, p.387) sees this capital as having had a 10,4 high abacus. However, because the capital façade is flat, the angular enlargements of the volute must be seen as just that. It remains possible, however, that an abacus was painted on, but seen in the light of other examples of this era, that seems improbable. Kirchhoff (1988, p.13) identifies the smooth torus type echinus.

- The column of this capital was grooved (Ducat, 1971, p.387). Martin's (1973, Fig.13) reconstruction shows an angular volute spandrel with no leaves.

Column: See Col-4 in 2.4.1.2.

Ion-5 Naxian marble Ionic capital of a column from the *prostōn* (east portico) of the Naxian *oikos* (Bld-12c).

Origin: Naxos

Date: Just before 550 BC (Courbin, 1987, p.74). Other dates: 560-550 BC (Gruben, 1989, p.168, Note 15). Gruben (1989, p.168, Note 15) uses this example to show the flaws of Kirchhoff's proportional dating system, but Kirchhoff relied more on qualitative detail here. Other dates: Wesenberg (1970, p.300) argues for a date near the end of the Sixth Cent BC on the basis of capital and column proportions. Martin's (1973) earlier date is 575-60 BC, Kirchhoff's (1988, p.15; Based on detail) is the beginning Sixth Cent BC. Apart from Vallois, this capital was assigned to the east portico of the Naxian *Oikos* by Courbin (1980, p.300) and dated as such (530-500 BC)

The function is confirmed by Gruben (1989, p.168, Note 15), who rejects Kirchhoff's (1988, p.15, p.260, Note 103) assignment of this capital to a Delian votive column from the early Sixth Cent BC. Description references: Courbin, 1980, p.103 flw., Plate 24-5, 73.4-6 (*prostōn* capital); Kirchhoff, 1988, p.15, No.3; Martin, 1973, p.389, No.9; Vallois, 1966a,

p.101, No.3 [*prostōn* column base]; 1966b, p.176, No.11 [*prostōn* capital]; Wesenberg, 1970, p.300 [dating, proportions]; 1971, Fig.250 [column base]. Dimensions: Courbin, 1980, Plate 25. Fragment allows for measuring bottom bearing, top bearing to midline, side to midline and bearing-to-bearing heights, as well as accurate dimensioning of echinus diameter. Volute and length dimensions are hypothetical. Courbin's (1980) dimensions are different from Vallois's (Also cited by Kirchhoff).

Notes: The reference in Martin (1973, p.389) is wrong in that it mistakenly allots Fig.18 to this capital [his No.9], whilst it is in fact the drawing of No.10 and 11 (1973, p.390), ie the internal *Oikos* capitals [Ion-24], which correlates with Kirchhoff (1988, No.16) and Vallois (1966b, No.10 [not 11]).

Ion-6 Naxian marble Ionic capital of the Naxian sphinx column (Col-7), Apollo sanctuary, Delphi.

Site found: Between the Athenian stoa, -treasury and Asclepion. Delphi Museum.

Origin: Naxos

Date: 575-60 BC ["570-60 BC, plutôt que de 575" BC] (Amandry, 1953, p.26, 31), but with the acceptance of Gruben's (1993, p.104) assertion that it follows the Iria capital [Capital Ion-7 dated to 570 BC {Building start 580/70 BC}], therefore in the 570-60 BC range [A date also stated by Jacquemin (1993, p.224); Amandry's date is reported by Ohnesorg (1996, Note 28) as 570 BC]. Other dates: 570-60 BC (Courbin, 1980, p.55 Note 4); Courbin (1987, p.68, Note 20, p.69, p.71) later dates the Naxian *Oikos* [*His "Ila"*] to 575 BC, with the Naxian sphinx column 'dix ans plus tard', ie in 565 BC. Gallet de Santere's (1958, p.291) date is 575 BC; Gruben (1965, p.190, Note 32) uses Amandry's date of [575] 570-60 BC, whilst (1989, p.172) remaining sure that it follows the temple at Iria, Naxos (with similar column, capitals and bases) which temple he (1993, p.104) gives a starting date of 580 BC and (1966, Fig.55) a dedication date of 550 BC. Kirchhoff (1988, p.16) dates the capital at 580-70 BC, which corresponds to that of Jacob-Felsch (1969, p.15, 109), namely 580 BC [She gives no explanation for her date].

Description references: Alzinger, 1972-3, p.186, Fig.16; Amandry, 1953, p.1 flw., Plate XI, XII.1-3 [capital and column]; Boardman, 1959, p.199; Jacob-Felsch, 1969, p.109, No.5.2.d [only measurements]; Kirchhoff, 1988, p.16-7, No.4, Fig.1.2; Theodorescu, 1980, p.162, No.23.

Dimensions: From Amandry (1953, p.1 flw., Plate XI). Even though damaged, all dimensions are measurable from capital.

Notes: For the restored middle section of the canal, Gruben (1989) postulates that the canal's bottom bead disappears into the echinus (As Ion-7 of the Dionysos Temple IV, Iria, Naxos), rather than a separated canal (Also see Betancourt, 1977, p.108 [Also the straight canal shown in the drawing by Perrot and Chipiez in Betancourt (1977, Fig.51)]). The volutes and canal have round edges that read as beading. Detailing on the spandrel palmette and volute moulding grooves are sharper than that of Ion-7. Ohnesorg (1996, p.43) argues that the details are a mixture of the Iria [Ion-7]

inner and outer capitals, and therefore later. The cyma is carved out deeper and overhangs the torus moulding of the column top (See Amandry, 1959, p.26), and the 17 cyma leaves are randomly placed.
Column: See detail at Col-7 in 2.4.1.2.

Ion-7a-c Fragment of an indigenous marble Ionic capitals of the Dionysos Temple IV (Bld-3d), Iria, Naxos. Naxos Museum.

Site found: Ag Georgios Gyris.

Origin: Naxos

Date: A date of 570 BC is taken from the following arguments: Ohnesorg (1996, p.41) describes the temple construction start date as ca 575 BC, whilst Gruben (1993, p.104; 1997, p.315) describes its start as ca 580 BC, with its first capitals as from 570 BC (1989, p.172), but before the Naxian Sphinx column (Accepted above as from 570-60 BC). Other dates: 580-70 BC (Kirchhoff, 1988, p.18).

Description references: Amandry, 1953, p.21 Footnote 2, Table 7, No.5-7.[need p.21]; Boardman, 1959, p.199 Footnote 4; Drerup, 1952, p.8 Footnote 9; Jacob-Felsch, 1969, p.188, No.177; Gruben, 1972, p.359 flw. Fig.20a-c; Gruben *et al.*, 1987, p.597-600, Fig.3a-b, Fig.39, item 11, Fig.41; Gruben, 1989, p.161-72, Fig.4, 5; Gruben, 1991, Fig.4, p.71; Kirchhoff, 1988, p.17-8, No.5; Ohnesorg, 1996, Fig.3 [3-dim scaled sketch].

Inner capital 7b: Gruben, 1991, p.66, Fig.4 [perspective].

Outer capital 7c: The fragment of the outer capital is also described by Gruben (1993, p.104, Plate XVIII.1). Dimensions: From Gruben's (1989, Fig.4) dimensioned reconstruction. The fragment is more than half the capital and permitted measurable retrieval of most dimensions, and accurate reconstruction of echinus diameter and volute size.

Notes: Gruben (1993, p.104) shows that the stone Ionic Order finds its form in an architectural context [Ie Delos and then Iria], followed by the artistic [Ie Delphi], whilst the Iria and Delphi works come from the same studio. The capital is predated by the column fragment from Kolonna [Aegina] and the Ionic sphinx column from Aphaia [Aegina], as well as the Naxian *Oikos*.

- According to Kirchhoff (1988, p.18) the capital is not architectural, but Gruben's (1989) architectural allocation and Gruben and Lambrinouidakis's (1987) allocation of item 11 [another capital fragment] is accepted.

- The volute and canalis edges read as beading.

- The disappearing bead at the middle bottom of the canalis, the middle section to Gruben (1993, p.104) appearing as a rectangular block [bracket capital] with two volutes added on [Also Ohnesorg, 1996, p.104, Note 20]. Gruben (1989; 1993) postulates a similar detail for the Naxian Sphinx column capital, whose middle part is a restoration.

- Gruben *et al's* (1987, Fig.41) front elevation has leaf spandrel palmettes; Gruben's (1989, Fig.4) back elevation has drop palmettes, indicating to him progression during the construction process. The author sees this as parsimony and emphasis of frontality. However in Gruben (1993, p.104, Plate

XVIII.1, Note 13) it is stated that the outer capital palmette copies that of Sangri [Ion-1], whilst the inner capital has a 5-leaved spandrel (Ohnesorg, 1996, p.43), definitely then a progression.

- Gruben (1996, p.65; 1997, p.300) provides the motivation for the cult depiction of the temple.

Ion-9 Fragment of a marble Ionic capital of a votive column, Demeter and Apollo sanctuary at Sangri. Naxos Museum, item 27.

Site found: Unpublished

Origin: Naxos

Date: 580-70 BC (Kirchhoff, 1988, p.19). The author indicates similarities with capitals Ion-1, and Kirchhoff (1988, p.19) with Ion-6 and -7a, b.

Description references: Kirchhoff, 1988, p.19, No.7; Kontoleon, 1954, p.337, Fig.10.

Dimensions: None published. Due to this, as well as its damaged state, the capital cannot be used in quantitative comparisons.

Notes: The capital does not have the resolution of detail shown by that of the Naxian Sphinx column and the Iria temple, Naxos, and might thus be earlier. This capital shows concave volute channels and a bearing offset angle spandrel palmette detail which is a refinement of that of Ion-1 (the first example of an Ionic capital with an extension of the bearing surface, roughly in the shape of an angle extension, or maybe an angle palmette), which might indicate an experimental phase between that and Ion-6 and Ion-7a-b.

Column: No detail available.

Ion-10 Parian marble Ionic capital of a votive column (with separated *canalis*) from the Katapoliani church, Paros. Paros Museum, item 775 (München TU No. M70).

Site found: Katapoliani church, Paros.

Origin: Paros

Date: 570-50 BC (Ohnesorg, 1993b, p.113). Other dates: Second quarter of the Sixth Cent BC (Kirchhoff, 1988, p.23), in terms of proportions.

Description references: *Archaiologika Chronika*, 1960, *AEphem*, Chron.1, No.3, Plate B.α-γ; Daux, 1963, p.824, Fig.18-9; Gruben, 1972, p.377 flw., Fig.36a, b; Kirchhoff, 1988, p.22-3, No.9, Fig.1.3; [-] *Prakt*, 1962, p.183, Plate 185; Ohnesorg, 1993b, p.113, Plate XXI.1-2.

Dimensions: Although some dimensions are measured accurately, some are approximate and used for comparative purposes. The dimensions for the length, width and height of the capital, the volute centre to volute centre, the volute top to volute centre, the capital bottom bearing surface diameter, the horizontal overhang of the echinus cyma from the bottom bearing edge, and the top bearing surface length are from measurements taken by the author from the artefact in the Museum, but a tape was used in stead of calipers. The capital top bearing length was taken on the capital centreline. The capital total length was measured on the side where the volute extremity is undamaged, and the measurement was taken from the volute edge to an existing midline pencil mark, and a total dimension constructed by multiplying it by two. The bottom

bearing surface diameter was calculated from the modern stand's circumference [1995], and the echinus diameter by adding the echinus overhang to that. The author's dimensions are not similar to that of Ohnesorg (1993b, Note 16 [ie A=920, B=330, L= 211]). The dimensions in *AEphem* (1960 [ie A=910, B=327, G=295]) also do not reflect the author's measurements. The author has also photographed the capital at an horizontal angle with a telephoto lens, with measuring staff present. The acting Ephor for the Cycladic Region, Mr Kouράρης, has provided permission to publish the photographs and dimensions. He is thanked herewith, and the assistance by the BSA is acknowledged. Only a few smaller dimensions not measured on the artefact were scaled from the photographs, with the measured main dimensions as regulating norm. The author has attempted a reconstruction of the capital front from these photographs. Due to the use of photostatic reproduction slight distortions are inevitable.

Notes: The canalis bottom beading abutting into the echinus top (although the beading adjoining continues here) shows similarity with the Iria capital (Ion-7), detail also postulated by Gruben (1989) for the Naxian sphinx column capital at Delphi (Ion-6). Ohnesorg (1993b, p.113) sees this capital as the oldest Parian standard capital, similar to the Iria capital which is slightly more developed and older.

- From the dimensions the east Ionian foot standard of 346 (This foot standard type ascertained by Gruben (1972a, p.324)) there is reason to think that 1/4 ft could have been used as design module, but Ohnesorg (1993b, p.114) proposes a dactyl grid ordering (of ca 18,35) for the capital, and states that the volute has no precise geometrical construction. The author agrees, and shows the use of the random arc system for volute construction [See Chapter 3.3.4.3.2].

Column: There is no detail re the column.

Ion-11 Naxian marble *ersatz* Ionic capital found in the Competaliast agora, Delos.

Site found: The Competaliast agora, Delos. Delos Museum.

Origin: Naxos

Date: Second quarter of the Sixth Cent BC (Kirchhoff (1988, p.24) based the date on his proportional and qualitative evaluation). Other dates: After 540 BC (From Martin (1973, p.314 and 396*))

Description references: Kirchhoff, 1988, p.23-4, No.10; Hellmann *et al*, 1979, p.103 flw, No.F, Plate XV.79 and XVI.85; Martin, 1973, p.396, No.17; Vallois, 1966b, p.180, No.16.

Dimensions: Martin (1973) gives only few dimensions retrievable from the artefact, and no further reconstruction.

Notes: * Martin (1973) disputes Vallois's designation of this capital to the Naxian Stoa, which is accepted. However, he also believes it to be somewhat younger than those of the stoa (Martin's (1973, p.314) date for the Naxian Stoa is 550-40 BC), which places this capital after 540 BC, and which places Kirchhoff's date a bit too early. Kirchhoff's date is used in this study due to the positioning in a wider range of capital proportions.

Column: No column detail has been published.

Ion-12 Fragment of an Ionic capital of an unknown votive column, Halkipinar-Izmir (Smyrna). Izmir Museum, Basmahane. Item No.712.

Site found: Baths of Diana, Halkipinar-Izmir (Smyrna)
Date: Before or around 520 BC: The statement of '...not older than 520 BC' due to detail [co-existence of eye and concave *canalis*] (Gruben, 1963, p.174 Note 168) may now be slightly altered due to the dating of Ion-74, where these details co-exist. Its date is 550-25 BC. The possible large size of the Smyrna capital's echinus relative to the polster width may also indicate an older age than 520 BC, but because the drawings are not reliable, Gruben's date will be kept for now.

Other dates: Hahland's (1964, p.197) detail related date is 530 BC; Alzinger's (1972-3) date is 530-20 BC (See his Footnote 29 for various other datings, for instance Boehlau and Schefold's (1940-2) date is '560/50 BC, before the Artemision ['D']'. This has now been discounted. Gruben's date is also mentioned). Kirchhoff (1988, p.73) also indicates a date in the second quarter of the Sixth Cent BC, likewise 'determined by dateable detail'. If this date [as Schefold's] of before 550 were to be accepted, this capital would be the first Ionian standard example on the eastern Ionian mainland, which is unrealistic.

Description references: Alzinger, 1972-3, p.183, Fig.13 [Footnote 29]; Hahland, 1964, p.197 Footnote 116, Fig.57; Kirchhoff, 1988, p.73, No.45; Martin, 1944-5, p.361 Footnote 7.

Dimensions: The dimensions are very approximate, only to be used for comparative purposes. The scaled drawing in Alzinger (1972-3, Fig.13) was used by the author for a reasonable reconstruction for purposes of comparison [Alzinger indicates that the bottom elevation is not to scale, but interestingly it shows that the echinus bearing co-incides with the volute inner edge, which makes it possible to articulate this dimension on the scaled elevation, and reconstruct the echinus dimension on the bottom elevation]. If those more reliable dimensions are used, a standard measure of 1ft=291,4 (72,85 qt ft) could have been a module. Notable is that the drawing indicates a big diameter for the echinus, like the Naxian sphinx capital at Delos and the Iria temple, Naxos, which would not be likely at 520 BC. The dimension of the echinus is given, but not used in further calculations.

Note: It is suggested that the piece be measured precisely to ascertain whether the same module as the Aeginetan Sphinx capital, the Naxian Sphinx capital at Delphi, and the Dionysos temple at Iria, Naxos was used.

Ion-13 Two similar large-grained marble Ionic capitals of the Apollonion, Nasos, Aeolis (According to Wiegand (1904b)). Found in the Apollo temple, Maskonisi, island Nasos, Aeolis. Present capital location unknown.

Origin: -

Date: Speculated after 520 BC: Wiegand's (1904b) date is 'nicht jünger als das 5. Jahrhundert v. Chr.', as is Weikert's (1929, p.130). Alzinger is correct in rejecting the link between the capital and the Attic base

in Wiegand's drawing, in terms of the first occurrences of the Attic base in the east Ionian mainland. He justly points out the correspondence of the capital form to the Sixth Cent BC examples from Athens [eg Ion-30 of 530 BC and Ion-35 of 520 BC], which, according to him, must predate this capital; It is here then that we must look for a date, as well as the stylistic link. Kirchhoff's (1988, p.74) date of the second quarter of the Sixth Cent BC is surely optimistic. Because of the enigmatic nature of this artefact, the capital is not included in the chronologically put tables.

Description references: Alzinger, 1972-3, p.201, Fig.36; Kirchhoff, 1988, p.74, No.46; Wiegand, 1904b, p.256, Fig 1.

Dimensions: Kirchhoff provides some dimensions he scaled from Wiegand's drawing: A-645, B-250 C-505, D-188, E-270, G-225, L-175 and Q-350. By overlaying these on Wiegand's drawing the author augmented these, always cross-referencing to the given dimensions. These new dimensions are F-385, H-350, J-80, K-95, alpha-30°. Because the drawing is poor dimensions are very approximate. Due to this (Over and above the enigmatic nature) the capital will not be used in quantitative comparisons. The capital should be redocumented in the future.

Note: According to Wiegand the island is across from present day Ayvalik. This is in historic Aeolia, near Pithane (These capitals should be located).

Ion-14 Medium-grained, Greek (island?) marble Ionic capital of the sphinx column of Kyrene [currently Shahat], found in Shahat [ancient Kyrene], in a disused quarry *extra mura*.

Origin: Probably Thera

Date: 550 BC, or shortly thereafter (White, 1971, p.52). This date is confirmed by the sphinx detail, as well as external evidence (Pedley (1971, p.40-6).

Other dates: Kirchhoff dates the capital to ca 560 BC (1988, p.25).

Description references: Kirchhoff, 1988, p.25-6, No.11; [-] *Libya Ant.*, Vol.3/4, 1966-7, p.190 flw.; White, 1971, p.49 flw., Fig.1, 2 and Plate 10, Fig.5, 6. Dimensions: The dimensions as reported by Kirchhoff (1988) from the good scaled drawing by White (1971, Fig.2) are approximate. The author has further taken the cyma and *canalis* heights, as well as the volute eye-to-edge dimensions from this scaled drawing, which may be used for comparative purposes.

Notes: White gives a good quantitative and qualitative comparison between this capital and the others of the time, as well as indicating the similarities between this and the Naxian sphinx column. The work is apparently imported from an unknown (probably Thera) workshop, or finished in situ by recent Ionian immigrants (White, 1971, p.55). The Kouros and Korai that were found with the capital are of the same marble, and show strong Samian traits, but also local particularities in detailing.

- A module of 73,875 (qt of variation of Solonic-Attic ft= 295,5) or 73,95 (qt of variation of Solonic-Attic ft=295,8) which looks promising [the latter was used in ratios] should be tested to the newly measured dimensions of the artefact.

Ion-15 Model reconstruction from a fragment of a marble Ionic capital of the Lower Temple (Bld-21) at Myus, found in the lower terrace, *temenos* at Myus. Reconstruction and original fragments in archives of Pergamon Museum, Berlin.

Origin: Myus

Date: Around 550 BC (Weber, 1967, p.139). Other dates: Gruben (1963, p.124, Note 79) calls for a chronological link between this building and the Artemision [ie to him app 550-40 BC]. Alzinger's (1972-3) date for the building is just before the start of the Artemision ['D'] temple in Ephesos. The date for the Artemision 'D' is just before 550 BC (Bammer, 1984, p.76 and Fig.84). Kirchhoff's date of ca 560 BC (1988, p.75-6) seems too early.

Description references: Alzinger, 1972-3, p.178, Fig.8; Mace, 1978, p.204-5, No.46, Fig.55-6; Kirchhoff, 1988, p.75-6, No.47; Weber, 1965, p.54 flw.; Weber, 1967, p.137 flw., Fig.5 [drawing side elevation and dimensions], Plate 8.1 [copy of photo of reconstruction];

Dimensions: The capital remains a model reconstruction, and dimensions are not measurable from the original. The main dimensions for the plaster reconstruction were measured by Kirchhoff (1988, Note 222), drawn by Weber (1967 [width]) and also reported by Mace (1978). Those dimensions of smaller elements of the model are more approximate because they were not taken from the model with calipers but are the author's reconciliations of those measurements taken from Museum photo PM643 (Staatliche Museen, Berlin, kindly provided by Dr V. Kästner), the author's own more horizontal photograph of the model elevation [taken with a telephoto lens and with staff present], regulated by use of the published dimensions. Notes: The author thanks Prof. Dr. Heilmeyer, Director of the Staatliche Museen, Berlin, for permission to photograph the capital with a measuring staff present. Also thanks to Dr. H Kienast of the DAI, Athens, for help in this regard.

- The detailed reconstruction of plan dimensions and previously unpublished portions of the column and capital fragment by Weber (1965, p.54-63, Fig.4; 1967, p.128-143, Fig2-6, Table 8.1) vindicates the well-known plaster reconstruction of the capital in the Berlin Museum shown here.

- A Cycladic foot standard measure of 295,5 (?) is proposed as module for the building and capital, but a foot standard measure of 293,75 applies equally well on both.

- In terms of the possible foot standard used [ie 295,5 (?)] a link with Temple 'A' from Paros could be investigated.

Ion-16 Reconstruction from fragments of a marble Ionic capital of the Artemision 'D' (Bld-2d), Ephesos. British Museum, catalogue No.B.49.

Site found: The Artemision 'D', Ephesos.

Origin: Ephesos

Date: Bammer (1984, p.76 and Fig.84) places the building start date before the middle of the Sixth Cent BC. He (1991, p.64) recently presented evidence that the *crepidoma* was complete by 560 BC, making his date very feasible. Other dates: Hogarth's (1908b)

building date was 550-25 BC. Kirchoff's (1988, p.77) dating of the capital is 560-50 BC. Boardman earlier argued for a date in the 3rd qt. of the 6th Cent BC or later, contemporary with the Heraion IV (1959, p.205).

Description references: Alzinger, 1972-3, p.174, Fig.5 [capital only partly restored]; Kirchoff, 1988, p.76-7, No.48, Fig.2.1 [also see No.49]; Pryce, 1928, p.42, No.B.49, Fig.34 [fully restored capital]; Hogarth, 1908a, Plate VI [scaled drawing of reconstruction]; Hogarth, 1908b, p.268 flw., 276 flw., Fig.80; Theodorescu, 1980, p.161, No.1; Murray, *JHS*, 1889, p.5-7, Plate 3.

Dimensions: Dimensions are not measured from the artefact, but gained as accurately as permitted from the large scaled drawings of the reconstruction by Hogarth (1908a, Plate VI [section and elevation]). These were remeasured by the author, and *errata* in Kirchoff (1988) and Mace (1978) were found. Even though the total capital length [A] is hypothetical, the lengthwise fragment of a volute, and over half of the echinus, may permit reasonably accurate identification of a capital-volute-extremity-to-midline dimension. For this reason, as reconstructed capital, Ion-16 is usable in quantitative comparisons, always mindful of its true [uncomplete] nature.

Note: It is accepted that the Hogarth's reconstruction uses fragments that belong together.

Ion-17 Parian marble Ionic capital (with separated *canalis*) of a sphinx or lion votive column dedicated to Archilochos, found in Ag Tris Eklesies, Paros. Paros Museum, item 733 (München TU No M71).

Site found: Ag Tris Eklesies, Paros.

Origin: Paros

Date: Ca 550 BC (Ohnesorg, 1993b, p.114). Other dates: Shortly after 550 BC (Haselberger, 1986, p.213); 550 BC (Gruben, 1989, p.166); Kirchoff's (1988, p.26) date is the second quarter of the Sixth Cent BC. Description references: Daux, 1961, p.846, Fig.24-5; Daux, 1962, Fig.10; Jacob-Felsch, 1969, p.189, No.121; Kirchoff, 1988, p.26, No.12, Fig.1.4; [-] Kontoleon, N. *Aspects de la Grèce Pré-classique.*, 1970, p.35.68 [sic]; Orlandos, 1964, p.190, Fig. 9; Orlandos, 1966, p.255 flw, Plate A; Ohnesorg, 1982, p.289 ff., Fig.1, 11; Theodorescu, 1980, p.162, No.24; Mace, 1978, No.53, p.212-3, Fig.41-3, Ohnesorg, 1993b, p.114, Note 28 [Dims], Plate XXI.3-4; Haselberger (1986, p.213, No.10.1 and sketch).

Dimensions: The length and width dimensions from Orlandos (1966, Plate A) and (1964, Fig.9) cannot be trusted due to differences in his own publications. As Kirchoff (1988, p.26, Note 96), the author uses Haselberger's (1986, p.213) drawing for dimensions [using the right side volute with width of 276,7 for internal volute dimensions rather than the left volute of 279], which drawing has now been further augmented by the author by scaling remaining portions from the drawing [Some dimensions are different to that of Kirchoff]. Ohnesorg's (1996, Note 28) length [912] dimension is also different to Haselberger's.

Notes: The author has augmented Haselberger's highly accurate drawing by reconstructing a possible volute lay-out diagram of the artefact. Haselberger's

(1986, p.213) report that the volutes are not geometrically ordered, but are free spirals within the proportionally ordered whole, is partly correct in that some geometric order is present (A volute lay-out diagram made on Orlandos's drawing would be incorrect, indicating caution in working on rough drawings). The base dimension used as module is a dactyl of 18,44, and D:E:D=3:4:3, A:Q=5:3, D:G:B=5:6:7, K:J:Volute distance below echinus =6:7:5. These ratio's of Haselberger have been utilised in gaining further dimensions, which (apart from B) were controlled on his.

- Ohnesorg (1982, p.289) said this capital and its base was possibly originally dedicated to the poet Archilochos, and later utilised as central cult element in the heroön of Archilochos during the second half of the Fourth Cent BC. Later she (1996, p.114) says it was used as a 6th Cent BC grave dedication, later dedicated to Archilochos.

Ion-18 Parian marble Ionic capital (with separated *canalis*) of a Naxian sphinx column from the Artemision of Delos. Delos Museum, item A583.

Site found: Near the Artemision, Delos

Origin: Naxos

Date: 570-550 BC (Ohnesorg, 1993b, p.113, Note 21), but a little bit after Ion-10 from Paros. Other dates: 560-50 BC (Kirchoff, 1988, p.27). According to Jacob-Felsch (1969, p.113) the votive column was erected in 560-50 BC, and was one of two standing together (The other capital is Delos Museum No. A584: Ion-19).

Description references: Amandry, 1953, p.19 Footnote 1, Plate 15.3, 16.1-3; Jacob-Felsch, 1969, p.112-, No.8.2 [no dimensions]; Kirchoff, 1988, p.27, No.13, Fig.1.5; Martin, 1972, p.311, Fig.6; Martin, 1973, p.387, No.7-8, Fig.14-7 [Dimensions]; Theodorescu, 1980, p.162, No.26; Vallois, 1966b, p.171, No.9.

Dimensions: Reported by Martin (1973, Fig.17) as part of his reconstruction.

Notes: It is remarkable that this Naxian artefact is made from Parian marble (See Ohnesorg, 1993b, p.113). Jacob-Felsch (1969, p.113) indicates that the base and column were similar to the Naxian sphinx column at Delphi.

Ion-19 Second Parian marble Ionic capital with separated *canalis*, of a Naxian sphinx column from the Artemision of Delos. Delos Museum, item A584.

Origin: Naxos

Date: 570-550 BC (Ohnesorg, 1993b, p.113, Note 21), but a little bit after Ion-10 from Paros. Other dates: 560-550 BC (Kirchoff, 1988, p.28); According to Jacob-Felsch (1969, p.113) the votive column was erected in 560-50 BC, and was one of two standing together (The other capital is Delos Museum No. A583 [See Ion-18]).

Description references: Amandry, 1953, p.19 Footnote 1, Plate 16.4-5; Kirchoff, 1988, p.28, No.14; Vallois, 1966b, p.171, No.10.

Dimension: The few remaining dimensions from Kirchoff (1988, p.28) are: D=383, G=498. Capital cannot be used in quantitative comparisons.

Notes: It is remarkable that this Naxian artefact is

made from Parian marble (See Ohnesorg, 1993b, p.113). Jacob-Felsch (1969, p.113) indicates that the base and column were similar to the Naxian sphinx column at Delphi.

Ion-20 Naxian marble Ionic capital of a votive column with engraved marks, Delos.

Site found: The theatre, Delos.

Origin: Naxos [?]

Date: Approximately 560 BC (Martin, 1973).

Description references: Martin, 1973, p.382, No.5, Fig.9-11 [drawings]; Theodorescu, 1980, p.162, No.27; Vallois, 1966b, p.168, No.3 [description, dimensions].

Dimensions: Martin, 1973, Fig.11. There are big discrepancies between Vallois's measurements and those of Martin. The author has used those in Martin's reconstruction, and has corrected the mistake of the vertical dimensions of the volute centre in Fig.11.

Note: Echinus leaves are elongated and articulated with grooves only. The canalis has a triangular bottom.

Ion-21 Fragments of an Ionic capital from the acropolis, Athens. Pergamon Museum Archives Item SK997.

Site found: Acropolis, Athens.

Origin: Athens

Material: Unpublished

Date: Just before the Kallimachos column [See capital Ion-62] of 489 BC (Raubitschek, 1938, p.170).

Description references: Puchstein, 1887, p.6-7, Fig.2 [scaled dwg]; Raubitschek, 1938, p.170, Fig.27 [photograph]; Mace, 1978, p.164-5, No.10, Fig.126-7; Altenkamp, 1991, p.485, Fig.2 [From Raubitschek].

Dimensions: Even though some dimensions may be taken from the author's photograph, they cannot be used in quantitative comparisons due to the extremely damaged state of the capital.

Notes: Photographs are published with kind permission of Prof. Dr. Heilmeyer, Director of the Staatlichen Museen, Berlin. Thanks also to his member of staff, Dr. V Kästner, and to Dr. H Kienast of the DAI, Athens, for help in this regard.

- The Lesbian cyma is carved in low relief. The canalis is flat, but edged with rectangular border.

Ion-22 Fragment of an indigenous Poros Ionic capital of a votive column (Col-5) from the sanctuary of Aphaia, Aegina.

Site found: The cistern in the *temenos* at Aegina

Origin: Aegina

Date: Gruben (1965, p.207; 1989, p.169, Note 25) sees the votive column as a very early Ionic example of the beginning of the Sixth Cent BC, and the start of the monumental type of votive column [It is however preceded by a column with unknown top part, at Kolonna, Aegina]. Gruben's date is supported by the Kolonna evidence. Other dates: Kirchhoff (1988, p.22, Note 73) dates the Aeginetan Sphinx capital [Ion-22] to ca 550 BC with the help of capital Ion-10, and due to the inclined volutes, but his date is not accepted. Description references: Alzinger, 1972-3, p.199,

Fig.31; Gruben, 1965, p.170, 180, Fig.1, 2, Table 2, 3 and Appendix 68-70; Kirchhoff, 1988, p.19, No.8.

Dimensions: From Gruben's (1965, Table 2) reconstruction drawing. Dimensions A, C and D cannot be measured from the artefact, but A and D are redeemable due to the existing volute spiral.

Notes: Gruben (1965, p.198, Note 48) attests that the sphinx that he uses in the reconstruction, namely the one from the "Aphrodite" [actually Apollo] sanctuary at Kolonna, was of Cycladic origin: (As apparently confirmed by K.Schefold). Walter-Karydi (1987, p.49) however sees the sculpture as being an Aeginetan work, but she (1994, p.128 Note 6) does see the column as being Ionic in detail [fluting] and nature [She is adamant about a column at this time carrying a sphinx]. According to Kirchhoff (1985, p.21-2) and Gruben (1965, p.207) the Aeginetan capital was an indigenous creation, with recognisable Cycladic and east-Ionic (in this case Chiotan) stylistic influences.

- The capital is the earliest example with inclined volutes (Used for optical reasons, according to Gruben (1965)).

- The quarter foot of a 291,25 foot standard seems to provide a module for the reconstruction drawing of the capital, as well as the column shaft height, and is similar to that of the Naxian Sphinx column at Delphi [Ion-6] and the Dionysos Temple at Iria, Naxos [Ion-7]. This analysis should be tested to other portions of the artefact. If this is true it would, together with similarities with early Cycladic column fluting design and the use of Cycladic marble for the sphinx, be an indication of Cycladic collaboration in the artefact.

- Gruben (1965, p.198) reports a Doric 324 foot measure used for Temple II of 570 BC; A few of his given capital dimensions allow for a qt. ft of 82 (1ft = 324) to be seen as base dimension.

Column: See Col-5 in 2.4.1.2.

Ion-23 Reconstruction of a fragment of a marble Ionic capital of a votive column, Thasos. Thasos Museum, item 217.

Site found: Wall B, bastions of the centre entrance of the Acropolis.

Origin: Thasos

Date: Middle Sixth Cent BC (Kirchhoff, 1988, p.28-9) due to similarities with capital Ion-18 [560-50 BC {Kirchhoff, 1988, p.27; Jacob-Felsch, 1969, p.113}].

Description references: Kirchhoff, 1988, p.28-9, No.15, Fig.1.6; Martin, 1972, p.303, Fig.1-3 [Dimensions].

Dimensions: From Martin's (1972, Fig.2) reconstruction.

Notes: Kirchhoff (1988, p.29) thinks that, due to form similarities with the Naxian sphinx capital [See Ion-18], this capital might have had a separated *canalis*.

- The echinus has an astragal fixed to its bottom

Ion-24 Reconstruction of a fragment of a rough-granulosed marble Ionic capital of an interior column (and tristyle in-antis façade*) of the Naxian *Oikos* (Bld-12b), Delos.

Site found: East and adjacent the *Oikos*

Origin: Naxos.

Date: A date of before 580 BC is accepted. The dating of the building and its capitals are hotly debated: 575 BC (Courbin, 1987, p.68 Note 20, p.69); Ohnesorg (1996, p.41) dates it to the beginning of the Sixth Century BC; Gruben (1996, p.70) to before 580 BC (See notes below, and also the author's comment in Chapter 4). Other dates: Kirchhoff (1988, p.30, Note 103) rejects circumstantial evidence and dates [Gruben (1989, p.168, Note 15) rejects his method and date] it to ca 550 BC based on proportions only. Gruben (1989, p.172 and also Note 29 for dates) accepts the building date as beginning Sixth Cent BC, or the 1st quarter of the Sixth Cent BC (1989, p.168 Note 15), and lastly (1996, p.70) as before the Dionysos temple IV, Iria, Naxos, which he dates to 580-70 BC.

Description references: Courbin, 1980, p.51 flw., Plate 6, 49\1-5[*capital]; Martin, 1973, p.390, No.10, Fig.18 [**description and dimensioned drawings]; Kaster in Gruben, 1963, p.177 flw., Fig.47 [***Dimensions]; Kirchhoff, 1988, p.29-30, No.16; Theodorescu, 1980, p.162, No.25; Vallois, 1966a, p.101, No.2 [internal column base]; 1966b, p.177, No.12 [description internal capital]; Ohnesorg, 1996, p.41, Fig.1 [Acceptance of Kaster's work].

Dimensions: From Ohnesorg's (1996, p.39 [Ref], Fig.1) publication of Kaster's [app. 1962] reconstruction. His dimensions can only be approximate due to the bad condition of the capital (There are wide differences between Kaster's and Martin's dimensions). The indication of a possible design module (based on a module that could be probable for other parts of the building), remains hypothetical.

Notes: Kaster's opinion that the capital might have had an abacus is confirmed in Courbin (1980, Plate 6) and Ohnesorg (1996; Kaster's drawing). Kaster's (1980, p.180) volute [D] : dist btw volutes [E] ratio of 1 : 1 is confirmed by Ohnesorg (1996, p.41 [her Va : V]). The volute spirals were lightly carved or drawn on, but due to the condition of the capital no accurate deduction is possible. The echinus is a "hanging" smooth Ionian cyma. The existence/form of the spandrel palmette, part of the echinus, is unclear.

-* Courbin's (1987, p.71) argument that the outside in-antis west façade and the inside colonnade capitals are similar and contemporary, is accepted.

-** Martin's (1973, Fig.18) reconstruction is not used.

- *** Column and parts of the capital reconstructed by Kaster (Drawing in Gruben (1963, p.177-82, Fig.38 [Here by Gruben], 47-8). The volute widths differ from Vallois (1966a) and Martin (1973).

- The plan ordering device seems to be a rectangle across [2,5 : 3].

Ion-25a Reconstruction of a damaged Naxian marble Ionic capital of the Naxian Stoa (Bld-22), Delos. Delos Museum, item A7672.

Site found: South of the Agora of the *Competaliasts*, Delos.

Origin: Naxos.

Date: Martin's (1972, p.314) date is 550-40 BC. Others: Kirchhoff (1988, p.34) indicates that all the capitals originated in the Third quarter of the Sixth

Cent BC.

Description references: Alzinger, 1972-3, p.186, Fig.17; Kirchhoff, 1988, p.31-2, No.17; Martin, 1972, p.314, Fig.7; Martin, 1973, p.392, No.12, Fig.19-21; Theodorescu, 1980, p.162, No.28; Vallois, 1966a, p.101, No.4 [Column]; Vallois, 1966b, p.179, No.14; Hellmann *et al*, 1979, p.103 flw., No.A. [Also photographs of the whole group].

Dimensions: From Martin's (1973, Fig.20) reconstruction. His drawing has a reconstructed bottom diameter that is much too big (Martin's (1973, No.12, p.392) written dimensions also indicate 260) if compared to Vallois's (1966a, p.101; 1966b, p.179) top of column [255], and capital bottom diameter [250] dimensions. Because Hellman *et al*'s (1979, p.104) list of (Vallois's) capital dimensions show a range of 255-270 [Column diameters differ], a diameter of 255 [as Vallois's] is used in the comparisons of capitals. There is a problem in that the dimensions of the fragment used by Martin have not been published, and comparison with the reconstruction is not possible. He also does not explain how he obtained the dimensions, even though there are a few capitals. On the whole, the dimensions of the series differ slightly (See Kirchhoff, 1988, p.31-5; Hellman *et al*, 1979, p.104 table), and there is a variation of 1/7 between the min. and max.capital lengths. This gives an idea of the accuracy level of the reconstruction, as well as of any found base dimension. Conclusions from analyses of dimensions of Ion-25a should be seen in this light. Because the Delian foot of 330 (1"=27,5) has been identified as base dimension by Hellman *et al* (1979, p.111) for the whole building and the capital, it is so used and indicated in the analysis of the capital.

Notes: Capitals Ion-25a-f (Kirchhoff, 1988, No.17-22; Also in Hellman *et al* (1979) belong to the same building and will not be described here.

- There is a small angle at the volute-top bearing plane junction. The two sides of the capital have differing volutes: The volutes in Hellman *et al* show a wider channel and fewer turns.

Ion-26 Reconstruction of a fragment of a white marble Ionic capital of the temple of Apollo Phanaios (Bld-26), Phanai, Chios. Present location of fragment No.29 unknown.

Site found: From the site.*

Origin: Chios

Date: Boardman's (1959, p.184) date for the capital is 525-500 BC (The building in the third quarter of the Sixth Cent BC, and 525-500 BC for the capital, due to features more advanced than those at Ephesus and Samos (Boardman, 1959, p.183, Table p.184)). Other dates: Third quarter of the Sixth Cent BC (Kirchhoff, 1988, p.83, p.323 Note 677).

Description references: Alzinger, 1972-3, p.187, Fig.18; Boardman, 1959, p.170 flw., p.180 flw., Fig.4, Plate XXVIIa, b; Kirchhoff, 1988, p.82-5, No.50; Lamb, 1934-5, p.142 flw., Table 30c, d., [Fig 6d?]; Theodorescu, 1980, p.162, No.34 [See Boardman, 1967]; Kyrieleis, 1978, p.385 flw.; Kyrieleis, 1980, p.336 flw.

Dimensions: Kirchhoff gives dimensions from Boardman's (1959, Fig.4) unscaled reconstruction

[with approximate overall dimension]. For comparative purposes this is further augmented with dimensions scaled off by the author. The dimensions are approximate. Note that the abacus height is unknown because it has been lost.

Notes: *Currently the temple site is under the Basilica Church and a modern chapel.

- The plan ordering device is a rectangle rather than Theodorescu's (1980, Table 2, Plate 4) square.

Ion-27 The Naxian marble Ionic so-called "Nieborów" capital, most probably belonging to the Propylon II, Delos [Connected with Ion-32 and Ion-48]. Warsaw Nat Museum, item Nb2570MNW.

Site found: The locality of Lowics.

Origin: Gruben identifies it as Delian [Mickoki deems it hailing from Naxos or Delos].

Date: 520-500 BC as for Ion-32 (Gruben (1997, p.368-9). Other dates: The capital which is similar to the early island Ionian types but with strong Athenian influence, based on the proportions and form properties of the capital and in comparison with others, is dated by Mikocki to 500-470 BC (To him certain form properties are 'more advanced' than the others' dated to the Sixth Cent BC). Gruben sees this date as marriagable with that of the corner capital Ion-32. With proportions only, the date as per Theodorescu's system (1980) would have been 480-60 BC (1986, p.141-3). Kirchhoff (1988, p.228) dates the capital to the third quarter of the Sixth Cent BC, based on the proportions.

Description references: Kirchhoff, 1988, p.228-9, No.N1; Mikocki, 1986, p.137 flw., Fig.1-3; Gruben, 1997, p.369-71.

Dimensions: Most dimensions are retrievable from the artefact except the volute height which is approximate on Mikocki's (1986, Fig.1) reconstruction of it. The volute channel bottom bead dimension, echinus diameter and volute width were scaled off and added to his dimensions. Gruben's (1997, p.371) report of Mickoki's dimensions are not exactly similar to his.

Notes: Gruben (1997, p.369) lists the affinities between this, the corner capital and the Pheia capital and his reasons for apportioning them to the same building. The inner façade has a concave canalis, the outer convex.

Ion-28a-b Reconstruction from six fragments of the marble Ionic capitals of the Archaic Didymeion (Apollo) temple, Didyma (Bld-6d). Pergamon Museum, Berlin.

Site found: On the temple site.

Origin: Didyma

Date: The date for the Archaic building and terrace wall is 550 BC onwards, according to Tuchelt (1991, p.21), with detail of the terrace dated to 540 BC. The date for the capital is *ca* 540-30 BC, because the frieze is from 530 BC onwards (Schattner, 1996, p.41). Other dates: Gruben's (1963, p.176) date is between 540-20, based on built form and sculpture of the temple. He mentions that there is no established date (He (1963, p.164) also gives 530 BC as an approximate date). Kirchhoff's date is 540-30 BC (1988, p.86).

Description references: Ion-28a (Standard): Alzinger, 1972-3, p.178, Fig.7; Gruben, 1963, p.115 flw., Fig.16-9; Kirchhoff, 1988, p.85-6, No.51 [No.52: See Ion-82]; Theodorescu, 1980, p.161, No.8.

Ion-28b (Corner): Gruben, 1963, p.131 flw, 159 flw, Fig.22 [Underside diagonal volute], 41,42 and 43a-b; Kirchhoff, 1988, p.208, No.EK1.

Dimensions: Gruben (1963, p.118, 127) indicates that the fragments allow for ascertaining detail and design module (eg from the existing column diameter and volute width. The dimensions used are from Gruben (1963, p.127), which are reconstructed, design dimensions, rather than executed dimensions. His dimensions mostly occur within a maximum tolerance of 1,0% from the modular ideal, and for deducted dimensions up to 1,75%, last (according to Gruben) well within the accuracy range possible in reconstructions. Even though they are hypothetical, the clarity in these dimensions is reflected in the design of the building as a whole, and will be used as such.

Notes: The square plan ordering device as Gruben (1963, Fig.21) and Theodorescu (1980, Plate 4), and the use of the 349 Samian foot in Gruben (1963, p.127). Gruben (1963, Note 70) indicates that, due to the canalis-volute junction, the volute spiral is not ordered mathematically or by circle constructions, to him an example of artistic freedom in aesthetic matters. The author has constructed a geometrical ordering device (Chapter 4, Fig.4a.16), which should be tested on Gruben's (1963, Fig.16) 1:7,5 drawing.

- Gruben (1963, Fig.41-2) uses types of corner capitals and models of a corner capital to show that the remaining fragments actually make up part of a capital with diagonal volutes.

Ion-29 Fragment of a white marble Ionic capital of an unidentified temple, found in the Bysantine aquaduct, Selçuk [Ephesos]. Selçuk Museum, Item KA1.

Site found: The Byzantine aquaduct, Selçuk.

Origin: Ephesos

Date: Both Kirchhoff (1988, p.87) and Theodorescu (1980, Table 1, No.2) date the capital to 550-25 BC.

Description references: Alzinger, 1972-3, p.175 flw, Fig.6a; Bammer, 1972a, p.440 flw., Fig.1-11; Kirchhoff, 1988, p.87, No.53; Wilberg, 1906, p.232, 234, Fig.199; Theodorescu, 1980, No.2; Mace, 1978, No.40, Fig.70-5.

Dimensions: Extant dimensions are from Bammer (1972a, Fig.11), with volute dimensions scaled from Wilberg's (1906, Fig.199) reconstruction. The length, height and echinus diameter of the capital are therefore hypothetical.

Note: Theodorescu wants to link the capital with the Artemision 'D' (1980, p.161). Bammer indicates a strong influence in terms of form and detail but does not classify it as part of the Artemision finds, and Kirchhoff doesn't mention the link.

Ion-30 Poros Ionic capital of a votive column (See Kawerau, 1907, Fig.1), Athens. Acropolis Museum, item 3655

Site found: Acropolis

Origin: Athens

Date: Little bit older than 530 BC (Raubitschek, 1938, p.166); Not before 530 BC (Boardman, 1959, p.206); Ca 530 [Type B] (Jacob-Felsch, 1969, p.34, Note 106.1). Other dates: The date of "die erste Zeit des 6. Jahrhunderts" by Kawerau (1907, p.206) [and 540-30 BC by Theodorescu (1980, Table 1, No.44)] apparently cannot be sustained: Boardman (1959, p.206 and Note 6) argues that Athenian capitals with connected volutes do not appear before 530 BC. One must still consider the validity of this statement in the light of findings relating to the proposed connection between the column identified by Raubitschek (1949, No.1, p.5) and the capital figured by Wiegand (1904a, p.172-3, Fig.172).

Description references: Alzinger, 1972-3, p.195 flw., Fig.25; Kawerau, 1907, Fig.1-4, Plate IV [scaled drawings]; Raubitschek, 1938, p.166-7, Fig. 24; Theodorescu, 1980, p.163, No.44; Puchstein, 1887, p.12, Fig.9 [scaled drawings].

Dimensions: The dimensions are approximate, scaled from Puchstein's (1887, Fig.9 [capital]) and Kawerau's (1907, Fig.1 [column]) reconstructions. One takes note of Raubitschek's (1938, p.166) insistence that the diameter of both the echinus and decorative piece at the column top is 240. The column flutes are deep and the flat arris, probably a first, is used (See shaft in Raubitschek (1938, Fig.24)).

Notes: The 328 'Phaidonische Fuß' as mentioned by Drerup (1937, p.234) mostly used in all early Attic capitals, was tried on the approximate dimensions gained from the drawings and it fits well (Only the length of the capital however might have been a bit shorter, ie 2×228 (width) = 456, in stead of 464). It is therefore proposed that this capital be accurately measured and this finding tested.

- The hexagonal plan ordering device is mentioned by Theodorescu (1980, Table 2).

- This is not the large, famous poros capital from the acropolis (See Raubitschek, 1949, No.1, p.6) which is deemed by him to be as old as the Aeginetan sphinx capital and the Naxian sphinx capital at Delphi.

Ion-31 Reconstruction from a fragment of an Ionic capital of a votive column, Selinus. Palermo Nat Museum, item 324.

Origin: Selinus

Material: Not published.

Date: Theodorescu's (1974, p.46) date, from a typological comparison, is the "end of the Sixth and the beginning of the Fifth Cent BC", and also 510-480 (?) BC (1988, Table 1, No.78).

Other dates: Due to the large volutes Kirchhoff's manufacture date is the last quarter of the Sixth Cent BC (1988, p.36).

Description references: Kirchhoff, 1988, p.35-6, No.23; Theodorescu, 1974, p.13, paragraph 2.1b capital No.II, Plate III, Fig.4, and XII Fig. 5, 6; Theodorescu, 1980, p.164, No.78.

Dimensions: Dimensions used are from Theodorescu's (1974, Plate XII Fig.5) reconstruction. Although the total top bearing-to-bottom bearing height is 345, a measurement of 260 from top-bearing-surface-to-below-leaf-cyma is used for comparative purposes.

Note: The hexagonal plan ordering device is shown by Theodorescu (1980, Table 2). The top of the canal is bow shaped.

Ion-32 Big-crystalline [Naxian] marble Ionic corner capital of the Propylon II outer façade, Delos [And hypothetical standard capital][Connected to Ion-27 and -48], Delos Museum.

Origin: East island Ionian, most probably Naxian (Gruben, 1997, p.368).

Date: 520-500 BC (Gruben, 1997, p.368). Other dates: Earlier Gruben (1963, p.168) identified the capital as Late Archaic. (Theodorescu (1980, p.162) gives a date of 540/10 BC. Kirchhoff's date is the last quarter of the Sixth Cent BC (1988, p.37). Boardman hesitates to assign it to the Sixth Cent BC (1959, p.210)).

Description references: Dinsmoor, 1928, p.133; Martin, 1944-5, p.362 Footnote 4; Roux, 1961, p.343, Plate 91-2; Gruben, 1963, p.168-9, Footnote 159, Fig.44a-b; Vallois, 1966b, p.180, No.20; Theodorescu, 1980, p.162, No.29; Kirchhoff, 1988, p.36-7, 208, No.24/EK2; Gruben, 1997, p.363-72, Fig.49 [det dwgs], 50 [photos], 54 [axonomic].

Dimensions: The author initially relied on dimensions from Vallois (1966b) [as if it were a standard capital] and Mace (1978, No.31, p.182), with volute inner dimensions scaled from the photograph in Roux (1961, Plate 91.2). This unsatisfactory situation is avoided now that Gruben's (1997, p.371) dimensions for his and Ohnesorg's hypothetical standard capital is available (He is also aware of the fact that corner capitals often vary in size relative to the standard, an aspect also dealt with by Koenigs (1979, p.193) and Korrés (1996, p.92, Fig.3-4)). Due to the long history of speculation around this capital, Gruben's hypothetical dimensions are still provided, even though capital Ion-48 obviously now provides the dimensions for an outer capital.

Notes: After a long sojourn it is now accepted that this capital is not from the *Porinos Naos* [As a matter of interest Gruben (1987, p.76) dates the building to the end of the Sixth Cent BC, whilst he (1963, p.168 and Footnote 159; 1997, p.360) identifies the *Porinos Naos* as an *in-antis* temple. Boardman also did not accept the assignation to the *Porinos Naos* (1959, p.210).

- See Gruben (1963, Footnote 159 on p.168) for references of different datings [mostly Late Archaic] as well as different functional assignations [eg Courby (Delos XII) assigned it to the *Propylon*] and (1997, Note 265) for the capital's history.

- Earlier Gruben (1963, p.168) classified the capital as eastern island Ionic with Attic influence, and identified it as the earliest existing example of an Ionic corner capital [but not necessarily the first]. He saw in the exposed upwardly flaring echinus at the inner corner a reflection of a possible early form of corner capital, eg an hypothetical corner capital of the Artemision 'D'. His dating then was that it should be later than the start date for the Didymeion/Apollonion [540-20 BC], but before the date of it's capital [540-30 BC; see Ion-28]. This dating now falls away.

- The plan ordering device of a hexagon is shown in

Theodorescu (1980, Table 2). Gruben (1997, Fig.49) shows the volute ordering diagram. The experimental uncurved diagonal volute is probably the first in the Cycladic region after the east Ionian types (Gruben, 1997, p.369), and of type III designated by Korrés (1996, p.93, Fig.5).

Ion-34 Ionic capital [3852] from the acropolis, Athens. Acropolis Museum, Item 3852.

Site found: Acropolis

Origin: Athens

Material: Unpublished

Function: Unpublished, most probably a votive column.

Date: 530 BC (Raubitschek, 1938, p.166); Ca 530 [Type B] (Jacob-Felsch, 1969, p.34, Note 106.3).

Description references: Raubitschek, 1938, p.166-7, Fig.25.

Dimensions: None published. Capital cannot be used in quantitative comparisons.

Note: Raubitschek links the capital to the Ameinias capital [See Ion-76; Acropolis Museum 3850], with an established date of 530 BC.

Ion-35 Damaged marble Ionic capital of a votive column, Acropolis, Athens. Acropolis Museum. Item No. 3853.

Site found: Acropolis, Athens.

Origin: Athens

Date: Approximately 520 BC (Bormann, 1988b); Ca 530 [Type B] (Jacob-Felsch, 1969, p.35, Note 106.4).

Description references: Bormann, 1887, p.8, Plate 18.1 [not 1988a, Plate 29.2]; Bormann, 1888b, p.276, Fig.17; Trowbridge, 1886, p.25-6, Fig.3; Von Luschan, 1912, Fig.2; Lehmann-Haupt *et al*, 1913, p.469, Fig.2; Braun-Vogelstein, 1920, Plate 3.4; Wurz, 1925, p.97, Note 3, Fig.246a-b; Mace, 1978, No.2, p.152, Fig.104-5.

Dimensions: Dimensions are approximate, only to be used for comparative purposes. Dimensions are provided in Trowbridge's (1886, Fig.3) reconstruction, from which the volute spiral and vertical dimensions were scaled. The [lost] abacus length and depth as scaled from Trowbridge's drawing is a hypothetical exercise [The Bormann and Wurz elevations show where the abacus was sheared off, below the volute connection, begging the question how Trowbridge drew the section showing the shear to be at the top of the volute. Nevertheless, other contemporaneous examples, as well as Wurz (1925, Fig.246 [reworking of Bormann (1887, Plate 18.1)], indicate that Trowbridge's reconstruction is not fantastical]. The echinus is oval on the bearing plane, but has a round sunken socket for the connection of the [round] column. connection. *Errata* occur in Mace (1978, p.152).

Notes: This is not Theodorescu's (1980) capital No.45 [which is another, similar capital referred to by Bormann (1888a, Plate 29.2) (See capital Ion-67)].

- The bottom bearing plane has a female column socket for an oval column. Ovuli are painted on the domed echinus. [possible Pheidonian foot of 328]

Ion-36 Grey island (?) Raubitschek (1949, p.10)) marble Ionic capital of the votive column (Raubitschek, 1934, Fig.4) dedicated to Chairion by Alkimachos. Acropolis Museum, item 124.

Site found: North wall between Propylaea and Erechteion, acropolis, Athens.

Origin: Athens

Date: 520-10 BC (Jacob-Felsch, 1969, p.35, 119; Raubitschek, 1940, p.18). On historical grounds, as well as on the basis of the statue and capital [520-10 BC] a date of 510-500 BC (Raubitschek, 1943, p.18).

Other dates: Kawerau's (1886) date is 520-10 BC. Raubitschek (1949) dates the stander of the column to the last quarter of the Sixth Century BC (on epigraphic evidence), but the statue and capital to the decade 520-10 BC (1940, p.18).

Description references: Alzinger, 1972-3, p.196, Fig.27; Jacob-Felsch, 1969, No.18.2a (capital measurements), 18.2b (column), p.119; [-] Kawerau, G. *AEphem*, 1886, Plate 6; Puchstein, 1887, p.9, Fig.6; Bormann, 1888b, p.284, Fig.26; Raubitschek, 1943, p.17-8, Plate 7.1-3 and Fig 4; Raubitschek, 1949, p.10-1, No.6; Theodorescu, 1980, p.163, No.46.

Dimensions: Due to the state of the capital and method of measuring the dimensions are approximate, but usable for comparison. Those measurable dimensions reported by Raubitschek (1943) [ie A, and B {reconstr}, and fragment top socket-bottom bearing], and Jacob-Felsch (1969) {Similar}, were used as regulating dimensions, after which drawings by Raubitschek (1943, Fig.4) and Puchstein (1887, Fig.6) were reproduced to the same scale [according to the existing regulating measurements] and elements then scaled off. The echinus diameter is hypothetical due to its damaged state. The statue plinth on Raubitschek's side elevation has been drawn to look like an abacus. The author's inspection has shown that he has drawn the plinth incorrectly [there is no abacus]. Jacob-Felsch (1969, p.119, No.2b) mentions a [500 high] plinth connected with the 1100 column, totalling 1600. Notes: The column was offered to Athena in honour of Chairion the Eupatrid (Treasurer), father of Alch[k]imachos (Raubitschek, 1940, p.17).

- The plan ordering device of a rectangle-across is shown in Theodorescu (1980, Table 2).

Ion-37a (See also Ion-37b) Two damaged sandstone (Base and column of limestone) Ionic capitals of the pronaos of the Athena temple (Krauss, 1959), Posidonia (Paestum). Paestum Museum.

Site found: -

Origin: Paestum

Date: 510-500 BC (Kirchhoff, 1988, p.40; Theodorescu, 1980, Plate 1, No.74).

Description references: Benoit, 1954, p.35, Fig.13-4; Kirchhoff, 1988, p.39-41, No.27, Fig.1.7; [-] Krauss, 1948, *Mdl*, Vol.1, p.11, Fig.1.2; Krauss, 1959, Capital I, p.45 flw., Fig.27.1, 28.1 and 3, Plate 34-5; Theodorescu, 1980, p.164, No.74.

Dimensions: Measurable dimensions and reconstruction from Krauss (1959, Plate 34-5). Volute extremities are damaged [but Ion-37b gives clues].

Notes: Krauss (1959, p.43-8) notes the standard foot measure of 328 is inherent in the horizontal and

vertical dimensions of the peripteros and pronaos, including the Ionic capital.

- The plan ordering device of a rectangle-across is shown in Theodorescu (1980, Table 2).

Ion-38 Indigenous marble Ionic capital of a votive column, Thasos. Thasos Museum.

Site found: -

Origin: Thasos

Date: End of the Sixth Cent BC (Kirchhoff (1988, p.42) apparently dated this capital according to his proportional analysis.

Other dates: Martin's (1972) date is 510-480 BC.

Description references: Kirchhoff, 1988, p.41-2, No.28; Martin, 1972, p.308, No.3, Fig.4, 5; Theodorescu, 1980, p.163, No.38.

Dimensions: From Martin's (1972, Fig.5) **reconstruction**. Volutes extremities are damaged. The cyma is lost, and these dimensions are hypothetical.

Note: The plan ordering device of a hexagon is shown in Theodorescu (1980, Table 2). [Test module 291,4]

Ion-39a Fragment of an indigenous limestone Ionic capital of Temple 'A' (Zeus Polios (?)), Histria (Theodorescu, 1968, Fig.16-7). Histria Museum. Invoice No. not published.

Site found: Sector of the Greek temple (Sector "T"), 1956 campaign

Origin: Histria

Date: 500-480 BC (Theodorescu, 1968, p.285 [capitals between 500-490 BC], 382).

Other dates: End of the Sixth Cent BC (Kirchhoff, 1988, p.43).

Description references: Kirchhoff, 1988, p.42-3, No.29; Theodorescu, 1968, p.261-84, No.A1, Fig. 1-4 [capitals], 11 [bases], 14 [column, 15-17 [temple]; Theodorescu, 1980, p.163, No.43.

Dimensions: From Theodorescu's (1968, Fig.4a-d, 11, 14) **reconstruction**. Volute extremities are damaged. Fragment more than half a capital.

Note: Theodorescu identifies a design module of one foot = 328 [qt ft = 80,0], and one dactyl is 20,5. The plan ordering device of a hexagon is shown in Theodorescu (1980, Plate 4). The echinus relief does not continue under the bolster.

Ion-40a Soft Comiso limestone Ionic capital of unknown building type or votive column, Gela. Gela Museum.

Site found: The cistern at the acropolis Molino a venta.

Origin: Gela

Date: Barletta argues that seen with the other architectural elements, as well as based on the proportions, a date at the end of the Sixth Cent BC is indicated (1983, p.249).

Other dates: Theodorescu's (1974, p.39) date is 550-525 BC, but his last revision (1980, Plate 1, No.75) is 525-500 BC; Adamesteanu's (1960) date is 520-500 BC; Kirchhoff's date is late Sixth Cent BC (1988, p.89); Barletta (1983, Note 32) reports other dates [500-450 BC].

Description references: Adamesteanu, 1960, p.79 flw., Fig.4-5; Barletta, 1983, p.245-8, Fig.40; Kirchhoff,

1988, p.89-90, No.55.1; Theodorescu, 1974, p.12 No.2.1: No.I, Plate I, Fig.1, Plate XI, Fig.3 [dimensioned drawing]; Theodorescu, 1980, p.164, No.75.

Dimensions: From Theodorescu (1974, Plate XI, Fig.3). These dimensions differ from those of Adamesteanu (See Barletta (1983, Note 42)). Also note the *errata* in Theodorescu's horizontal volute-to-volute and volute bead-to-centre dimensions. The echinus has a fixed astragal, included in the dimensions. The capital allows for accurate retrieval of all dimensions. Notes: Barletta stresses the Geloan uniqueness of the echinus [elongated vertical ovoli] and extended abacus, and sees it as a purely stylistic device, but points out the similarities in proportion with Samian and northern east-Ionian examples of the late Sixth Cent BC, (1983, p.249-51).

- In terms of function Barletta argues for a prostyle porch (1983, p.245, 247). Adamesteanu (1960, p.81-2) argues for a votive column.

- The plan ordering device of a rectangle-across is shown in Theodorescu (1980, Table 2).

Ion-41 Marble Ionic capital of a votive column.

Private owner.

Site found: Unknown.

Origin: Unknown (Gela?)

Date: Kirchhoff (1988, p.90) connects this capital with examples from Gela, and dates it to the late sixth Cent BC. [See Chapter 4 where this date is revisited after the main analysis in this study].

Description references: Kirchhoff, 1988, p.90, No.56; Sotheby, 1970, p.100, No.174, Fig.174 [Photograph and length and breadth measurements only].

Dimensions: All dimensions must be taken as approximate. The capital was redrawn over the photograph [taken from slightly above] from Sotheby's, and other dimensions scaled from the drawing, taking the given capital length [578 in damaged state] as base measure. The bearing-bearing dimension is app 240, which means that the column drum and bead added below the echinus measures 47. The bottom bearing diameter is not obtainable.

Note: Also see Kirchhoff (1988, p.89, No.55.I and IA)

Ion-42 Reconstruction from fragments of two related sandstone Ionic capitals with marble volute eyes from Massalia (Marseille), possibly of architectural origin (Maybe an Apollonion (Benoit, 1954)). Chateaux Borely.

Site found: 'Pavillion de santé', port of Marseille.

Origin: Massalia (Marseille)

Date: Benoit's (1954) date is 520-10 BC. Benoit (1954, p.35-7) argues for a date after 540 BC [The sack of Phocaia and Ionian colonisation of Massalia], and also between the Heraion IV of 540 BC and the Doric-Ionic temples of Paestum and Silaris from the end of the century. Other dates: The capital is dated to the end of the Sixth Cent BC by Kirchhoff (1988, p.91), and between 520-10 by Theodorescu (1980, Plate 1, No.73). Pedersen (1983, p.111) accepts the Heraion IV capital as the model for this one. We know that the capital of the Heraion IV only came about after 500 BC, and therefore Pedersen (1983, p.111) dates the

Massalia capital to a date after 500 BC (He does not accept Benoit's date). In this study it is accepted that the Massalia capital preceded that of the Heraion IV. Description references: Benoit, 1954, p.16 flw., Fig.1-12, 16; Kirchhoff, 1988, p.91, No.57, Fig.2.4; Theodorescu, 1980, p.164, No.73. Dimensions: All dimensions are by Benoit (1954, p.19-26 and Fig.4, 9, 12) given in his reconstruction drawings. Due to the capital's state the bearing-to-bearing height and volute height remain hypothetical.

Ion-43 Marble corner capital [and hypothetical standard capital] from a temple, Miletos. Milet Museum, item 2285.

Site found: The city area, modern Milet

Origin: Miletos

Date: From historical and proportional considerations Koenigs's date is to the end of the Sixth Cent BC (1979, p.194). Datewise Kirchhoff (1988) quotes Koenigs.

Description references: Kirchhoff, 1988, p.209, No.EK4; Koenigs, 1979, No.2, p.191-4, 198, Tables 62-3, Plates 4-6 [dimensioned drawings].

Dimensions: From Koenigs's (1979, Plate 5) reconstruction for which most dimensions are not measurable from the fragments. Koenigs reconstructs two possible capital heights: Versions A and B, as well as a hypothetical standard capital from the corner capital dimensions. All dimensions used by the author are as Version A standard capital (Koenigs, 1979, p.198). Koenigs shows his reconstruction method for the volute spiral on Table 4 and postulates a total column plus capital height of 6500-8500 on p.194. The module of 1 dactyl = 21,87 in Koenigs (1979, Note 350).

Notes: Part of the cyma is lost, and capital height is hypothetical. Capital length is deduced from the formula for finding the echinus centre posed by Bammer (Koenigs, 1979, Note 16). Enough is left of the volute front and polster to enable accurate reconstruction of these parts.

Ion-44a Fragment of an Ionic capital of a temple, Ephesos. Selçuk Museum.

Site found: The "Door of persecution", St John basilica, Selçuk.

Origin: Ephesos

Material: Unpublished.

Date: Kirchhoff's (1988, p.92) date is around 500 BC. Further, capital No. Ion-44e, was dated to 530-10 (?) BC by Theodorescu (1980, Table 1, No.3)), and Alzinger's (1972-3, p.177) date is 480 BC [Because he links it to the Temple B (now Monopteros III) capitals]. The date of the Temple B capitals is accepted as being soon after 500 BC. This, together with Thieme's tentative dating of the Ephesos capital to ca 500 BC [see comment at Ion-77] leads the author to place it with the Temple B capitals, ie 500 > BC.

Description references: Alzinger, 1972-3, p.177 flw., Fig.6d; Bammer, 1972a, Capital K2, p.440 flw., 446, Fig.18-21; Kirchhoff, 1988, p.92, No.58.

Dimensions: A few dimensions are retrievable [B, E, F, H, M] from the fragment shown by Alzinger (1972-3, Fig.6g) and Bammer (1972a, Capital K2, Fig.21

[Dimensions], Table p.450 [Dimensions]). For limited comparative purposes very approximate dimensions [M, J, K] could be scaled from Bammer (A scaled abacus height of 70 is similar to that of Capital K1, and the maximum echinus diameter is scaled to 530). Kirchhoff reports a maximum capital length gleaned from Bammer (1972a) but no such dimension is given there.

Notes: The capitals were squared off to be re-used as building material, and as a result three-quarters of the volute members, as well as the abacus extremities were lost.

- Although the form and detail of the capitals of the series of capitals by Bammer (1972a, Capitals K1-4 [See Ion-44a-d]) are similar to the other example in Bammer's article, namely Capital KA1, the proportions are quite different.

- One is unsure how Bammer could have overlooked the similarities of the example reported by Alzinger (1972-3, Fig.6f [Wilberg, 1906, Fig.200; See Ion-44e]), and which Theodorescu (1980, Table 1, No.4) mistakingly apportioned to the Artemision 'D'.

Ion-45 Fragment of a marble Ionic capital (Most probably a temple (?)) near Miletos (Yeniköy, Milet). Milet Museum, item 2264.

Site found: Wall, north of Yeniköy, modern Milet.

Origin: Miletos

Date: From the proportions, as well as other statuary found nearby, about in the second half of the Sixth Cent BC (Koenigs, 1979, p.189). Other dates: Kirchhoff (1988, p.230) dates it to approximately 500 BC.

Description references: Kirchhoff, 1988, p.229-30, Nr.N2; Koenigs, 1979, p.187, No.1a, Plate 60.1-2, Beil.2 [capital drawing], 3 [volute drawing].

Dimensions: From Koenigs's (1979, p.198, Beil.2-3) reconstruction. The fragment allows for accurate echinus and volute dimensions.

Notes: Although Koenigs does not exclude the possibility of the capital being from a votive column, the smooth capital top together with the postulated column height of 5500-6000 (1979, p.189) indicates a building in a sanctuary outside the city.

- Koenigs (1979, Plate 2, p.198) shows the method of volute reconstruction and indicates use of a foot measure of 350 as well as a dactyl measure of 21,87 used as module. The volute-offset spandrels are hypothetical, and the capital may even have had an echinus as the small capital Excl-8 below.

Ion-46 A limestone Ionic normal capital and two fragments of limestone corner capitals of the pseudo peripteral octastyle Temple 'D' (Mertens, 1979, Fig.2), Metapontum.

Site found: The old sanctuary, Metapontum.

Date: 500-490 BC: Late Archaic, in the Fifth Century BC (Mertens, 1979, p.128, 138-9).

Other dates: Merten's date corresponds with that of Kirchhoff (1988, p.231), ie the early Fifth Century BC. Pedersen (1983, p.111) accepts the Heraion IV capital as the model for this one. We know that the capital of the Heraion IV probably only came about after 500

BC, and therefore Pedersen (1983, p.111) dates the Metapontum capital to a date after 500 BC. In this study it is accepted that the Metapontum capital originated about simultaneously with that of the Heraion IV.

Description references: Kirchhoff, 1988, p.231-4, No.N4; Mertens, 1979, p.103 flw., Fig.2-3; Mace, 1978, p.200, Fig.136-7 [Photographs].

Dimensions: Accurate main dimensions from Mertens (1979, p.107 and Fig.2), with additions from Kirchhoff (1988, p.231) and Mace (1978, p.200). The author has scaled the *canalis* and echinus heights, as well as volute edge-to-eye distances, from Mertens's good drawing.

Notes: Mertens (1979, p.114-5) describes the method of ascertaining the basic design module (an island-Ionic Solonic-Attic foot variation of 293) and the module for the column centres (the module being the epistyle element = 11/16 of a 293 foot = 201,4).

- The pointed ovoli are grooved in the middle.

Ion-48 Marble Ionic capital of the Propylon II [?], Delos [Standard capital of Ion-32]. Olympia Museum. Site found: The harbour of Pheia, Olympia.

Origin: Cycladic

Date: As Ion-32, 520-500 BC (Gruben, 1997, p.368).

Other dates: Late Archaic piece, date as for the corner capital from Delos [Ion-32] by Mallwitz (1980, p.369. 371); Kirchhoff (1988, p.38.) previously dated it to 525-500 BC, and later (Kirchhoff, 1988, p.231) after proportional comparison with the corner capital, to 500-475 BC.

Description references: Kirchhoff, 1988, p.38, 231, No.25/N3; Mallwitz, 1974, p.108-11, Fig.6 {Provenance. Likeness to Ion-32}; Mallwitz, 1980, p.361 flw., 371 flw., Fig.3, Plate 165-6; Michaud, 1974, p.618 flw., Fig.96; Korrés, 1996, p.95 [Disputes link to Ion-32]; Gruben, 1997, p.363-72, Fig.52-4 [Links capital Ion-32, -48 and 27].

Dimensions: From Mallwitz's (1980, Fig.3) reconstruction, also used by Gruben (1997, p.371). Volute bottom and outer extremities are not measurable from the artefact. The upper surface is damaged.

Notes: There is a bead attached below the echinus. The bearing-to-bearing dimension of 344 includes this element (Dimensions J, K, and L at Ion-48).

- The capital has both concave and convex volutes. The ovoli [pointed] do not continue under the polsters.

- This capital is not part of the Apollo *Porinos Naos* on Delos as previously thought but the outer façade capital of the Propylon II. It shares many of the characteristics of capital Ion-32, a corner capital many thought to also have been from the Delian Apollo *Porinos Naos* but now apportioned to the Propylon II (See capital Ion-32).

Ion-50a Thasian marble Ionic capital of the Temple of Artemis, Neapolis. Kavalla Museum.

Site found: Near the Serapeion, Kavalla (Neapolis), north west of Thasos.

Origin: Thasos

Date: Roux's (1961) date is 500-480 BC. Other dates:

In the second half of the Sixth Cent or early Fifth Cent BC (Bakalakis, 1936, p.11). Other dates: First quarter of the Fifth Cent BC (Kirchhoff, 1988, p.45). Raubitschek (1938, p.163) is of the opinion that Bakalakis's date is too early.

Description references: Bakalakis, 1936, p.1-19, No.1, Fig.10-3; Kirchhoff, 1988, p.45-7, No.31; Theodorescu, 1980, p.163, No.42.

Dimensions: From Bakalakis's (1963, Fig.13 and p.10) reconstruction, which dimensions Kirchhoff (1988, p.45) augments.

Notes: The hexagonal plan ordering device is shown in Theodorescu (1980, Table 2). The back volutes have no eyes.

Ion -51a Marble Ionic capital of the Dionysos temple (Bakalakis (1963, p.34)), Therme-Thessaloniki. Saloniki Museum.

Site found: Bishop's throne of Basilica Demetrios, - Thessaloniki.

Origin: Therme-Thessaloniki

Date: Late Sixth Cent BC (Bakalakis, 1963, p.31). Bakalakis's (1963, p.31) dating is 'Late Archaic', and statues of the late Sixth Cent BC have been found in the deposit. Kirchhoff's (1988, p.49) date is the first quarter of the Fifth Cent BC, and Theodorescu's (1980) is 510-480 BC.

Description references: Bakalakis, 1963, p.30-4, Plate 17, 1 and 17,4; Kirchhoff, 1988, p.47-6, No.32A.1; Theodorescu, 1980, p.163, No.41 [His capital No.41 actually refers to all Bakalakis's examples. See note at Ion-51e on Miletian influences].

Dimensions: Accurate overall dimensions provided by Bakalakis (1963, p.31, Note 3). For an approximate size the column top diameter is used for H; Internal dimensions scaled from his frontal photograph [Plate 17.1] are related to these dimensions, but are approximate.

Notes: This capital's *canalis* is concave, and not convex as in the pronaos. Kirchhoff mentions its relatedness to the capital from Neapolis [see Ion-50], both in form and time (1988, p.49, No.31). Theodorescu's (1980) dimensions differ from that of the reference he uses [ie Bakalakis (1963)]. The octagonal plan ordering device is shown in Theodorescu (1980, Table 2).

Ion-52 Thasian marble Ionic capital of a free-standing anta column of an unidentified temple, Thasos. Thasos Museum, item 213.

Site found: -

Origin: Thasos

Date: Martin's (1972, p.323) date is 510-460 BC.

Other dates: Kirchhoff's (1988, p.50) date is the first quarter of the Fifth Cent BC.

Description references: Kirchhoff, 1988, p.49-50, No.33; Martin, 1972, p.315, No.4, Fig.8-11; Theodorescu, 1980, p.163, No.39.

Dimensions: Martin (1972, Fig.9) provides dimensions, all measurable. The capital is well preserved.

Notes: The hexagonal plan ordering device is shown in Theodorescu (1980, Table 2).

- See Ion 53a-b for a very similar capitals.

Ion-53a Thasian marble Ionic anta capital of an unidentified temple, Thasos. Thasos Museum, item 214.

Site found: -

Origin: Thasos

Date: Martin's (1972, p.323) date is 510-46 BC. Other dates: Kirchhoff's (1988, p.51) date is the first quarter of the Fifth Cent BC.

Description references: Kirchhoff, 1988, p.50-1, No.34; Martin, 1972, p.317, Fig.12 (Capital No.5); Theodorescu, 1980, p.163, No.40 (Theodorescu refers to Martin's Fig.12, but his dimensions don't tally with Martin's).

Dimensions: Martin (1972, p.317) provides dimensions of measurable sections, but approximate volute measurements were scaled from the author's reconstruction drawing based on his frontal [but not corrected] photograph [Fig.12].

Note: The square plan ordering device is shown in Theodorescu (1980, Table 2).

Ion-54 Two volute fragments of an hard lime tuff Ionic capital of the Late Archaic 'Megaronbau' (Boehlau *et al.*, 1940, p.161), Larisa (On-the-Hermos). Izmir Museum (Capitals 17 and 18 from Larisa).

Site found: -

Origin: Larisa (On-the-Hermos)

Date: Late Archaic (Mertens, 1969, p.134; Schefold in Boehlau *et al.*, 1940-2, p.161). Other dates: Theodorescu's (1980, Plate 1, No.16) date is approximately 510 BC, and Kirchhoff's (1988, p.51) date is the first quarter of the Fifth Cent BC (Based on apportionment to the Megaronbau and the relief detail).

Description references: Alzinger, 1972-3, p.182, Fig.12; Schefold in Boehlau *et al.*, 1940, p.125, 161, No.17-8, Plates 20-1; Kirchhoff, 1988, p.51-3, No.35; Theodorescu, 1968, p.267, Plate 1, No.8; Theodorescu, 1980, p.162, No.16.

Dimensions: Dimensions are to be seen as approximate and only used for comparative purposes. Polster and volute dimensions [Except I³] scaled from the excellent drawings by Johannes in Boehlau *et al.*, 1940, Plate 21. All other dimensions are hypothetical, from a reconstruction attempted from these drawings. The curve described by the polster volute channel beads at the bottom of the capital were used to gain a probable centre point. This centre point resulted in a probable capital length [922] coinciding with that [925] posed by Theodorescu (1968, Table 1, No.8). Theodorescu's proposed bottom diameter of 400 is very realistic if it is seen in relation with the scaled capital width of 382. The most contentious part of the reconstruction was the determination of the bottom echinus plane. Rather than taking other capitals' proportions, the author, from a design perspective, took the line horizontal to the end of the upcurled, outside volute bead as a probable reference line for the echinus bearing plane.

Note: The abacus is thin, in the form of a beading.

Ion-55 White big-crystalline marble Ionic capital of a free-standing anta column, Halicarnassos. Izmir Museum, item 3553.

Origin: Halicarnassos

Date: 500-480 BC (Martin, 1959; Theodorescu, 1980, Table 1). Kirchhoff (1988, p.53) dates it to the 1st quarter of the Fifth Cent BC on stylistic grounds.

Description references: Alzinger, 1972-3, p.179, Fig.10; Kirchhoff, 1988, p.53-4, No.36; Martin, 1959, p.65, Plates I, II [*]; Plommer, 1955, p.169, Fig.15, Plate 12a-b; Theodorescu, 1980, p.161, No.14.

Dimensions: All main dimensions are from Martin, R. 1959. *Le Chapiteau Ionique d'Halicarnasse*. *REA*, Vol.61 (1959 [as reported in Alzinger (1972-3, Fig.10)]), augmented by the author with dimensions [K, J] scaled from the drawing, together with a probable but hypothetical vertical volute dimension [G]. The reconstruction drawing by Plommer in Bean & Cook (1955, Fig.15) does not conform to the dimensions by Martin (1959). Dimensions are used for comparative purposes.

Notes: Theodorescu (1980, Table 1, No.14) describes it as the capital of a votive column. The ovoli do not appear on the echinus under the polster. The rectangular-across plan ordering device of the capital is shown in Theodorescu (1980, Table 2).

- Martin (1972, p.323), also quoting Gruben, describes the uniqueness in proportion of this isolated provincial capital.

Ion-56 Limestone Ionic capital used as games table, Tamassos (Nikosia), Cyprus. Nikosia Museum, item 1935/ V 27.2.

Site found: -

Origin: Tamassos, Cyprus.

Date: The date of the early Fifth Cent BC (According to Kirchhoff's (1988, p.54) proportional system, based on a photograph even he identifies as unsuitable) must be seen as very tentative. Other dates: Buchholz (1974, p.558) dates the capital in the Hellenistic period. The discussion by Wright (1992a, p.441-3) precludes the existence of any Ionic capitals on Cyprus before late Sixth C BC. He does not provide a date for this specific capital.

Description references: Buchholz, 1974, p.558 [Abacus length], Fig.4; Buchholz, 1987, p.196, Note 63; Kirchhoff, 1988, p.54, No.37; Michaelidou-Nicolaou, 1970, p.549 flw, Fig.1 and 2.

Dimensions: All dimensions are approximate, due to the angle of the elevation photo in Michaelidou-Nicolaou (1970, Fig.1-2). The author took the reported abacus length [C¹] of 355 as guide. The abacus width [B¹] is scaled from the top elevation in his Fig.2. The capital is not used in quantitative comparison, and is here identified as a candidate for re-documentation.

Notes: The marks on top of the abacus relate to the game played on the capital. The flat-round beading of the volutes become rectangular at the canalis.

- A double abacus is a normal occurrence in contemporaneous Cypriot proto-Aeolic capitals (See Shiloh, 1979, p.36-8, Plate 11.1).

Ion-57 Two volute fragments of a coarse grained yellowish marble Ionic capital, Kyzikos [Cyzicus], NE Troad (Close to Bursa).

Site found: In terrace wall outside the eastern acropolis wall.

Origin: Kyzikos.

Date: The date of this capital should be revisited after the analysis in this study and related to other capital designs. Existing dates: 'As early as the Ephesos [IV-Polycrates] temple ...with adorned pulvinar' (Hasluck, 1901, p.196); First quarter of the Fifth Cent BC (Kirchhoff bases this on his proportional analysis (1988, p.55), acknowledging the lack of complete reconstructive drawings).

Description references: Alzinger, 1972-3, p.184, Fig.14; Hasluck, 1901-2, p.196 [Dimensions], Plate VI.6; Kirchhoff, 1988, p.55-6, No.38.

Dimensions: Only the extant elements [D, B, H] dimensioned by Hasluck (1901, p.196 [taking note of Kirchhoff's (1988, p.55) assignation of the given echinus dimension to the capital bottom diameter H]. Capital cannot be used in quantitative comparisons.

Notes: Kirchhoff believes that the cyma was connected to the column, which places another light on the cyma measurements of Hasluck (1988, p.55). According to Hasluck (1901, p.196), the polster is smooth, thus not adorned or divided by beads.

- Kirchhoff, without precise dimensions, believes this capital to be from the island-Ionic region, due to the relationship of capital elevation proportions to the Megaronbau capital from Larisa-am-Hermos (See Ion-54). [Also part of new date?]

Ion-58a-b Reconstruction from fragments of indigenous marble Ionic capitals of the uncompleted Heraion IV (Polycrates; Bld-1e), Samos. Pergamon- and Samos Museums.

Site found: -

Origin: Samos

Function: Capitals of the Heraion IV (Polycrates), Samos. Functional context dwg

Date: After 500 BC: The building period of the building started by 538 BC (Kyrieleis (1981, p.48, 70) or 540 BC (Kienast (1992, p.186)) just before the North Building I/Phase III and peripteral South Building I, but work was halted during Polycrates's reign [ie somewhere between 535-22 BC]. Importantly, Pedersen (1983, p.112) says that the inner columns with cyma capitals [Cym-9] were up by 522 BC. Although work on the upper parts only fully recommenced around 500 BC (Kienast, 1992, p.186 [Lasting to the Fourth Cent BC (Gruben, 1963, p.89)]), and even whilst there was quite a lot of building activity at Samos after Polycrates, eg the South Building I and North Building II/ Phase IV peristyle by 525-10 BC (Kienast *et al.*, 1989, p.7), there is no proof for the peripteral columns being up. The Syracuse Athenaion of after 500 BC was a huge project modelled after the Heraion IV. Kirchhoff's [capital] date of 490-80 BC (1988, p.96) and Gruben's date of around 480 BC (1961, p.236) for the capitals would refer to the Heraions' final completion stage, and this date is accepted for the capital.

Description references:

Ion-58a: Gruben, 1960, p.42-5, Drawings 42-5, 49 [dimensioned drawings]; Alzinger, 1972-3, Fig.3; Kienast, 1992, p.182-88; Kirchhoff, 1988, p.94-7, No.62, Fig.2.5; Reuther, 1957, p.45-7, No.28. See Kyrieleis (1981, Fig.43)/ Mace (1978, p.221-4, Fig.81-93).

Ion-59b: Gruben, 1960, p.89-91, Dwg.46 [Side+bottom elevations]. The author has made a collage from Gruben's (1960, Drw.42-3) drawings of the reconstructed standard capital and added new portions to show the elevation parallel to the architrave], Dwg.73 [Underside of diagonal volutes]; Kirchhoff, 1988, p.209 flw, No.EK5.

- See Cym-5 and Cym-9 for cyma capitals of the temple interior.

Dimensions: All dimensions of the standard capital from the reconstruction by Gruben (1960, Drw.49), for which he (1960, p.85) did not rely on any proportional system, and in which the main dimensions are deemed to be accurate to 1-2% (1960, p.184). Only after reconstructing the capital was a modular link with the column upper diameter found.

Notes: Gruben (1960) reconstructed seven complete standard capitals (Ion-58a) from the 52 fragments, and 2 corner capitals (Ion-58b), of which fragments of the diagonal volutes exist.

- The capitals were earlier seen as contemporaries of those of Temple 'B', Samos (Kirchhoff's (1988, p.97) No.63, Theodorescu's (1980, p.162) No.32). These and newly found examples [See Ion-59] have recently been shown to rather belong to Monopteros II, seen to be a contemporary and miniature replication of the Heraion IV (Kienast (1992, p.188-9)).

Ion-59 Indigenous marble Ionic capitals of the Monopteros II (Bld-25; previously wrongly assigned to Temple B (Kienast, 1992, p.188-9)), between the Heraion and altar, Samos. Museum depot, Samos.

Site found: -

Origin: Samos

Date: The construction of the building related to the Heraion IV (Kienast, 1992, p.188-9) which started ca 540 BC. Other datings of the capitals have always rested on the assumption that they belonged to Temple 'B', also deemed to be related to the building period of the Heraion IV (Eg 490-80 BC by Kirchhoff (1988, p.96)). Although now shown to be of the Monopteros II, Kienast (1992, p.189) also links the Monopteros II with the Heraion IV stylistically. As explained elsewhere [See Ion-58] the Heraion IV started at ca 540 BC, stopped somewhere between 535-522 BC, and whilst most work on the pronaos and upper portion resumed ca 500 BC (Kienast, 1992, p.189), this little building may even have been complete before then. In this study, the dates are used as similar, ie ca 480 BC. Description references: Alzinger, 1972-3, p.172, Fig.4 (top capital); Buschor, 1957, 1957, p.20; Ziegenaus, 1957b, p.95 flw., 106 flw., Beil. 108.1-3 [capital I]-9.1-2 [capital II], Table XV; Gruben, 1965, p.327, Fig.249 [-]; Kirchhoff, 1988, p.97-8, No.63.1; Kyrieleis, 1982, p.13-4, Fig.35; Theodorescu, 1980, p.162, No.32; Kienast, 1992, p.188-8, Fig.17a-b.

Dimensions: From Ziegenaus (1957b, Table XV). All dimensions measurable on artefact.

Note: The echinus is undecorated under the bolster, and the back of the capitals are left flat and undecorated.

Ion-60 Fragment of an Ionic capital, possibly of the Athenaion II (rebuilt after Harpargos), Phocaea. Basmahane Museum, Izmir.

Site found: -

Origin: Old Smyrna

Date: End Sixth Century BC, at the rebuilding of the destroyed temple [Phase I - Bld.16] (Akurgal, 1985, p.117). Other dates: Kirchhoff's (1988, p.106) date is 490-80 BC, being a contemporary of the capitals of the Heraion IV (Polycrates temple [whose upper part is dated from 500 BC onwards in this study]). Boardman (1959, p.209) also believes this capital is from the Athenaion II, built soon after the incursion in the late 540's by Harpargos.

Description references: Akurgal, 1956, p.36 [Turkish text], Plate 3 a-b; Alzinger, 1972-3, p.186, Fig.15; Kirchhoff, 1988, p.106, No.72.

Dimensions: None published. Due to this, but more to the damaged state of the capital, it cannot be used in quantitative comparisons.

Ion-61 Fragments of a white limestone Ionic capital of a temple in the Athena sanctuary, Syracuse. Syracuse Museum.

Site found: Under the 17th Cent AD Palazzo Vermexio/del Municipio.

Origin: Syracuse

Date: The capitals are placed in the Fifth Cent BC, probably after 480 BC: Pedersen (1983, p.111, 103) sees the capital of the Heraion IV at Samos (dated to ca 500 BC by him), as the model for this Syracusan capital of after 500 BC (In this study the Syracuse capital is also thought to have followed that of the Heraion IV - Phase 1 start-up ca 540 BC to Polycrates, Phase 2 from 500 BC). Pedersen (1983, p.111) dates the Syracuse temple to after 480 BC. Other dates for the temple: Barletta's (1983, p.88-9) dates are <525-500 BC and "...not later than 520 BC"; Last quarter of the Sixth Cent BC (Gentili, 1967, p.76); Last third or quarter of the Sixth Cent BC (Martin, 1969, p.21); Before 530 BC (Fuchs, 1964, p.690); Not older than early Fifth Cent BC (Kirchhoff, 1988, p.99). It seems that all these dates are linked to earlier notions of only one building phase of the Heraion IV. Barletta's concluding remarks, which bring us to the relatively late date for the completion of Syracuse capitals which also ties in with latest dates for the upper parts of the Heraion IV and the Monopteros II (whose capitals she obviously also thought to be of the Temple B at Samos), and closer to the date by Pedersen. Barletta's (1983, p.88-90) date for the lower portions of the temple is 525 BC or even later [ie after Heraion IV start-up], and for the upper portions and capital, from the Fifth Cent BC [ie after Heraion IV's possible earlier, and definite later capitals]. Kirchhoff (1988, p.99) ventured, based on his proportional analysis, that it is not older than early Fifth Cent BC. This also ties in with the accepted date.

Description references: Kirchhoff, 1988, p.98-9, No.64; Martin, 1969, p.185 flw., Fig.1; Schefold, 1972, p.80, Plate 21, 2-4 [capital fragments, column fragments; Fuchs, 1964, p.684, 690-93, Fig.11 [Announcement, date, column]; Barletta, 1983, p.89-90; Gentili, 1967, p.67-8, Fig.18-21, 24 [Drawings of

reconstruction, dimensions of echinus and volute fragments, other fragments].

Dimensions: The scaled reconstruction drawing by Gentili (1967, Fig.18) remains hypothetical.

Notes: There are three different reconstructions of this capital from the early fragments reported by Gentili (1967, Fig.18-20), namely that of Gentili (1967, Fig.21), Martin (1969, Fig.1) and Pedersen (1983, Fig.24). Gentili (1967, p.77) and Barletta (1983, p.87-8) indicate that there were two capital types (Barletta indicates interior, and exterior [pteron] capitals), without abaci and occasionally with loose echinus, but both referring to the Archaic Samian type with capital bearing offset. This confirms Gentili's reconstruction rather than that reported by Martin (1969, Fig.1), who shows an abacus. Pedersen's (1983, Fig. 24) reconstruction of the polster view, using the fragments shown by Gentili (1967, Fig.24), shows a side view of a Samian type but which postulates a top bolster-palmette addition with side ovoli decoration (Like the Giardino Spagno capital [See capital Excl-9]). Despite the different reconstructions both Martin and Barletta confirm the connection between the capitals they describe and the column shown by Fuchs (1964, p.690 and Fig.11 [As Gentili, 1967, Fig.Fig.12]), dated by him to before 530 BC. Due to the Samian trend shown by the Giardino Spagno capital Martin's reconstruction seems less probable. Also, Martin (1969, Fig.1) gives no references for his reconstructed capital and column model [Although Gentili (1967, Fig.17) and Schefold (1972, Plate 21.4) shows the fluting to be correct]. Later excavation reports (by eg Vosa [See Schefold, 1972, p.80, Note 3]) have produced more fragments of volutes and echini (Schefold, 1972, Plate 21.2), but which do not increase our insight in overall capital form.

- The capital does not lend itself to full interpretation.

Ion-62 Reconstruction of a Naxian marble Ionic capital of the 'Nike of Kallimachos', a votive column dedicated to the hero Kallimachos, Athens. Acropolis Museum, No's. 3776, 3820, 3830, Theta 312, unnumbered item.

Site found: The Belvedere, acropolis, Athens.

Origin: Athens

Date: 490-89 BC (Raubitschek, 1940). The date is confirmed by means of epigraphic information, and is thus confirmed as an established date by both Jacob-Felsch (1969, p.35, 127) and Raubitschek (1949, p.18)

Description references: Alzinger, 1972-3, p.196, Fig.28; Jacob-Felsch, 1969, No. 30.2a, p.127 [date, dimensions]; Raubitschek, 1940, p.53 flw., Fig.1; Raubitschek, 1949, p.18-9, No.13; Theodorescu, 1980, p.163, No.48; Zuchner, 1969, p.329-31, Fig.18-20; Möbbius, 1927, Beil.18.5; Hampe, 1939, p.168-74, Fig.1; Korres in Economakis, 1994, p.174 [scaled reconstruction drawings of capital and column]

Dimensions: The dimensions provided must be seen as approximate and mostly hypothetical, due to the fragmented state of the capital, but they give an idea of the capital's probable size. Dimensions are used for comparative purposes. Dimensions are from the scaled drawings of existing fragments and the reconstruction by Korres in Economakis (1994, p.174 [With one

dimension on the drawing]). However, Korres's drawing and scale are not accurate, and the abacus length and width do not tally with known dimensions by Züchner (1936, Note 1). Also, how Theodorescu came to his dimensions for the proportional relationships is unclear [He does not provide the capital dimensions in any table]. He (1980, Table 1, No.48) indicates that his relationships rely on Raubitschek (1940, Note 7). This work in turn again refers mainly to Möbius (1927 [fragment size]) and Züchner (1936, Note 1 [More fragments and three new dimensions C1=550, B1=ca 400, plinth depression length = 350]). Theodorescu's relationships do not tally with those gained from the Korres drawings which are scaled and which do provide a dimensions for control in scaling. Notes: Erected just after the death of Kallimachos during victory over the Persians. It is (chronologically seen) the last example from the Archaic era up to the Persian wars. Raubitschek (1940, p.55-6) finds in the Nike statue the origins of the severe style, and argues for a sculptor from Paros, based on detail of the sculpture as well as the flower on the cushion of the capital, related to two unpublished Samian capitals.

- The relationship column : statue = 1:½ (Jacob-Felsch, 1969, p.127).
- Korres's reconstruction shows a squashed inward volute form. The author detects a possible double-square rectangle between the volute ends, used as plan ordering device.

Ion-63 Partial reconstruction from a volute fragment of an Ionic capital from a votive column, Miletos. Milet Museum, No.2293.

Site found: Miletos

Origin: Miletos

Date: From the dimensions available, still in the Sixth Cent BC (Koenigs, 1980, p.58)

Description references: Koenigs, 1980, p.56-8, Fig.5; Kirchhoff, 1988, No.N6, p.235.

Dimensions: Scaled from Koenig's (1980, Fig.5) partial reconstruction drawing. The length A, width B and depth L are obviously not measurable, and only suggested by Koenigs. These tentative but responsible dimensions are used for gaining proportional relationships for comparative purposes. Koenigs (1980, Note 1-2) reconstructed the proportions of the fragment by referring to the capitals from the Lower Temple at Myus [Capital Ion-15, itself a reconstruction], the [Archaic] Didymeion [capital Ion-28a], a capital fragment resembling these but smaller [Capital Ion-82, undimensioned], as well as one from Yenikoy [Capital Ion-45].

Ion-64 Ionic capital of a votive column from Sangri, Naxos, of stratified grey-white, coarsely crystalline marble and with pattern aligned parallel with the column axis. Naxos Museum No.2

Site found: Church of Ag. Nikolaus, Sangri.

Origin: Naxos

Date: App 550 BC ['Der über 5 Jahrzehnte jüngere Kioniskos B' (Gruben, 1989, p.169) [ie. 50 years after Col.1, Sangri, Naxos, {Also Capital Ion-1}, which is still in the 7th Cent BC {Orlandos in Kirchhoff, 1988, p.137}]]

Description references: Gruben, 1989, p.165 flw., Fig.3, Plate 19.5. Also drawing by author *in situ*.

Dimensions: Gruben (1989, p.165 flw., Fig.3). All dimensions measurable from capital. Author scaled those dimensions not noted on drawing [D, G, J, K, L]. The drawing does not allow for accurate dimensions of E, F, I¹⁻⁴].

Notes: Capital and column are of one piece. The back of the capital is smooth. The column tapers 14%, and the capital sides follow the taper upwards to the top. The echinus is an undeveloped, flat, sloping piece below the canalis edge bead. The back side of the capital is unworked.

- Gruben (1989, p.166) notes the similarities in proportion with the Parian 'Archilochos' capital [See Ion-17] and dates it similarly.

Ion-65 Two Ionic votive column capitals (with torus echinus) from Branchidai-Didyma.

Site found: The processional way from the *polis* to Branchidai-Didyma.

Origin: Unknown. The capital is not included in geographical analyses.

Material: Marble

Present location: Unpublished.

Date: Not older than Sixth Cent BC (Tuchelt, 1991, p.39). Due to this rather vague date it cannot be included in chronological comparisons.

Description references: Tuchelt, 1991, p.39, Fig.58.1-2; Ohnesorg, 1996, p.45, Fig.5 [frontal elevation].

Dimensions: No dimensions have been published. Tuchelt's photograph with measure on the foreground can only give a rough indication.[Ca 1200 long, 360 wide, 506 high]. Due to the lack of dimensions the capital is not suited for quantitative interpretation, but the capital should be properly documented.

Notes: Two capitals were found. Ohnesorg (1996, Note 36) describes them as "fast identisch", and from her analysis probably votive capitals without statues.

- The Delphic capital with reconstructed torus echinus (See capital Ion-66) is seemingly similar but is actually thought to have had a leaf cyma. It is also different in terms of the volute element which shows a double beading and large flat central eye. It is also more elongated in overall form.

Ion-66 Parian marble Ionic capital with a reconstructed plaster echinus from a votive column from Delphi. Delphi Museum (Not displayed).

Site found: Delphi

Origin: Paros (?)

Date: 525-500 BC (Hahland, 1964, p.194). Date based on comparison of formal qualities with other artefacts. Other dates are: 500-475 BC (Kirchhoff, 1988, p.100); 540-30 BC (Buschor, 1957, p.8); 2nd half of the Sixth Cent BC (De la Coste-Messeliere, 1957, p.310).

Description references: Mace, 1978, No.34, Fig.51; Kirchhoff, 1988, No.65, p.99-100; De la Coste-Messeliere, 1957, p.27, 310, Fig.17. [Photograph of reconstructed capital; Dimensions of volute]; Buschor, 1957, p.8; Hahland, 1964, p.194.

Dimensions: Dimensions are very approximate due to the manner of defining dimensions and the lack of a representation of the side elevation. In order to

provide an idea of the size of the capital the capital volutes were reconstructed by the author and dimensions of the reconstructed front elevation scaled, taking De La Coste-Messeliere's (1957, p.310) given dimensions of the extant front width [590] as departure point. Dimensions are used for comparative purposes only.

Note: The plaster reconstruction of the missing echinus shows a ribbed torus shape, but Kirchhoff (1988, p.100) thinks the real echinus would have been an egg-cyma.

Ion-67a-b Two similar marble Ionic capitals from votive columns, one (Ion-67b) from the acropolis, Athens. Ion-67a: National Museum, No.85; Ion-67b: Acropolis Museum, Athens. No.135.

Origin: Athens.

Date: Ion-67a: Not published.

Ion-67b: 520 BC (Theodorescu, 1980, Plate 1; Mace, 1978, p.155); around 530 [Type B] (Jacob-Felsch, 1069, p.34-5, Note 106.5).

Description references Ion 67a: Unpublished. Author's photograph with measuring staff printed with kind permission of Mr. Nikos Kaltsas, Curator of the Sculpture Collection. Dr H Kienast and Mr Kaltsas are thanked for their advice on differentiating between this capital and Ion-67]. The shaft piece [?] has been shorn off. This capital has a triple raised band on the polster centreline. It is proposed that this capital be fully documented.

Description references Ion-67b: Von Luschan, 1912, p.8, Fig.3 [unscaled front elevation]; Borrmann, 1888a, p.15, Table 29.2a-d; Borrmann, 1888b, p.277, Fig.18 (not 25 as mentioned by Mace) [scaled side elevation]; Theodorescu, 1980, p.163, No.45, Plate 2; Trowbridge, 1888, p.26, Fig.6 [Dimensions on drawings without scale]; Mace, 1978, No.3, p.154-5, Fig.106-7 [Drawings by Borrmann and Trowbridge].

Dimensions Ion-67b: There are wide variations in reports on dimensions, and published dimensions cannot be regarded as fully accurate. For comparative purposes dimensions for Ion-67b are taken from Mace (1978, p.154), with consolidation of remaining elements from others where information is deemed to be reliable: Canalis, echinus and shaft piece [36 high, 187 diam] connected to the echinus are from Borrmann (1888b, Fig.18 [Dimensions taken from the scaled drawing in Borrmann (1888a, Table 29.2) are: A-506, B-270, C-357, D-159, E-188, F-315, G-180, H-189, I¹-106, I²-95.5, I³-74, J-86, K-72, L [without shaft piece]-158, M-48, Q-320 {Alpha results in 27,9°}); both vertical volute edge-to-eye dimensions were scaled from Von Luschan (1912, Fig.3), taking the volute height of 180 as co-ordinating dimension. The shaft piece dimension is not included in the bearing-to-bearing height in order to make the dimensions useable for comparison.

- It is proposed that capital Ion-67b be remeasured, and the probability of the use of the Pheidonic foot standard of 328 be tested (Motivation for this from Drerup (1937, p.234 [See Ion-30])).

- The rectangle used as plan ordering device is indicated in Theodorescu (1980, Table 2). The abacus has a painted meander.

Note: The similarity in capital form is remarkable.

Ion-68 Marble Ionic capital (due to its size, most probably of a votive column) from Paros. Paros Museum (Previously in Museum, now in storage. No visible item No.)

Site found: Unidentified

Origin: Paros.

Date: No published dating could be found. The piece is believed to be Archaic: Because the column and capital are made of one piece, as those from Sangri, Naxos, this may indicate old age, ca <550 BC. The capital is not used in chronological analyses. This capital's date is evaluated after the main analysis in the study.

Description references: Descriptions by the author of this (as far as is known) previously unpublished capital. This description with kind permission of Dr D.U. Skillardi, Director of the Paros excavations of the Athens Archaeological Institute, through the instances of the BSA.

Dimensions: A few main dimensions were taken from the capital and augmented from an enlarged photograph with measuring staff. Due to the angle of the photograph the scaled dimensions are not reliable. Those elements and mouldings that were still visible on the capital were the main guides in the reconstruction, together with the use of a probable volute spiral ordering system [Circle segments]. Dimensions are used for comparative purposes only. The capital should be re-documented in future.

Notes: The capital has a canalis bottom beading with an upside down cord-shape. The volute turns in very sharply after the first half turn, and seems to be very small. Although the top of the capital is damaged, it is unlikely to have had an abacus. The cyma decoration cannot be discerned. There are convex, oblong losenges as a necking under the cyma, on the column shaft [length unknown]. The volute angle spandrel palmette has no profile.

Ion-69 Marble Ionic capital (Due to its size and markings, most probably of a votive column [but without sculpture]) from Paros. Paros Museum, No.929 (München TU No M72).

Site found: Modern wall in the Antique city.

Origin: Paros [?]

Date: Contemporary with Ion-17, namely ca 550 BC [>] (Ohnesorg, 1993b, p.115). Dr D.U. Skillardi confirmed its Archaic heritage [Interview in November, 1997]. Museum description is 'proto-Ionic, Sixth Cent BC'.

Description references: Ohnesorg, 1993b, p.115 [No photograph], Notes 27-8 [Gives a few dimensions and a commentary {The Greek publication she mentions in which more drawings are provided, is unfortunately not named, and is thus unobtainable}]. The author's further qualitative description with kind permission of Dr D.U. Skillardi, Director of the Paros excavations of the Athens Archaeological Institute, with whom the author made contact through the instances of the BSA.

Dimensions: Apart from Ohnesorg's two given dimensions [A>680 {Column top diam=ca 244}] all dimensions used must unfortunately remain

approximate (Scaled from a photograph by the author) and viewed as guide. The capital length was taken as framework dimension to calculate other dimensions. Markings on the capital that were still visible were the main guides in the reconstruction which includes a probable volute spiral ordering system. The capital has a socket the size of its current modern stander, ca 182 diam. Although not correct, as an indication of the capital bearing [H] diameter, the column [top] diameter of ca 244 can be taken as a guide. The capital should be re-documented in future.

Notes: The groove under the echinus leaves continues right round, and the leaves have no borders at their bottom. The volute spandrel palmette has no profile. The bottom bead of the canalis is horizontal with the top bearing plane of the capital. The capital, especially the canalis, reminds of the example from east Ionian Nasos as well as the Archaic Athenian examples.

Ion-72 *In situ* yellow limestone Ionic capital from rock cut tomb at Kyrene (Cyrenaica).

Site found: Tomb N8, Cyrenaica (Kyrene)

Origin: Cyrenaica

Date: 525-500, or even later (Boardman, 1959, p.208; Mace, 1978, p.169). Other dates: White (1971) dates the capital between 570-500 BC.

Description references: White, 1971, p.55 flw., Fig.7; Boardman, 1959, p.207-8; Mace, 1978, p.168-9, Fig.134-4.

Dimensions: No dimensions have been published. Capital cannot be used in quantitative comparisons.

Notes: The bottom cyma of the two superimposed ones partially continues under the polster.

- No quantitative interpretation will be attempted due to the lack of dimensions. Because the capitals are from a rock-cut tomb, the qualitative and quantitative aspects must not be seen from a structural, tectonic point of view.

Ion-73 Fragments of a Poros anta capital of the South Building I (*Sudbau*; Bld-24) of the Hera sanctuary, Samos. Pergamon Museum, Berlin.

Site found: Unpublished.

Origin: Hera sanctuary, Samos

Date: The temple is a contemporary to the North Building of 545-35 BC (Furtwängler et al (1989, p.61)). Other dates: Building completed between the First Dipteral Heraion and Phase IV (Kienast (1992, p.191)) [which supports the above date]. Kyrieleis (1981, p.92) reckons start ca 550 BC and completion late Sixth Cent BC. Buschor (1930, p.60) placed it together with the "Rhoikos" [ie First Dipteros] Temple period, as did Ziegenaus (1957a, p.69), due to occurrence of column rejects of the dipteros in the foundation of South Building I. Kienast (1992, Note 84) for more datings.

Description references: Buschor, 1957, p.17 flw, Fig.11, Plate XIV.2.

Dimensions: None. Capital can not be used in quantitative comparisons. Due to the size of the fragment the capital is not included in qualitative comparisons.

Note: Kyrieleis (1981 p. 92) indicates no [standard] Ionic capitals are extant, as does Kienast (1992, p.189).

Ion-74a-b Reconstructions of the two island marble Ionic capitals tentatively linked with the East fountain house or *Enneakrounos* (Bld-27) in the Athenian agora. [Agora Museum].

Site found: A616: Odeion, Agora, S of bastion Athena Nike, Acropolis.

Origin: East Ionian artist (?)

Date: Late Archaic, based on the capitals, together with the bases, and if linked with the Enneakrounos, in the third quarter of the Sixth Cent BC [During the reign of Peisistratos] (Merrit, 1980, p.88, 92). The architectural use of island marble dates it to before the Persian War (Merrit, 1982, p.83).

Description references: Capital Ion-74a-b: Merrit, 1982, p.82-92, Fig.1-2, Plate 12.a-f [capitals].

Capital 74b: Möbius, 1927, p.171, Beil.XIX.2-3; Theodorescu, 1980, no.56.

Dimensions: Merrit, 1982, p.82-92, Fig.1-2, Dimensions augmented by the author [scaled from her drawings], except for the echinus height which is from Möbius (1927, p.171). Volute height and abacus length/width dimensions are hypothetical.

Notes: For the discussion of the link between three bases and capitals, see Merrit (1980).

- Merrit (1982) believes this is not a local work, but executed by east Ionians for Athens.

- The author has tested the use of the Samian foot measure of 349 as module for the capital and the building, and there is reason to think it may have been used. The Pheidonian foot of 328 however also finds application in the capital and the building.

- Detail (eye, echinus, palmette) differs on both sides. The polster baldus consists of three flutes with double separating beads. The abacus has been reconstructed with a rounded shape. Capital A616 has been extensively altered later as a stander.

Ion-75 Fragments of an Ionic capital of soft poros (Known as the "large Archaic poros capital") deemed to be part of the Kekrops column found on the acropolis, Athens. One portion built into the acropolis wall, and location of another portion unpublished.

Site found: North wall of the acropolis, Athens.

Origin: -

Date: Before recent publication of new evidence surrounding the capital the author placed this capital at probably 530 BC at the earliest for the following reasons: Raubitschek (1938, p.164) groups this capital with the block like capital Iver-8, and calls it 'altertümlich'. This form of capital has always been thought to have been of the oldest types of Ionic capital, but Iver-8 has been dated to 550 BC (See Raubitschek, 1938, p.164; Betancourt, 1977, p.102). Later Raubitschek (1949, p.5) even deemed it possible to be older than 550 BC, with the proviso that it be proved that the capital matches a column [to which it could be linked] which is dated on epigraphical evidence. Raubitschek (1949, p.5, 6) elsewhere also datewise links the capital to the Naxian and Aeginetan sphinx columns, which would make this capital the earliest Athenian Ionic capital. However, Boardman disputes this early dating in terms of the concave *canalis*, large volute eye [with bronze insert] and simple cushion binding. [However this also occurs at

Paros, capital No.Iver-2, dated 550 BC]. He (1959, p.206, Note 6) mentions that capitals with linked volutes don't appear in Athens until 530 BC. The author's chronology in Chapter 2 confirms this view, and the date of 530 BC is thus seen as the earliest possible. However, from the latest work by Korrés (1997, p.95) this capital is linked to the Late-Archaic Kekrops monument, and therefore belongs to the end of the 6th Cent BC.

Description references: Raubitschek, 1949, p.5-6, Item No.1 [column]; Raubitschek, 1938, p.148, Note 4, p.160, Note 3, p.164, Note 2; Weikert, 1929, p.99 [2 450 total column height]; Boardman, 1959, p.206, Note 6 [capital]; Wiegand, 1904a, p.173, Fig.172a [portion still in wall, from Acropolis Institute photograph 75], 172b [volute], 172c.1-2 [Dimensioned drawings of Fig.172a]; Korrés (1997, p.95 flw).

Dimensions: Wiegand's (1904a, Fig.172c1-2) drawing shows a possible width [B] of 1005. Capital cannot be used in quantitative comparisons.

Notes: The piece that is built into the wall is not dimensioned but shows more detail than the loose fragment. The rectangular beading on the volute and canalis is similar to that of the one façade of Ion-74. Raubitschek (1949, p.148, Note 4) reports that the capital had a separate abacus, fixed to the capital top with a socket.

- Wiegand (1904a) thought the piece might be either a votive column capital or part of an altar due to its size.
- The given capital width is ca 12¼ qt ft of 82, and the top to eye dimension ca 7¼ qt ft (See Drerup, 1937, p.233) for foot standard).

Ion-76 Pentelic marble Ionic capital of a votive column by Gorgias and dedicated by Ameinias, found on the acropolis, Athens. Athens Nat Arch Museum No.3850.

Site found: Acropolis, Athens.

Origin: Athens

Date: 530-20 BC (Raubitschek, 1943, p.19). Due to dating of the Kore [and epigraphic evidence of the column linked with it], this is an **established date** for Archaic Athenian capitals. This coincides with Boardman's (1959, p.206, Note 6) statement that capitals with linked volutes do not appear in Athens until 530 BC. Elsewhere Raubitschek (1949, p.10) mentions the last quarter of the Sixth Cent BC. Both Raubitschek's dates revolve around the style of the Kore No.611. This Kore, together with capital No.3850, is linked to column, No.5 (1943, p.19; 1949, p.10). Jacob-Felsch dates the Kore to 530-20 BC, and the column (1969, p.34-5, Note 106 [Type B]) to ca 530 BC.

Description references: Raubitschek, 1943, p.18 flw; Table 7.5-7 [reconstruction drw]; 1949, p.9-10, No.5 [no dimensions]; Jacob Felsch, 1969, p.117, No.14 [no dimensions]; Boardman, 1959, p.206, Note 6 [capital]. Dimensions: None published. Capital cannot be used in quantitative comparisons. The proper documentation of this capital with an established date is very important. Notes: The top diam of the column No.5 is ca 190 (Jacob Felsch, 1969, p.117). The volute spandrel palmette was probably painted on. The domed

echinus on Raubitschek's reconstruction is conjectural. - Although no dimensions have been published, Drerup's (1937, p.234) comment suggests that the Pheidonian foot standard of 328 should be applicable to the capital design.

Ion-77 Fragment of a Mylasan marble Ionic capital of an in antis temple or treasury at Labraynda [Presently Labranda] NE of Mylasa halfway between present Bodrum and Milet. Capital presently still on the temple terrace.

Site found: The temple terrace at Labraynda.

Origin: The stone of the building is Labrayndan gneiss and Mylasan marble, but the execution of the cyma is close to Parian (Burgtempel A, Paros), Samian (Heraion) and Siphnian (Treasury, Delphi) work, and the capital resembles that at Ephesos (Ion-44) tentatively dated by Thieme to ca 500 BC [But which is linked to Ion-59 to 500> BC]. No definite statement as to the Origin: of the design and workmanship is provided by Thieme. The fact that Mylasa is the Carian capital and the shrine of Zeus Labrayndos a Carian shrine points to the fact that the work was done from outside.

Date: Ca 500 BC (Thieme, 1993, p.49-50). The capital's date is also connected to the date of other architectural elements, together in the range 520-500 BC.

Description references: Thieme, 1993, p.47-51, Fig.1-2 [drawing and reconstruction], Plate IX [photograph].

Dimensions: Thieme, 1993, p.47-51, Fig.1-2.

Note: The piece is severely damaged and detail of the [smooth] polsters and capital top are not known. Thieme has provided a reconstruction of the volutes which may be used as guide to the capitals façade size and proportion.

Ion-78a-b-c Three completed limestone Ionic capitals of an uncompleted temple at Miletos (Mengerevtepe, Milet)

Site found: Mengerevtepe, modern Milet.

Origin: Miletos

Present location: Unpublished

Date: Ca 500 BC [Before 494 BC] (Weber, 1996, p.86); Other dates: Late Archaic (Weber, 1995, p.228). Description references: Weber, 1995, p. 228-38, Fig.29-32 [column drums], 33-6 [Capital a {No.13031} and b {No.13132}], 38 [Hypothetical reconstruction of column and capital on stylobate]; Weber, 1996, p.85, Fig.4, 6 [Capital a {No. 13031}], p.86, Fig.5 [Capital c {No.13032}].

Dimensions: Dimensions are retrievable from the artefact, and shown on Weber's (1995, Fig.33, 38) drawing, except for the horizontal volute [D] and inter-volute dimensions [E] which were scaled from Fig.33 by the author (Intra-volute dimensions [I1-4, F] are absent due to the unworked state of the volutes).

Notes: Weber mentions that the columns were found on the stylobate, without bases. Previously Weber stated that the capitals were uncompleted before the temple was damaged (1995, p.238), but that markings for future echinus leaves appear on the echinus top. Later Weber (1996, p.86), from his further observations, stated that the stonework was completed,

and that detail on volutes and echinus would have been paintwork, although never applied. The capitals are without abaci, and what looks like an abacus are most probably the profiles of spandrel palmettes on the volute offset [An offset as in the examples of the Samian Heraion IV [See Ion-58]]. Capital a's bottom bearing [4300] overhangs the column top [4160]. Because Weber now sees the capitals as complete, the possibility does not exist anymore that this thickness would have been taken away with the modelling of the echinus cyma. The detail of Capital c shows a slightly different echinus shape which could have had a smaller bottom diameter, or the capitals may have been of different sizes. Due to the lack of dimensions there is no certainty regarding the fit.

Ion-80 Bright yellow limestone Ionic capital from a votive column with reclining lion, dedicated to Mikos (One of the few examples of those used at a grave). Ankara Museum.

Site found: From an unknown site

Origin: Miletos/Didyma

Date: Koenigs's & Philipp's (1978/80, p.164) date of ca 500 BC is accepted. There has been a lot of controversy around this capital, as may be seen from the other dates: Akurgal's (1961, Fig.249) date is 470-60 BC. Kirchhoff (1988, p.101) mentions that his date in the early Fifth Century BC is based on dating of stylistic influences of both capital and lion, by others (Namely Borchardt and also Gabelmann (See references in Kirchhoff, Note 321)). However, Jacob-Felsch's (1971, p.132, no.36) date for the lion is 470-60 BC, and she also refers to Gabelmann. Alzinger (1972-3, p.181) sees this capital as contemporary to the "frühklassische Kapitell vom Polykratestempel in Samos". Koenigs's & Philipp's (1978/80, p.164) date for the lion is 530-500 BC, brought down to 500 BC by stylistic aspects of the capital.

Description references: Kirchhoff, 1988, p.101, no.67; Alzinger 1972-3, p.181, Fig.11; Akurgal, 1961, p.280, Fig.249. Koenigs *et al*, 1978/80, p.157-73, Fig.1-2 [First published, dimensioned drawings].

Dimensions: Koenigs *et al*, 1978/80, Fig.1-2. Only the abacus length was scaled.

Notes: Koenigs *et al* (1978/80, p.157) report that the volutes of the capital seem to be constructed free-hand. The echinus is not flat above, but battered towards the canalis. The volute faces are inclined to the top (Also see Ion-64), and taper towards their outside ends.

- The apportioning of the place of origin of the capital is derived from the stylistic aspects of the lion statue (See Koenigs *et al*, 1978/80, p.163) and capital (p.161).

- According to Koenigs *et al* (1978/80, p.160) there is no dactyl module used in the form, although there is proportioning A:B = ca 5:2, A:G = ca 1:3, D:E:D = 4:5:4, G:L = 3:2.[Do*]

Ion-81 Fragment of a marble Ionic capital of a votive column, Acropolis, Athens. Acropolis Museum.

Site found: Acropolis

Origin: Athens

Date: Ca 520 BC (Mace, 1978, p.158).

Description references: Mace, 1978, No5, p.157-8,

Fig.108; Borrmann, 1887, *Ant Denk*, Band 1.2, p.8, Plate 18.2 [scaled drawing of segment]; Wurz, 1925, p.103, Note 13, Fig.265.

Dimensions: Only dimensions published reported by Mace (1978): Fragment height 120; Fragment width app 180; Capital cannot be used in quantitative comparisons.

Note: The capital face is smooth and has painted detail. The middle and bottom of the capital is lost.

Ion-82 Fragment of a marble Ionic capital of a votive column, Didyma. Didyma Museum depot. Item F723 Site found: Didyma

Origin: Didyma

Date: Just before the capitals of the Didymeion (Gruben, 1963, p.142). The capitals of the Didymeion are dated 540-30 BC, from the latest firm dating of the frieze at ca 530 BC (Schattner, 1996, p.41), rather than 540-20 BC by Gruben (1963, p.176). Gruben (1963, p.164) also gives 530 BC as an approximate date for the Didymeion capitals. Other dates: Kirchhoff's (1988, p.86) date for this capital is also 540-30 BC.

Description references: Gruben, 1963, p.140, No.30, Fig.32, 33; Kirchhoff, 1988, p.86-7, No.52; Knackfuss in Wiegand, 1941a, *Did. I*, p.148, F723 Tab.213.

Dimensions: None published. The fragment cannot be used in quantitative comparisons.

Notes: This piece closely resembles those of the Apollonion, Didyma, but is about 60% of the size. Gruben (1963, p.142) describes it as a characteristic Milesian capital. Koenigs (1980, p.57, Note 1) identifies it as from a votive column, and relates his capital Fig.5 (Ion-63) to this one and those of the Didymeion (Ion-28a) and Myus (Ion-15), Yenikoy (Ion-45) for proportional reconstruction.

2.3.3.3 Ionic Aeolicising capitals [Note widely differing dates] Description of the quantitative and qualitative aspects of these capitals are not provided in Table form. Photographs of Aeolicising capitals in Appendix 1. There is no Iver-1

Iver-2 Marble Aeolicising capital of a *perirrhantèrion* with upside down capital, Paros. Paros Museum, item 737 (München TU No.78).

Site found: The Early-Christian Tris Ekklesies Basilica, Paros, also used as water basin [Holes are modern].

Origin: Paros

Date: Maybe around 550 BC (Ohnesorg, 1993b, p.117). Other dates: "Kaum später als im 6.Jhd" (Kirchhoff, 1988, p.139, 217).

Description references: Betancourt, 1977, p.140, No.32; Daux, 1961, p.843, Fig.14; Daux, 1962, p.860, Fig.6, 7; Gruben, 1972, p.378, Fig.37; Kirchhoff, 1988, p.139, 127, No.E and A5; [-] Orlandos, A. *Prakt*, 1961a, p.189, Fig.8, Plate 147γ; Orlandos, 1961b, p.193, Fig.199; Ohnesorg, 1993b, PlateXXII.3-4.

Notes: Kirchhoff's description of the artefact being a votive column cannot be sustained. The portion of the basin edge has been found (See Orlandos (1961a, Fig.8). This type of water basin has parallels in Paros (eg Ohnesorg, 1993b, Plate XXII.5). Capitals Cont-13 and -14 are related to this type). The back side of the capital has been left uncompleted.

- The volutes are constructed from quarter circles according to Ohnesorg (1993b, p.117). The back side of the capital face is unworked.

Iver-3 Marble Aeolicising capital (without echinus) of a votive column, Delos. Delos Museum.

Site found: -

Origin: -

Date: Early Sixth Cent BC (Kirchhoff, 1988, p.220). Other dates: Betancourt (1977) dates it to the second half of the Sixth Cent BC.[!]

Description references: Betancourt, 1977, p.92, 140, No.31, Fig.45; Kirchhoff, 1988, p.217, No.A6; Martin, 1973, p.373, No.1, Fig.1; Martin, 1958, Plate 27.5 [Three-dimensional drawing].

Iver-4 Fragment of a marble Aeolicising capital of a votive column, Delos. Delos Museum.

Site found: -

Origin: -

Date: Early Sixth Cent BC (According to Kirchhoff's proportional analysis (1988, p.14)).

Description references: Kirchhoff, 1988, p.14-5, No.2; Martin, 1973, p.374, No.2, Fig.3; Vallois, 1966b, p.170, No.6.

Note: The inscription on the capital may be original, or of a later re-use of it (Kirchhoff, 1988, p.15). Revisiting this information is essential.

Iver-5 Parian marble Aeolicising capital of a votive column (Ohnesorg; Betancourt), or votive- or architectural capital (Kirchhoff), Paros. Paros Museum Inv 793 (München TU No. M1)

Site found: The Aesclepeion at Paros.

Origin: Paros

Date: Due to stylistic detail ca 540-30 BC (Ohnesorg, 1993b, p.116). Other dates: Second quarter of the Sixth Cent BC (Kirchhoff, 1988, p.215). Betancourt's (1977) dating is the last third of the Sixth Cent BC.

Description references: Betancourt, 1977, p.93, 140, Footnote 136, No.33; Gruben, 1972, p.376 flw., Fig.35; Kirchhoff, 1988, p.214-5, No.A1; Ohnesorg, 1993b, p.115-6, Plate XXI.7.

Notes: Ohnesorg (1993b, p.116) notes that the capital may have been unadorned by sculpture. She indicates the similarity with the Oropos capital (Iver-11), and that the capital base dimension derives from the volute eye diameter of 56 mm.

Iver-6 Volute of an Aeolicising capital from a votive column from the Thesmophorion, Paros. Paros Museum item 1006-7 [Not displayed] (München TU No.M132a-b).

Site found: Ag Georgios, Paros

Origin: Paros

Material: Not published.

Date: Around 525 BC [After Iver-5] (Ohnesorg, 1993b, p.117). Other dates: Gruben dates the capital in the third quarter of the Sixth Cent BC (1982c, p.687); Still before the middle of the Sixth Cent BC (Kirchhoff, 1988, p.235).

Description references: Gruben, 1982c, p.687, Fig.37; Kirchhoff, 1988, p.234-5, No.N5; Ohnesorg, 1993b, Note 39, Plate XXII.1-2.

Notes: The capital is too small to be architectural (See Gruben (1982c)).

- Ohnesorg (1993b, Note 39) provides the main reconstructed dimensions: Length 1 125, depth 405, height ca 380. [Do*]

Iver-7 Parian marble Aeolicising capital of a votive column, Athens. Acropolis Museum, item 3794.

Site found: -

Date: 550-500 BC (Betancourt, 1977, p.100); Other dates: 550-30 BC [Type A] (Jacob-Felsch, 1969, p.34, Note 105.2).

Description references: Betancourt, 1977, p.141, No.36 (See further references), Plate 53-5, Fig.48.

Iver-8 Blue-grey Humettic marble Aeolicising capital of a votive column, Acropolis, Athens. Acropolis museum, item 10261.

Site found: -

Origin: -

Date: 550-500 BC (Betancourt, 1977, p.102); Jacob-Felsch, 1969, p.304, Note.34; Raubitschek's (1938) date is 550 BC

Description references: Betancourt, 1977, p.141, No.37 (See further references), Fig.49; Raubitschek, 1938, p.164, Fig.20-1; Raubitschek, 1943, No.f.t; Jacob-Felsch, 1969, p.34 Note 105, p.122, Cat.II.

Iver-9 Parian marble Aeolicising capital of a small building or sanctuary (Betancourt, 1977) on the Acropolis, Athens. Acropolis Museum, Item 9980.

Site found: -

Origin:-

Date: 550-25 BC (Betancourt, 1977, p.104).
Description references: Betancourt, 1977, p.141 (See further references), No.38, Plate 56-9; Borrmann, 1887, p.8, Plate 18.3 [drawing with scale provided]; Borrmann, 1888b, p.276, Fig.16; Trowbridge, 1886, p.24, Fig.2; Lehmann-Haupt, 1913, p.471, Fig.4; Von Luschan, 1912, p.16, Fig.10; Braun-Vogelstein, 1920, Table 1.2 [3 dimensional drawing].

Iver-10 Marble Aeolicising capital of a votive column (from the Hypostyle Stoa), Delos. Delos Museum Item 202 (?).

Site found: The Hypostyle Stoa, Delos

Origin: Unpublished. The capital will not be placed in geographical analyses.

Date: Uncertain - According to Kirchhoff (1988, p.215) the capital originated in the mid Sixth Century BC because of similarities with the Aeginetan [Aphaia] sphinx column which he (1988, p.20) erroneously dated to 550-40 BC. Ohnesorg dates the capital to 550 BC on volute detail alone. The capital is not included in chronological analyses.

Description references: Kirchhoff, 1988, p.215, No.A2; Vallois, 1966b, p.165, No.2 [Dimensions]; Ohnesorg, 1996, Fig.4a,b.

Note: The capital has a smooth round torus echinus with scales engraved. The top of the capital is missing. There is indication of metal applique, possibly on the volutes. The bolster is deeply contracted.

Iver-11 Cycladic (Parian?) marble Aeolicising capital of a votive column, Oropus (Oropos). Athens National Museum, item 4797.

Site found: St Eleussa, Sykamion-Oropos.

Origin: -

Date: Just after the middle of the Sixth Cent BC (Kirchhoff, 1988, p.216). Other dates: Betancourt's date is approximately mid Sixth Cent BC.

Description references: Bammer, 1972, p.453; Betancourt, 1977, p.106, 141, No.39, Plate 67; Kirchhoff, 1988, p.215-6, No.A3; Ohnesorg, 1993b, p.116, Plate XXI.8.

Note: Ohnesorg (1993b, p.116) indicates the similarities with Iver-5. Although the marble is Cycladic, the concave-convex volute channel design is not.

Iver-12 Fragment of a rough grained crystalline marble Aeolicising capital from votive column, Delos. Delos Museum.

Site found: -

Origin: -

Date: 550 BC (Martin, 1973, p.377). The date is certain due to external indices.

Description references: Martin, 1973, No.3, p.375-8, Fig 4-5; Kirchhoff, 1988, No.A9, p.219.

Iver-13 Fragments of an Aeolicising capital from the acropolis, Athens. Acropolis Museum, Item 3847.

Site found: Acropolis, Athens

Origin: Athens

Material: Unpublished

Date: 540 BC (Raubitschek, 1938, p.164); Other dates: 550-530 BC [Type A] (Jacob-Felsch, 1969, p.34, Note 105.1).

Description references: Raubitschek, 1938, p.164,

Fig.22.

Note: No dimensions are available. The resemblance to Phoenician and Israelite Timorah type capitals in terms of the abacus and bolster spandrel palmette is noteworthy.

Concluding note:

The Aeolicising capital of the small building (No.31) at Alâzeytin ([Bodrum Museum No.3582]) across from Hallicarnassos, of the 2nd half of the 6th Century BC, as shown in Betancourt (1977, p.56, Fig.19b, Plate 32-4, are not included with these capitals. The capital is an isolated import into the Lelegian region.

2.3.3.4 Aeolic capitals

Description of the quantitative and qualitative aspects of these capitals are not provided in Table form. Some main dimensions are noted here, and photographs and drawings of mentioned capitals are in Appendix 2. Omissions: See p.60

Aeol-1 Fragments of tufa Aeolic capitals of the incomplete peripteral temple of Athena, Old Smyrna. Izmir Archaeological Museum, No.3546.

Site found: Old Smyrna, Bayrakli, Izmir,

Origin: Old Smyrna

Date: Ca 580 BC. Probably ca 580 BC, due to Kuhn's (1986, p.80) dating of the first quarter of the Sixth Century BC concurrent with the building of a new cella or sekos as part of a total Smyrnaean enlargement of the temple area, after Alyattes took the city. Other dates: Akurgal (1960; 1985, p.119) gives a date around the end of the Seventh Century BC (620 BC in *Alt Smyrna I*, p.66) for an Archaic temple and mentions (1985, p.121) the Smyrnaean restoration of this temple in 580 BC after its total destruction by the Lydians in 600 BC (It is clear his idea of a restoration of a 7th Century BC temple destroyed by Alyattes is rejected by Kuhn). Betancourt (1977, Plate 36) gives one date, namely 600 BC. The Izmir Museum dates the piece at 580 BC. Wiegartz (1994, p.125) places it at the early Sixth Cent BC following Akurgal's argument in *Alt-Smyrna I*, ignoring Kuhn's arguments.

Description references: Betancourt, 1977, p.60-3, 138, No.18 (Also see further references), Plate 36, Fig.20; Akurgal, 1985, Fig.40a; Akurgal, 1962, Plate.101, Fig.22; Kuhn, 1986, p.39-49 [Some dimensions p.47, Fig.3], Fig.3-4 [New capital elevation/plan reconstruction].

Notes: The restoration of Kuhn (1986, Fig.3) is not certain for all aspects of the capital, restored from the fragments of 24 different capitals, but the leaf cyma is not accepted as being part of the capital any more: Various earlier alternative interpretations for the column have previously been put, like Wesenberg's (1971, Fig.230), who saw the cyma as a column base flaring up and outwards. According to Betancourt (1977, p.59), archaeological records indicate their use at the top of the shaft. Akurgal's (1985, Fig.41a) drawing of his proposed Phase II restored temple of 580 BC [from his 1983 *Alt-Smyrna I* report] shows

smooth cylindrical bases, the cyma as capital echinus and most importantly, a first speculated reconstruction of a voluted capital of which small fragments are extant (See Betancourt, 1977, p.59). However, Kuhn's (1986, p.41, Fig.1, 10) critique of Akurgal's *Alt-Smyrna I* report establishes the so-called echinus cyma as column base, but flaring down and outwards, with capital resting directly on the column shaft end [Although this base form was soon replaced by other canonic forms, a leaf cyma is also used as column base at Neandria (See Aeol-2 below), and the outwardly flaring type is once again in monumental form at Temple 'D' in Metapont of 470 BC, and later in other buildings, all references to this early rather atectonic form].

- The Old Smyrna temple columns are deemed by Kuhn (1986, p.43; 80) to be the first stone peristyle in east Ionia, and their capitals be the first Aeolic capitals. No corner capital pieces have been found. [Do* dwgs].

Aeol-2 Porous tufa Aeolic *peripteros* capitals [with mushroom-shaped leaf cyma *naos* capitals] of the temple (Bld-Aeol-4), Neandria. Archaeological Museum, Istanbul. No.704 K275.

Site found: Acropolis of Neandria

Origin: Neandria

Date: Ca 550 BC (Wiegartz, 1994, p.125); Other dates: ca 550 BC (Wesenberg, 1971, p.138); 575-50 BC (Betancourt, 1977, p.73, Plate 41).

Description references: Betancourt, 1977, p.64-73, 138, No.19, Plate 41, Fig.25-9, 32 (Other relevant references and dims. are indicated on p.138: bottom diam H=400, restored length A=1200, top bearer C scales 504). Clarke, 1886, p.1-7, Fig.1-2 [Small capital - found in city wall]; Schefold, 1939, p.43, Fig.21; Wiegartz (1994, p.125, 130-1) [New small capitals - found 125 NW of temple].

Notes: Schefold (1939, p.47) earlier deemed the large bulging leaf cyma to not be part of the capital. Wiegartz (1994, p.129-31) supports the idea of a *peripteros* for the temple, with the bigger capitals apportioned to the front columns with wider spacing, and the smaller capitals for the rest. This leaves the mushroom-shaped leaf-cymas as capitals for the *naos* aisle. The *peripteros* columns have the bulging leaf-cymas as bases (Here Wesenberg's (1971, p.78, 133, 128, Note 54, Fig.164) idea for the outer columns is made more definite, and Altekamp's (In *Forschungen Kleinasien II*, 1991, p.45-62) question is answered).

- Drerup (1952, p.13 flw) suggests that these capitals are the result of design aspects relating to metalwork in architecture, furniture making and art. [Kuhn, 1986, p. 55-9 however states that Aeol-1 has timber precedents, the others stone relief and metalwork applique]

Aeol-3 Tufa Aeolic capital of a building (Bld.Aeol-8), Larisa (On-the-Hermos). Archaeological Museum, Istanbul, Item No.1924 K277.

Site found: Acropolis of Larisa.

Origin: Larisa (On-the-Hermos)

Date: 575-50 BC (Wiegartz, 1994, p.125); Other dates: 575-50 BC (Betancourt, 1977, p.76, Plate 42).

Description references: Betancourt, 1977, p.138,

No.20, Plate 42, Fig.34 (Further references and dims. are indicated on p.138); Boehlau et al, 1940, Plate 19a [Dimensions: Bottom diam H=425, length A=1300, top bearer C scales 880]; Schefold, 1939, p.42, Fig.14; Krischen, 1938, Plate 32 [as free-standing column]; Wesenberg, 1971, p.75, No.2 [With further references], Fig.153-4; Kuhn, 1986, p.59.

Notes: Betancourt (1977, p.76) argues that it is definitely architectural, probably from the Megaron, and not from a free-standing column as Krischen (1938) drew and Schefold argued, and from this he dates it to 575-50 BC. Schefold in Boehlau *et al* (1940, p.161-2) argues convincingly that the Megaron had two Ionic columns and capitals in antis (See Ion-54). As the date of the Megaron was used to date the capital, Betancourt's date should actually be reconsidered from new evidence as it arises.

- Schefold (1939, p.50) saw it as capital of statue-carrying votive column, and dating from the 7th Cent BC.

- Wesenberg (1971, p.79), on the strength of the argument for the new reconstruction of the Neandria cyma, column and capital, that the leaf cyma was not situated between column and capital but used as column base (Also recently so argued for Old Smyrna by Kuhn (1986)).

Aeol-4 Phocaeen stone Aeolic capitals of the Old Palace ('B')(Bld.Aeol-5), Larisa (On-the-Hermos). Archaeological Museum, Istanbul. No.1925 and 6.

Site found: Acropolis of Larisa.

Origin: Larisa (On-the-Hermos)

Date: 550 BC (Betancourt, 1977, p.76).

Description references: Boehlau *et al*, 1940, Plate 19b, 22a; Betancourt, 1977, p.138, No.21 (See further references and dimensions: Capital Bottom diam H=385, reconstructed length A=1220, top bearer C=728)], Plate 45-7.

Note: Possibly sheathed with bronze.

Aeol-5a/b Local Trachyte Aeolic capitals of the Late Archaic (Apollo Napaïos?) peripteral Temple II (Bld.Aeol-2b), Klopédi [also known as Kolumdado, or Nape, presently Keramidoti], Mytilene [Lesvos]. Archaeological Museum, Mytilene.

Site found: Klopédi, near Aia Paraskeve, Mytilene [Lesvos]

Origin: Klopédi, Lesvos.

Date: The last third of the Sixth Cent BC (Betancourt, 1977, p.85).

Description references: Aeol-5a: Betancourt, 1977, p.83-5, 139, No.27 (Also see further references and dims.), Plate 49, Fig.41-2; Condis, 1950, p.28, Fig 3; Koldewey, 1890, p.44 flw, Taf.XVI.1-3, XVII [Capital detail and dimensions: Bottom diam H=480, length A=1360, top bearer C=880]; Scully, 1964, p.129-34, Fig.10-1.

Aeol-6 Limestone Aeolic capital of temple (See Bld.Aeol.2b) at Klopédi or the city Mytilene, island Mytilene [Lesvos]. Istanbul Archaeological Museum, No.985 K276.

Site found: "Acropolis of Mytilene" [could be either the town or island]

Origin: Even though it could be from Klopedi, Williams (1993, 85) indicates it to be from Mytilene [Town].

Date: Late Sixth Cent BC (Betancourt, 1977, p.87, Plate 50).

Description references: Betancourt, 1977, p.85-7, 139, No.28. (See further references and dimensions: Bottom diam H=360-90, length A=1260, top bearer scales 728 using Fig.18 from Schefold), Plate 50; Condis, 1950, p.30, Fig.4 [photo includes portion of base and column drum]; Scully, 1964, Fig.14; Schefold, 1939, Fig.18. Note: Schefold (1939, p.46) indicates that the capital carried a timber architrave.

Aeol-7 Grey granite Aeolic capital of unknown architectural application (See Bld.Aeol-7), Eressos (Eressos), Mytilene (Lesvos). Archaeological Museum, Mytilene town, without invoice No.

Site found: Modern house near Eressos.

Origin: Eressos, Lesvos.

Date: In the second half of the Sixth Cent BC, or even later (Betancourt, 1977, p.88).

Description references: Betancourt, 1977, p.88, 139, No.,29 (Also see further references and dimensions), Plate 51, Fig.43; Kirchhoff, 1988, p.139, No.F; Condis, 1950, p.25flw [Dims.], Fig.1-2.

Note: The back side of the capital is both flat and smooth.

Aeol-8 Marble leaf cyma [of an Aeolic capital?] (further detail lost/unknown), Thasos. Thasos Museum invoice No.1385

Site found: Agora, Thasos.

Origin: Thasos

Date: Akurgal (1959, p.3) dates it to the second half of the Sixth Century BC.

Description references: Martin, 1958, p.125, Plate 26.3; Salviat, 1956, p.421, No.2 [Announcement of discovery]; Akurgal, 1959, p.2, Table 5a; Betancourt, 1977, Plate 37.

Notes: The cyma has an upside down truncated cone form, and the leaf pattern is similar to that of the bases of the columns of the capitals from Larisa (Aeol-3) and Neandria (Aeol-2). Martin (1958, p.125) describes the cyma as definitely part of an Aeolic capital, with the style 'plus évolué' [He also still thought that the Old Smyrna capital had a leaf cyma echinus. His definition has to be revisited in the light of Aeol-1 and -2].

Aeol-9 One of many [lost] Andesit leaf cymas and a fragment of an Andesit volute of an Aeolic capital from a temple (?), Aegae [Aigai, near Pergamon]. Pergamon Museum depot, invoice No. unknown (DAI Photoarchiv Pergamon in Istanbul PE71 and 90).

Site found: from the rubble of the upper town of Aegae, between the market and cistern.

Origin:

Date: Ca 550 BC, as the capital from Neandria [Aeol-2; dated to 550 BC as accepted in this study] (Radt, 1991, p.482); Other dates: As Neandria [Aeol-2] (Wiegartz, 1994, p.125).

Description references: Schefold, 1939, p.49; Wesenberg, 1971, p.80 Note 393; Radt, 1991, p.481-3, Notes 1-22 [References to artefacts, site and photo

sources], Beil.56.1-5 [photographs]; Wiegartz, 1994, p.123-5, Note 28-9.

Notes: The close similarity of the volute detail with that of Neandria [Aeol-2] is mentioned by Radt (1991, p.482, who uses this as a dating technique. The size, material and proximity on the site of of both volute and leaf cushion indicate to Radt (1991, p.483, Note 19) their belonging together, but there is no definitive conclusion as to the relative positions (Here one refers to the similar problematique at Neandria).

2.3.3.5 Torus capitals

Description of the quantitative and qualitative aspects of these capitals are not provided in Table form. Photographs and drawings of Torus capitals in Appendix 2.

Tor-1 Poros fragment of one torus capital (Group E) of the First Dipteros (Bld-1d), Samos. Pergamon Museum, Berlin, No. SK1726.B

Site found: Earthworks around the Heraion IV

Origin: Samos

Date: Ca 575 BC (Kienast, 1990, DiskAB5, p.124 [-]; Kienast, 1992; Hendrich, 1997, p.77).

Description references: Kienast, 1992, p.176-7, Fig.5; Hendrich, 1997, Vol.1 p.5-35, Fig.7-12, Beil.5, Table 1 and Vol.2 [Drwg of fragments and reconstructions from fragments; Positions].

Notes: All the torus capitals of the temple exist only in small fragments. Other than the bases which were built into the Heraion IV foundation walls, the capitals were deliberately smashed to provide material for the new coastal road and ramp for the transport of the marble blocks to the Heraion IV site. Hendrich (1997, Table 1, Beilage 5) has apportioned the fragments into 6 categories according to their position in the First Dipteros (A-cella, B-pronaos, C-inner peristyle, D-outer peristyle, E-corner groups, F-front peristyle).

- Due to the amount of torus fragments it is obvious that there were more than needed for the column bases. This, and the shape and surfaces of the torus fragments lead Kienast (1992, p.176) to believe that the First Dipteros had torus capitals rather than Ionic capitals [An idea earlier expressed by Gruben (1960, p.75)]. The idea of the torus being used for capitals is also underpinned by the stone torus capital from kettle stand from Samos (Kienast, 1985, p.384). Kienast further proposes that the capital carried a timber block on the upper surface of the capital (See drawing in Hendrich, 1997, Beil.5), an idea also earlier stated by Gruben (In Gruben et al, 1961, p.241), but his idea now being supported by the roughness of the upper capital surface. The hypothesis presently rests mostly on a reconstruction of a probable corner capital timber and metal pre-form by Kienast (1999), indications that the upper surfaces of the capitals were prepared for timber elements, and to a lesser degree on the existence of a grooved marking on one of the capital fragments (R240 [See Hendrich, 1997, Fig.30a]). This fragment is from the Museum depot, from an unknown site. The mark would indicate where a timber block or beam would have to be positioned. Whilst Hendrich (1997,

p.37) indicates that this fragment may have come from the Heraion IV foundation wall, and thus received a marking, one must keep in mind that all the other capital fragments (So fragmented that any markings are not traceable) were not from the foundation but from the earthworks around the Heraion IV, increasing the possibility that the marking had another reason. Kienast has for some time expressed the hypothesis that this capital form may have provided the vehicle for metal applique plates, mostly due to the probability that such a corner example might have been the pre-form of the stone capital, in that plates from both sides would form the diagonal, concave corner volute shape, when fixed to the timber block and to each other. The author has, from Kienast's verbal descriptions in 1997, prepared a type drawing (See Chapter 4.1.1.12 and Append.1, Tor-1), but which has very recently been superseded by Kienast's (1999, Fig.5) own, more erudite drawing. One may think that Hendrich's (1997, p.37, Note 141) apportionment of the capital fragment with marking line to an inner peristyle, where no bracket blocks are expected if one takes the Heraion IV as a further evolution of the type, would make the hypothesis invalid. One must indicate that, as the inner capitals would probably have had markings for epistyles, this is still no proof that the outer capitals may not have had similar markings. Whilst there may be reservations around the proportions of the hypothesised timber block (Ie not as thin in width as later canal forms), the reasoning around the evolution of the corner capital form demands that the possibility of timber brackets must remain open for now.

- Photographs of torus SK 1726.B are published with kind permission of Prof. Dr. Heilmeyer, Director of the Staatliche Museen, Berlin. Thanks also to his member of staff, Dr. V Kästner, and to Dr. H Kienast of the DAI, Athens, for help in this regard.

-The height dimension of the specific capital shown here by Ch. Hendrich, as received verbally from Dr H. Kienast, rather than referring to the general dimension of type E.

Tor-2 Fragments of limestone torus capitals of the so-called 'Limestone' Apollo temple (Didymeion), Didyma, rather deemed to be an early phase or inner limestone peristasis of the Archaic temple (Bld-6d). Present location of fragments A670, A675, A158 (grooved) and A149 (smooth) is unknown.

Site found: Didyma

Origin: Didyma

Date: Not earlier than 540 BC if part of the Archaic Didymeion. The existence of a separate limestone building, started early in the Sixth Century BC (Schneider, 1996, p.83; He indicates the roof cyma detail dates from ca 570 (Schneider, 1996, p.83)) is currently viewed with caution (Verbal communication Kienast), with the limestone elements possibly being of an early phase or the inner peristasis of the Archaic temple, whose terracing was begun in 550 BC (Tuchelt, 1991, p.21). These capitals are therefore not older than those of the First Dipteros, which building was started around 575 BC (Kienast, 1992; Hendrich, 1997, p.77), but from that tradition.

Description references: Schneider, 1996, p.80-1, Fig.5-6

Notes: If the first dipteral Heraion did have timber brackets on the outer peristasis torus capitals (See Tor-1), one cannot surmise the same detail for an inner peristasis here.

- The diameter of the capitals are between 1020-1360 (Schneider, 1996, p.80).

Tor-3 Capital of a small kettle stand replica (Col-9), Samos.

Origin: Samos

Date: "Altertümlicher.." [if read in context here meaning closer to] the outgoing years of the 7th Cent BC (Buschor, 1930, p.46); Kirchhoff (1988, p.147) dates it in the early 6th Century BC.

Description references: Buschor, 1930, p.46, Beil.XI; Kirchhoff, 1988, p.147, No.K1.

Note: The very shallow torus 'capital' is slightly faceted. The column has a round moulding at the top. Column: See Col-9 in 2.4.1.2.

Tor-4 Limestone capital of small kettle stand replica (Col-10), Samos.

Origin: Samos.

Date: ".näheren sich eng der Rhoikoszeit". (Buschor, 1930, p.46); Kirchhoff (1988, p.147) just states "Rhoikoszeit". [Referring to the time of the 1st Dipteros]

Description references: Buschor, 1930, p.46, Beil XI [base], Beil XII [capital]; Kirchhoff, 1988, p.147, No.K2.

Note: The shaft and capital are monolithic. The capital is turned with concave flutes with flat edges.

Column: See Col-10 in 2.4.1.2.

2.3.3.6 Cyma capitals

Description of the quantitative and qualitative aspects of these capitals are not provided in Table form. Photographs and drawings of cyma capitals in Appendix 2. Omission: See p.57.

Cym-1 Fragment of a leaf cyma capital of the Apollo temple (Bld-20), or a votive column*, Naukratis.

Site found: Level 312-27, *Temenos* of Naukratis. British Museum

Origin: Naukratis, built by the Milesians (See notes at Bld-20).

Material: Limestone.

Date: Pedersen (1983, p.99, 116) reports the dating as being in the second quarter of the Sixth Century BC, around 500. Other dates: According to the cyma shape around 580-70 BC, a bit earlier than the Naxian sphinx capital at Delphi (Kirchhoff, 1988, p.198).

Description references: Flinders-Petrie *et al*, 1886, p.11 flw., Plate III; Dinsmoor, 1927, p.103, Fig.37; Dinsmoor, 1928, p.125-6, Fig.47; Pedersen, 1983, p.99-100, 116, Fig.11-12; Kirchhoff, 1988, p.188-9, 197-8, No.E1.

Notes: There are four reconstructions of the capital: i) Petrie's (1886, Plate III), with (lost) volute capital-torus combination on the leaf cyma (much like shown in Capital Ion-66 from Delphi and Capital Ion-65 from

Didyma); ii) Dinsmoor's (1927, Fig.37; 1928, Fig.47) standard volute capital, made up of a separate canal and torus; iii) Kirchhoff (1988, p.198) who sees this as a cyma capital only; iv) Gruben (1976, p.333) believes the canal part was of timber (Also see Pedersen, 1983, Note 74).

-*Kirchhoff also refutes the theory that this capital belonged to the Archaic 'first' or 'limestone' temple of Apollo. However, Pedersen (1983, p.99, No.S2) in his work on decorated column shafts and capitals mentions a fragment from a second column similar to this one, giving more credence to the architectural nature of the capital. Nevertheless, no finality exists on the matter. - One would like to acknowledge Petrie's find of a volute section, but that might have belonged to another monument. This capital is placed with the cyma capitals, but the existence of a timber or stone canal piece may not be excluded.

Cym-2 Fragment of a marble leaf cyma capital of a votive column, Didyma. [Original invoice No. F656].
Site found: The town Jeronda

Origin: Didyma

Date: Second quarter of the Sixth Cent BC (Kirchhoff, 1988, p.198).

Description references: Kirchhoff, 1988, p.198, No.E2; Wiegand, 1941a, Plate 224.1; Wiegand, 1941b, p.148, No.gß, p.194 No.F656.

Note: Wiegand describes it as a base of an altar, but Kirchhoff (1988, p.198) believes it is too flat for that.

Cym-3 Two fragments of a marble leaf cyma capital of a votive column, Didyma. Pergamon Museum, Berlin.

Site found: -

Origin: Didyma

Date: Second quarter of the Sixth Cent BC (Kirchhoff, 1988, p.199 (according to the egg-cyma form)).

Description references: Kirchhoff, 1988, p.199, No.E3; Wiegand, 1941a, Plate 220; Wiegand, 1941b, p.148, F657, Z657-8.1-7.

Cym-4 Fragment of a marble leaf cyma capital of a votive *Kore*(?) column, Delos. Delos Museum, item 222.

Site found: Delos

Origin: Unknown. However, the similarities with the leaf cyma of capital Ion-23 from Thasos, of the same period, leads one to suspect the same origin.

Date: *Ca* 550 BC - Ohnesorg (1993b, p.112) believes the capital is younger than Cym-14 [575-50 BC] from Paros, therefore Martin's (1973, p.382) date of the first (rather than the second) quarter of the Sixth Cent BC is too early. Kirchhoff's (1988, p.200) date of mid Sixth Cent BC seems feasible then.

Description references: Kirchhoff, 1988, p.199-200, No.E4; Martin, 1973, p.378, No.4, Fig.6-8; Ohnesorg, 1993b, p.112, Note 8-9.

Notes: Upper diameter 640, height 210, diameter of top plinth 390-400, height of plinth 55, leaf width 110 (Ohnesorg, 1993b, Note 8, 9). The similar diameter dimension in Martin (1973, p.380, Fig.8) therefore does not allow for 20 leaves of 95mm, but rather 18 of 110mm.

- The bordered cyma leaves are separated by another round beading, a detail in this period only found in Thasos (Much later in Chios [Ion-26 and Cyprus [Ion-56]).

Cym-5 Fragment of a marble leaf cyma capital of an interior column of the cella, Heraion IV (Bld-1e), Samos [Also see Cym-9]. Pergamon Museum.

Site found:

Origin: Samos

Date: After 540 BC, at earliest before 535 BC, probably before 522 BC: Pedersen (1983, p.112) indicates that "...bei dem Tod des Tyrannen im Jahre 522 v. Chr. noch längst nicht vollendet. Ein Teil der Säulen - vermutlich der Cella - wird jedoch fertiggestellt."

Other dates: Buschor (1957, p.16). Kirchhoff (1988, p.200) concurs.

Description references: Buschor, 1957, p.16 flw., Beil.11.2; Kirchhoff, 1988, p.200, No.E5; Reuther, 1957, p.51.

Notes: Kirchhoff wrongly apportioned this capital to a votive column, even though Buschor (1957) correctly identified it as from the Heraion IV. The cella columns seem to be the first architectural columns in stone to show the honeysuckle necking detail.

- See Capital Ion-58a-b for description and dates for the standard and corner capitals in the *peripteros* of this building. See Gruben (1963, Fig.38) for a functional context drawing.

Cym-6 Fragment of a marble leaf cyma capital of a votive column, Didyma.

Site found:

Origin: Didyma

Date: Around 500 BC (Kirchhoff, 1988, p.201, (according to the ornamentation)).

Description references: Kirchhoff, 1988, p.201, No.E6; Wiegand, 1941a, Plate 220; Wiegand, 1944b, p.148, F659.

Cym-7 Fragment of a Poros leaf cyma capital of the North Building Phase IV (Kienast *et al*, 1989) (Bld-1e), Samos. Presently in the Depot, Samos.

Site found: Heraion

Origin: Samos

Date: 525-10 BC (Kienast *et al*, 1989, p8). Other dates: Still in the Sixth Century BC (Kyrieleis, 1978, p.258); Last quarter of the Sixth Century BC (Kalpaxis, 1986, p.640); Early Fifth Cent BC (Buschor, in Kirchhoff, 1988, p.201 (according to the cyma form))
Description references: Kienast *et al*, 1989, p.48-62 [building description], 153-9 [finds], Fig.35 [drawings of fragment], Plate 12.4, p.154-6 Items No.11-20 [description and photo of capital fragment], Fig.9 [reconstruction of unfluted column and capital of peristyle], 10 [reconstruction of pronaos], 11 [reconstruction of building], 36-7 [Frieze], Plates 15-20 [plans]. See also Buschor, 1957, p.20, Beil.21.1 ['Heraion: Poroskapitell']; Kirchhoff, 1988, p.201-2, No.E7.

Notes: Buschor (1957) ascribed this capital to the Heraion. The possibility that the capital is from the Artemis-Apollo (See Walter, 1976, p.91, Fig.85) sanctuary north east of the Heraion, Samos, was

rejected by Kirchhoff (1988, Note 713) who sees it as a votive column capital [Also see Reuther, 1957, p.51]. One must remember that the 'Artemis-Apollo' building is actually the North Building I. Walter's cult designation was disputed by Furtwängler *et al* (1989, p.64).

- Even though the reconstruction by Kienast *et al* (1989) shows only torus capitals, the possibility of an element between cyma and epistyle cannot be completely excluded.

Cym-8 Fine white porous stone leaf cyma* of the Athenaion I (Before Harpagos) (See Bld-20), Phocaea (Foça). Earlier Basmahane Museum, Izmir, now [Sept 1999] in a court of the Archaeological Museum.

Origin: Phocaea

Date: Second quarter Sixth Cent BC (Akurgal, 1985, p.117, 394). Other dates: Akurgal (1961 p.328 Note 16) previously dated the capital in the second half of the Sixth Century BC (he concurs with Roland (1959, *Revue des Etudes Grecques*, Vol.72, p.324 [-])).

Description references: Akurgal, 1961, p.238, 287, Fig. 252; Akurgal, 1962, p.377, Table 101.23; Akurgal, 1985, p.117-8; Akurgal, 1956, p.7 [Turkish text], Fig 36; Akurgal, 1959, p.1-2, Table 1b; Martin, 1958 [BCH, *Etude d'arch Class. I*, 1955-6], p.121, 125, Fig. 3. Notes: It must still be ascertained whether the piece (See Akurgal, 1960) is a cyma for an Aeolic capital, just as wrongly (See Aeol-1) speculated for the Old Smyrna capitals (See Betancourt, 1977, p.60-3, 138, No.18), a stand-alone cyma capital, or even a column base, as is evident for Old Smyrna, Neandria and Larisa (See Aeol-1 to -3). The lower portion of the column [the torus] shows Samian/Ephesian detailing. After Harpagos, Phase I was rebuilt in the Ionic style as Phase II with complete Order (See Ion-60).

* The existence of a fragment of a second cyma at the Museum was recently brought to the author's attention.

Cym-9 Marble leaf cyma capital from the eastern inner ring (See Buschor, 1957, p.16) of the dipteros of the Heraion IV (Bld-1e; Polycrates), Samos. Presently Pergamon Museum, Item A601. [Also see Cym-5]

Site found: Heraion

Origin: Samos

Date: After 540 BC, at earliest before 535 BC, but probably before 522 BC: The building start-up commenced by 540 BC (Kienast, 1992, p.185). Work was halted during Polycrates's reign, and work on the upper parts recommenced *ca* 500 BC (Kienast, 1992, p.186), but it cannot be said with certainty that some outer peristyle columns have not been completed by that time [We know of all the other activity in the sanctuary before 500 BC. Pedersen indicates that the eastern peristyle columns were commenced after 500 BC]. The inner [cella] columns [See Cym-5] were up by 522 BC (Pedersen, 1983, p.112). Other dates: Buschor (1957, p.16) dated these capitals to 515-500 BC.

Description references: Buschor, 1957, p.16; Reuther, 1957, p.43-4, No.8, Plate 21, 1-2, Drw.39 [Also see capitals A602-5, Drw.40-3]; Mace, 1978, No.61-5, Fig.81-91 [His No.66 and 68 are not of the Heraion IV as stated]; Boardman, 1959, p.200-1; See Cym-5 and Cym-7 and Notes 710 and 713 in Kirchhoff, 1988.

Notes: See Capital Ion-58a-b for description and dates for the standard and corner capitals in the *peripteros* of

this building. See Gruben (1963, Fig.38) for a functional context drawing.

Cym-10 Cyma capital of the *in-antis* Klazomenaean Treasury ('XVI'; Bld-30), Sanctuary of Apollo, Delphi.

Origin: Klazomenai

Date: *Ca* 528 BC: "Two decades after the fire of 548 BC (Gruben, 1961, p.135; 1966, p.78). Other dates: Beginning 2nd half Sixth Cent BC (Weikert, 1929, p.135).

Description references: Dinsmoor, 1913, p.5-83, Fig.3; Gruben, 1961, p.135-6; Weikert, 1929, p.135.

Cym-11 Cyma capital of the *in-antis* Massiliot Treasury (Bld-31), Sanctuary of Athena, Delphi.

Origin: Massilia.

Date: Soon after the Klazomenaean Treasury [ie after 528 BC; See Cym-10] Gruben, 1961, p.135. Other dates: De la Coste-Messeliere's (1957, p.330) date is 530-10 BC; Akurgal's (1961, p.287 and Note 15) date is 533-500 BC.

Description references: Dinsmoor, 1913, p.5-38, Fig.3; De la Coste-Messeliere, 1957, p.330, Plate 214-7.

Notes: The building is on the *Terasses Orientalis*, west and set back of the Athena *Pronaia* temple. Pomtow (1913, p.1-49 [alternative no. p.199-246], Fig.22-3, 42, 50, 58, Table II) previously reconstructed this building and held it to the Klazomenaean *Phylacus* [Repentance] temple which he dated to 550 BC, and reconstructed with a capital with two superimposed leaf crowns.

Cym-12 Fragment of a leaf cyma capital (with inscribed top band) from a votive kouros column, Paros. Paros Museum Inv 767 (München TU No. M 158).

Site found: Unpublished

Origin: Paros.

Material: Unpublished.

Date: *Ca* 550 BC (Ohnesorg, 1993b, p.111) due to stylistic criteria.

Description references: Ohnesorg, 1993b, p.111, Plate XX.1-3 and Note 2 [Dimensions and references to analyses of inscription].

Notes: The epigraphically based date of 525-500 BC is not accepted by Ohnesorg [No reason].

- The main dimensions are: Diameter 504, height 146,5. The echinus side is smooth with painted leaves, but relief leaf ends appear on the bottom

Cym-13 Cyma capital of the Caryatid column of the distyle *in-antis* Cnidian Treasury (Bld-19), Apollo Sanctuary building 'XXV', Delphi.

Site found: -

Origin: Old Smyrna.

Date: *Ca* 560 (Gruben, 1961, p.135) or *ca* 550 BC (Gruben, 1966, p.78). Other dates: 575-50 (Weikert, 1929, p.103-5); 550-45 (De la Coste-Messeliere, 1957, p.319).

Description references: Durm, 1910, p.260; Dinsmoor, 1913, Fig.3; De la Coste-Messeliere, 1957, p.319, Plate 55 [Capital]; Gruben, 1961, p.135, Fig.26, 28, 30 [left].

Note: The supporting columns for the caryatids have

Samian bases.

Cym-14 Fragment of a leaf cyma capital (with top band) from a votive *kouros* column, Paros. Paros Museum Inv. 364 (München TU No. M 215).

Site found: Unpublished.

Material: Unpublished.

Date: 575-550 BC (Ohnesorg, 1993b, p.111).

Description references: Ohnesorg, 1993b, p.111, Plate XX.4-5, Note 5-7.

Notes: The main dimensions are: Diameter 432, height 164-5, hole in bottom bearing is 160 in diam and 50 high

Cym-15 White Parian marble leaf cyma capital, Keos. Keos Museum without Inv. No.

Site found: Unpublished.

Date: Archaic, but no specific date published. The capital cannot be included in the chronology.

Description references: Ohnesorg, 1993b, p.112, Note 10, Plate XX.6.

Notes: The main dimensions are: Top diameter 555, height 211. Leaves inscribed as Cym-11.

Cym-16 White Attic (?) marble leaf cyma capital with Lesbian *cyma recta* profile, Keos. Keos Museum without Inv. No.

Site found: Unpublished.

Date: Archaic, but no specific date published. The capital cannot be included in the chronology.

Description references: Ohnesorg, 1993b, p.112, Note 11, Plate XX.7-8.

Notes: Leaves are painted on. The main dimensions are: Top diameter 347, height 134

Cym-17 Damaged Parian marble "Lesbian" leaf cyma capital, Siphnos. Siphnos Museum Inv. 133.

Site found: Unpublished

Date: Archaic, but no specific date published. The capital cannot be included in the chronology.

Description references: Ohnesorg, 1993b, p.112, Note 11, Plate XX.7-8.

Notes: There is no photograph. The main dimensions are: Top diameter 480, height 206

Cym-18 Egg cyma of a votive column, Didyma. [Original invoice No. F 655].

Date: Whilst Wiegand (1941b, p.148) dated it to the early 6th Cent BC, Kirchhoff (1988, Note 486) cites Tuchelt's [1970] date of 560/50 BC.

Description reference: Wiegand, 1941b, p.148, No.α, Tf 220; Kirchhoff, 1988, p.147, No.K4.

Note: The leafed capital had a top band and a bead-and-real moulding below in the manner of pieces from Myus. There is no photograph.

2.3.3.7 Capitals excluded in terms of the time delineation

No detailed quantitative and qualitative information is provided.

Excl-1 Various fragments of Ionic poros volutes from Didyma.

These fragments were assigned as votive column

capitals by Wiegand (1941a, No. A, B, C and D, Fig.F662; 1941b, p.149). Only capital A was dated by Wiegand who saw it as being of the oldest, known Ionic capitals. According to Gruben (1963, p.137-40) however, not one of these capitals, except Wiegand's No.D, could be an Ionic normal capital, although he then assigned them all as of architectural Origin: (An *acroterion*, console, stair wall edge, etc). Gruben (1963) provided provisional dates, all being in the Sixth Century BC, but much later than Wiegand's. Lately one of the mentioned Ionic capitals, No.D has been redated to ca 600 by Gruben (1996, p.63) and reassigned as an architectural capital on top of a rectangular timber column. This capital is included as a pre-form of the Ionic capital as Preion-2 in the study. Wiegand's capitals A, B, and C are excluded from this study on the basis of Gruben's (1963) chronological assignation.

Excl-2 The Ionic capital described as being found on the north flank of the Propylaea, acropolis, Athens, which is actually from the Athenaion II, Sounion.

Capital reference: Puchstein (1887, p7-8, No.4, Fig.4) [drawing and dimensions]; Mace No.8, p.161; Theodorescu, 1980, No.53.

Like Puchstein (1887, No.4) Mace identifies the capital [National Museum No.4478] as 'found at the north flank of the Propylaea', and reports the date of manufacture as being a little before 480 BC (1978, p.161, No.8, Fig.150 [Not Fig.149. Here Mace confused the order of the illustrations]). Theodorescu (1980, Table 1 and No.53 on p.163) identifies a capital [No.53] as Puchstein's No.4, and calls it 'chapiteau votif (dans la Pinacothèque)', dated to 470-50 BC. Möbius (1927, p.170, Beil.18.9) however identifies a different capital [DAI photograph 871] as Puchstein's No.4 capital, and mentions its close likeness to a capital from the Athenaion II at Cape Sounion. There is another capital, identified by Theodorescu (1980, Table 1, and No. 68 on p.164) as being from 'Cap Sounion, Athénaion', dating from 475-50 BC. The capital that Gruben (1966, p.210) connects to the Athenaion II at Cape Sounion, and dates to 460-450 BC, corresponds to the capital 'found at the north flank of the Propylaea', namely Puchstein's No.4. The reader can hopefully gather that there are two similar capitals, both connected to Cape Sounion. Although they are not exactly the same in terms of dimensions, there is enough proximity to show they might be closely related. The above two capitals are presently in the National Museum, Athens (items No.4478 and 4479), and identified as coming from the Athenaion II, Sounion (Also see confirmation from Daux (1961, Fig.1 and p.605). Due to the assigned function and corresponding dating of the building [475-50 BC], the mentioned capital is excluded from the study (A third capital in this series was found by Züchner (1936, p.332, Fig.21) behind the Acropolis Museum (Drerup (1937) dated the capital to 500-480 BC and believed the series to have belonged to a propylaea)).

Excl-3 'Chapiteau votif(?) dans la Petit Musée de l'Acropole'.

Theodorescu (1980, No.47) dates the capital to 480 BC, and Mobius's (1927) date was in the Fifth Century BC.

Excl-4 'Chapiteau d'angle trouvé sur les pentes de Areopage'.

Theodorescu's (1980, No.49) cited date is 480 BC. The capital is excluded from the study.

Excl-5 The Ionic capital from the Museum in Eritria. This capital is dated by Theodorescu (1980, No.65) to 490-70 BC, but Kirchhoff's (1988, No.39) date of the second quarter of the Fifth Century BC applies.

Excl-6 The Ionic capitals of the prostyle harbour sanctuary, Emporio Chios.

Capital description: Boardman, 1967; Also École Française D'Athènes, 1955, 289, Fig.12.

Kirchhoff (1988, No.54, p.88-9 and No.EK3, p.208) dated the capitals to 520-10 BC. In the light of Boardman's discourse on all other building elements, which he dated to the first half of the Fifth Century BC, and more probably the second quarter, these capitals will not be included as Archaic capitals, although they display all the traits of the Ephesian Archaic capitals.

Excl-7 Two Ionic capitals of the *Hestiatorion* of Céos (presently Kea/Tzia), Delos.

Capital description: Kirchhoff, 1988, p.43-5, No.30; Roux, 1961, p.342-3, Plate 90.2; Roux, 1973, p.535-45, fig.5-7 [Building] p.525-54, fig.8 [capital and base]; Theodorescu, 1980, p.162, No.30; Vallois, 1966b, p.186, No.22.

Vallois classified these marble capitals (On poros bases and columns) as being from the so-called *Thesmophorion*. Roux's (1961) date for this function was 489-79 BC, and that of Kirchhoff (1988, p.44) in the first quarter of the Fifth Century BC (according to his proportional analysis). However, Roux (1961) argued against this classification. After having been assigned to a *Hestiatorion* by Roux, their accepted dating is 480-70 BC (Roux, 1973, p.543). The upward flaring echinus is remarkable. There is correspondence to the inner corner of the capital now assigned to the south entrance of the Apollo sanctuary at Delos (See Ion-32, -27, -48 and Gruben (1997, p.372) who sees the *Hestiatorion* capital as copying them).

Excl-8 Small marble Ionic capital of a votive column from Didyma, found in the foundation of the church built in the *aduton* of the Didymeion. Presently in the Pergamon Museum, Berlin.

Capital description: Kirchhoff, 1988, p.100, No.66; Wiegand, 1941b, Part 1², p.147-8 No.e, Plate 210-1, Inv No.652a-d; Part 1³, p.652-3, Plate 83a; Alzinger, 1972-3, p. 171, fig.2; Theodorescu, 1980, p.161 No.9; Mace, 1978, p.191, Fig.121-3. Kirchhoff (1988, p.66, Note 317) reports the dimensions from the drawings by Wiegand, with his own additions from the drawings and text. Like Alzinger he also draws attention to the Samian shape of the capital, excluding of course the abacus. Apparently Gruben (1963, Notes 137,164,

247, 300) sees this as a fusion of two distinct types.

Date: Even though the capital looks as if it might be an early type, Wiegand (1941b, p.148) sees this as a late capital from after the Persian destruction of Didyma in the Fifth Century BC. The capital is therefore not included in the work. Other datings: Alzinger's (1972-3, p.172) date is in the early Fifth century BC; Kirchhoff's (1988, p.100) date is between 475-450 BC; Theodorescu (1980, Table 1) provides a date of 490-80 BC without any motivation.

Excl-9 Fragmented Ionic limestone capital of a votive column from the Giardino Spagno excavation, Syracuse. Presently in the Syracuse National Museum, Inv.No.3420 [Thanks to S. and E. Pauw for information].

Capital description: Cultrera, 1943, NSC, p.79-80, No.6 [Dimensions], Fig.37-8; Kirchhoff, 1988, p.102, No.68; Theodorescu, 1980, No.76; Benoit, 1954, RA, p.35, Fig 15 [3-d photograph, no date]; Alzinger, 1972-3, p.179, Note 20; See Theodorescu (1980, Plate 4) for plan ordering of the capital's bottom elevation. Due to the ornamentation and the capital bearing offset this capital is similar to those of the Heraion IV and Monopteros II (See Kirchhoff, 1988, p.102; Gruben, 1960, p.89), but it has bolster palmettes, similar to Pedersen's (1983, Fig.24) reconstructed side elevation for the Archaic Syracusan temple capital Ion-61.

Dating: Kirchhoff (1988, p. 102) dates it to 450-425 BC; Theodorescu (1980, Table 1) dates it to 510-480 BC without motivation; Benoit (1954) provides no date; Cultrera (1943) also provides no date; Alzinger (1972-3, p.179) seems to place the capital after 450 BC due to correspondences with other capitals.

Excl-10 Portion of a marble Ionic capital from the Athenaion II or 'Newer' Athena temple, Miletos [Kalabak-tepe, Milet], found at the 'Newer' temple. Presently in the Balat Museum

Origin: Miletos

Date: This capital has evoked much debate, but the date accepted is that of after 479 BC, in the 2nd quarter of the Fifth Cent BC (Mallwitz, 1968, p.123; Koenigs, 1980, p.58 [His date is an approximate date based on detail]). Other dates are: 525-500 BC (Weickert, 1929, p.141). Alzinger (1972-3, p.178, Note 18) states it was found at the Athena temple, [but] that it dates to the Sixth Cent BC, and that identification is problematic regarding both form and function. Boardman (1959, p.208) could not date it closely, but clearly apportioned it to the 'Newer' temple. Kleiner (1968, p.36-8) apportioned it to a Classical rather than an Archaic Athenaion. Notwithstanding the dating, and the fact that Koenigs (1980, p.58) couldn't expressly confirm or reject Von Gerkan's apportionment of the capital to the Classical Athenaion, he discerned pre-Classical proportions (Proportions being midway between an example from Ephesos [Ion 29: 550-25 BC] and Kavala [Ion-50: 500-480 BC]). Mace (1978, p.105, Note 191) became confused when he reported on Wiegand (In *Milet I*, Vol.8, p.67) and Boardman's (1959) dates, which he misread to have been in the Archaic period.

Dates for the 'Newer' temple: After 494 BC

(Boardman, 1959, p.208; He appoints this capital to the newer temple); After Mykale, namely 479 BC (Kleiner, 1968, p.36). Kleiner (1968, p.36) mentions that from the capital piece, as well as from a egg cyma from the epistyle, we are dealing with elements from the Classical, post 479 BC temple. Akurgal (1985, p.221) says the temple dates from the first half of the Fifth Century BC due to its conformity with the Hippodamos plan.

Description references: Apart from [-] Von Gerkan's (1925, *Milet*, 1, Vol.8, p.16flw, 52 flw) [now disputed] reconstruction there are others by Mallwitz, A. 1968. *Athena-Tempel*. *IstMitt*, Vol.18, p.89-143]; Schiering, W. und Mallwitz, A. 1968. *Athena-Tempel*, *IstMitt*, Vol.18, p.144-60 [-]; Gruben, 1963, p.121, Note 71 [disputes the reconstruction with volute eye]; Boardman, 1959, p.208, Note 1 [argues for 4 *scotia* in the cushion instead of the 5 in the reconstruction [this will impact on the width]]. Also discussed by Alzinger, 1972-3, p.178, Note 18, Fig 9 [V. Gerkan's drawing]; Kleiner, 1968, p.36-8, Fig.20; Weickert, 1929, p.140-1; Koenigs, 1980, p.58, No.6, Table 29.1-2.

2.3.3.8 Contentious and 'ghost' capitals, comments, and omissions.

No detailed quantitative and qualitative information is provided. There is no Cont-4.

Cont-1 The lost/not completed Ionic capitals, Temple 'A', Paros.

The definitely Ionic temple was not fully completed. Gruben (1982a, p.215, Fig.16) reconstructed a capital outline, and dated the temple to 530-20 BC (1982a, p.229).

Cont-2 Not completed Ionic capitals of the Apollonion, Palati, Naxos.

Date of temple 550-25 BC (Zaphiropoulou, 1988, p.14). See Gruben (1970, p.341-2) for hypothetical capital dimensions.

Cont-3 Capital of the Iphidike dedication.

This dedication of the last quarter of the Sixth Century BC by the Chiot sculptor Achermos (Raubitschek, 1949, p.8; Jacob-Felsch, 1969, No.4.2, p.161) is deemed to have had an Ionic capital.

Cont-5 Fragment of a yellowish marble volute of an Ionic capital from Adrasteia, Kyzikos [Cyzicus. NE Troad/Propontis [And a colony of Miletos]] found in a cistern opposite the isthmus. Istanbul Archeological Museum, Item No. 1358.

There is doubt whether the capital from Kyzikos is from a temple or an altar (The more likely, according to Hazluck (1901, p.196)). The capital is dated to after 500 BC (Alzinger, 1972-3, p.184) and described by Hazluck, (1901, p.195, Plate 6.5 [Dimensions]); Alzinger (1972/3 p.184, Fig.14 top). The double volute bead, as in early Naxian examples, is noteworthy. Alzinger (1972-3, p.186) mentions that the dishform eye is as an example from Halkipinar [See Ion-12], of the Sixth Cent BC.

Cont-6 The Ionic capital of unknown stone type, from Sardis, found near 'Dede Mezari' (Sardis excavation

Inv.No. LX 76.5).

Description: Mace 1978, p.224-5 and Fig.154-7 (He cites Greenewalt, 1978, Fig.10-13). The date that Mace reports is 525-500 BC or later. Too little remains for full interpretation.

Cont-7 Ionic capital from Athens.

Description: Raubitschek (1938, p.169 [No invoice No. and no picture]). He reports that the capital's column had a Samian torus, and dates it with the Kallimachos capital of 489 BC. Due to lack of description the capital is not used in further inquiries.

Cont-8 Ionic capitals from Athens.

Description: Puchstein, 1887, Fig.5, 7, 8. No further information regarding the date or provenance of these Athenian capitals is known.

Cont-9 Ionic capital from Kition, Bamboula acropolis, Cyprus

Wright (1992, p.441-2, Fig.291A) reports on a Sixth Cent BC Ionic capital of unknown function. The author was unable to get the *Report of the Department of Antiquities at Cyprus*, 1984, p.209-13, to go further into this matter.

Cont-10 Nine small Ionic capitals from Paros

Mentioned by Ohnesorg (1993b, p.115 Note 29) as Paros Museum No. 930, 935, 936, 420 and one without No. but München TU No. M75, as well as No. K188 in Museum and No.154 in a church on the southern part of Paros. Apart from a short description of M 75 in Ohnesorg (1993b, p.115, Plate XXI.6) no further detail is available.

Cont-11 Fragment of a possibly Archaic Ionic volute in a rock pile of the castle at Mytiline.

Mentioned by Williams (1993, p.86), and although there are remains of an Ionic column that is suggestive, the capital's provenience, function and dating are still far from settled.

Cont-12 Two uncompleted *perirrhantaria* in the shape of an upturned Ionic colonnette, Paros. Paros Museum Inv No.997 and in court of the Katapoliani Church, Paros Town. (München TU No. M281 and KA684).

Ohnesorg (1993b, p.117, Note 47, Plate XXII.5) identifies these previously unpublished items. These *perirrhantaria* are easily taken for Ionic votive colonnettes (eg Cont-13, 14 and Iver -2) if the water basin is broken off. No date is provided.

Cont-13 Lost Parian Archaic capital, copied as a marble Ionic capital of a *perirrhantereion*, Ag Antonios Kephalos, Marpissa, Paros (München TU No. I 4).

Found at Castro of Mount Kephalos, Paros. Presently built in under the church altar piece.

Origin: Paros

Date: Byzantine (Ohnesorg, 1993b, p.118), but being a copy of an Archaic example. Other dates: Early Sixth Cent BC (Kirchhoff, 1988, p.138).

Description references: Alipranti, 1975, p.90, No.γ, Fig.23 [Photograph showing context of present use; dimension]; Kirchhoff, 1988, p.138, No.B, Fig. 3.2

[rudimentary sketch].

- This capital up till recently was deemed to have been one of the first Ionic capitals next to that from Sangri, Naxos (See dates above). Ohnesorg (1993b, p.118) deems this to be a crude Byzantine copy of an (then extant) Archaic upside down capital and column, designed as *perirrhanteion* (Like Iver-2). One must bear the existence of this Original Archaic capital in mind in the analyses.

- The capital, presently used in the normal upright position under an altar, is fixed to a column shaft which has rudimentary flutes stopping abruptly, making it uncertain whether the shaft had no base and followed the Doric fashion, or whether it has been sawn off to make it shorter. If seen as water basin the loss of 'base' should be seen as a loss of bowl, which made possible for the column to be used in the normal upright fashion (It is noted here that there should be search for shards of a possible water bowl rim).

Cont-14 Lost Parian Archaic capital copied as a marble Ionic capital of a *perirrhanteion*, Ag Antonios Kephalos, Marpissa, Paros (München TU No. 15). Found at Castro of Mount Kephalos, Paros. Presently built in as base of the ambo support column in the church.

Origin: Paros

Date: Byzantine (Ohnesorg, 1993b, p.118), but being a copy of an Archaic example. Other dates: Early Sixth Cent BC (Kirchhoff, 1988, p.138).

Description references: Alipranti, 1975, p.90, No.α, Fig.17 [Photograph; One capital dimension]; Kirchhoff, 1988, p.138, No.C; *Archaikologia chronika*, 1960, Chron. 1, No.2, Plate A2.

- This capital is almost similar to Cont-13, and also deemed to have been a very old Ionic capital [only surpassed by Ion-1]. Even though this is not the case, in future analyses one must bear in mind that there was an original Archaic capital made in Paros.

- The capital has no column any more {Capital part of 16th Century ambo column base}.

- Other than Cont-13, the cup lozenge shape of the canalis top is more pronounced, the horizontal canalis profile differs, and the polster edge detailing differs. The volute bottoms have been chopped away partially for the column alteration.

- The rounded capital top has very small angle pieces to create a flat bearing surface.

Cont-15 Fragment of a marble Ionic capital (function unknown), Delos. Delos Museum.

Origin: Not published

Date: Last quarter of the Sixth Cent BC, (Kirchhoff, 1988, p.38).

Description references: Kirchhoff, 1988, p.39, No.26; Vallois, 1966b, p.33, 185, No.21. No photograph available. Capital cannot be used in study. No dimensions published. Capital cannot be used in quantitative comparisons.

Cont-16 Lost torus and possibly also cyma capital of the North Building I - Phase III, Samos.

The Phase III/Nordbau I building was started by 545-35 BC [Slightly before the Heraion IV], and the Phase IV/Nordbau II peristyle by 525-10 BC (Kienast *et al*, 1989, p.7-8).

Cont-17 Possible lost Ionic[?] capital for a monumental column at Kolonna, Aegina.

Material : Aeginetan limestone [column] and Cycladic marble [sphinx].

Date: 620 BC [column shaft flutes [Ionic style] and style of sphinx hypothetically connected with column] (Walter-Karydi, 1994, p.128 and Note 6; Also Walter-Karydi, 1987, p.49). If this date is incorrect, the fluting of the column would make the column at least contemporary with the Aphaia sphinx column, and due to the shallower fluting even slightly earlier. Description reference: Column: Walter-Karydi, 1994, p.125-8, Fig.3-4. Sphinx: Walter-Karydi, 1987, p.49 (This sphinx is the first monumental example in Hellas).

Note: Because of the excellent fit of the sphinx hind-quarters with the capital of the Ionic sphinx column from the Aphaia sanctuary, Gruben (1965, p.187 and Note 22) used it for his Aphaia reconstruction. Because of this Walter-Karydi (1994, Fig.4) *mutatis mutandis* reconstructs the Kolonna column to the likeness of the Aphaia column of Gruben, but we have no proof that the sphinx statue and the Kolonna column belong together, and none regarding the form of the support [capital?] for a statue, or a possible crown if there was no statue. In any event, the column is the oldest known Hellenic monumental column in stone, shows Ionic type fluting, and Ionic columns of this period and of this size would most probably be sphinx columns.

Cont-18 Marble Aeolicising capital of a stander, Delos. Delos Museum.

Date: Gruben (1982b, p.184 Footnote 38) calls it Byzantine-archaistic. According to Kirchhoff (1988, p.140) a date as for the First Dipteros (to him 600 BC, which would now be *ca* 575 BC; See Hendrich, 1997, Note 314). There is nothing in his description to disprove Gruben's date.

Description references: Kirchhoff, 1988, p.216-7, 139, No.A4 and D, Fig.3.3.

OMISSIONS

Knowledge of certain capitals were only brought to the author's attention after completion of the analysis - my thanks to Prof. Dr. B. Wesenberg.

These capitals include the Aeolic capitals from Alazeytin (See W. Radt, *Siedlungen und Bauten auf der Halbinsel von Hallkarnassos*, *IstMitt* 3, 1970, p.23 flw, and currently in the garden of the Bodrum Castle), the newly found piece from Ilion (See *Studia Troica* 5, 1995, p.87, Fig.6-7), and the 'Arkades type' capital in the school courtyard at Foça (See *Akurgal, Anatolia* 5, 1960, Table 2b).

The effect of the inclusion of these three exemplars should be taken into account in future interpretation.

2.3.4 The use of reconstructions of capitals

A delimitation accepted for this study requires that only those capitals, votive columns and buildings of which published information is available are interpreted. As mentioned in Chapter 2.3.3, not all the published information provides reliable quantitative data. The manner in which an indication of the level of reliability of data for reconstructed capitals is provided in the study has been dealt with. There is however a group of capitals which have not been visually documented, damaged capitals which have not been reconstructed, and capitals which have been photographed in such a way that taking reliable dimensions from the photograph is not possible.

The question is how such capitals may still be made useful in broadening the data base and gaining useful knowledge from them, rather than discarding them completely. Firstly, in the catalogue of Ionic capitals the author is explicit about the method used to gain dimensions. Some capitals are identified as being unusable for quantitative or qualitative analysis, but if they are deemed usable, there is an indication of the accuracy level of dimensions in Table 2.2, the fact that certain dimensions are not measurable from the artefact is identified in the catalogue, and the lack of morphological criteria are indicated in Table 2.1. Secondly, where good drawings of damaged capitals are available, or photographs that allow for completion of volute elements through geometric construction, such reconstruction is attempted. (Such drawings being included in the illustrations in Appendix 2), but again identifying the level of reliability in the relevant Tables. In the section dealing with volute geometries, the reliability level is likewise identified, and no reconstructions are attempted for those that are not reliable.

For the sake of completeness the author places new information regarding various capitals where permission was gained to inspect and photograph hitherto unpublished or poorly published capitals, even though the necessary permission to work with calipers could not be obtained due to restrictions beyond the control of the author. (These capitals, together with those capitals that have over time never been properly documented, are identified in the catalogue as candidates for re-documentation). The dimensioning and drawing of capitals Ion-10 (With permission from the *Ephoria* of the Cycladic region) was undertaken for this purpose. Other capitals of which certain dimensions have not been published, like Ion-15 and -21 (with permission of the Staatliche Museum Berlin), Ion-67b (with permission of the National Museum Athens) and capitals Ion-67, -68 and -70 from Paros (with permission of Dr Skillardi, Head of the Paros excavation) were photographed by the author. Comment regarding the accuracy of dimensions that are presented is stated in the catalogue. However, regardless of their nature, this information was retained in the study for the reasons previously stated, and because of their possible usefulness in other studies.

Capitals that are identified for immediate re-documentation are Ion-12, -13, -56, -65, -67b, -68, -69 and -76.

It is the author's serious intention to augment the more synthesising nature of the results obtained from this study through future rectification of data from personal contact with the artifacts. This is made possible by the exposure of the state of reliability of data in this study. In order to understand and evaluate the present inclusion of the abovementioned capitals in the more synthesising analysis, there is an attempt to establish the influence of the use of the more 'contaminated' quantitative data in Chapter 3.2.5.

2.3.5 Chronological ordering of capitals

After the identification and description of capitals, and evaluation and acceptance of dates in the text in Chapter 2.3.3 above, the Ionic, Aeolic, Cyma and Aeolicising capitals are ordered chronologically according to their currently seen, approximate chronological positions within 25 year periods in Table 2.3 below. Undated capitals which may be re-dated after the analysis, are indicated at the bottom. (One must remember though, as explained earlier (See 2.3.1.2 and 2.6.2.2) and as pointed out by Theodorescu (1980, p.82, 87-90), that due to the dating methodology often forced on researchers due to lack of contextual evidence, a degree of latitude regarding the accuracy of certain of the 7-6th Century BC capitals should be expected. The seeming preciseness of the chronological succession reflected in the chronological table is an effluent of the analytical process followed in the study and of the compactness of the table format; Nevertheless, the dates remain a reflection of the quality of current scientific endeavour in this regard. The user of the chronology includes the critical assessment of the accuracy of certain dates in Chapter 2.3.2.1, -2, -5, in the catalogue of capitals in 2.3.3 and the text hereafter, all of which acknowledge those instances where precision in terms of dates may be compromised. Apart from the known datum points, the established dates and where dates rely on contextual evidence. Even though there is a continuous striving for greater accuracy in this study, the acknowledgement should remain a tempering influence in this study and further deductions relying on the chronology, and should demand further corroboration in the future.

The datum of the artistic and architectural Ionic standard capitals are identified (See * in Table 2.3 below, and discussion at 2.3.6). Capitals where established dates are present are printed in boldface and so identified. The chronologically ordered quantitative and qualitative aspects of Ionic capitals are also included in Appendix 1, Table 1.1 and 1.2 in spreadsheet format for further manipulation.

As a result of the chronological ordering, the identification of and dates for morphological innovations, form experiments, interim canonical phases and for a possible canonical form of the Ionic standard capital may be dealt with as part of the interpretation process in Chapter 3. Further discussion based on the chronological ordering of capitals is dealt with in Chapter 4.

Table 2.3 Chronologically ordered inventory of relevant Archaic non-standard Ionic, Aeolic, Aeolicising, cyma standard Ionic and torus capitals (625 up to 489 BC).

No.	ORIGIN	FUNCTION	DATE USED	DATE REFERENCE USED	No.	ORIGIN	FUNCTION	DATE USED	DATE REFERENCE USED
625 to 600 BC									
Preion-1	Delos	Artemision E (?) [Rectangular timber columns]	Before 600 BC	Gruben, 1996, p.64	Cym-5	Samos	Cells capitals, Herion IV	[?]<522 BC	Pedersen, 1983, p.112
*Ion-1	Naxos [Artistic datum]	Votive column, Demeter and Apollo sanctuary, Sangri	End 7th C BC <u>estab</u>	Gruben, 1989, p.164	Cym-9	Samos	Inner ring cyma capital, Herion IV	[?]<522 BC	Pedersen, 1983, p.112
		[In Gruben (1993, p.102) there is an assertion that it is from after mid 7th C BC]			Not made	Palati, Naxos	Heikatompedos [Entablature incomplete - See Cont-2]	ca 530 BC	Gruben, 1961, p.344
600 to 575 BC									
Preion-2	Didyma	Unknown building [Rectangular timber columns]	ca 600 BC	Gruben, 1996, p.63	Ion-30	Athens	Votive column	530-20 BC	Gruben, 1982a, p.229
Iver-3	Delos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.220	Ion-76	Athens	Votive column (Ameisias)	530 BC >	Boardman, 1959, p.206
Iver-4	Delos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.14 [propr]	Ion-34	Athens	Votive column	530-28 BC <u>estab</u>	Raubitschek, 1943, p.19
Ion-22	Aegina	Sphinx column, sanctuary of Aphaia	Early 6th C BC	Gruben, 1989, p.169, Note 25 Gruben 1993, Note 8	Cym-10	Delphi [ex east Ionia]	Klasoneseion Treasury, Apollo sanctuary	ca 530 BC	Raubitschek, 1938, p.166
					Cym-11	Delphi [ex west Ionia]	Masiliot Treasury, Apollo sanctuary	ca 528 BC	Gruben, 1961, p.135
Ion-4	Naxos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.13 [propr]	Iver-6	Paros	Votive column, Thesmophorion, Paros.	>528 BC	Gruben, 1961, p.135
*Ion-24	Naxos [Archit datum]	Interior capital (And pronaos), Naxian Oikos, Delos	< 580 BC	Ohnesorg, 1996, p.41				ca 525 BC	Ohnesorg, 1993a, p.117
Aeol-1	Old Smyrna	Incomplete temple of Athena I	[ca 580] after Alyattes	Kuhn, 1986, p.80	525 to 500 BC				
Ion-9	Naxos	Votive column, sanctuary of Demeter and Apollo, Sangri	580-70 BC	Kirchhoff, 1988, p.19	Ion-26	Chios	Temple of Apollo Phanaios [Started 550-25 BC]	525-500 BC	Boardman, 1959, p.184
575 to 550 BC									
Tor-1	Samos	First Dipteros (Herion III)	575 BC	Kienast, 1992; Hendrich, 1997	Ion-66	Delphi	Votive column [from Paros?]	525-500 BC	Hahlund, 1964, p.194
Cym-8	Phocaea	Athenaion I	575-50 BC	Akurgal, 1983, p.117	Ion-72	Cyrenaica, N Africa	Rock cut tomb	525-500 >	Boardman, 1959, p.208 and Mason, 1978, p.169
Aeol-3	Larisa (o-t-Hermos)	Building	575-50 BC	Betancourt, 1977, p.76, Pl. 42	Ion-67	Athens	Votive column, akropolis	520 BC	Theodorescu, 1980, Pl.1 and Mason, 1978, p.155
Ion-7a-b	Iria, Naxos	Temple of Dionysos IV [Bldg start 580 (-575) BC]	570 BC	Gruben, 1989, p.172; 1993, p.104	Ion-35	Athens	Votive column, akropolis	ca 520 BC	Bormann, 1988b
Ion-6	Delphi	Naxian sphinx column, Delphi	570-60 BC	Amandry, 1933, p.26, 31, 199 and Gruben, 1993, p.104	Ion-81	Athens	Votive column, akropolis	ca 520 BC	Mason, 1978, p.158
					Ion-12	Smyrna	Votive column, Halikarpinar, Smyrna	[?] 520 BC	Gruben, 1963, p.174. note 168
Ion-11	Delos	Capital found in the Competalist agora, Delos.	575-50 BC	Kirchhoff, 1988, p.24 [propr]	Ion-36	Athens	Votive column (Alkimachos)	520-10 BC <u>estab</u>	Jacob-Felsch, 1969, p.119 and Raubitschek, 1940, p.18
Cym-2	Didyma (Jeronda)	Votive column	575-50 BC	Kirchhoff, 1988, p.198	Ion-42	Massalia	Architectural	520-10 BC	Benoit, 1954
Cym-3	Didyma	Votive column	575-50 BC	Kirchhoff, 1988, p.199	Ion-32	Delos [Naxian ?]	Corner capital Propylon II	520-500 BC	Gruben, 1997, p.368
Cym-14	Paros	Votive kouros column	575-50 BC	Ohnesorg, 1993a, p.111	Ion-27	Delos [Naxian ?]	Inner capital, Propylon II (ac 'Nieborow', Warsaw)	As Ion-32, or 500-BC	Gruben, 1997, p.370
Ion-10	Paros	Votive column (sep <i>canalis</i>), A. Katapoliani, Paros	570-50 BC	Ohnesorg, 1993a, p.113	Ion-48	Delos [Naxian ?]	Outer capital, Propylon II (found Phcia, Olympia)	As Ion-32	Gruben, 1997, p.370
Ion-18	Delos	1st Naxian sphinx column from the Artemision of Delos	570-50 BC	Ohnesorg, 1993a, p.113	Ion-37	Posidonia-Paestum	Athens temple	510-500 BC	Kirchhoff, 1988, p.40 and Theodorescu, 1980, No.74
Ion-19	Delos	2nd Naxian sphinx column from the Artemision of Delos	570-50 BC	Ohnesorg, 1993a, p.113	Ion-52	Thasos	Anta column of an unidentified temple	510-460 BC	Martin, 1972, p.323
Ion-20	Delos	Votive column (theatre)	ca 560 BC	Martin, 1973	Ion-53	Thasos	Anta column of an unidentified temple	510-460 BC	Martin, 1972, p.323
Cym-13	Delphi	Quisidm Treasury	ca 560 BC	Gruben, 1961, p.135	Aeol-6	Klipedi or Mytilene	Temple at Klipedi or Mytilene	Late 6th C BC	Betancourt, 1977, p.87, Pl. 50
Ion-16	Ephesos	Artemision TD	<550 BC	Bammer, 1984, p.76 and Fig.84	Ion-51	Miletos-Thessaloniki	Dionysios temple	Late 6th Cent BC	Bakalakis, 1963, p.31
Ion-5	Naxos	Proton (east) of the Naxian oikos, Delos	Just < 550 BC	Courbin, 1987, p.74	Ion-63	Miletos	Votive column	Still 6th Cent BC	Koenigs, 1980, p.58 [propr]
Lost	Naxos?	Column of Athena Polias, Delos	Just < 550 BC	Gruben, 1989, p.166, Note 12	Ion-38	Thasos	Votive column	End 6th Cent BC	Kirchhoff, 1988, p.42 [propr]
Cym-1	Naukratis, Egypt	Apollonion I / votive column	< 550 BC	Pedersen, 1983, p.116				End 6th Cent BC	[Martin (1982) = 510-480 BC]
Toe-2	Didyma	Limestone phase Didymeion [Start bldg ca 600 BC by Schneider (1996, p.83) contextual: <550 BC]			Ion-40	Gela	Building	End 6th Cent BC	Barletta, 1983, p.249
550 to 525 BC									
Aeol-2	Neandria	The temple, Neandria (Acropolis)	ca 550 BC	Wiegartz, 1994, p.125	Ion-43	Miletos [Milet city]	Architectural	End of 6th Cent BC	Koenigs, 1979, p.194
Aeol-9	Aegae (Pergamon)	Possibly a temple.	As Aeol-2	Rack, 1991, p.482	*Ion-75	Athens	Kakrops column [?] (north wall akropolis)	ca 530	[See Boardman, 1959, p.206]
Iver-2	Paros	Peripterasterion	ca 550 BC	Ohnesorg, 1993a, p.117				Now placed as Late Archaic by Korres (1997, p.95)	
Cym-12	Paros	Votive <i>kyros</i> column	ca 550 BC	Ohnesorg, 1993a, p.111	Ion-60	Phocaea	Rebuilt Athenaion II	End of 6th Cent BC	Alurgal, 1985, p.117 [contexted]
Cym-4	Thasos [?]	Probably a votive <i>kyros</i> column, Delos	Mid 6th Cent BC	[Kirchhoff, 1988, p.200]	Aeol-7	Ereos	Unknown architectural application	550-500 > BC	Betancourt, 1977, p.88.
Ion-23	Thasos	Votive column	Mid 6th Cent BC	Kirchhoff, 1988, p.28-9	500 to 480 BC				
Ion-17	Paros	Votive column (Archilochos/Ag Tris Eklesies)	ca 550 BC [?]	Ohnesorg, 1993a, p.114	Ion-77	Speculative	In <i>axis</i> temple/treasury, Labrynda [Mylasa]	ca 500 BC	Thieme, 1993, p.49-50
Ion-69	Paros	Votive column, Paros (Modern wall antique city)	as Ion-17	Ohnesorg, 1993a, p.115	Ion-80	Miletos/Didyma	Votive lion column [Mikros], unknown site.	ca 500 BC	Koenigs et al (1978/80, p.164)
Aeol-4	Larisa (o-t-Hermos)	Old Palace (building B), Larisa (On-tho-Hermos)	550 BC	Betancourt, 1977, p.76	Ion-58	Samos	Complete entablature Herion IV [Start-up 540 BC]	2nd phase 500>BC	Kienast, 1992, p.186
Iver-12	Delos	Votive column	550 BC	Martin, 1973, p.377	Ion-59	Samos	Monopteros II [If linked to the Herion IV 2nd phase]	500>BC	Kienast, 1992, p.188-9
Ion-14	Kyrene	Sphinx column of Kyrene	550 BC >	White, 1971, p.52	Ion-61	Syracuse	Ionic temple in the Athena sanctuary	500>BC	Barletta, 1983, p.88-90
Ion-15	Myus	Lower temple	ca 550 BC	Weber, 1967, p.139	Ion-44	Ephesos	Temple (found St John Basilica, Selcuk)	500>BC	Linked to Ion-77, Ion-59
Ion-64	Sangri, Naxos	Votive column	ca 550 BC	Gruben, 1989, p.169	Cym-6	Didyma	Votive column	ca 500 BC	Kirchhoff, 1988, p.201
Iver-11	Oropos	Votive column	Just > mid 6th C BC	Kirchhoff, 1988, p.216	Ion-31	Selinus	Votive column	ca 500 BC	Theodorescu, 1974, p.46 [topolog]
Iver-7	Athens	Votive column, Athens.	550-500 BC	Betancourt, 1977, p.100.	Ion-56	Tamassos, Cyprus	(prob) votive column (later game table)	Early Fifth Cent BC	Kirchhoff, 1988, p.54 [propr]
Iver-8	Athens	Votive column, acropolis	550-500 BC	Betancourt, 1977, p.102.	Cym-7	Samos	Votive column	Early Fifth Cent BC	Theodorescu, 1957, p.20
Ion-45	Miletos (Yeniköy)	Temple (?)	ca 550-500 BC	Koenigs, 1979, p.189	Ion-39	Histria	Temple 'A' (Zeus Potisus?)	500-490 BC	Theodorescu, 1968, p.285
Iver-9	Athens	Small building or sanctuary on the acropolis	550-525 BC	Betancourt, 1977, p.104.	Ion-46	Metapontum	Temple TD	500-490 BC	Martens, 1979, p.128, 138-9
Ion-29	Ephesos	Temple (found in the Byzantine aqueduct)	550-25 BC	Kirchhoff, 1988, p.87 and Theodorescu, 1980, Tab.1, No.2	Ion-50	Napoli	Temple of Artemis	500-480 BC	Roux, 1961
					Ion-55	Halicarnassus	Free-standing anta column	500-480 BC	Martin, 1959
Ion-74	Athens [+East Ionia]	Emmenonion in the Athenian agora	550-25 [40-30] BC	Merril, 1982, p.88, 92	Ion-54	Larisa (O-t-Hermos)	Late Archaic	Martens, 1969, p.134	
Aeol-5	Klipedi	Late archaic (Apollo?) temple, Klipedi.	Last 3rd 6th C BC	Betancourt, 1977, p.83.	Ion-78	Miletos	Uncompleted Temple (Mangrovevtepe, Milet)	ca 500 [< 494] BC	Weber, 1996, p.86
Ion-25	Delos	Naxian stoa	550-40 BC	Martin, 1972, p.314	Ion-21	Athens	Votive column (?) [Berlin 997]	<489 BC	Raubitschek, 1938, p.170
Ion-82	Didyma	Votive column	< Ion-28	Gruben, 1963, p.142	Ion-62	Athens	Votive column (Nike of Callimachus)	490-89 BC <u>estab</u>	Jacob-Felsch, 1969, p.127
Ion-73	Samos	Anta capital of South temple	545-35 BC	Furtwängler et al (1989, p.61)					
Iver-13	Athens	Votive column [No.3847]	540 BC	Raubitschek, 1938, p.164					
Ion-28	Didyma	Didymeion/Apollonion II (Building start 550 BC)	ca 540-30 BC,	Tuchelt, 1991, p.21					
			Before frieze	Schuttnner, 1996, p.41					
Iver-5	Paros	Votive- or architectural	540-30 BC	Ohnesorg, 1993a, p.116					

[Note: These Archaic capitals not placed due to lack of knowledge regarding date or place of origin are so indicated in the catalogue. Ion-10, -41, -57 and -68 are not placed chronologically, but their dates are locked into after the analyses. Ion-13 and -41 cannot be placed chronologically. Due to a lack of precise dating Cym-14, -15, -16, -17 and Iver-10 can also not be placed here. Iver-10 can also not be placed geographically.]

2.3.6 Geographical ordering of capitals

The geographic ordering of relevant early Ionic capitals is undertaken in two different ways: Firstly, all the non-standard and standard Ionic and Aeolicising capitals up to 525 BC are geographically and chronologically ordered according to geographical provenience for the sake of discernment of broader trends during the delineated founding period in the Archaic era and to facilitate future determination of geocultural aspects. This is done in two ways: In Appendix 1, Table 1.3 and 1.4, in which the quantitative and qualitative aspects, respectively, are given in spreadsheet format for manipulation, as well as in Table 2.4 below, where functional contexts are shown to increase insight and to prevent duplicative work later (Namely Pre-datum Ionic temple (PrITmp), Pre-datum Ionic building (PrBldg), votive column (IVc), -temple (ITmp), -shrine (IShr), -stoa (Istoa), -fountain-house (IFh) or -tomb (Itmb)), or for Aeolicising capitals (Namely votive column (Avc), -stander (AStd) or -shrine (AShr)). The symbol * indicates the place of manufacture.

The following finely grained geographical ordering in Table 2.5 below relies on knowledge re links between colonies and their mother cities, between religious centra like Delphi, Delos and Branchidae-Didyma with their centres of origin, and from identification of design ateliers where known. This is only done for first generation Archaic capitals up to 525 BC, in order to provide suitable data for typological analyses regarding geographically related design tendencies in the first phase of the founding of the capital. (More detailed research regarding interim typological phases of capital design in the Archaic period after 525 BC is excluded from this study).

2.3.7 A datum for the Ionic standard capital

2.3.7.1 External evaluation of the identified datum point of the Ionic capital

Reliable confirmation of the coming into being of the first Ionic capitals from contemporary written sources is impossible due to the lack of any such documentation (See Philipp (1968); Kostof in The architect. Chapters in the history of the profession, 1977, p.17); Coulton (1977, p.15); Onians (1988, p.3); Wesenberg (1983; 1996) in this regard). The oldest surviving architectural source, namely Vitruvius (1955 [50 BC], paragraph iv.i.vii) does not mention any Ionic votive column, and furthermore does not acknowledge any Ionic building before the Artemesion at Ephesos - which he, if he refers to phase 'D', erroneously holds as the first .

From Oliver-Smith's (1969, p.148) exhaustive study the first artistic reference to a functional Ionic capital in non-architectural context (ie furniture decoration) dates to 560 BC, and the first reference to the capital in architectural context, to 520 BC. Other early artistic references to the capital form are identified in the work by Blundell (1995, Fig.22, p.221; The date being *ca* 520 BC), Dunkley (1939, p.161-3, Fig.6), Schefold (1966, Fig.79; The date for the hydria showing the furniture with upside down capital being 570 BC), Beazley (1912-3, p.246, Fig.1-4; The date for the vase showing an altar with the typical Ionic canal is 530 BC onwards), Akurgal (1961, Fig.20; The date for the Ionic architectural columns on the sarcophagus No.267, Samos Museum, is known to be between 575-560 BC, very close after the conception of the Order) and Wehgartner (1983, No.B595, Plate 9, Fig.9; The date is 570-60 BC) do not upset the datum point of the Ionic capital as stated in 2.2.9.3 above. However, the early acceptance of the form in earthenware decoration and other functional artifacts is indicated by the dates concerned. Howe's (IDO, p.268) similar inquiry regarding representation of the Doric Order has resulted in a similar result, namely that there is no representation of the Doric capital or the Order before its emergence in 600 BC. It is deemed to be of great importance to the study that no depictions of Ionic buildings occur in Early Archaic Orientalisation earthenware decoration before 575 BC, which surely would have happened if such works existed in either timber or stone formats.



Table 2.4 Geographically and chronologically ordered Ionic and Aeolicising capitals 625-525 BC.

WEST IONIAN	MAINLAND	N.AFRICA	ISLAND IONIAN	EAST IONIAN
625 to 600 BC			Preion-1, Delos - PrITmp Ion-1, Iria, Naxos - IVc (Established date)	
600 to 575 BC			Preion-2, Didyma - PrIBldg Iver-1, Delos - AStd Iver-3, Delos - AVc Ion-4, Delos - IVc Iver-4, Delos (*Naxos)- AVc Ion-24, Delos - ITmp Ion-9, Sangri, Naxos - IVc(?)	Tor-2, Didyma - ITmp
575 to 550 BC			Ion-7, Iria, Naxos - ITmp Ion-6, Delphi [ex Naxos] - IVc Ion-11, Delos - IBld? Ion-10, Paroika, Paros - AVc Ion-18, Delos - IVc Ion-19, Delos - IVc Ion-20, Delos - IVc Ion-5, Delos - ITmp Lost, Athena Polias - Naxos? - IVc	Tor-1, Samos - Itmp Ion-16, Ephesos - ITmp Tor-1, Samos - Itmp
550 to 525 BC			Iver-2, Paros - Perirhanterion Ion-23, Thasos - IVc Ion-17, Paroika, Paros - IVc Ion-69, Paros - IVc Iver-12, Delos - AVc Ion-14, Kyrene - IVc Ion-64, Sangri, Naxos - IVc	Ion-15, Myus - ITmp Ion-45, Miletos [Yenikoy] - IBld(?) Ion-29, Ephesos - IBld(?) Ion-82, Didyma - IVc Ion-73, Samos - ITmp Ion-28, Didyma - ITmp
	Iver-11, Oropos - AVc Iver-7, Athens - AVc Iver-8, Athens - AVc Iver-9, Athens - AShr(?) Ion-74, Athens [e.Ionia] - IFh Ion-30, Athens - IVc Ion-76, Athens - IVc [Established date] Ion-34, Athens - IVc		Ion-25, Delos - IStoa Iver-5, Paroika, Paros - AVc Uncompl [Cont-2], Palati, Naxos - ITmp Lost [Cont-1], Temple A, Paros -ITmp Iver-6, Paroika, Paros - AVc	

Note: Capitals that cannot be geographically put are Iver-10, Ion -66, -77.

Table 2.5 Finer grained geographically and chronologically ordered Ionic and Aeolicising capitals 625-525 BC.

Unknown	WEST IONIAN	MATILAND	NAFRICA	ISLAND IONIAN		MILESIAN		EAST IONIAN	SAMIAN
Unknown	SICILY	ATTICA	ARGINA	Kyrene	PARIAN	NAXIAN		EPHESIAN	
625 TO 600 BC									
Preion-1, Delos - PriTemp [Unknown origin]						Ion-1, Iria, Naxos - IVc [Established date]			
600 to 575 BC							Preion-2, Didyma - Pri bldg		Iver-1, Delos - AStd [Samos?]
Iver-3, Delos - AVc [Unknown origin]				Ion-22, Aegina - IVc					
						Ion-4, Delos - IVc [ex Naxos] Iver-4, Delos (*Naxos)- AVc Ion-24, Delos - ITmp [*Naxian building] Ion-9, Sangri, Naxos - IVc			
575 to 550 BC							Tor-2, Didyma - ITmp		
						Ion-7, Iria, Naxos - ITmp Ion-6, Delphi [*Naxos] - IVc Ion-11, Delos - IBldg? [Ex Naxos]			Tor-1, Samos - ITmp
					Ion-10, Paroika, Paros - AVc	Ion-18, Delos - IVc [Ex Naxos] Ion-19, Delos - IVc [Ex Naxos] Ion-20, Delos - IVc [ex Naxos?]			
						Ion-5, Delos - ITmp [Naxian building] Lost Naxos? Athena Polias - IVc		Ion-16, Ephesos - ITmp	
550 to 525 BC					Iver-2, Paroika, Paros - A Periklanterion Ion-23, Thasos - IVc Ion-17, Paroika, Paros - IVc Ion-69, Paros - IVc				
Iver-12, Delos - AVc []				Ion-14, Kyrene - IVc		Ion-64, Sangri, Naxos - IVc	Ion-15, Myus - ITmp		
	Iver-11, Oropos - AVc Iver-7, Athens - AVc Iver-8, Athens - AVc								
	Iver-9, Athens - ASir (?)							Ion-45, Miletos [Yenikoy] - IBldg (?)	
	Ion-74, Athens [E.Ionia] - IFh					Ion-25, Delos - IStoa [Naxian building]		Ion-29, Ephesos - IBld(?)	
							Ion-82, Didyma - IVc		Ion-73, Samos - ITmp
					Iver-5, Paroika, Paros - AVc		Ion-28, Didyma - ITmp		
						Uncompl, Palati, Naxos - ITmp [Lost, Temple A, Paros - ITmp]			
	Ion-30, Athens - IVc Ion-76, Athens - IVc [Established date] Ion-34, Athens - IVc								
						Iver-6, Paros - A Thesmochorion			

Note: Capitals that cannot be geographically put are Iver-10, Ion -66, -77..

As mentioned in Bakker (1992) the above-mentioned domestic use of the capital motif in the Tyrrhenian and Corinthian spheres 50 years after its artistic conception may lead to varying conclusions. The motif might have been known almost simultaneously in the latter and the Naxian/Parian/Samian spheres, or otherwise the early use of the motif in the sanctuary of Delphi might have made it acceptable and available to the non-Ionian spheres. The acceptance of the motif in the Tyrrhenic vocabulary is not strange: We know that Corinth, like Naxos, took the lead in the Orientalising process of the arts (Robertson, 1975, p.24), and the Doric Tyrrhenic sphere was closely linked with the Cyclades. It seems then that the motif was available but did not find the same common use as in the Ionian sphere. However, the later Sixth Century Athenian secular architectural application of the capital motif in stoas and fountain houses, seen together with the Corinthian vase decoration of an Ionic capital as fountain stand (Dunkley, 1939, Fig.6) and allegedly with Athenian religious votive columns (The Keklopien column [?]) and Athenian temples (The pre-Parthenon [?]) on the acropolis, serve as indicators to the widespread embracement of the Ionic style in the Athenian sphere.

2.3.6.2 Self-referential evaluation of the datum

One of the tasks the author had initially set out to do was to define the datum point of the complete, stone Ionic capital (See * in Table 2.3 above). The oldest extant fully formed stone Ionic standard capital that may be identified is part of the sphinx colonnette (See capital Ion-1; Column Col-1) dedicated to Apollo, at the Apollo and Demeter sanctuary at Sangri, Naxos. The event happened in the last decade of the Seventh Century BC and is underscored by epigraphic evidence on the capital. This capital remains the benchmark from which prior and further evolution is discussed.

2.4 PHYSICAL CONTEXT OF AN EVOLVING IONIC ARCHITECTURAL CAPITAL UP TO 525 BC AND OF RELEVANT VOTIVE COLUMN CAPITALS

2.4.1 Achieving a relevant data base of buildings and votive columns

The catalogue that follows describes relevant buildings and votive columns before the artistic datum of the Ionic standard capital, ie the Sangri colonnette, and the architectural datum of the Ionic standard capital, ie the Naxian *Oikos*, and then the stone buildings from the architectural datum on until 525 BC - as delineated to test hypotheses re early capital form - in terms of their description sources, accepted dates and related debate and inquiry, their material, place of provenience and explanatory notes. Quantitative description of the main elements of the façades of Archaic Ionic buildings only is provided in Appendix 1, Table 1.5 (Space limitations prohibits provision of façade and plan drawings). Where sources were unobtainable for use they are indicated with [~] and included in the catalogue, in order to enable further research. An index for the catalogue of buildings is provided below to facilitate its use:

Index	Artifacts within which capitals appear	Page No.
2.4.1.1	Catalogue and description of relevant <u>buildings</u> before the architectural datum of the stone, Ionic standard capital.	65
2.4.1.2	Catalogue of relevant free-standing columns before and during the architectural datum of the stone, Ionic standard capital.	69
2.4.1.3	Catalogue and description of Ionic buildings from the architectural datum of the stone, Ionic standard capital to 525 BC [The foundational phase or first generation]	71
2.4.1.4	Catalogue of relevant Aeolic buildings before and during the architectural datum of the stone, Ionic standard capital.	79
2.4.2	Chronological ordering of buildings from the Ionic sphere up to 525 BC	81
	Table 2.6 Chronologically ordered buildings from the Ionic sphere up to 525 BC	81

2.4.1.1 Catalogue and description of relevant buildings before the architectural datum of the stone, Ionic standard capital.

Bld-1a Heraion I Samos (Naos)

Date: Start 8th Cent BC (Kienast, 1996, p.16)

Note: This building is held as the first Hellenic temple building.

Capitals: Not extant.

Bld-1b In-antis *Hekatompedos IA*, Samos

Date: ca 700 BC (Kienast, 1996, p.16).

Note: The supposed surrounding timber colonnade for Phase I (Buschor, 1930, p.13ffw, Fig.4-5, Beil.2; [-] Buschor-Schleif, 1933, p.152, Fig.3-4, Beil.47.3; Drerup, 1969, p.13, Fig.11-12; Kalpaxis, 1976, p.17-26, Fig.1; Mallwitz, 1981, p.624-33, Fig.16, 24; Ainan, 1988, p.117, Note 45) has been discredited from a re-analysis of the documentation of the remains by Kienast (1996, p.23). So conferred by Gruben (1996).

Capital: Not extant.

Bld-1c Prostyle *Hekatompedos II*, Samos

Date: ca 660 BC (Kienast, 1996, p.16)

Note: The supposed surrounding timber colonnade for Phase II (Buschor, 1930, p.35, Fig.7, 13; [-] Buschor-Schleif, 1933, p.154, Fig.5; Gruben, 1966, p.317-8 [Incl plan]; Drerup, 1969, p.14, Fig.12; Kalpaxis, 1976, p.35-7, Fig.17-18; Kyrieleis, 1981, p.79-80, Fig.56; Mallwitz, 1981, p.624-33) has been discredited by Kienast (1996, p.23) from a re-analysis of the documentation of the remains. Gruben (1996, p.62-3) also cannot prove the existence of a surrounding colonnade, but says the Lefkandi, Mazaraki and Ephesos examples are now asking for new examination of the issue.

Capital: Not extant

Bld-2a Stone *sekos* I [Artemision 'A'] with timber surrounding colonnade, Ephesos

Bammer (1990, p.136-60, Fig.14; 1991, p.73-5, Fig.21) has identified an Eighth Century BC surrounding timber structure around the outside of a stone *sekos* wall (Artemision 'A') [ie like a U-formed 'stoa'], which in its turn enclosed a monopteral baldachin for the cult statue. Bammer's (1990, Fig.14,

p.148) work shows this *sekos* underwent a series of

reconstructions [Phases 3-4] up to the time of the renewal of the temple by Kroisos (Artemision 'D'). Lambrinoudakis (1996, p.60) believes Phase I to be a flat roofed enclosure, as Bammer's (1990, Fig.30) version of it. Due to the open nature of the *sekos* type, the open version in Bammer's drawing seems more probable.

Capital: Not extant

Bld-2b Stone *sekos* II [Artemision 'B'] with higher peripteros, Ephesos.

Date: [not provided] - exists till Kroisos temple phase 'D' (Bammer, 1991)

It is important to note that the peripteral *sekos* (Artemision 'B') existed before the erection of the ca 600 BC north-south orientated, non-peripteral marble *Hekatompedos* [See Bld-15] at its west side (Bammer, 1984, Fig.83; 1991, Fig.1) showing the origins of the surrounding timber colonnade on this site. We deal here with a lean-to around a U-shaped *sekos* wall rather than around a closed building, as well as with a baldachin formed by a colonnade, rather than the peripteral *oikos* form-type which asks for a formalised stone colonnade.

Capital: Not extant

Bld-2c Anta *sekos* and naiskos, with no peristyle [Artemision 'C'], Ephesos.

Date: 600-90/80 BC [*do ck] (Bammer, 1984, p.172, Fig.83). Tölle-Kastenbein (1994, p.43-4, Fig.6) reports that Phase 'C' took place somewhere between the time of the Seventh Century BC flooding [Not a Cimmerian attack] of the Artemision 'B' and Phase 'D' [See Bld-2c] in ca 560 BC, and her time frame is during 600-590/80 BC.

Notes: Bammer (1984, p.172 and Fig.83) thinks Phase 'C' was an anta building with a *naiskos*. Tölle-Kastenbein (1994, p.52) proposes that this phase was an octastyle peripteral *sekos* which peristyle later provided the foundations for the enlarged *dipteros* of Phase 'D' [Her suggested interaxial distances between columns indicate for her the use of stone construction for the peristyle]. Her argument, namely that we can only conceptualise the Artemision 'C' as a *peripteros* due to the proven existence of a peripteral predecessor [See Bld-2a] and a dipteral follower [Bld-2c], is a theoretical construct and remains hypothetical.

Capital: Not extant

Bld-3a Dionysos Temple I, Iria, Naxos (A 2 aisled, stone + timber *oikos* with flat timber + earth roof)

Date: From 8th Cent BC (Gruben, 1996, p.67).

Description: Lambrinouidakis, 1996, p.55-56, Fig.1 [Plan].

Capital: Not extant

Bld-3b Dionysos Temple II, Iria, Naxos (A 4 bay hypostyle of stone and timber)

Date: 2nd half 8th Cent BC (Gruben, 1996, p.67).

Description: Gruben, 1996, p.65, Fig.6.I; Lambrinouidakis, 1996, p.55-56, Fig.1 [Plan], 2 [Column base].

Note: Four aisled with three colonnades of 5 timber columns each [With columns on flat stone plates level with the ground], like a 'hypostyle hall' later to be repeated at the Eleusis Telesterion.

Capital: Not extant

Bld-3c Tetrastyle prostilon (stone and timber) Dionysos temple Phase III, Iria, Naxos.

Date: ca 700 BC Gruben, 1993, p.102; Lambri-
noudakis (1996, p.55) says 680 BC.

Description: Gruben, 1996, p.67, Fig.6.II; Lambri-
noudakis, 1996, p.57-60, Fig.3 [Marble spout with
cavetto moulding], 4-5, 7 [Prostyle detail].

Notes: Phase III keeps the three outer walls, but changes to a 3-aisled layout with two new colonnades on new, raised bases [these are more formalised and consciously articulated as 'columns'], to provide a central hearth with baldachin/lantern. Gruben (1996, p.67) believes these columns to have had voluted timber bracket capitals and the columns with bulging tops. The total column is deemed to be the godfather of the Sangri colonette [Ion-1 of ca 100 years later]. Importantly the temple gains a tetrastyle front prostyle of timber [both columns and entablature] with columns on stone bases on a continuous, raised strip stylobate.

Capital: Not extant (See Gruben, 1996, Fig.4 and 6.II).

Bld-4 The (timber + mud on stone foundations) prostyle Apollonion (Daphnephorion) Phase I, Eretria, Euboea.

Date: Eighth Cent BC (Auberson, 1968, p.8).

- Auberson (1968, p.9, 15)), in his reconstruction, claims the existence of a peristyle building following Phase I, in the form of the Phase II in 670-50 BC. His reconstruction shows a *hekatompedos* type with timber surrounding colonnade but without a central colonnade. Kalpaxis (1976, p.30-34, Fig.9-12), like Auberson, is also adamant that it had a stylobate and a surrounding colonnade. Mallwitz (1981, p.634) however contests the existence of the colonnade. Phase II is not accepted in this study.

- The foundations of the Eighth Cent BC Phase I Geometric Apollonion (Auberson, 1968, p.9) indicate the existence of a prostyle portico like the models of the Geometric Heraion of Argos and of Perachora (Auberson, 1974, p.60, Fig.3-4). The reconstruction (Also in Mallwitz, 1981, p.608, Fig.8a-b) shows a small timber and mud wall *oikos* on stone foundations, but having small projecting *antae* and round columns in prostyle arrangement, very slender and not likely to

have supported anything like a capital. This building is more of the *pfostenbau* type, with the proposed prostyle construction being of the latched type. The internal timber columns are also round, but around the *oikos* wall they are used more as wall support framework. It is clear that no kind of articulate form relevant to this study could have been present, and that there was no monumentalisation through rational design devices.

Capital: Not extant

Bld-5 Hearth Temple, Tsikalariou, Naxos.

Date: Geometric (Drerup, 1969, p.21).

The temple is described by Drerup (1969, p.21, Fig.17). It was a hearth temple with a western entrance, but there is uncertainty whether it was an *anta* temple or a bilobal *oikos*. The non-axial timber columns rested on wide standing plates, and the foundation for the walls were of ashlar stone with rubble infill (There is no knowledge of the stone technique employed for the upper parts). Capital: Not extant.

Note: No remains of a temple is indicated for the Geometric Grotta site at Naxos (Lambrinouidakis, 1988, p.243-5).

Bld-6a The stone *Sekos I* (Didymeion I) Didyma, [with timber peripteros?]

Date: Ca 700 BC Tuchelt, 1987a., *sine pag*, Fig.2a, 4.

The *Sekos I* or *Didymeion I* may have had a timber peristyle (Gruben, 1963, p.177), although one can understand that traces of this would have been completely wiped out by the subsequent phases.

Tuchelt (1991, p.20) questions the existence of a baldachin structure for the Geometric *Sekos*.

Capital: Not extant.

Bld-6b Schneider's hypothesised Limestone Didymeion I, Didyma [Rather to be seen as an early phase of the Archaic marble Didymeion].

Date: There is no absolute clarity regarding the date of this phase, but it would have to be before the marble dipteros of 550 BC. Schneider (1996, p.83) would want to have it that a limestone temple was started by 600 BC and complete by 570 BC (To him the dating of the raking cyma of the pediment indicates this), five years before the First Dipteros at Samos was started. Whilst to him the excavations and remains clearly indicate a separate phase before the marble phase, there is currently no evidence for a building of the necessary size earlier than the Archaic Didymeion. To Schneider (1996, p.80, Fig.5-6) the limestone phase was a complete peripteral temple with torus capitals and indications of timber entablature, richly ornamented *tondach* (clay tiled roof), and with the limestone raking cyma clearly proving the existence of a gable front, with the oldest leaf cyma in stone (Earlier dated by Kirchhoff (1988, p.117, 122) at ca 570 BC or slightly later, as he thought this temple to have started at 590 BC). The indicated roof tiles are dated by Åkerström (1966, p.112) at between 575-50 BC. According to Schneider (1996, p.83), the Didymeion I underwent various phases of change up to the Didymeion II, but it is too early to know the form of the plan and its relationship between this and following temple. It might currently be

wiser to see these limestone fragments as an early phase of the Archaic Didymeion [Rather not to be called Phase II], with the torus capitals being part of its inner peristasis. Schneider (1996, p.80, Fig.4) shows the columns had 32 flutes, rather shallow, with sharp arris, and rounded at the top (Bottom not extant) [This is closer to the older Archaic designs]. The column also had (Flat) relief work at the top and carried a torus capital.

Capital: Tor-2.

Bld-7 Athena Temple, Koukounaries, Paros.

Date: After 700 BC (Gruben, 1989, p.165).

The temple was a simple rectangular *oikos* without portico built over a preceding circular structure (See Aiman, 1988, p.113). It had an ashlar-with-rubble-infill foundation, and stone standing plates (Gruben, 1989, p.165) for the timber columns (Of unknown section).

Capital: Not extant.

Bld-8 Timber South Stoa, Samos

Date: Second half of the Seventh Cent BC (Gruben, 1957, p.52, 61), slightly earlier than Coulton's (1976, p.280) date.

From Gruben (1957, p.52, 58, 60, Fig.1) we learn that the timber columns were not square but rectangular [140x190]. From his drawing we see the existence of flat foundation plates of rectangular form for the outer colonnade, some with rectangular hollows let into stone, and others with upstands, and for the inner colonnade there are no hollows for the posts. The building was composed of three similar sections, each 200 modular feet [1 ft = 349,75] long. Apart from this small example of modular design, nothing else shows up any form of conscious metrication. Gruben sees the whole building as being prototypical of Ionic construction form, and specifically the occurrence of base, column, capital and entablature with epistyle (Timber beam), dentil (Rafters) and cornice (The earth roof edging board). The reconstruction of the building with dentils remains conjectural. He (1957, p.54-5, 61) asks of us to think of the building's timber posts and bracket capitals in a very functional way, and in terms of this extreme functionality and rectangularity, together with the plain form of the bases, not to expect the capitals to have been decorated. However, he also thinks that this construction form evolved into one using round column timbers, from the bulb of which evolved the echinus.

Capital: Not extant

Bld-9 Roofed [one-columned] in-antis Older Athena Temple, Miletos

Date: 620 BC (Kalpaxis, 1976, p.64, Fig.39-40). In a search for pre-Ionic work Kleiner (1968, p.38) has dated the Older Athena Temple (*Pronaon*) at the west Agora of Miletos (Archaic "Alt-Milet") to the Seventh Century BC (Previously Boardman (1959, p.59, p.208) could not date the temple). Like Kalpaxis, Mallwitz (1968, p.123) also dates the temple to 620 BC, which puts a finer date on Kleiner's date. The one in antis and two suspected naos columns described by Kalpaxis

(1976, Fig.39-40) is as Mallwitz's description (Istmitt, Vol.18, 1968, fig.2 [plan] and 12 [reconstr elevation]).

Although the temple is deemed to have had a flat mud roof, there is nothing to substantiate Mallwitz's stone entablature and Ionic Order for the in antis column. The only element extant is a rough 300 diam in situ column base [no question of a square or rectangular inset], which surely indicates a round column. The base is not shown in Mallwitz's reconstruction!

Capital: Not extant

Bld-10 Temple 'A', Prinias, Crete

Date: 620 BC (Gruben, 1957, p.60).

Notes: Pernier (1934, Fig.2) shows Temple 'A' as an *in antis* temple [with square column and a stone frieze on a timber epistyle at the portico], and with internal round columns (3 aisled) with stone bases on standing plates, placed axially on both sides of a hearth. The use of a stone standing plate with attached base for a round timber column is confirmed by Gruben (1957, p.60, Note 18 [See his references]), who also sees the pre-form of the Ionic base in this example [The Cretan-Ionian architectural connection is seen as important]. Also of note is the existence of the voluted roof *acroteria* similar to Geometric models of shrines. Apart from the current acceptance of the placement of the frieze in the dado position (Mallwitz, 1981, p.620 [Position not at northern flank of portico]; Boardman, 1978, Fig.32.4), there are another alternative interpretations of the building. Mallwitz's (1981, p.619-20, Fig.20) indicates Beyer's 1976 alternative reconstruction of the temple as saddle-roofed, timber-framed construction on a stone base structure without a columnar outside arrangement as very probable, but criticizes the reconstruction of the sculptural stone door element. If Beyer is correct, the interior would also be of the half-framed timber construction kind. From the size of the architectural stone elements, from the definite indication of the use of stone bases attached to the standing plates, as well as from the craftsmanship of the stone relief work, there is a strong case to be made for a more traditional type of construction, with the hypothetical possibility of the existence of a stone capital form on substantial round timber columns.

Capital: Not extant.

Bld-11 Timber framed South Stoa, Didyma

Date: End of the Seventh Cent BC (Akurgal, 1985, p.223, Fig.83 No.3), making it the oldest stoa in Asia Minor.

Gruben's (1963, Fig.5) drawing shows the use of round columns. According to a reconstruction in Tuchelt (1987a, *sine pag.*, Fig.6 (Drawn by R. Naumann)) one should rather see this stoa as a timber frame construction [Balkbau] than as half-timber construction. Last reconstruction shows rectangular vertical supports (like at the Samos South Stoa) supported on square standing plates. Tuchelt's roof shows a ceiling cum roof structure of round poles, supporting an earthen roof with timber edge details and no dentils.

Capital: Not extant.

Bld-12a Naxian *Oikos* 'I' [Courbin's "Pre-oikos"], Delos [Even though to be rather seen as 2 rather than 3 aisled *oikos*, this pre-phase is now deemed not to have existed].

Date: Pre-600 BC (Galette de Santerre, 1984).

Description references: Gallet de Santerre, 1958, Plan B; Gallet de Santerre, 1984 [Here the existence of this phase is deemed unassailable]; Courbin, 1987, p.65 (Gruben (1997, p.304, -6) cites Courbin (1980) as placing it before 650 BC).

Notes: There are two main streams of thought on this building: The Courbin school which promotes the idea of the existence of the pre-650 BC pre-*oikos*, and the Gruben school which sees the marble *oikos* as the 1st phase (Also see Gruben, 1997, p.306-9). All the reconstructions of the pre-*oikos* show the use of a timber double inner colonnade [Column section unknown] and no pronaos and no *antae* [But an aduton]. Lately Kalpaxis (1990, p.153) has suggested that the post holes for the supposed *Oikos I* double colonnade were for scaffolding, which removed doubts around the difficulties of construction of the upper structure of the central marble colonnade of a supposed *Oikos "IIa"*. The new reconstruction of the marble *Oikos* by Ohnesorg (1993b, No.2, p.9, 53, Table 3) also shown in Gruben (1996, p.70, Fig.9) confirms the central colonnade, but with beams running transversely, the colonnade construction then being integrally bound with wall construction in one phase [Scaffolding still useful, as shown]. The still experimental manner of the marble 'frieze' elements at the beam ends in the upper zone of the wall of the marble temple are more rudimentary than that of the marble Dionysos Phase IV temple at Iria, which could also indicate that a marble *Oikos* could have been constructed earlier and in one, single phase. The awkward roof junction between the main room and the portico posed by Courbin could suggest that the marble *Oikos "IIa"* had a pre-600 BC predecessor [albeit with a central timber colonnade and transverse timber beams], but even this idea is upset by the latest re-evaluations by Ohnesorg (1993b) and Gruben (1997). They reconstruct a building built in one phase, with complete and straight roof lines, and with marble in-antis portico and internal colonnade. Gruben's (1997, p.270, 286) argument also rests on re-evaluation of the sequence of the position of the *kouros* base, the condition of the *Oikos* north wall hard up against it, together with the position of *oikos* buildings in the temenos and gate construction.

Capital: Not extant: Never constructed.

Bld-13 Unknown building of unknown typology, Didyma

Date: Ca 600 [From capital dating by Gruben (1996, Note 13).

A timber columned structure of unknown typology is assumed from Gruben's (1996, Note 13) designation of a capital from Didyma (Capital Preion-2, previously deemed to have been a roof acroterion (See capitals Excl-1 below), and which is now dated to ca 600 BC (due to similarities in detail with the votive column capital from Sangri [Ion-1]), and which is similar to the capital proposed for the Delian Artemision 'E' The

column/s of the building was/were of rectangular timber, capped by the stone Ionic canal capital. The whereabouts and detail of this building is unknown.

Capital: Preion-2.

Bld-14 Tetrastyle prostyle stone [+timber?] Artemision 'E', Delos

Date: Ca 600 BC: Older than the Naxian *Oikos* {'IIa'}, according to Kalpaxis (1976, p.76). Kalpaxis calls the Older Artemision temple the 'Temple E' which is different from Drerup's (1969, p.24) description. Kalpaxis (1976, p.76, note 285) indicates that Vallois states that the early 7th Cent BC temple (His Temple 'E') gained a prostyle "Im 6. Jht". Vallois (1966b, p.48-9) and Gallet de Santerre (1958, p.253, 278) state that the Geometric Artemision at Delos was altered to become a prostyle temple [Artemision 'E']; Drerup (1969, Fig.21 [hatched]) date is slightly more than 100 years after its erection in 700 BC [ie early in the Sixth Cent BC, and preceding the erection of the Ionic in-antis façade of the Naxian *Oikos* at Delos and the Ionic prostyle of the Dionysos temple at Iria, Naxos].

Notes: The example from Delos shows the existence of the prostyle typology before the existence of the datum of the standard Ionic capital in the prostyle at the Naxian *Oikos* and the Iria temple IV. The possibility exists that the columns were of stone, but there is no certainty. The capital that Gruben (1996, p.64) tentatively proposes for this prostyle, namely capital Pre-ion I from the base of the Apollo *kouros* statue, clearly rested on a rectangular timber post, and was dated to 'before 600 BC' (Gruben, 1996, p.64), which would mean that the building had timber columns and was older than Vallois's, Gallet de Santerre's and Kalpaxis's dates of after 600 BC. If this was the case it means that timber columns were still commonly used at this late stage, but strangely here rectangular timber columns on round bases after Dionysos III at Iria already had round columns, indicating parallel traditions or an inability to put a [first?] stone Ionic bracket capital on a round column. We see here the use of a continuous stylobate [As before at Dionysos III at Iria] but here turned back to the cella.

Capital: [Preion-1?]

Bld-15 The amphi in-antis [?] 'Marble

Hekatompedos', Ephesos (Naos).

Date: Ca 600 BC (Bammer, 1991, Fig.1).

Bammer (1984, p.174-183, Fig.82-3) indicates the existence of a marble (1984, p.207) *Hekatompedos* west of the Artemision at Ephesos (ie in front of it) by 600 BC. The midline of the 16,0 x 34,40 [100 ft] building with a proportion of ca 1:2 lay on the Artemision's axis. Even though Bammer (1984, p.179, 181) indicates the similarities in temple and altar buildings in the Early Archaic period, he argues against the building being an altar [He indicates the discontinuance of offerings there just at the time of the start of the Artemision 'D', the distance of the building to the Artemision 'C' and the existence of marble roof-tiles, deemed to have belonged to this building, as reasons for this]. There are however no remains of columns or column foundations, which still places a

shadow over Bammer's interpretation, leaving us with no example of Ionic stone colonnades before 600 BC. Capital: Not extant.

Explanatory note:

The 8-9th Cent BC timber columned baldachin for the *bomos* of Apollo at Delos (Gruben, 1997, p.409, Note 395), later enlarged as Archaic building No. GD39, is noted as a columnar timber structure, but is not listed as a building in the catalogue.

2.4.1.2 Catalogue of relevant free-standing Ionic votive columns before and during the achievement of the architectural datum of the stone, Ionic standard capital.

Note: There are no columns Col-2, -3 and -6.

Col-1 Local Naxian marble Ionic sphinx colonnette dedicated to Apollo, from the Demeter and Apollo sanctuary, Sangri [Garoula], Naxos. Naxos Museum Date: At the end of the Seventh Century BC (Gruben (1989, p.164) accepts the epigraphical evidence from Kontoleon, which apparently is confirmed by Wörle [his translation and references cited in Gruben's text]). Other dates: Still in the Seventh Century BC (Orlandos in Kirchhoff (1988, p.137)).

Description reference: Gruben, 1989, p.161-72, Fig.1-2, Plate 19; Kirchhoff, 1988, p.137, No.A; Picard, 1955, p.293, Fig.18.

Notes: The capital and column are of one piece. The column apparently had a standing plate. The column bottom was let into a socket in the plate which rested on the ground, a common practice in the Cyclades and similar to Geometric/Early Archaic architectural bases.

- The capital probably carried a small sphinx (Gruben, 1989, p.164), the plinth of which was connected to the hollow on the capital bearing surface. The inscription on the capital shows that the column was dedicated to Apollo (Gruben, 1989, p.164; Walter-Karydi, 1994, p.128, Note 9).

Column dimensions: Gruben (1989, p.Fig.1-2). The ell was used as base dim for the column height (fixed base not included), and there is indication of use of a foot standard in the capital design.

- The column was found in the nearby church of Ag Georgios Lathrinis, Garoula, where it was used as prothesis. Presently it is housed in the Naxos Museum, Item No.8.

Capital: Ion-1.

Col-4 Lost votive column, Delos.

This column is only suspected from the existence of its capital, Ion-4, and no further detail exists.

Date: The capital is dated to the early 6th Cent BC.

Capital: Ion-4.

Col-5 Aeginetan poros sphinx column, Aphaia Sanctuary, Aegina (The Kolonna sphinx used for the reconstruction is of Cycladic marble).

Date: *Ca* 600 BC (Gruben, 1965, p.207; Gruben,

1989, p.169 and Note 25). Gruben* accepts this column as being older than the columns of the Doric Heraion of Olympia and before the Doric peripteral Aphaion II of 570 BC (Gruben, 1965, p.180, 195, 200, 204, 207; 1989, p.169, Note 25). Kirchhoff's (1988, p.20) capital date is 550-40 BC. [* Gruben's date rests additionally on evidence related to construction [The reparation of damage due to moving the column for the Temple III phase] and also to style considerations [Volutes, cyma, base]].

Description references: Gruben, 1965, p.173-90, Tables 2-3 [Column, capital, shaft and base], Beil.65-70 [Photographs], Fig.1 [Cockerell's drawing], Fig.2 [Fiechter's drawing]; Wurz & Wurz, 1925, Fig.242 [Reconstruction from Cockerell's drawing].

Dimensions: Gruben (1965, p.176, 187, 190, 198, Plate 2).

Notes:

- The column shaft had 36 hollow flutes (Gruben, 1965, Table 2), of deeper section than the Kolonna column. The capital, lost after 1811, was recovered in 1964.

- An Ell dimension of 523 was used as base dim for the total height. Other elements (Except for the lost base, reconstructed from the proportions of the Naxian example of Delphi by Gruben) show use of a Cycladic ft standard of 291,25 (close to that of Dionysos Temple Iria of 291,4, and of the Naxian column at Delphi. Gruben was unaware of this foot standard at the time of his reconstruction). Column height : column bottom diameter [above round beading] is 1:10,55 [10 ½]. Column reduction was achieved by placing the top and bottom column diam in a ratio of 2:3. The Doric foot standard used in the Phase II temple of Aphaia relates to a few elements in the column and capital.

- A supposed twin for this column at the Apollo sanctuary at Kolonna, Aegina (See Col-8 below), is argued to have been constructed in 620 BC (See Walter-Karydi, 1994), but the deductions there remain hypothetical. Gruben and Buschor (See Gruben, 1965, p.187, Note 22) ascribed the sphinx of that column to the ">Aphrodite Heiligtum<", now designated as the Apollo sanctuary, Kolonna. Because of the excellent fit of the hind-quarters of the sphinx from Kolonna with the capital of the Aphaia sphinx column, Gruben (1965, p.187 and Note 22, Fig.5, Beil.71.2) used it in his reconstruction. Gruben's (1965, p.198, Note 48) assertion that the sphinx of Kolonna is of Cycladic origin (So confirmed by K. Schefold), is refuted by Walter-Karydi (1987, No.1 and p.49) who is certain of its Aeginetan pedigree. She (1994, p.128 Note 6) does

see the column as being Ionic in nature. Both Kirchhoff (1985, p.21-2) and Gruben (1965, p.207) see the Aeginetan capital as an indigenous creation, with recognisable Cycladic and east-Ionic (in this case Chiotan) stylistic influences.

Capital: Ion-22.

Col-7 The Naxian sphinx column, Apollo Sanctuary, Delphi. Delphi Museum.

Date: 575-60 BC [570-60 BC, "plutôt que de 575" BC] (Amandry, 1953, p.26, 31), but with the acceptance of Gruben's (1993, p.104) assertion that it follows the Iria capital [Dated to 570 BC], therefore in the 570-60 BC range [A date also stated by Jacquemin (1993, p.224); Ohnesorg (1996, Note 28) reports Amandry's date as 570 BC]. Other dates: 570-60 BC (Courbin, 1980, p.55, Note 4); Courbin (1987, p.68, Note 20, p.69, p.71) later dates the Naxian *Oikos "IIa"* to 575 BC, with the Naxian sphinx column 'dix ans plus tard', ie in 565 BC. Gallet de Santere's (1958, p.291) date is 575 BC; Boardman's (1959, p.199) date is ca 550 BC. Gruben (1965, p.190, Notes: 32) uses Amandry's date of [575] 570-60 BC, whilst he (1989, p.172) later remains sure that it follows the temple at Iria, Naxos (with similar column, capitals and bases) which temple he (1993, p.104) gives a starting date of 580 BC and (1966, Fig.55) a dedication date of 550 BC. Kirchhoff (1988, p.16) dates the capital at 580-70 BC on proportions, which corresponds to that of Jacob-Felsch (1969, p.15, 109), namely 580 BC [She gives no explanation for her date].

Description references: Alzinger, 1972-3, p.186, Fig.16; Amandry, 1953, p.1 flw., Plate XI, XII.1-3 [capital and column]; Boardman, 1953, p.199; Jacob-Felsch, 1969, p.109-10; Kirchhoff, 1988, p.16-7, No.4, Fig.1.2 [capital]; Theodorescu, 1980, p.162, No.23 [capital]; Ohnesorg, 1996, p.43.

Dimensions: Amandry (1953, p.1 flw., Plate XI) and Gruben, 1963, p.148, 154.

Notes:

- The column is made up of drums, and has no entasis (Jacob-Felsch, 1969, p.109). It has 44 flutes (rather than the 36 of the Aphaia sphinx column), and very shallow top and bottom apophyge with round moulding.
- There is a discrepancy in the column height dimensions of Jacob-Felsch [9 900] vis a vis Amandry [9 894], and a problem with firstmentioned's account of the top column diam : bottom column diam ratio.
- Gruben (1972, p.325, Note 17) could, as Amandry, not find a base dimension for the column design. Following Gruben's work at Iria, the author has applied the foot standard of 291,4, and found it was possibly used as base dimension for both column and capital, as well as the ell of 523 for the design of the total height [9 894]. Column reduction was achieved by placing the top and bottom column diam in a ratio of 3:4. The column height is 10 $\frac{2}{3}$ the bottom diam [taken above shallow apophyge [Wesenberg (1983b, p.46) reports 10,32 using the bottom diam and a height of 9 891]. These figures indicate that the column was of the same studio as the Dionysos temple of Iria, and cross fertilisation between functional types. There is however no torus between base and column as at the Iria

Dionysos temple.

- For the restored middle section of the capital canalis, Gruben (1989) postulates that the canalis bottom bead disappears into the echinus (As the Dionysos Temple, Iria, Naxos), rather than a separated canalis (Also see Betancourt, 1977, p.108 [Also the straight canalis shown in the drawing by Perrot and Chipiez in Betancourt, 1977, Fig.51]). The volutes and canalis have round edges that read as beading.

Capital: Ion-6

Col-8 Fragment of an Aeginetan limestone votive column (linked with a Cycladic marble sphinx statue and a hypothetical Ionic capital similar to that of the Aphaia sphinx column), Apollo Sanctuary at Kolonna, Aegina.

Date: 620 BC, according to the manufacture date of the sphinx, as well as the form of the column shaft flutes, which are flatter and therefore older than those of the Aphaia column, according to Walter-Karydi (1994, p.128 and Note 6); Also Walter-Karydi (1987, p.49)). Whilst the linking of the column fragment and sphinx fragment are hypothetical, and the column date therefore as well, the column is at least as old as the Aphaia column, and possibly even slightly older.

Description references: Column: Walter-Karydi, 1994, p.125-8, Fig.3a-b [column shaft fragment], Fig.4 [Column reconstruction using Gruben (1965, Table 3)]. Sphinx: Walter-Karydi, 1987, p.49 [The stone sphinx appears in Hellas ca 650 BC, and this sphinx is argued to be the the first monumental example, but not proven to belong to the column].

Notes: The Ionic nature of the fluting, and the age of the column, allows for the deduction that the column was most propobably a sphinx column.

- From Walter-Karydi's (1994, Fig.3b) drawing of the shaft profile one may reconstruct a column section with 36 flutes, similar to the number of flutes on the Aphaia column (See Gruben, 1965, Plate 2). The flatter profile of the fluting, relative to the Aphaia column should be noted (Walter-Karydi did not redraw the column shaft flutes on the reconstruction to reflect their very shallow concave profile. The bottom and top endings of the flutes would therefore not end like those in the Aphaia column).

- Because of the excellent fit between the sphinx hind-quarters and the capital of the Sphinx column from the Aphaia sanctuary [Ion-22], Gruben (1965, p.187 and Note 22) used it in his reconstruction. Walter-Karydi (1994, Fig.4) *mutatis mutandis* reconstructs the Kolonna column to the likeness of the Aphaia column of Gruben. She did not try to compare the tapering of the shaft fragment with those of the Aphaia column, from which action a better reconstruction might be done. Even though the sphinx of this column fits on the capital of the Aphaia sphinx column, we have no absolute proof that the Kolonna column had an Ionic capital. Apart from the fact that the column would have had some capital, it seems to be older than that at Aphaia, making it the oldest monumental votive column in stone.

Capital: None extant. Hypothetical capital proposed for the column by Walter-Karydi: See capital Cont-17.

Col-9 Kettle stand with torus capital, Samos.

Origin: Samos

Date: "Altertümlicher.." [if read in context here meaning closer to] the outgoing years of the 7th Cent BC (Buschor, 1930, p.46); Kirchhoff (1988, p.147) dates it in the early 6th Century BC.

Description references: Buschor, 1930, p.46, Beil.XI; Kirchhoff, 1988, p.147, No.K1.

Note: The column neck has a round moulding.

Capital: Tor-3

Col-10 Limestone kettle stand with torus capital, Samos.

Origin: Samos.

Date: "...näheren sich eng der Rhoikoszeit". (Buschor, 1930, p.46); Kirchhoff (1988, p.147) just states "Rhoikoszeit". [Referring to the time of the 1st Dipteros]

Description references: Buschor, 1930, p.46, Beil XI [base], Beil XII [capital]; Kirchhoff, 1988, p.147, No.K2.

Note: The shaft and capital are monolithic.

Capital: Tor-4.

2.4.1.3 Catalogue and description of Ionic buildings from the architectural datum of the stone, Ionic standard capital to 525 BC [The first generation]

2.4.1.3.1 The architectural datum of the stone, Ionic standard capital: The original granite and marble Naxian *Oikos* [Earlier deemed by Courbin as Phase "IIa"].

Bld-12b A supposed *Oikos* Phase "IIa": Alterations to the interior axial colonnade and the western in-antis pronaos of the roofed *Oikos*, Delos. This phase is presently deemed to be part of the the initial building phase.

Accepted date: A date of before 580 BC is accepted: between ca 590/80 BC. Ohnesorg (1993b, p.58; 1996, p.41, Fig.1-2) dates the building to the early 6th Cent BC, 20 years before her date for the Iria temple of ca 575 BC; Gruben (1989, p.172; 1993, p.103) to 600-575 BC, later (1996, p.70) to before 580 BC and recently (1997, p.308) to 590/80 BC. Gruben (1997, p.270) indicates the proof for reasoning for the post 600 BC date in the detail of the northern wall of the *Oikos*, related to the erection of the *kouros* base. Previously the dating of the building and its capitals were hotly debated: According to Courbin (1987, p.68, note 20, p.69, p.71) both colonnade and distyle in-antis prodromos are alterations and are contemporary, ca the turn of the first and second quarter of the Sixth Cent BC, [ie 575 BC]. However, just the type of detail of the capital relative to the date of the capital [ie 570 BC] of Iria temple at Naxos asks for an earlier date. Ohnesorg (1993a, p.58) gives a synopsis of dates by others given for the *Oikos* inner capitals over time, and Gruben (1997, p.306, Fig.21) provides a synopsis of Courbin's dates for Delian buildings, followed (1997, p.308, Fig.22) by his own.

Material: Granite, with Naxian marble (Vallois, 1966a, p.101) columns, capitals, frieze and roof (Ohnesorg, 1996, p.41).

Capital: Ion-24 (Ion-5 later east prostyle)

Description references: Bruneau *et al*, 1965, p.33, 79, Fig.6 [Their date is 'des premiere années du VI^e s']; Bruneau *et al*, 1983, p.121 flw; Courby, 1921, p.233-8, Plate VII; Courbin, 1980, p.42-98 flw., Fig.8-27, Plate 24-5, 73.4 and 73.6 (Courbin (1987) argues this is most

probable reconstruction)]; Mertens, 1986, p.433-6; Courbin, 1987, p.68-74, Fig.6-8, 12-4 [Elevation, section]; Coulton, 1976, p.233, Fig.60.7 [Plan]; 47-8; Gruben, 1963, p.148, 155, Fig.38, Fig.38 [interior column]; Kaster in Gruben, 1963, p.177-82, Fig.47-8 [interior column and capital and section]; Vallois, 1966a [1944], p.16-8, 101, No.2 [interior base]; Courbin, 1979, p.18-21 [Same dates as 1980, but calls phase IIa = II, and IIc = III]; Kalpaxis, 1990 [Rejects *préikos* or Phase I as scaffolding]; Ohnesorg, 1993a, p.53-8, Tables 3-4 [Roof, inner colonnade and E+W prostyle reconstructions]; Ohnesorg, 1996, p.40-3, Fig.1 [Kaster's capital reconstruction], Fig.2 [bldg section]; Gruben, 1993, p.103-4, Note 10 [Alternative tristyle in-antis pronaos column spacing], Fig.4; Gruben, 1996, p.70, Fig.9 [Perspective of Ohnesorg's 1993a reconstruction]; Gruben, 1997, p.301-47, Fig. 22 [New plan], Fig.40 [drawing section naos {showing position of scaffolding posts}, in-antis tristyle western prodromos façade and section prodromos].

Book reviews and critical essays: Bommelaer, 1983, p.121-2 [indicates important *errata* in *Delos XXXIII*; Critique of interior column height]; Mertens, 1986, p.431-6 [Critique of *Delos XXXIII*; dates a bit earlier; description of entablature]; Scranton, 1982, p.455-6 [Critique of *Delos XXXIII*; confirms its dates; political status of building]; Wesenberg, 1970, p.297-302 [Critique of Vallois, 1966; critique of interior column heights; critique of prostoan date]; Plommer, 1970, p.186 [Critique on interior column height and alternative proposal with superimposed interior colonnade]; Koenigs (1985, p.450) concurs with Courbin that Plommer's proposal is implausible and does not reflect the trend in slenderness in Ionic works.

Notes: The reconstructions by Kaster (In Gruben (1963)) and Courbin (1987) show a single beam down the length of the interior, with the Ionic capital bolsters facing the viewer at the door, logical if capitals supported the single axial architrave along its bearing length. However, Gruben (1996, p.70, Fig.9) shows the new reconstruction by Ohnesorg (1993a, p.57, Table 3) which shows the beams running transversely, and with

capital façades facing the doorway. Also, the beams and roof-tiles are from marble, and where the beams lie on the side walls their ends are covered by marble frieze blocks. Their new interpretation clears up reservations re the improbability of Courbin's reconstruction of a linear central beam with roof construction on top in super-position, already very singular in its conception, to say nothing of its problematic of construction [Even with the double row of posts seen as scaffolding positions, which Gruben (1997, p.318) has now shown to have been required for the marble roof construction]. It is clear that the marble elements on the line of the transverse roof beams in the upper zone like act as frieze plates on the outer wall (These were copied with so much more skill in the Iria temple. This detail makes Ohnesorg's early date of ca 600 more feasible, with the [amphi] prostyle of Artemision 'E' at Delos then being still earlier.

- The outer columns of the alternative tristyle *prodomos* layout argued for by Gruben (1993, Note 10; 1997, p.348, Fig.22, Fig.40; Also Ohnesorg, 1996, p.41) is used for comparative purposes, rather than the inner columns that featured in all works up till now [Gruben, 1997, p.344 has in any case shown that they vary in length up to 380, due to their being level at the top and following the sloping floor at the bottom].
Dimensions: The reader will know the dispersed nature of the sources for elements of this building! In terms of internal and *prodomos* column heights, Gruben's (1997, Fig.40, p.347) internal beam height and column height differs from Ohnesorg's (1993a, Table 3)], whilst his dimensions also refer to older works like Kaster's inner column reconstruction [The 5130 inner column height of Gruben (1996, Fig.17) {obviously using only one of the varying column heights} is in the +200 error range (Gruben, 1965, p.190) set earlier, and for Kaster's (In Gruben, 1963, p.181) reconstruction of 5002. In his 1997 reconstruction Gruben uses a height of 5000] and refers to Courbin's (1980 [*Delos XXXIII* Notes 2.5.7-10 {argument very difficult to follow}] base height, later cited in Courbin (1987, p.71) as 664. The outer column (inv 31) bottom diam R = 367 (Courbin, 1980, Plate 4). The outer column spacing of ca 2460 is from Gruben (1997, Fig.40). Kaster's (Drawing in Ohnesorg, 1996, Fig.1) capital bearing to bearing height L of 163 is used rather than the 172 of Ohnesorg (1993a, Table 3).

- Due to the lack of a detail dimensioned plan of the *prodomos* there is no certainty regarding use of a standard foot or ell as base dimension. Using Gruben (1997) the inner column height is $13\frac{1}{2}x$ and the outer column height app $13\frac{1}{4}$ [13,22] x the column bottom diam (but Gruben (1997, p.348) reports $12\frac{1}{4}$). The marble columns of this building, the earliest known stone architectural columns, have conical bases and 24 lightly concave flutes, rounded at the top and bottom.

2.4.1.3.2 Buildings in the time from the architectural datum of the stone, Ionic standard capital, up to 525 BC.

Bld-1d The poros, roofed octastyle dipteral 'araeostyle' Heraion III, now named the First Dipteros, at Samos.

Date: Ca 575 BC (Kienast, 1990, DiskAB5, p.124 [-]; Kienast, 1992; Hendrich, 1997, p.77).

Capital: Tor-1

Description references: Buschor, 1930, p.72 flw. [Plan only]; Johannes, 1937, p.13ff [bases]; Reuther, 1957, Z.3 [detail of west end excavation finds]; Gruben, 1966, p.321 ff; Kienast, 1992, p.174-80; Hendrich, 1997, Beil.2 [Plan constructed from Kienast (1992)], Beil.5 [Correct elevation of columns].

Notes: The plan by Buschor (1930, p.83, Beil.XIX) has been altered from new work by Kienast (1992, p.175, notes 19-20), as drawn by Hendrich (1997, Beilage 2). The stylobate proportion is still 1:2 (The distance from front columns to stylobate edge is given, but there is no clear evidence for the intercolumnium. The column height is still theoretical.

- As Hendrich (1997) indicates, the temple was built by Theodoros. Rather than calling this temple the Rhoikos temple, the accepted nomenclature will be "the First Dipteros from Samos".

Bld-1e The roofed (poros and marble) octastyle dipteral 'eustyle' Heraion IV (so called Polycrates* Temple), Samos. [*The term is still used together with the designation 'Heraion IV'].

Date: The building period started by 538 BC (Kyrieleis, 1981, p.48, 70) or 540 BC (Kienast, 1992, p.185). The programme was halted sometime during Polycrates's reign [ie before 522 BC], and the upper parts and prostyle commenced ca 500 BC (Kienast, 1992, p.186), definitely by a successor of Polycrates (Kalpaxis, 1986, p.68). It is however not excluded that certain parts of the building may have been complete in Polycrates's time (verbal communication from Kienast (1996)).

Description references: Buschor, 1930, p.95-9, Beil.XXVII [Plan]; Buschor, 1957, p.12-20; Gruben, 1960; Gruben, 1966, p.325 flw, Fig.17; Kienast, 1992, p.182-8; Reuther, 1957 [Detail drawings of plan and elements]. One awaits publication of the 1989 campaign by Furtwängler *et al*.

Notes: Gruben (1966, p.328) indicates that the west side was never completed, and that the east side and long side adjacent the east façade were the only parts of the temple ever to be completed. The peripteros had standard capitals, fragments of which have been reconstructed by Gruben (1960), and are stylistically similar to those of the Monopteros II (which capitals were previously ascribed to Temple 'B'; See capital Ion-59). According to Gruben (1966, p.327) the marble columns and Ionic standard capitals went up by approx. 500 BC (He (1996, Fig.17) also reports 530 BC), but Kienast has indicated verbally that the capitals must be seen as of the later date (See Ion-58). The inner capitals were egg-cyma capitals and the anta walls had a super-imposed triple volute (Gruben, 1966, p.328-9; Drawings in Reuther (1959), eg Drw.39-43). Tölle-Kastenbein's (1994, Fig.12b) roofed pronaos and open naos without columns is not correct. Kienast's (1992, p.175) assumption that the First Dipteros had stone architraves which were subsequently used in the

Heraion IV, has since been discarded (Kienast, 1997). He is however sure that its column drums were re-used in similarly dimensioned parts of Heraion IV, and that the reason for the Heraion IV's relocation to new foundations was due to destruction of the First Dipteros because of faulty foundations and their subsequent subsidence (possible helped along by tremors), rather than due to destruction by fire.

- The building uses both plan design and materials of the First Dipteros, and there is no simple co-ordination between building elements. Foot standard and ell were used in plan design, with the naos being the originator of modular co-ordination between walls and columns (rather than the other the peristyle design being that). There are significant proportions in the relation between column diameter and interaxis (1:2¼) and intercolumnation (2:3), and stylobate (1:2).

Capitals: Ion-58a+ b Ionic standard capitals +500> BC, rather ca 480 BC; Cym-9, ca 522 BC; Cym-5, <522 BC.

Bld-2d The (marble) hypaethral octastyle dipteral 'araeostyle' Artemision 'D' (Kroisos) temple, Ephesos. Date: From recent finds an **established terminus ante quem** of 560 BC for the start of the crepidoma (Bammer, 1991, p.64). Other dates: Before the middle of the 6th Cent BC (Bammer, 1984, p.76 and Fig.84); 550-525 BC (Kalpaxis, 1986, p.712).

Description references: Bammer, 1972b, Fig.5 [Plan; modular dimensions]; Murray, 1889, p.1-10, Plate 3 [Bases and columns]; Hogarth, 1908a, b [Building plan, elevation, section; capital drawings]; Wilberg, 1906, p.221-4; Lethaby, 1917, p.1-16; Krischen, 1938, p.19, Plate 33-4; Bammer, 1972b, p. Bammer, 1984, p.212-29, Fig.110, 112 [Dating, elevation]; Gruben, 1963, p.155-8 [column dimensions, plinth module]; Bammer, 1991, p.63-83, Fig.1, 21 [Plan Artemision A, B]; Tölle-Kastenbein, 1994, Fig.1-6 [Plan: *sekos* of Artemision A-E]; Wesenberg, 1983b, p.33-49, 105 [new interpretation proportion system, column height]; Gruben, 1996, p.74-6 [New interpretation of proportion system and module].

Sources not used: Bammer, 1988, *OJh*, Vol.58, Beibl.1, p.1 flw; Alzinger, W. 1961/2. *OJh*, Vol.46, p.105f; Robinson, E. 1951. *JHS*, Vol.71, p.156f; Jacobsthal, P. 1951. *JHS*, Vol.71, p.85f; Bammer, A. 1990. *Anatolian studies*, Vol.40, p.137 flw [especially p.160, Fig.30]

Notes:

- The possible start of the temple seems to coincide with the start of Kroisos's reign (560-47 BC). The building was completed by 450 BC (Bammer, 1972b, p.259).

- Bammer (1984, p.172 and Fig.83) thinks the preceding Early Archaic Temple 'C' was an anta building with a naiskos, rather than being a peripteral temple, making version 'D' the first known peristyle temple possessing an Ionic standard capital (In dipteral form). Tölle-Kastenbein (1994, p. 52, Fig.3, 6) has since argued that the Artemision 'C' of 600-598/80 BC was a peripteral stone *sekos*, but her thesis has been rejected on technical grounds.

- This temple is the first Ionian temple using plinths, which Gruben (1963, p.158) deemed to have been

utilised as module [foot and ell] for the column dimensions, both vertically and horizontally (Gruben, 1963, p.158 [In Phase 'E' extended to a 3-dimensional grid]), and foreshadowing the use of a planning grid module for plan organisation. However, Wesenberg (1983b, p.45) shows that plinths were differing in size. Column centres and lengths, both base and column diameters and naos, pronaos and opisthodomos wall centres were all regulated on foot and ell standard dimensions, and interior space dimensions were regulated by foot standard dimensions. The stylobate proportion (1:2) is significant. The column heights have never been determined. The proportions of column bottom diameter to column centres (1:3¼), and to intercolumnation (1:2¼), using Krischen's column height of 18 900, are significant, but now under threat. His column height reconstruction relates to that of the later temple. Wesenberg (1983b, p.44-9) argues for a lower column of 8xUD [1525]. He illustrates the various column height options but as measured from the stylobate (8xcolumn bot diam for column height incl plinth: 12 204 [8UD], 8x col bot diam=column height excl plinth: 12 594/604 [8,26UD], 8x col bot diam=shaft height: 14232 9,33UD)]. Whilst none may be proven by the remains, the 1:8 option cannot be disproven either. He uses the column plus plinth option in his table, and the column less plinth option in his Fig.2. Gruben (1996, p.76, Fig.17) also realises the possibility of a lower column but, after a re-evaluation of Vitruvius's term *vestigia*, uses the spira as base module, and gains a column height (also measured from stylobate) of 12 600, being 8 x 1575 spira diam. The difference between Wesenberg's 12 594 option and Gruben's reconstructed dimensions are negligible.

- The entablature has never been found (Hogarth, 1908b, p. 270). Krischen's (1938, Plate33-4; Also published in Berve *et al* (1961, Fig.130) and in Bammer (1984, p.221, Fig.112)) reconstruction and Hogarth's (1908a [no Fig. no.]) reconstruction of the western façade are more or less similar, with two exceptions:

i Krischen's reconstruction shows a dentil moulding between two ovolo mouldings, therefore resembling that of the Late-Classical Athenaion at Priene (Dinsmoor, 1973, Plate LV). Hogarth's reconstruction shows only an ovolo moulding. Scrutiny of Pryce's finds (1928) does not show up any dentils.

ii Krischen's column heights (Gruben, 1963, p.158) are still shown in one table to contrast with that of Gruben (1996; [Gruben's latest analysis is used in stead of Hogarth's and Wesenberg's]).

iii Keil (1964) in Akurgal (1985, Fig.54) also uses the short columns in his reconstruction. Bammer (1984, Fig.112) offers a revised version of Krischen's elevation, with altered column detail and plinths.

Capital: Ion 16a-c. Corner capitals for the Artemision 'D' have not been found.

Bld-3d The roofed tetrastyle prostyle 'araeostyle' Dionysos temple IV, Iria, Naxos.

Date: Around 575 BC (Ohnesorg, 1996, p.41), being midway in Gruben's (1996, p.67) date of "Bei dem gegen 580/70 begonnenen vierten Tempel..". Other

dates: 570 BC (Gruben, 1989, p.172); "ein Jahrzehnt vor Ausarbeitung der Kapitelle, um 580 v. Chr." (1991, p.64); ca 580 BC (Gruben, 1993, p.104).

Capital: Ion-7a-b

Material: Naxian marble (Order), Granite (Walls).

Description: Gruben, 1972, p.360, Fig.22 [Column/capital]; Gruben *et al.*, 1987, p.569-608, Fig.39, 46 [excavation plan/elevation]; Gruben, 1989, p.172, Fig.4, 5 [Column/capital only]; Gruben, 1991, p.63-71, Fig.1-14 [Fig.5: first dimensioned plan of reconstruction]; Gruben, 1993, p.104, Fig.5 [plan]; Gruben, 1996, p.65-70, Fig.7-8; Ohnesorg, 1993a, p.23; Ohnesorg, 1996, p.41-43, Fig.3 [3-D capital dwg, new column heights].

Notes: The building start predates the Naxian Sphinx column but the capitals are almost contemporaneous (Gruben (1991, p.64) and (1993, p.104 [he cites the capital detail])). The completion date is ca 550 BC (Gruben, 1991, p.64; Ohnesorg, 1993a, p.23), to be seen from the use of the toothed chisel. The long building period is mainly due to the experimentation with marble and monumental scale. The outer columns have 24 flutes, no apophyge and bottom beading. Earlier Gruben (1989, p.595), from comparing the columns to that of the Naxian Oikos, deemed the outer columns to be 8070 high with interaxis of 4 080. Gruben (1991, p.63, Fig.5) stated a height of 7 200 and interaxis of 4 070. His (1996, Fig.17) last height dimension is 6860, a height of 9 column bottom diameter of 760. Inner columns are higher, [ca 8 000 or 10 x *ud* {Ohnesorg, 1996, p.41, Note 27; Gruben, 1996, Fig.17}] and have 28, 32 or 36 flutes (Gruben (1991, p.69; 1996, Fig.17)). The column bases (some still unfinished) have a torus moulding on top. The door moulding shows no fascias (Gruben, 1991, p.64).

- According to Gruben the building shows high dimensional tolerances, and the 1991 plan shows indications of the use of standard ft (291,4) and Ell (523) in the design [naos walls and euthynteria dims, wall centres and column interaxes]. The prostyle has a separated stylobate.

Bld-6c *Sekos II* (Didymeion IIa), Didyma.

Tölle-Kastenbein (1994, p.56) wants us to see the Temple Phase II as a two phased complex whose *sekos* and *naiskos* (Phase IIa) were conceptualised and begun in the second quarter of the Sixth Century BC, and whose dipteros (Phase IIb) was started from 550 BC onwards, together with the terrace wall. Tölle-Kastenbein (1994, p.54) indicates that *sekos II* (or Phase IIa -her nomenclature) was already complete by 550 BC by employing Schneider's (See Tölle-Kastenbein, 1994, p.56, Fig.8) dating of cornice details of the *sekos* walls at Didyma and the "Rhoikos" altar at Samos and so inferring that an anta type *naiskos* and a *sekos* must already have been complete by ca 550 BC at the point where the dipteral Didymeion IIb (See Bld-6d) is believed to have begun. From dating evidence of the cornice this will be taken as possible.

Description: According to Tölle-Kastenbein (1994, p.56, Fig.8) Gruben's [1963] elongation of the *sekos* to the east was not correct, and she proposes a different position for the termination of the *sekos*,

namely that the *sekos IIa* had an outside edge to outside edge length of 100 Ionian foot, and a width of 50 Ionian foot on the wall centre lines (Tölle-Kastenbein, 1994, p.56). There is at present no evidence for this, and the reader is referred to the text at Bld.6d below.

Bld-6d The hypaethral (marble) Phase IIb of the octastyle (Gruben) or decastyle (Fehr) dipteral 'diastyle' Archaic Apollonion/Didymeion, Didyma.

Date: Ca 550 BC. Tuchelt's (1987a, *sine pag*; 1987b, *sine pag*) date is 550 BC; Later he (1991, p.20) dates the 'Neubau' [Didymeion IIb], 'Rundbau' [Tholos/altar?] and terrace wall to 'um 550 v. Chr.', with the date of the terrace wall detail fixed at 540 BC.

Description reference: Wiegand, 1941a/b; Gruben, 1963, Fig.1, 39 [Plan and elevation]; Hahland, 1964; Wesenberg, 1971, p.120 No.22, Fig.261 [base dwg with dimensions]; Fehr, 1972, p.14-59, Fig.1 [plan]; Tuchelt, 1987a; Tuchelt, 1991 (Other sources not used by the author: Drerup, A. *et al.* 1964, *AA*; Krauss, F. 1961. *Mitt II*; Von Gerkan, A. 1963/4. *IstMitt*, Vol.13-4, p.63 ff; Naumann, R. *et al.* 1963-4. *IstMitt*, vol.13/4, p.16ff; [-]Tuchelt, K. 1973. *Vorarbeiten zu eine Topografie von Didyma*. *IM*, Beiheft 9, p.14-5, Fig.3).

Notes:

- The newly found architrave sculpture (Schattner, 1996, p.14) has been dated to 530-20 BC. Other dates: Gruben's date is between 540-20 BC (1963, p.176) based on built form and sculpture of the temple. He mentions that there is no fixed date (He also gives 530 BC as an approximate date (1963, p.164), and later he (1966, p.340, 344) dates the temple to 540-25 BC). Fehr's (1972, p.30, 53) date is 545-40 BC, based on the terrace wall details of 540 BC. He mentions that the architrave was up by 520 BC [which tallies Schattner's architrave sculpture, but not others mentioned below]. Kirchhoff (1988, p.86) dates the capitals to 540-30 BC. Boardman (1959, p.208) dates the capitals to the pre-Persian era.

- The building is still subject to a lot of re-interpretation. From Gruben's (1963) work we know of the use of the foot and ell standards in the design, and a modular rectangular planning grid for column and wall centrelines and certain *sekos* wall piers. Fehr (1972) argued for use of a 10 ft design module. Tölle-Kastenbein's (1994) idea of a 1:2 *sekos* has not been proven. Whichever way, the plan design shows a high intensity of noetic control.

Capital: Ion-28a-b. Ion 28b is the oldest extant stone corner capital. Gruben (1963, p.168) earlier saw the stone capital Ion-32 of an then unknown Delian building as an experiment between a possible Artemision 'D' corner capital and capital Ion-28b. With his date of capital Ion-32 being 'Late Archaic', he meant the Delian building must have been between 546-40 BC to be before the *Didymeion*. Gruben (1997) now identifies Ion-32 as being a capital of the Delian Propylon II, in effect then later as the Didymeion.

Bld-12c The later tetrastyle prostyle 'araeastyle' east façade alteration or *prostodon* of the roofed distyle in-antis 'araeastyle' Naxian *Oikos*, Delos.

Date: This phase is dated to just before 550 BC by

Courbin (1987, p.74, [560-550 BC by Gruben (1989, p.168 note 15)], or 560-550 BC (Gruben, 1989, p.166, note 12; p.168, note 15) contemporaneous with the Athena Polias column at Building Δ, which is in agreement with Courbin (Gruben (1997, p.308) is mid 6th Cent BC). Mertens dates this phase 25 years after the erection of the marble building in the 1st quarter of the 6th Cent BC (1986, p.436). Vallois's date is 575-60 BC due to the capital date (1966a, No.11, p.175-6). Gallet de Santere's (1958, 293) date is 'avant le milieu du VI^e siècle [ie before 550 BC]; Bruneau *et al*'s (1965, p.79) date is "d'environ 560".

Material: Naxian marble (Wesenberg, 1971, p.119)
Description references: Bruneau *et al*, 1965, p.33, 79 [Guide de Delos 1]; Courbin, 1980 [*Delos XXXIII*], p.98 -122 [p.119 note 5 = hypoth column height of 4370 by Vallois], Fig.28-34; Courbin, 1987, p.74-76, Fig.6, 8, 11-2; Coulton, 1976, p.233, Fig 60.7 [Plan]; 47-8; Vallois, 1966a [1944], p.16-8, 101, No.2 [interior base], No.3 [*Prostōon* base]; Wesenberg, 1971, p.119 No.15, Fig.250 [*Oikos* base]; Ohnesorg (1993a, Table 3 [Section, but no column height]); Gruben (1997, Fig. 40 [section *prostōon*, column height of 3 610].

Note: There is use of a foot standard, and modular design re intercolumnation, base and column diameters, as well as the use of significant proportions for the relation column : column interaxis (1.5½).

Capital: Ion-5 (Interior is Ion-24, [lost] in-antis capital similar).

Bld-16ab 16a - Siteworks planning [called Phase I-II], and 16b - The (poros) flat-roofed tristyle prostyle Treasury (?) or Nordbau I [Phase III], Samos. Siteworks date: 590-550 BC Furtwängler *et al* (1989, p.4-6)

Building date: 'Etwa um die Mitte des 6. Jhs', namely 545-35 BC (Furtwängler & Kienast, 1989, p.7, 57). These dates are established dates which rely on reliable stratification from finds reported in the work. Other dates: 575-550 BC (Kyrieleis (1978, p.257); Concurrent with the Rhoikos [1st Dipteros] temple, just before 550 BC (Kyrieleis, 1981, p.116 [Here we have again a difference of opinion in terms of the starting date of the 1st Dipteros]; Kalpaxis (1986, p.59) is of the opinion that the North Building must be older than the 1st Dipteros, because of its plan form.

Capital: Cyma fragments apportioned to Phase IV building (Furtwängler *et al*, p.153-6, No.5-20 [Also see Kyrieleis, 1980, p.338]).

Description reference: Furtwängler & Kienast, 1989 [Detailed description and drawings, especially Fig.8 {perspective} and Table 20.1 {plan}. See p.152 Items.1-4 for description of unfluted column drum fragments]; Kyrieleis, 1981, p.115-7 [Notes, site plan]; Kyrieleis, 1978, p.250-4, Fig.3 [Foundation plan]; Kyrieleis, 1980, p.336-41, Fig.1 [partial plan excavation]; [-] Kienast, H. *Samos II*; [-] Walter, H. 1963, *Delt*, Vol.18, Chron.228, Fig.1.

Notes: The Phase III building had an open-fronted cella with pronaos type columns, and with a single colonnade dividing the cella into two aisles. It had a tiled saddle roof with gables, and was altered to become a peripteral structure [Phase IV] late in the 6th

Cent BC [525-10 BC] (Furtwängler & Kienast, 1989, p.57-8; Kyrieleis, 1978, p.258). Column drum fragments without grooves belonging to Phase III were found (Furtwängler *et al*, 1989, p.152, No.1-4), but no spira or torus elements. Very little information exists regarding the dimensions: naos = 13 400 x 27 400 (Furtwängler *et al*, 1989, table 20.1), column centres [prostyle] (Furtwängler *et al*, 1989, Fig.6, p.32-3, Pl.20.1), column centres cella = 3 238 and base diam = 900 (Furtwängler *et al*, 1989, Table 20.1), foot standard = 349,5 or 350 [1225 equals 3,5 Samian feet (Furtwängler *et al*, 1989, p.32). The foot standard was used in the prostyle column interaxis and naos wall width, and the Ell for the building and the foundation widths. The naos has no significant proportion, and the inner column interaxes are equal subdivisions of the space rather than modules based on a standard.

Bld-17 North-West Stoa [Nordhalle], Samos.

Date: 575 BC. The date was previously 570-60 BC due to similarities with the First Dipteros (Coulton, 1976, p.280). Because the First Dipteros is dated earlier, this building should shift back accordingly, ie ca 575 (Kienast, 1992).

Description references: Buschor, 1930, p.53-6; Buschor *et al*, 1957, p.2-3; Coulton, 1976, p.279-80; Coulton, 1976, p.279-80 (with further cross references); Walter, 1990 [1965], p.62-3, 79.

Capital: None extant.

Bld-18 The Athenaeion I (of unknown typology), Phocaea (Peninsulae presently called Foça). The temple destroyed during the Medean incursion of Harpargos.

Date: Second quarter Sixth Cent BC (Akurgal, 1985, p.117) (Although the building could arguably have come to being before the Iria temple in Naxos, there is no evidence to sustain such a proposition).

Description references: Wesenberg, 1971, No.6, p.118, Fig.224 [dimensions base]; Akurgal, 1961, p.238, 287, Fig. 252; Akurgal, 1962, p.377, Table 101.23 [column and capital], 101.24 [terracotta panels]; Boardman 1959, p.209 [Bases]; *Anatolia*, Vol.5, 1960, p.2, Table 2 (cyma capital); [-] Martin, R. 1955-6, *Etude d'arch Class.* 1, p.121, 125, Table 26, Fig.3; [-] BCH, Vol.80, 1956, p.421 No.2; Gruben, 1963, p.106 note 54 [base dimensions; Gruben talks as if this is from the Athenaeion I]

Notes: There are no assembled elements left of the Early Archaic temple which has been demolished during the Medean incursion under Harpargos (the 540's BC (Boardman, 1959, p.200)). There are pieces of columns and capitals. The torus of the capital is in the style of the Smyrna capital, and the column is grooved with a turned torus moulding at the bottom. The temple, built of fine white porous stone, was rebuilt at the end of the Sixth Century shortly after its destruction, but very little of that version also has come through to us. The building does not lend itself to iconographic reconstruction.

Capital: Cym-8 (The capitals from the Athenaeion II [See capital Ion-60] are Ionic).

Bld-19 The roofed distyle in-antis Cnidian Treasury (*Building XXV*), Apollo sanctuary, Delphi.

Date: Around 560 BC (Gruben, 1961, p.135), and around 550 BC (Gruben, 1966, p.78); Other dates: 575-550 BC (Weikert, 1929, p.103-5); 550-545 BC (De la Coste-Messeliere, 1957, p.319).

Description references: Durm, 1910, p.260; Dinsmoor, 1913, p.5-83, Fig.2-6, 11, 13 [Plan]; De la Coste-Messeliere, 1957, p.319, Plate 55 [Caryatid capital]; Gruben, 1961, p.135, Fig.26, 28 below, 30 left.

Capital: Cym-13 (The Ionic building has supporting columns for the caryatids with Samian torus bases and leaf-cyma

capitals. The antae also have torus shaped mouldings at floor level).

Bld-20 The Milesian (limestone) Appolonion I, Naukratis, Egypt. Of unknown typology.

Date: In the second quarter of the Sixth Century BC, around 550 BC (Pedersen, 1983, p. 99, 116). Other dates: Second quarter of the Sixth Cent BC (Weikert, 1929, p.87); Boardman (1959, p.203) dates the building to just before the middle of the Sixth Cent BC, and Flinders-Petrie *et al* (1886, p.12) to 620 BC or earlier!

Description references: The building is known to have been built by the Milesians (Herodotos, 2.179) but no drawing of the plan exists. Apart from a scaled drawing of the famous column and capital and the verbal description of the temple by Flinders-Petrie (1886, p.12-3, Plate III) there is another scaled drawing of the column by Pomtow (1913, Fig.47) and another reconstruction of the capital by Dinsmoor (1927, Fig.37; 1928, Fig.47); Wesenberg (1971, Fig.241) provides a drawing of the column base.

Notes: Due to severe destruction of the material remains and lack of any reconstruction drawings the building does not lend itself to full interpretation. The capital and column ascribed to the temple by Flinders-Petrie *et al* (1886, p.12, Plate III) and Pomtow (1913, Fig.47), is now thought by Kirchhoff (1988, p.197-8) to be part of a votive column (He dates this column to just before the Naxian Sphinx column at Delphi [ie just before 570 BC]). However, in his work on decorated column shafts and capitals Pedersen (1983, p.99, No.S2) mentions a fragment from a second column similar to this one, giving more credence to the architectural nature of the column and capital.

Capital: Cym-1 [Three capital reconstructions (From drawings/verbal comments) are possible]

Bld-21 The roofed (marble) hexastyle peripteral 'araeostyle' Lower Temple, Myus [currently Avşarkale].

Date: From present knowledge regarding reconstruction of the building, as well as designation of sculptures, just after 550 BC (Weber, 1965, p.62, 64), or around 550 BC (Weber, 1967, p.139). According to Gruben the dating of this building usually coincides with the starting time for the Artemision 'D' (which is, according to him, 540-20 BC (1963, p.176; and elsewhere, as average, 540 BC (1963, p.124, note 79)). Both Gruben's date for this building, and Kirchhoff's date of 560 BC (based on dating of capitals (1988,

p.76)), must be re-appreciated from the newly provided starting date of the Artemision by Bammer, which is an established date of 560 BC (1991, p.64; Previously dated to before 550 BC (1984, p.76 and Fig.84)), but before a new appreciation of this date in relation to Myus is forthcoming, Weber's date of 550 BC will be used.

Description references: Wesenberg, 1971, p.120 No.23, p.123 [bases]; Kirchhoff's (1985, p.75) comment about the lack of published detail is valid for heights and detail of columns, entablature and walls, but detailed reconstruction of plan dimensions and previously unpublished portions of the column and capital has been done by Weber (1965, p.54-63, Fig.4; 1967, p.128-143, Fig.2-6, Table 8.1) which vindicates the well-known plaster reconstruction. [waiting for A.Werz (A publication is due according to Weber, 1965, p.59, note 17 and 1967, p.134)].

Notes: Gruben's (1963, p.107, 121, 124 and 175) comments on column dimensions are accepted by Weber. Many of the stones were built into the aquaduct at Miletos (Weber, 1965, p.47); The temple seems to have been the inspiration for the early Fifth Century BC Athena temple at Milet and Lokri (Weber, 1965, p.61). Abzinger also argues for a Miletian connection regarding this temple (1972-3, p.178). The temple could have been designated to Dionysius or Apollo or Poseidon (Weber, 1967, p.141) or to Artemis (Akurgal, 1985, p.239).

- There is use of a foot and ell standard in modular design employing a square planning grid for column and naos wall centrelines [Later the norm in Ionic building design]. The building may be seen as breaking new ground in the simple but consistent manner of plan ordering. There is use of significant proportions for the relation between column height and interaxis (1:4¼) and intercolumnation (1:3¼), and the stylobate of 5:9 (ca 1:1¼).

Capital: Ion-15

Bld-22 The (Naxian marble) 'araeostyle' Naxian Stoa, Delos.

Date: 550-40 BC, based on style of capital (Martin, 1972, p.314); 3rd quarter Sixth Cent BC (Gruben, 1997, p.308); 3rd quarter Sixth Cent BC, due to capital dating (Kirchhoff, 1988, p.34); Coulton (1976, p.233) dates it to the middle Sixth Cent BC, and Vallois (1966b, p.213) to 550-40 BC.

Description reference: Bruneau *et al*, 1965, p.95 [*]; Coulton, 1976, p. 75, 95-6, 233 (with internal cross referencing), Fig. 60.6 [Plan]; Courby, 1914, p.247; Ducat, 1965, p.95; Courby, 1921, p.238-40, Plate V-VI [dimensions and site plan]; Martin, 1972, p.314 [Capital]; Martin, 1973, p.392-8 [Capital]; Vallois, 1953, Plate 3, Fig.16 [Plan]; Vallois, 1966a [1944], p.101 (No.4 and 5), 160; Vallois, 1966b, 178-80; Hellmann *et al*, 1979 [*Delos XXXII*], p.99-119, Plates 14-23; [-] Mason, *AJA* 86, 1982; [-] Courbin, 1983, *RA*; Ohnesorg, 1993a, p.59, Table 4 [Section south wing - reconstruction].

Notes: Various explanations exist for the entablature and roof construction: Whilst the epistyle has not been found, Courby (1921, p.240) argued against the

possibility of a stone entablature, whilst Coulton (1976, p.31-2, 132) insisted the entablature was of stone (the first for a stoa), that it is the first example of a L-shaped stoa (with the re-entrant corner angle being 98° rather than 90°), that there was no angle contraction [re column centres], and that the (unsurviving) re-entrant corner capital's shape (although not known) was probably a normal corner capital. Hellman *et al* (1979, p.115, Fig.39-40) argued against a timber entablature, and proposed a shallow stone architrave. Their reconstruction also showed a 98° re-entrant corner, as well as a capital with re-entrant corner volute. The effective span distance of the architrave (Z-C) is however quite long. Ohnesorg (1993a, p.59, Table 4) reconstructs the building with a marble architrave, frieze and cornice [all dotted in the dwg] and rooffiles, postulated from the existence of marble beams and geison.

- The dimensions of Hellman *et al* (1979) up to the epistyle are used [Ohnesorg's (1993a, Table 4) total column height of 3 110 is 3mm more than Hellman's 3 107 {Wesenberg (1983b, p.47, note 142) uses Vallois measured height of ca 3 110}].

Capitals: Ion25a-f.

Bld-23 The uncompleted, still to be roofed (marble) hexastyle peripteral 'diastyle' *Apollonion* (reconstructed version with amphi-prostyle naos and volute capitals in-antis), known as the '*Hekatompedon*', Palati, Naxos.

Date: Third quarter Sixth Cent BC (During Lygdamis tyranny: 550-24 BC, (Zaphiropoulou, 1988, p.14); During Lygdamis tyranny: Around 530 (Gruben, *Tempel der Griechen*, p.344)).

Description references: Gruben, 1972, p.319-66, Fig.12-3 [Two possible reconstructions regarding plan lay-out: In this work that in Fig.13 is used]; Gruben, 1982b, p.160-4 [new find: cyma], Fig.5 [Elevational impression of completed temple]. [~] Gruben, G. & Koenigs, W. 1968. *Der Hekatompedos von Naxos*. AA, p.693-717, and also 1970, p.135 flw. Gruben (1982b, p.163) mentions that reconstruction of the plan, façades and sections are under way, but the author has not seen any published.

Notes: This building had a very complicated design using a foot and ell standard, with modular co-ordination between naos side-walls and peristyle columns, walls and columns of the amphi-prostyle naos inside the peristyle, and of the interior spaces. The stylobate proportion is ca 1:2.

Capital: Not completed, but identified as Cont-2 (See Gruben's (1972, p.341-2) hypothetical dimensions).

Bld-24 The (poros) nonastyle peristyle (excl east) 'diastyle' South Building I (Südbau I), Samos.

Date: 545-35 BC, concurrent with the North Building I: 'Es ist durchaus denkbar, daß der Südbau als Pendant zum Nordbau I errichtet war.' (Furtwängler & Kienast, 1989, p.61 [also see p.7, 57]), and in between the 1st Dipteros and phase IV (Kienast, 1992, p.191 [which supports the above date]). Other dates: Kyrielys (1981, p.92) reckons start ca 550 BC and completion late 6th Cent BC. Buschor (1930, p.60) placed it together with the Rhoikos [1st Dipteros] temple, as did Ziegenaus

(1957a, p.69), due to occurrence of column rejects of the Dipteros in the foundation of South Building I. Gruben (1957, p.55) sees the building of the South Temple as concurrent with the Heraion III [First Dipteros], when the South Stoa was demolished to make way for the South Building I. Ziegenaus (1957a, p.69) has also come to the conclusion that there were two building phases, namely Phase I in the Rhoikos [1st Dipteros] building period, and Phase II, where the stylobate was raised, during the reign of Polycrates (See Kienast, 1992, note 84 for more datings)

Description references: Buschor, 1930, p.59 flw., Ziegenaus, 1957a, p.65-76, Plate VIII, Beil.85-94; Kyrielys, 1981, p.91-94. [plan], and Kienast, 1992, p.189-91. Buschor, 1957, Fig.11 and Plate 14.2 shows a portion of the anta capital [Ion-73].

Notes: Kienast has shown that the foundation markings in Buschor's (1961, Fig.26) and Ziegenaus's (1957a, Plate VIII) reconstructions are Roman column centrelines. Buschor's (1930) dimensions are the only at present until new drawings by Hendrich (See Kienast (1992, p.172)) are available.

- The peristyle does not occur on the east façade (entrance to *naos*). Because little is known about the columns and entablature (See Kienast, 1992, p.191), and nothing about the capitals apart from a small fragment of an anta capital, the building does not lend itself to full interpretation.

- Furtwängler & Kienast (1989, p.64) do not share Buschor's (1957, p.84; Also later: *AM* Vol.74, p.2) hypothesis that the building was a temple dedicated to the cults of Hermes and Aphrodite.

Capital: Ion-73. Although the two anta had Ionic capitals, no standard Ionic capitals for the peristyle have been found. Due to the close ties between the South and North Buildings, the peristyle may have had torus capitals as speculated for the North Building I.

Bld-25 The tristyle monopteral Monopteros II, Samos. Date: From 540 BC, but probably in the third decade before 500 BC [Before 522 BC?] (Similar to the Heraion IV, where there was a break in building construction sometime during Polycrates, with pronaos and upper parts of the building recommencing in earnest by 500BC (Kienast, 1992, p.186, 188)), not precluding that certain portions were up before then (Kienast verbal comment 1997). Other dates: Completed by 500 BC (Walter *et al*, 1986, p.143).

Building description: Kyrielys, 1981, p.82; Kienast, 1992, p.188-9, Fig.17a-b, 18 (base and column drum); Ziegenaus, 1957b, p.95-109, Beilage 102-9, Table XIII-IV; Walter *et al*, 1986, p.137-47 [plan]; Homann-Wedeking, 1964, p.226.

Notes: Kienast sees this building as a miniature of the Heraion IV, and closely associated with it. Because of two newly found capitals, similar to those thought to have belonged to the distyle in-antis Temple 'B', the total amount of similar capitals for the Monopteros II now amount to four (The two capitals previously ascribed to Temple 'B' are therefore ascribed to this building (Kienast (1992, p.198)). Kienast (1992, p.191) indicates that whilst the building elements point to a building phase between first Dipteros and Phase IV, it

is possible that the building may only have been started from 530 BC.

-Because of the lack of information regarding most of the building (Kienast, 1992, p.188), full interpretation cannot be attempted for this study. However, there is use of the ell as module for the stylobate and column interaxes, and the stylobate shows a proportion of 1:1¼).

Capital: Ion-59

Bld-26 The nonastyle peripteral (excl east) 'araecostyle' temple of Apollo Phanaion, Phanai, Chios.

Date: The building in the third quarter of the Sixth Cent BC, and the capital only in 525-500 BC due to features more advanced than those at Ephesos and Samos (Boardman, 1959, p.183, Table on p.184); Kirchhoff (1988, p.83) argues for the third quarter Sixth Cent BC [based on his dating of the capital, which for him could be earlier due to the earlier start date of the First Dipteros at Samos (1988, p.323 note 677). Boardman's analysis of Chian architecture as a whole stands

Description references: Boardman, 1959, p.170-218 [Column bases only]; Wesenberg, 1971, No.5, p.118, Fig.247 [spira] [references]; Lamb, 1934-5, p.142 flw, Plate 30c, d [capitals].

Notes: Alzinger (1972-3, p.187) argues for an Ephesian connection, but Kyrieleis (1986, p.193) shows the strong influence of the First Dipteros at Samos in terms of the bases, notwithstanding very little contact in other artistic spheres, and the strong link between Chiot decoration and that of Phocaea and Lesbos, as with the temple of Emporio.

- Reconstruction of the building as a whole has not been possible (Boardman, 1959, p.174). Although intercolumniation and entablature dimensions are not confirmed, a hypothetical reconstruction of the column height was done by Kirchhoff (1988, p.275 note 255), using the Artemision 'D's column diameters and centres, with resulting ratios [which the author has seen fit to revise in the light of new dimensions for the Artemision 'D' column centres by Bammer (1972b), to take them further towards hypothetical proportional dimensions].

Capital: Ion-26

Bld-27 The (Cycladic marble) tri-(or tetra (?)style *Enneakrounos* fountain house, SE agora of Athens [*] Accepted date: Merrit (1982, p.88, 92) reports a date [already inferred by Thompson (1972, p.197-99)] in the third quarter of the Sixth Cent BC [ie during the reign of Peisistratos] based on dating of the foundation deposits. Boersma reports a firm date of [also of Thompson (1965, p.50-1)] about 520 BC (528/7-511/0), during the ascendancy of the Peisistratids. However, seeing that the date by Merrit is based on more recent archaeological consideration, it will be accepted. The date is supported by the appearance of Attic Black Figure ware showing the Ionic fountain house from 520 BC (eg Blundell (1995, Fig.22, p.221) indicates construction anywhere between 530-20 BC.

Description references: Merrit, 1982, p.82-92, Fig.1-2, Plates 12-3 [Capitals and bases only]; ASCSA, 1976, No.61, p.154-6, Fig.63 [Basic plan (showing tristyle

plan)]; Boersma, 1970, p.23-4, 221; Thompson, 1972, p.197-99, Fig.50].

Material: [Cycladic] island marble (Merrit, 1982, p.83, 88), not Attic marble (as Möbius (1927, p.171)).

Notes: Three *tori* have been found, but Merrit argues for a tetrastyle building, and not tristyle as shown in ASCSA (1976, Fig.63).

- Merrit (1982) believes this is not a local work, but executed by east Ionians for Athens.

- There does not seem to be a strong use of a design module (Although a few foot standards, fit certain plan elements).

Capital: Ion-74a-b

Bld-28 The (marble) roofed tetrastyle amphi-prostyle 'systyle' Temple 'A', Paroika, Paros.

Date: 530-20 BC (Gruben, 1982a, p.229). 525-500 BC, due to paint details (Ohnesorg, 1993a, p.24).

Description references: Gruben, 1982a, p.197-229, Fig.16. Also see references in Weikert (1929, p.167).

Notes: Part of the naos and the opposite prostyle are unexcavated, being under a working church. Gruben (1982a, p.229) states that even after the latest excavation there is no proof that Lygdamis built it, but Kalpaxis (1986, p.77) demonstrates that he did. There are a few dimensions of the plan where foot standard base dimensions seem to have been used, but there is no consistency.

Capital: Capitals lost (Gruben, 1982a, p.215, Fig.16). These are itemised in this work as Cont-1.

Bld-29 The (marble) roofed (marble) pentastyle *in antis* Demeter Telesterion, Sangri (at Marmaria, currently Gyroula), Naxos.

Date: Ca 530-25 BC (Ohnesorg, 1996, p.46. Other dates: Not before 530-20 (Kalpaxis, 1986, p.78). 530-20 BC (Zaphiropoulou, 1988, p.17); Earlier Gruben (In Lambrinouidakis, 1976, p.302) dated the temple to 550 BC.

Description references: Gruben, 1996, p.70-73, Fig.10-6, 18 [Plan, sections, details], 74 [Proportions]; Ohnesorg, 1996 p.46, Fig.7 [capital]; Gruben in Lambrinouidakis, 1976, p.299-303, Fig.3[plan], Plate 197 a-b, 198b; Gruben, 1982a, p.214, Note 38 [proportions]; Kalpaxis, 1986, Plate 12.2 [perspective drawing]; Picard, 1955, p.290, Fig.14-16 [Bases dimensions and layout photographs]; Wesenberg, 1971, p.119, No.16, Fig.251.; [-] Gruben-Korrés, *Praktika*, 1977, p.382-4, Plates 8-12; 1979, p.254flw.

Material: Marble (Gruben in Lambrinouidakis, 1976, p.303).

Notes: This was an extremely un-canonical and experimental design. The plan is reminiscent of the telesterion type temple. The space was entered from the long side which had the gable, and the space had a central colonnade across the long dimension, each column carrying a beam in the short direction. The whole roof construction is of marble, with the columns of varying lengths taking up the roof pitch, and the pronaos had the first stone ceiling (albeit not with cassettes) which was also cambered.

- It is still unclear whether this temple was preceded by an older, Late Geometric/Early Archaic building. There

are remains of an older, 5th Cent BC temple at the church of Ag. Mamantos (Picard, 1955, p.293).

- The fact that the oldest known stone Ionic capital of a votive column was found in the vicinity of this site (Orlandos, 1954, p.337; Gruben, 1989; Picard, 1955) is noteworthy.

Capital: Doric (Ohnesorg, 1996, Fig.7), but with capital if painted reminiscent of cycladic leaf-cyma type (Gruben, 1996, p.73).

Bld-30 The roofed, in-antis (so-called) Klazomenaean Treasury, Sanctuary of Apollo (Building XVI), Delphi
Date: [Ca 528 BC], "Two decades after the fire of 548 BC" (Gruben, 1961, p.135; 1966, p.78). Other dates: Weikert's (1929, p.135) date is the beginning of the second half of the Sixth Cent BC; Ohnesorg (1993a, p.23) says *ca* 525 BC.

Description references: Dinsmoor, 1913, p.5-83, Fig.2-4, 13; Gruben, 1961, p.135-6; Weikert, 1929, p.135. Wesenberg, 1971, fig 89 [spira plus torus base combination - note that they are the same as the bottom of the Naukratis temple, Hera temple, bases from Phanai, Myus temple, Artemision, all with profiled spira bases, and the bases of the Naxian-*oikos* prostoion and the column of Athena Polias at Delos, as well as other Athenian columns, all with smooth spira drums and rudimentary form].

Capital: Cym-10 - The capitals were of the palm leaf variety with leaf-ends similar to the flat-rounded leaf-cyma type.

Bld-31 The roofed Massiliot Treasury (West of the Athena temple on the *Terasses Orientalis*, Sanctuary of Athena), Delphi.

Date: Soon after Building XVI [the so-called Klazomenaean Treasury], [ie soon after *ca* 528 BC] (Gruben, 1961, p.135; 1966, p.78). Other dates: De la Coste-Messeliere's (1957, p.330) date is 530-10 BC; Akurgal (1961, p.287 and note 15) between 533 and 500 BC. Pomtow (1913, p.48 (alternative number p.246)), mistakenly identifying this building as the 'Klazomenaean *Phylacus* temple', linked the date to a completion after the Klazomenaean Treasury [Which he thought to have been *ca* 550 BC]. Ohnesorg (1993a, p.23) is of the opinion that it is older than the Klazomenaean Treasury, ie 535-25 BC, or younger, ie 500 BC.

Description references: Dinsmoor, 1913, p.5-83, Fig.2-4, 9, 13; De la Coste-Messeliere, 1957, p.330, Plate 214-7; Pomtow (1913, p.1-49 (alt. p.199-247), Fig.22-3, 42, 50, 58, Table II [identified as the Klazomenaean *Phylacus* temple])

Capital: Cym-11

2.4.1.4 Catalogue of relevant Aeolic buildings before and during the architectural datum of the stone, Ionic standard capital.

Note: Because there is no detail quantitative analysis of Aeolic buildings in the study other than of capitals and column interaxis where possible, and because detail

reference to capitals are available in the capital catalogue above, there is here mostly an indication of Betancourt's (1977) synopsis of references in order to prevent duplication, and new relevant information that has been forthcoming.

Bld-Aeol1 Athenaion I (*Oikos*/peripteron (?)), Old Smyrna

Date: Seventh Cent BC (Betancourt, 1977, p.59). (See Bld-Aeol-3).

Capital: Not extant.

Bld-Aeol2a Early Archaic peripteral Temple I, Klopedi [Kolumdado, Nape], Lesbos

Date: Around 600 BC (Betancourt, 1977, p.82)

Capital: Not extant.

Bld-Aeol2b The newer, octastyle peripteral Temple II, Klopedi [Kolumdado, Nape], Lesbos

Date: 533-500 BC (Betancourt, 1977, p.85)

Capital: Aeol-5 [-6?]

Description references: Koldewey, 1890; Betancourt, 1977, p.82-7, Fig. 40-2); Kuhn (1986, p.77, Note 276) gives a synopsis of publications providing dimensions: He reports an interaxis of 2 150, Column bottom diam of 710 and a proportion of 3 : 1 for interaxis : Column bottom diam.

Notes: Betancourt's (1977, Fig.42) restoration of the façade shows columns as monolithic and with entasis, and he argues for a timber entablature. Kalpaxis (1986, p.73, Table 9.2-3) shows that the column drums were not finally dressed, but it is unclear whether the columns were going to be fluted or not. Most of the elements of the temple were built into the church of the Taxiarchis [Michael] and other buildings in the area. 13 capitals were accounted for, but the temple probably had more. Many of these have been lost again (Koldewey, 1890, p.44-5).

Bld-Aeol3 The peripteral Athenaion II, Old Smyrna

Date: *Ca* 580 BC. See discussion at capital Aeol-1.

Building description: Kuhn, 1986, p.39-80, Fig.10 [Perspective].

- Kuhn's (1986) reconstruction of the temple shows a new version with leaf cyma acting as base, flaring down-and-outwards. His arguments for this arrangement, as well arguments of others, at Capital Aeol-1.

- The Smyrna temple columns are deemed by Kuhn (1986, p.43; 80) to be the first stone peristyle in east Ionian [Excluding the First Dipteros at Samos]. The stylobate is 32m x 19m. The amount of columns on the front are not known. However, in sympathy with Archaic Ionic peristyles and the Klopedi Temple he argues for an octastyle front with interaxis of 2 530 on the west *pteron*, and interaxis: Column bottom diam = 3 : 1 (Kuhn, 1986, p.75; [He does not exclude the possibility for seven columns with 2 950 interaxis and 3,7 : 1]).

Capital: Aeol-1

Bld-Aeol4 Octastyle peripteral temple, Neandria

Date: *Ca* 550 BC (Wiegartz, 1994, p.125); Other dates: *ca* 550 BC (Wesenberg, 1971, p.138); 575-50 BC (Betancourt, 1977, p.73, Plate 41).

Building description: Clarke, 1886, p.1-7 [capital]; Koldewey, 1890; Akurgal, 1985, p.62-5; Betancourt, 1977, p.63-73 (with further references), Fig.30 [cella], 31 [peripteros - unscaled]; Clarke, 1886, p.1-20, [also 136,48??]; Wiegartz, 1994, p.117-32, Fig.4 [Scaled plan], Table 20-22.

Notes: The column spacings were larger in the front and back than on the sides of the peripteros.

- The small Aeolic capitals were used on the sides, the larger ones for the front (Wiegartz, 1994, p.82). The leaf cyma with spreading leaves were capitals in the interior colonnade. The bowl shaped leaf cyma pieces are accepted as being column bases (See arguments at capital Aeol-2).

Capital: Aeol-2

Bld-Aeol5 Old Palace ['B'], Larisa (Bit Hilani)

Date: 550 BC (Betancourt, 1977, p.76)

Accepted date: 550 BC (Betancourt, 1977, p.76). Other dates: *Ca* 550 BC (Boehlau *et al*, 1940, p.143ff, Table 30).

Description reference: Betancourt, 1977, p.76-7 (with further references); Boehlau *et al*, 1940, p.143 flw, 153-6; Wesenberg, 1971, p.121, No.28 [Spira].

Material: Phocaeen stone.

Capital: Aeol-4

Bld-Aeol6 The Archaic Athenaion, Larisa (*Oikos / peripteron* (?))

Date: 3rd qt Sixth Cent BC (Betancourt, 1977, p.81).

Description: Betancourt, 1977, p.79-81, Fig.33, 38.

Capital: None extant.

Bld-Aeol7 Unidentified building, Eressos, Lesbos

Date: 550-500[>]BC (Betancourt, 1977, p.88)

Capital: Aeol-7

Bld-Aeol8 Unidentified building [Not the 'Megaron'], Larisa.

Date: 575-50 BC (Wiegartz, 1994, p.125); Other dates: 575-50 BC (Betancourt, 1977, p.76, Plate 42).

Notes: Betancourt (1977, p.76) sees the Megaron at Larisa as a distyle *in antis* Aeolic building, and apportions capital Aeol-3 to it. Schefold's (In Boehlau *et al* (1940-2, p.161-2)) view is that the Megaron had had two Ionic columns *in antis* (Ion-54 - Theodorescu's (1980, Plate 1, No.16) date is approx 510 BC) which means that we can't see the Megaron as an Aeolic building. This view, corroborated by Mertens (1969, p.134), is accepted in this study. Moreover, an Archaic Ionic dentil moulding has been assigned to the Megaron (See Boehlau *et al*, 1940, Item No.50, Table 24c, 42a.I). Aeol-3 is not seen as of a votive column.

Capital: Aeol-3.

2.4.2 Chronological ordering of buildings from the Ionic sphere up to 525 BC

Table 2.6 Chronologically ordered buildings from the Ionic sphere up to 525 BC

No.	SITE	BUILDING	START-DATE	DATE REFERENCE USED	FORM-TYPE	CAPITAL NO	ACCEPTED CAP. DATE
800 to 700 BC							
1a	Samos	Heraion I	Start 8th Cent BC	Kienast, 1996, p.16	Naos	Not extant	-
2a	Ephesos	Artemision 'A' 1-III	From 8th Cent BC	Bammer, 1991, Fig.21	Peripteral <i>sekos</i> - Stone + timber	Not extant	-
3a	Iria, Naxos	Dionysos Temple I	From 8th Cent BC	Gruben, 1993, p.67	2 bay <i>oikos</i> I - stone + timber	Not extant	-
3b	Iria, Naxos	Dionysos Temple II	2nd half 8th Cent BC	Gruben, 1996, p.67	4 bay hall - Stone and timber	Not extant	-
4	Eretria	Apollonion (Daphnephorion)	8th Cent BC	Auberson, 1968, p.8	prostyle - Timber + mud on stone	Not extant	-
5	Tsikaliariou	Hearth Temple, Naxos	Geometric	Drerup, 1969, p.21	Anta or bilobal <i>oikos</i>	Not extant	-
700 to 600 BC							
1b	Samos	Hekatompodos IA	ca 700 BC	Kienast, 1996, p.16	In-antis: Surrounding colonnade discredited	(Kienast, 1996, p.23)	Not extant -
6a	Didyma	<i>Sekos</i> I (Didymeion I)	ca 700 BC	Tuchelt, 1987a, Fig.2a, 4	Stone <i>sekos</i> [timber peripteros ?]	Not extant	-
3c	Iria, Naxos	Dionysos temple Phase III	ca 700 BC	Gruben, 1993, p.102	Tetrastyle prostyle - Stone + timber	Not extant	-
7	Koukounaries	Athena Temple, Paros	after 700 BC	Gruben, 1989, p.165	Rectangular <i>oikos</i>	Not extant	-
2b	Ephesos	Artemision 'B'	?	Bammer, 1991	Peripteral <i>sekos</i> - Stone + higher colonnade	Not extant	-
8	Samos	South stoa	2nd half 7th Cent BC	Gruben, 1957, p.52, 61	Stoa - Timber [Gruben, 1957, Fig.1]	Not extant	-
1c	Samos	Hekatompodos II	ca 660 BC	Kienast, 1996, p.16	Prostyle - Surrounding colonnade discredited	(Kienast, 1996, p.23)	Not extant -
9	Miletos	Older Athena Temple	620 BC	Kalpaxis, 1976, p.64	Roofed in-antis [one column] 2 bay naos	Not extant	-
10	Prinias	Temple 'A', Crete	620 BC	Gruben, 1957, p.60	3 bay naos	Not extant	-
11	Didyma	South stoa	End 7th Cent BC	Akurgal, 1985, p.223	Stoa - Timber frame [Tuchelt, 1987a, Fig.6]	Not extant	-
12a	Delos	Supposed Naxian <i>pre-Oikos</i> "I"	Pre 600 BC	Galette de Santere, 1984	2 rather than 3 bay <i>oikos</i> [Central colonnade]	Not extant	-
600 to 575 BC							
13	Didyma	Unknown building	ca 600 [from capital]	Gruben, 1996, Note 13	Unknown typology	Preion-2	ca 600 BC
14	Delos	Artemision 'E'	ca 600 BC (< 1.3b)	Kalpaxis, 1976, p.76	Tetrastyle prostyle - Stone [+ timber?]	Preion-1 [?]	ca 600 BC
15	Ephesos	Marble Hekatompodos	ca 600 BC	Bammer, 1991, Fig.1	Naos amphi-in antis [?]	-	-
2c	Ephesos	Artemision 'C'	600-90/80 BC [check]	Bammer, 1984, p.172, Fig.83	Anta <i>sekos</i> with naiskos	Not extant	-
12b	Delos	Naxian <i>Oikos</i> ["IIa" rejected]	600-575 BC	Gruben, 1993, p.103	Roofed distyle in antis	Ion-24	Early 6th Cent BC
16a	Samos	North Temple I: Planning I-II	590-550 BC	Furtwängler et al (1989, p.4-6)	Siteworks only	Not applicable	-
3d	Iria, Naxos	Dionysos temple Phase IV	ca 580 BC	Gruben, 1996, p.67	Roofed tetrastyle prostyle	Ion-7	570 BC
			ca 575 BC	Ohnesorg, 1996, p.41			
1d	Samos	First Dipteral Heraion	ca 575 BC	Kienast, 1992	Roofed octastyle dipteron	Tor-1	ca 575 BC
17	Samos	N-west stoa	As Heraion III	Coulton (1976, p.280).	Stoa	not extant	-
575 to 550 BC							
18	Phocaea	Athenaion I	2nd qt Sixth Cent BC	Akurgal (1985, p.117)	Unknown	Cym-8	2nd qt 6th Cent BC
6c	Didyma	<i>Sekos</i> II (Didymeion IIa)	? (Complete 550 BC)	Tölle-Kastenbein (1994, p.56)	<i>Sekos</i>	?	?
19	Delphi	Cnidian Treasury	Ca 560 BC	Gruben (1961, p.135)	Roofed distyle in antis	Cym-13	ca 560 BC
6b	Didyma	Didymeion IIb early phase [?]	Not 600 BC [Schneider, 1996]; phase < 550 BC [?]		Inner peristasis Archaic Didymeion	Tor-2	Contested: <550 BC
2d	Ephesos	Artemision 'D' (Kroisos)	560 BC	Bammer (1991, p.64)	Hypaethral octastyle dipteron	Ion-16	<550 BC
20	Naukratis	Milesian Apollonion I	ca/ < 550 BC	Pedersen (1983 p.116)	Unknown	Cym-1	< 550 BC
12c	Delos	<i>proston</i> , Naxian <i>Oikos</i>	Just before 550 BC	Courbin, (1987, p.74)	Tetrastyle- prostyle (alteration)	Ion-5	Just < 550 BC
550 to 525 BC [Pioneer Phase or First Generation cut-off line = 525 BC]							
21	Myus	Lower Temple	550 BC	Weber (1967, p.139)	Roofed hexastyle peripteron	Ion-15	ca 550 BC
6d	Didyma	Dipteron of Didymeion IIb	ca 550 BC	Tuchelt (1991, p.21)	Hypaethral octa/decastyle dipteron	Ion-28	540-30 BC
22	Delos	Naxian Stoa	550-40 BC	Martin (1972, p.314)	Stoa	Ion-25	550-40 BC
23	Palati, Naxos	Apollonion [Hekatompodon]	550-24 BC	Zaphiropoulou (1988, p.14)	Roofed hexastyle peripteron	Cont-2 = not extant - upper portion not completed	
24	Samos	South Temple I	545-35 BC	Furtwängler et al (1989, p.61)	Nonastyle peripteron (excl east)	Ion-73	545-35 BC
16b	Samos	North Building I/Phase III	545-35 BC	Furtwängler et al (1989, p.7,57)	Flat-Roofed tristyle prostyle	Cyma fragments apportioned to Phase IV building	
1e	Samos	Heraion IV (Polykrates)	540 BC on, + 500 > BC	Kienast (1992, p.185)	Unfinished octastyle dipteron	Ion-58	500 > / Cym-9 - ca 522 / Cym-5 - < 522 BC
25	Samos	Monopteros II	540 BC [as above]	Kienast (1992, p.188)	Tristyle monopteron	Ion-39	500 > BC
26	Phanai, Chios	Apollonion	3rd qt 6th Cent BC	Boardman (1959, p.184)	No reconstruction possible	Ion-26	525-500 BC
27	Athens, agora	<i>Enneakrounos</i> (Peisistratos)	3rd qt 6th Cent BC	Merrit (1982, p.88, 92)	Tetra(?) style fountain house	Ion-74	3rd qt 6th Cent [540-30] BC
28	Paroikia, Paros	Temple 'A'	530-20 BC	Gruben (1982a, p.229)	Roofed tetrastyle prostyle	Cont-1 = Lost	
29	Sangri, Naxos	Demeter temple	530-20 BC	Zaphiropoulou (1988, p.17)	Roofed pentastyle in antis	Doric capital - Ohnesorg, 1996, Fig.7	
30	Delphi	Klazomenian treasury	ca 528 BC	Gruben (1961, p.135)	Roofed distyle in antis	Cym-10	ca 528 BC
31	Delphi	Massiliot treasury	>528 BC	Gruben (1961, p.135)	Roofed distyle in antis	Cym-11	>528 BC

Note: We should take note of a supposed Early Archaic temple on Paros (Gruben, 1997, p.411) and a amphi-prostyle temple 'X' (Gruben, 1997, p.413), not included due to lack of detail.

2.5 OTHER ARTIFACTS BROUGHT INTO RELATION WITH THE IONIC CAPITAL

2.5.1 Identifying and demarcating further Hellenic artefacts related to an evolutionary view of the origin of the Ionic capital

From an overview of current evolutionist thought on the antecedents of the Ionic capital, the following artefact types are identified as containers for the embryonic phase of the Ionic capital: Monumental votive kettle and vessel stands (bronze, pottery, composite types and possibly already stone), votive free-standing and statuary columns (timber and *terracotta* and stone), and religious buildings. The author would suggest adding the altar. These, together with monumental sculpture, were the types in which the main aspects of religious devotion were contained: The sacrifice, the communal meal, shelter for the deity, the giving of thanks and the conclusion of religious contracts with the deity, and the community related organisational work of the fraternities. Due to the religious nature of the artifacts and the subsequent value Hellenic society placed on conserving them even if they were not replaced by others, one may suspect these artefacts as being the prime vehicles for a traditive conveyance of religious iconography. Architecture is a difficult case in this regard, due to the continuous enlargement and rebuilding of the temple over time. Even though the re-use of elements in larger scale buildings was not feasible, one would nevertheless expect a similar traditive approach to building typology and elements in subsequent phases of temples. A survey of Hellenic religious building typology, as well as the style typology, tells us that this was indeed the case.

The abovementioned artifacts are identified as being the most probable bearers of elements related with the Ionic Order and its capital within the Hellenic sphere.

2.5.2 The problematic of posing synchronic relations between artifacts from differing cultural enclaves

As is well known, and also demonstrated in this study, artefacts do not appear without a context, both abstract and concrete. Furthermore, groupings of artefacts like the abovementioned pottery, votive kettles, bridges, sculpture, architecture and the like may be discerned as well definable groupings or types more often than not showing chronologically traceable evolutionary changes in inherent qualities which include iconographical content, form, level of execution and so forth. Discernment of particular morphology and syntax included in works have in the past been instrumental in defining style groupings, as aide in defining production date, and bringing works from various types in relation with each other. Such overarching groupings may eventually also be brought together as belonging to certain cultural enclaves, and sub-classified into periods within such enclaves. In the history of the search for the antecedents of the Ionic Order and capital, many researchers have brought to the table examples of artefacts which due to single elements or overall constituency relate to the Ionic capital, and also due to a chronological relevance to the question at hand. In most cases these studies did not move forward the issue.

In order to bring into relation artefacts from various cultural enclaves, be they chronologically and/or geographically separated, firstly a certain level of contact and recursivity between cultural enclaves, be it diachronic or synchronic, must be demonstrable from contexts extrinsically or intrinsically related to the artifacts. Also, the nature of the contact and the chronology of such contact must be proven, and the certainty range pertaining to the date/s be known in the case of synchronic contact. Thirdly, identification of the transfer of stylistic elements or traits should be guided through thorough analysis of the style evolution inherent to the originating type, together with its eventual typological ordering, similar to the work done in this study. Only if a singular typological correspondence is identified within the parameters stated above, may transfer of type be positively identified.

In the endeavour to uncover the antecedents for the Ionic capital there are even more considerations. Due to the capital's occurrence in both the minor arts and architecture, the various intrinsic roles of the capital form (or its elements) within the schema of the artifact types within which they occur, with the tectonic or aesthetic demands on the form within a bigger schema, should be taken into account.

There are also hindrances to the exercise. For many historical cultural enclaves the typological ordering of artefactual types is not completed to the level one would require to come to definite conclusions regarding transfer of form or style. Also, even in the presence of established dates which could in a way stabilize a stylistic chronology in a time continuum, the range of accuracy of dating often cannot fall below 20 years, with serious consequences for the intrepid style matcher! In the final analysis, the fit between contextual meanings inherent to the originating and receiving artifacts should also be demonstrable. Knowledge regarding contextual meaning is often lacking. With this in mind, it is proposed that this study may in the future be used as a pointer towards artefacts which may be possible contenders, and that notice may be given in the study as to the added importance for further research to be concentrated on those typological groups. Whereas the 19th Century researchers mostly had to deal with describing, classifying and understanding a total field of Antique and Classical cultural production, our century became increasingly marked by specialisation in individual research enclaves and even in terms of production groupings (ie types [sculpture, architecture] or materials [pottery, metal etc]). The only way to possibly move forward is in a cross-disciplinary, multi-specialist way, and through the increased flow of research accross specialist boundaries. It is clear that no specific conclusions may be reached now, and the reader is asked to view the last portion of Chapter 4 in this light.

2.6 CONCLUSION

In this Chapter a satisfactory model is reached for the description and ordering of the capital of the Archaic Ionic Order and votive column and their pre-forms, and which is not only suitable for further typological interpretation, but which adds new data to the current *corpus* of early Ionic capitals.

Table 2.3 Chronologically ordered inventory of relevant Archaic non-standard Ionic, Aeolic, Aeolicising, cyma standard Ionic and torus capitals (625 up to 489 BC).

No.	ORIGIN	FUNCTION	DATE USED	DATE REFERENCE USED	No.	ORIGIN	FUNCTION	DATE USED	DATE REFERENCE USED
625 to 600 BC									
Preion-1	Delos	Artemision E (?) [Rectangular timber columns]	Before 600 BC	Gruben, 1996, p.64	Cym-5	Samos	Cells capitals, Herion IV	[?]<522 BC	Pedersen, 1983, p.112
*Ion-1	Naxos [Artistic datum]	Votive column, Demeter and Apollo sanctuary, Sangri	End 7th C BC <u>estab</u>	Gruben, 1989, p.164	Cym-9	Samos	Inner ring cyma capital, Herion IV	[?]<522 BC	Pedersen, 1983, p.112
[In Guben (1993, p.102) there is an assertion that it is from after mid 7th C BC]					Not made Palati, Naxos				
600 to 575 BC					Lost Paros				
Preion-2	Didyma	Unknown building [Rectangular timber columns]	ca 600 BC	Gruben, 1996, p.63	Ion-30	Athens	Votive column	530-20 BC	Gruben, 1982a, p.229
Iver-3	Delos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.220	Ion-76	Athens	Votive column (Ameisias)	530 BC >	Boardman, 1959, p.206
Iver-4	Delos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.14 [propr]	Ion-34	Athens	Votive column	530-28 BC <u>estab</u>	Raubitschek, 1943, p.19
Ion-22	Aegina	Sphinx column, sanctuary of Aphaia	Early 6th C BC	Gruben, 1989, p.169, Note 25 Gruben 1993, Note 8	Cym-10	Delphi [ex east Ionia]	Klasonesean Treasury, Apollo sanctuary	ca 530 BC	Raubitschek, 1938, p.166
Ion-4	Naxos	Votive column, Delos.	Early 6th C BC	Kirchhoff, 1988, p.13 [propr]	Cym-11	Delphi [ex west Ionia]	Masiliot Treasury, Apollo sanctuary	ca 528 BC	Gruben, 1961, p.135
*Ion-24	Naxos [Archit datum]	Interior capital (And pronaos), Naxian <i>Oikos</i> , Delos	< 580 BC	Ohnesorg, 1996, p.41	Iver-6	Paros	Votive column, Thesmophorion, Paros.	>528 BC	Gruben, 1961, p.135
Aeol-1	Old Smyrna	Incomplete temple of Athena I	[ca 580] after Alyattes	Kuhn, 1986, p.80	525 to 500 BC				
Ion-9	Naxos	Votive column, sanctuary of Demeter and Apollo, Sangri	580-70 BC	Kirchhoff, 1988, p.19	Ion-26	Chios	Temple of Apollo Phanaios [Started 550-25 BC]	525-500 BC	Boardman, 1959, p.184
575 to 550 BC					Ion-66	Delphi	Votive column [from Paros?]	525-500 BC	Hahland, 1964, p.194
Tor-1	Samos	First Dipteros (Herion III)	575 BC	Kienast, 1992; Hendrich, 1997	Ion-72	Cyrenaica, N Africa	Rock cut tomb	525-500 >	Boardman, 1959, p.208 and Mason, 1978, p.169
Cym-8	Phocaea	Athenion I	575-50 BC	Akurgal, 1983, p.117	Ion-67	Athens	Votive column, akropolis	520 BC	Theodorescu, 1980, Pl.1 and Mason, 1978, p.155
Aeol-3	Larisa (o-t-Hermos)	Building	575-50 BC	Betancourt, 1977, p.76, Pl. 42	Ion-35	Athens	Votive column, akropolis	ca 520 BC	Bormann, 1988b
Ion-7a-b	Iria, Naxos	Temple of Dionysos IV [Bldg start 580 (-575) BC]	570 BC	Gruben, 1989, p.172; 1993, p.104	Ion-81	Athens	Votive column, akropolis	ca 520 BC	Mason, 1978, p.158
Ion-6	Delphi	Naxian Sphinx column, Delphi	570-60 BC	Amandry, 1933, p.26, 31, 199 and Gruben, 1993, p.104	Ion-12	Smyrna	Votive column, Halikarpinar, Smyrna	[?] 520 BC	Gruben, 1963, p.174. note 168
Ion-11	Delos	Capital found in the Competalist agora, Delos.	575-50 BC	Kirchhoff, 1988, p.24 (propr)	Ion-36	Athens	Votive column (Alkimachos)	520-10 BC <u>estab</u>	Jacob-Felsch, 1969, p.119 and Raubitschek, 1940, p.18
Cym-2	Didyma (Jeronda)	Votive column	575-50 BC	Kirchhoff, 1988, p.198	Ion-42	Massalia	Architectural	520-10 BC	Benoit, 1954
Cym-3	Didyma	Votive column	575-50 BC	Ohnesorg, 1993a, p.111	Ion-32	Delos [Naxian?]	Corner capital Propylon II	520-500 BC	Gruben, 1997, p.368
Cym-14	Paros	Votive kouros column	575-50 BC	Ohnesorg, 1993a, p.113	Ion-27	Delos [Naxian?]	Inner capital, Propylon II (ac 'Nieborow', Warsaw)	As Ion-32, or 500-BC	Gruben, 1997, p.370
Ion-10	Paros	Votive column (sep <i>canalis</i>), A. Katapoliani, Paros	570-50 BC	Ohnesorg, 1993a, p.113	Ion-48	Delos [Naxian?]	Outer capital, Propylon II (found Phcia, Olympia)	As Ion-32	Gruben, 1997, p.370
Ion-18	Delos	1st Naxian sphinx column from the Artemision of Delos	570-50 BC	Ohnesorg, 1993a, p.113	Ion-37	Posidonia-Paestum	Athens temple	510-500 BC	Kirchhoff, 1988, p.40 and Theodorescu, 1980, No.74
Ion-19	Delos	2nd Naxian sphinx column from the Artemision of Delos	570-50 BC	Ohnesorg, 1993a, p.113	Ion-52	Thasos	Anta column of an unidentified temple	510-460 BC	Martin, 1972, p.323
Ion-20	Delos	Votive column (theatre)	ca 560 BC	Martin, 1973	Ion-53	Thasos	Anta column of an unidentified temple	510-460 BC	Martin, 1972, p.323
Cym-13	Delphi	Quindim Treasury	ca 560 BC	Gruben, 1961, p.135	Aeol-6	Klipedi or Mytilene	Temple at Klipedi or Mytilene	Late 6th C BC	Betancourt, 1977, p.87, Pl. 50
Ion-16	Ephesos	Artemision 'D'	<550 BC	Bammer, 1984, p.76 and Fig.84	Ion-51	Miletos-Thessaloniki	Dionysios temple	Late 6th Cent BC	Bakalakis, 1963, p.31
Ion-5	Naxos	Prostion (east) of the Naxian <i>oikos</i> , Delos	Just < 550 BC	Courbin, 1987, p.74	Ion-63	Miletos	Votive column	Still 6th Cent BC	Koenigs, 1980, p.58 [propr]
Lost	Naxos?	Column of Athena <i>Polias</i> , Delos	Just < 550 BC	Gruben, 1989, p.166, Note 12	Ion-38	Thasos	Votive column	End 6th Cent BC	Kirchhoff, 1988, p.42 [propr]
Cym-1	Naukratis, Egypt	Apollonion I / votive column	< 550 BC	Pedersen, 1983, p.116	Ion-40	Gela	Building	End 6th Cent BC	Barletta, 1983, p.249
Tor-2	Didyma	Limestone phase Didymeion [Start bldg ca 600 BC by Schneider (1996, p.83) contested: <550 BC]	< 550 BC		Ion-43	Miletos [Milet city]	Architectural	End of 6th Cent BC	Koenigs, 1979, p.194
550 to 525 BC					*Ion-75	Athens	Kakrops column [?] (north wall akropolis)	ca 530	[See Boardman, 1959, p.206]
Aeol-2	Neandria	The temple, Neandria (Acropolis)	ca 550 BC	Wiegartz, 1994, p.125	Ion-60	Phocaea	Rebuilt Athenaion II	Now placed as Late Archaic by Korres (1997, p.95)	
Aeol-9	Aegae (Pergamon)	Possibly a temple.	As Aeol-2	Radt, 1991, p.482	Aeol-7	Ereos	Unknown architectural application	End of 6th Cent BC	Alurgal, 1985, p.117 [contested]
Iver-2	Paros	Peripterasterion	ca 550 BC	Ohnesorg, 1993a, p.117	500 to 480 BC				
Cym-12	Paros	Votive <i>kyros</i> column	ca 550 BC	Ohnesorg, 1993a, p.111	Ion-77	Speculative	In <i>axis</i> temple/treasury, Labrynda [Mylasa]	ca 500 BC	Thieme, 1993, p.49-50
Cym-4	Thasos [?]	Probably a votive <i>kyros</i> column, Delos	Mid 6th Cent BC	[Kirchhoff, 1988, p.200]	Ion-80	Miletos/Didyma	Votive lion column [Mikros], unknown site.	ca 500 BC	Koenigs et al (1978/80, p.164)
Ion-23	Thasos	Votive column	Mid 6th Cent BC	Kirchhoff, 1988, p.28-9	Ion-58	Samos	Complete entablature Herion IV [Start-up 540 BC]	2nd phase 500>BC	Kienast, 1992, p.186
Ion-17	Paros	Votive column (Archilochos/Ag Tris Eklesies)	ca 550 BC [?]	Ohnesorg, 1993a, p.114	Ion-59	Samos	Monopteros II [If linked to the Herion IV 2nd phase]	500>BC	Kienast, 1992, p.188-9
Ion-69	Paros	Votive column, Paros (Modern wall antique city)	as Ion-17	Ohnesorg, 1993a, p.115	Ion-61	Syracuse	Ionic temple in the Athena sanctuary	500>BC	Barletta, 1983, p.88-90
Aeol-4	Larisa (o-t-Hermos)	Old Palace (building B), Larisa (On-tho-Hermos)	530 BC	Martin, 1973, p.377	Ion-44	Ephesos	Temple (found St John Basilica, Selcuk)	500>BC	Linked to Ion-77, Ion-59
Iver-12	Delos	Votive column	530 BC	Weber, 1967, p.139	Cym-6	Didyma	Votive column	ca 500 BC	Kirchhoff, 1988, p.201
Ion-14	Kyrene	Sphinx column of Kyrene	530 BC >	White, 1971, p.52	Ion-31	Selinus	Votive column	ca 500 BC	Theodorescu, 1974, p.46 [propr]
Ion-15	Myus	Lower temple	ca 530 BC	Gruben, 1989, p.169	Ion-56	Tamassos, Cyprus	(prob) votive column (later game table)	Early Fifth Cent BC	Kirchhoff, 1988, p.54 [propr]
Ion-64	Sangri, Naxos	Votive column	ca 530 BC	Gruben, 1989, p.169	Cym-7	Samos	Votive column	Early Fifth Cent BC	Buschor, 1957, p.20
Iver-11	Oropos	Votive column	Just > mid 6th C BC	Kirchhoff, 1988, p.216	Ion-39	Histria	Temple 'A' (Zeus Potisus?)	500-490 BC	Theodorescu, 1968, p.285
Iver-7	Athens	Votive column, Athens.	550-500 BC	Betancourt, 1977, p.100.	Ion-46	Metapontum	Temple 'D'	500-490 BC	Martens, 1979, p.128, 138-9
Iver-8	Athens	Votive column, akropolis	550-500 BC	Betancourt, 1977, p.102.	Ion-50	Napoli	Temple of Artemis	500-480 BC	Roux, 1961
Ion-45	Miletos (Yeniköy)	Temple (?)	ca 550-500 BC	Koenigs, 1979, p.189	Ion-55	Halicarnassus	Free-standing anta column	500-480 BC	Martin, 1959
Iver-9	Athens	Small building or sanctuary on the akropolis	550-525 BC	Betancourt, 1977, p.104.	Ion-54	Larisa (O-t-Hermos)	Late Archaic	Martens, 1969, p.134	
Ion-29	Ephesos	Temple (found in the Byzantine aqueduct)	550-25 BC	Kirchhoff, 1988, p.87 and Theodorescu, 1980, Tab.1, No.2	Ion-78	Miletos	Uncompleted Temple (Mangrovevtepe, Milet)	ca 500 [< 494] BC	Weber, 1996, p.86
Ion-74	Athens [+East Ionia]	<i>Emmenonion</i> in the Athenian agora	550-25 [40-30] BC	Merrit, 1982, p.88, 92	Ion-21	Athens	Votive column (?) [Berlin 997]	<489 BC	Raubitschek, 1938, p.170
Aeol-5	Klipedi	Late archaic (Apollo?) temple, Klipedi.	Last 3rd 6th BC	Betancourt, 1977, p.83.	Ion-62	Athens	Votive column (Nike of Callimachus)	490-89 BC <u>estab</u>	Jacob-Felsch, 1969, p.127
Ion-25	Delos	Naxian stoa	550-40 BC	Martin, 1972, p.314					
Ion-82	Didyma	Votive column	< Ion-28	Gruben, 1963, p.142					
Ion-73	Samos	Anta capital of South temple	545-35 BC	Furtwängler et al (1989, p.61)					
Iver-13	Athens	Votive column [No.3847]	540 BC	Raubitschek, 1938, p.164					
Ion-28	Didyma	Didymeion/Apollonion II (Building start 550 BC)	ca 540-30 BC,	Tuchelt, 1991, p.21					
Iver-5	Paros	Votive- or architectural	Before frieze	Schuttnier, 1996, p.41					
			540-30 BC	Ohnesorg, 1993a, p.116					

[Note: These Archaic capitals not placed due to lack of knowledge regarding date or place of origin are so indicated in the catalogue. Ion-10, -41, -57 and -68 are not placed chronologically, but their dates are locked into after the analyses. Ion-13 and -41 cannot be placed chronologically. Due to a lack of precise dating Cym-14, -15, -16, -17 and Iver-10 are also not placed here. Iver-10 can also not be placed geographically.]

CHAPTER 3 TYPOLOGICAL INTERPRETATION OF RELEVANT ARTIFACTS

- Sub problem 2** To gain typological understanding of an ordered data base of relevant artifacts.
- Hypothesis 2** Interpretation of an ordered *corpus* of early Ionic capitals from a typological perspective can alter and increase current interpretation.

3.1 INTRODUCTION

This Chapter deals with the abstract nature of the Ionic capital, in terms of design, production and integration in architecture and votive columns. The achievement of a suitable ordering model for Ionic capitals and subsequent compilation of a data base and a reliable chronology of Archaic capitals makes possible the manipulation of the data to discern the typological content and design trends within the given period. In this section of the study the replication of all the manipulations of data included in the excellent works by Kirchhoff (EIV) and Theodorescu (LCIG) is avoided. There is rather a selective use of the achieved, integrated ordering method and comprehensive data base so that selected, important aspects pertaining to capital typology are discerned with the intention to heighten current insight.

The Chapter initially deals with an analysis of the chronologically ordered Archaic Ionic standard capitals, as well as chronologically and geographically ordered 'first generation' Ionic standard capitals up to 625 BC, in order to arrive at typological understanding. The Chapter concludes with an exploration of the *techné* involved in the capital's conception and design, its making and also its joining to other parts of the formal systems in which it occurs. Especially the first generation Ionic standard capitals up to 525 BC are subjected to analyses that brings forth new knowledge (for example the determination of capital plan ordering methods and volute construction methods, as well as deeper understanding of the integration of capitals within their built context), and the range, place and time of innovations in the design process are identified. For this there is reliance on the contents of the data base achieved in Chapter 2. The insights from this chapter are used in the preparatory work in Chapter 4 which is a primer towards the eventual construction of a founding history for the Ionic capital.

3.2 TYPOLOGICAL INTERPRETATION FROM CHRONOLOGICAL AND GEOGRAPHICAL ORDERING OF THE ARCHAIC IONIC CAPITAL

3.2.1 Morphological aspects emanating from the chronological ordering

3.2.1.1 Trends identified through chronological ordering - Quantitative criteria

All Archaic Ionic capitals from 625 to 489 BC are included in this ordering process. The quantitatively described capitals are placed in chronological order in Appendix 1, Table 1.1. Whilst all possible

relationships are provided for further research, the author identified certain relationships between capital elements for the analysis that were deemed to provide the most insight into the properties of the capital form, as well as of its wider relationship with a votive column or Order.

Those capital proportions that are at the heart of the design are used in this study, whilst those that are derivative of them are excluded due to delimitation of the scope of the study (This delimitation then excludes reacting to Mace's (1978, p.123-36) proportional analysis). Only two co-incide with those looked at by Kirchhoff (EIV), namely the ratios D:E ($\frac{E}{D}$ [or *V:Va*]) and G:A ($\frac{A}{G}$ [or *Gesamt Höhe Volute: Gesamt Länge Kapitell*]). Whilst one realises that the column shaft necking diameter is the determinant to understanding the relationship capital design to column [ie building] design (in other words necking diameter : A [*Oberes Diameter : Gesamt Länge Kapitell*]), the non-existence of most buildings' and votive columns' shaft neckings, and the general dearth of column dimensions in the literature on capitals does not make it a very suitable option to discern trends. For this reason the chosen

Table 3.1 Trends identified through chronological ordering of all Archaic capitals - Quantitative criteria.

PROPORTION	TREND
B:A Capital width : capital length [$\frac{A}{B}$] or [Tiefe Polster insg.: Gesamt Länge Kapitell]	Relates to the plan shape: The capital plan proportions are scattered between ca 1:1,7 to 1:3,5 with a downward trend discernable until ca 520 BC [From Ion-36] when the ratio settles between 1:2,0-2,5. From this information one may say that there was a lot of experimentation regarding the proportion of the top and bottom elevation of the capital in both short and stretched variations of the capital until a canonic plan proportion was reached. Ideally one should bring any trends in proportioning the plan ordering device between the polster ends, ie E:B, into relation with the above trend.
H:A Echinus bottom \varnothing : capital length [$\frac{A}{H}$] or [\varnothing d. unteren Auflagers: Gesamt Länge Kapitell]	Relates to the capital and column shaft necking diameter*/[bottom bearing] relationship: The ratio starts at 1: 2,25 and ends at 1: 2,25, but apart from a few outsiders (a few below but mostly above, peaking at ca 1 : 3,4) it mostly hovers between the 1 : 2,0 to 1 : 2,5 range, decreasing over time. The ratios show a relative consensus of a capital length of between 2,0 to 2,5 times the capital bearing diameter (*capital soffit <i>mutatis mutandis</i> approximating a similar ratio for the column shaft necking diameter), with the decrease to 2,0 occurring after 550 BC. Of note is that the earliest capitals already fall within the favoured range.
H:C Echinus bottom \varnothing : capital top bearing length [$\frac{C}{H}$] or [\varnothing d. unteren Auflagers: Gesamt Länge oberes Auflagers]	Relates to the capital top and bottom bearing planes. The ratio starts at 1:2,25 followed by wide variations in the range between 1:1,2-3,0, but after 550 BC [Ion-15] the range fluctuates and then settles between 1:1,5-2,0 showing a fluctuation above 1 : 2,0 after ca 500 BC [Ion-50]. It seems that the favoured ratio for architectural works of the late Archaic era was ca 1:1,5. This, together with the favoured H:A ratio of 1:2-2,5 could possibly be part of a late Archaic canon. It is important to note that top bearing distance is not dependent on capital length (with all the devices known). Capitals' vertical bearing to bearing distances vary. In order to look at variations in the angle of transmission of load, this information must be read together with the angle of load transmission <i>alpha</i> (See 3.3.4.2.2 and App.1, Table 1.1), where the trend in variation of the angle of transmission is discussed), and also the bearing-to bearing height to width (L:B) ratio.
D:E Volute width : Distance between volutes [$\frac{E}{D}$] or [V{Gesamt Länge Volute}: Va {Volutenabstand}]	Relates to the horizontal façade proportion: There is an overall downward trend [The volutes come closer together] starting more erratic in the beginning, from ca 1:1-2, from ca 570 BC [Ion-10] to ca 550 BC [Ion-15] keeping around 1 : 1-1,5 , oscillating between 1 : 0,6-1,25 from ca 550 BC [Ion-64] to ca 500 BC [Ion-31] after which it remains between 1 : 0,5-1,0. Although there are variations, the overall trend is for volutes to come closer to each other over time.
G:A Volute height : total capital length [$\frac{A}{G}$] or [Gesamt HöheVolute: Gesamt Länge Kapitell]	Relates to the overall façade proportion: Although there are variations, the ratio decreases from between ca 1:2,5-3,5 to 1:2,0-2,75 over time, which indicates that, relative to capital length only, the volutes become relatively deeper over time.
L:B Canalis + echinus height : canalis/capital width [$\frac{B}{L}$] or [Gesamt Höhe Kapitell - von oberes Kanalis zu unterem Auflager : Tiefe Polster insg.]	Relates to the shape of the section of the main weight-bearing part of the capital: Over the whole period there is oscillation between 1 : 1,0 -1,75, but with most favoured seeming to be around 1 : 1,5.



Figure 3.1 Chronologically put Archaic standard Ionic capitals: Relationship between capital elements

ratio H : A [*ød. unteren Auflagers: Gesamt Länge Kapitell*] is chosen as a useful alternative in that it can possibly, even though in a diminished sense, give an indication of the capital length dimension in terms of the dimension of the capital's support structure (Also see * below). Trends are given in Table 3.1 and shown visually in Fig.3.1 above. The trends discerned below provide insight into the typological evolution of capital form during the Archaic period to the cut-off date of 489 BC, which may then also be seamlessly brought into relation with the conclusions for Classical and Hellenistic capitals by Theodorescu (LCIG). Apart from the fact that the occurrence of trends indicates the existence of a learning system, in other words where work builds on previous achievements and where communication between designers seems to have been a reality, these trends provide the necessary insight for the determining of the sophistication of the design system. Aspects of this analysis may in future also be used in quantitative interpretation of the Ionic Order, as well as in evaluation of the design relationship between the Archaic Ionic and Aeolic capital. The results of the analysis may be further used to assess the validity of such existing analyses that relied on a small selection of capitals.

The author's results were compared to those obtained by Kirchhoff (EIV, p.236-42) from his smaller sample. For the ratio D:E (E/D [or $V:Va$]) the author found an overall decrease during the Archaic period, which means that the echinus element became relatively smaller and the volutes came relatively closer over time. This is opposed to Kirchhoff's finding that Island Ionic capitals showed an increasing trend, and the east Ionian showed a similar increase before decreasing. This difference is dealt with further in the geographical analysis. For the ratio C:A (A/G or *Gesamt Länge Kapitell : Gesamt Länge oberen Auflagers*) the author's analysis and that of Kirchhoff co-incide, in that there is an overall decrease over time. Further analysis on the basis of Kirchhoff's other relationships may be done as a comparative study in order to pinpoint the major differences, but the author has already shown that his work cannot be relied upon fully due to some inconsistencies in the dating of capitals, as well as the incompleteness of the data base (See Chapter 2). An understanding of these trends on a more geographical basis, like that by Kirchhoff, is possible from the further ordering of capitals indicated below, but data from those capitals between 525 and 489 BC would have to be included from the interpretation inherent to the data included in the capital description. Also, as mentioned above, the analysis of other capital relationships are not made part of the argument here. Whilst, in the dating and classification process, knowledge of these relationships are less useful than those seen within a geographical perspective, they may be of value when the provenance of a capital is not known.

3.2.1.2 Trends identified through chronological ordering - Qualitative criteria

All Archaic Ionic capitals from 625 to 489 BC are included in this ordering process. The qualitatively described capitals are placed in chronological order in Appendix 1, Table 1.2. Whilst the Table provides the tools for a detailed analysis of chronological trends, external delineation of the study prevents the discussion of all 53 morphological aspects, apart from explaining how Table 1.2 is useful in various ways:

Apart from finding the first occurrence of innovations in terms of morphological criteria (The list is provided below in Table 3.4), the user may see if a particular morphological element was widely used within the overall period or whether it was an isolated experiment, whether the use of a particular morphological element increased or decreased over time, whether any morphological aspects typical of the Classical period appear progressively more densely distributed amongst the later Archaic capitals or not, whether some later Archaic capitals may have Archaistic tendencies and, after the geographical ordering of capitals, when the initiators of regional morphological groups appear in relation to the other capitals.

3.2.2 Morphological aspects relevant to geographical ordering

Only first generation capitals up to 525 BC are included in this analysis, which was completed as a model to show the applicational worth of the ordered data, but also to gain insight for use in the critical framework

3.2.2.1 Trends identified through geographical ordering - Quantitative criteria

Table 3.2 Trends identified through chronological and geographical ordering of all Archaic capitals - Quantitative criteria.

PROPORTION	TREND
B:A Capital width : capital length [$\frac{w}{h}$] Relates to the plan shape	In the first generation capitals up to 525 BC the Milesian [except Ion-15] capitals conform more to the post-520 BC ideal of between 1:2-2,5, whereas the Ephesian, Kyrenean and Aeginetan capitals are above [longer], the Athenian are below [shorter] and the Naxian capitals start in, then scatter below and above and then end in the range again]
H:A Echinus bottom ϕ : capital length [$\frac{h}{H}$] Relates to the capital and column diameter* relationship (*bottom bearing)	Before 525 BC the length of capitals relative to column diameter*/bottom bearing for Milesian capitals are constant around 1:2,4, for Ephesian capitals increase from 1:2,15-46 against the higher value against the decreasing overall trend, the Kyrenean capital is 1:1,38, the Aeginetan one is 1:91, it increases from 1,74 to 1:2,13 in Athenian capitals close to the later ideal, Parian capitals increase from 1:2,94-3,79 [except for Ion-17] and in Naxian capitals there is no visible trend but fluctuation between 1: 1,86-2,79 [Later the Samian capitals are around 1:1,9-1,99]. Seen overall the capital length relative to bottom diameter is longer than after 525 BC.
H:C Echinus bottom ϕ : capital top bearing length [$\frac{c}{h}$] Relates the top and bottom bearing planes	Before 525 BC Milesian capitals start at 1:1,8 then drop to 1:6 and rise to 1:2,0, the Ephesians are steady at 1:4-4,5, a Kyrenean is 1:2,5, an Aeginetan is 1:1,5, the Athenian capitals rise from 1:1,1-7, Parian capitals steady between 1:2,4-3 then fluctuate to 1:1,9-3,0. The Naxian capitals fluctuate between 1:2,2-1,6 [Later the Samian capitals are 1:1,6]. The Ephesian capitals come closest to the late Archaic favoured ratio of 1:1,5.
D:E Volute width : Distance between volutes [$\frac{e}{d}$] Relates to the horizontal façade proportion	Before 525 BC the Naxian capitals oscillate between 1:1 [Ion-24 being a notable early example of the later canon] to 1: 2,0, the Parian downwards between 1: 1-1,5 Milesian capitals start with further spaced volutes of 1:1,3 and then move closer toward the later ideal [Also later the Samian is constant around 1: 1, 25], the Ephesian downwards between 1:1,4-0,9, and the Athenian capitals downwards from 1:1,0-0,7]. The Milesian capitals, and more so the Athenian capitals come closest to the later favoured ratio). [NB See Kirchoff's (EIV) finding that Island Ionic capitals showed an increasing trend, and that east Ionian showed an increase before decreasing]
G:A Volute height : total capital length [$\frac{a}{G}$] Relates to the overall façade proportion -	Before 525 BC the Milesian trend is slightly downward from 1,8-1,6, the Ephesian down from ca 2,9-7, the Kyrenean at 2,8 and the Aeginetan at 3,3, the Athenian drops from 2,6-2,25, the Parian drop from 3,0-2,6, and the Naxian oscillates between 3,6-2,4.
L:B Canalis + echinus height : canalis/capital width [$\frac{b}{L}$] Relates to the section of the main weight bearing element	Before 525 BC the Milesian trend is upward from 1:1,1-1,7-6, the Ephesian slightly up from 1:1,4-5, a Kyrenean capital of 1:1,0, an Aeginetan capital of 1:1,0, the Athenian trend is downward from 1: 2,3-1,7, the Parian around hovers around 1:1,6 with two capitals being lower at 1:1,1-3, and the Naxian capitals range between 1:1,65-2,0 [except Ion-18 at 1,2 and Ion-1 at 1,3]. The later Samian capitals are between 1: 1,7-9. The Ephesian capitals come closest to the later favoured ratio of 1:1,5, followed by the Parian.

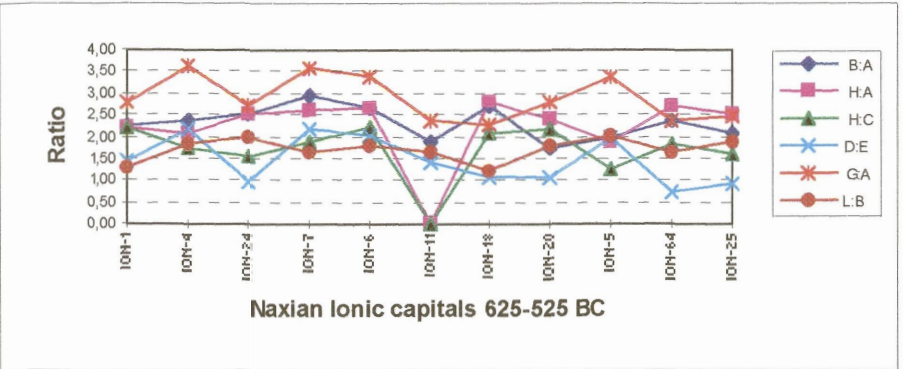
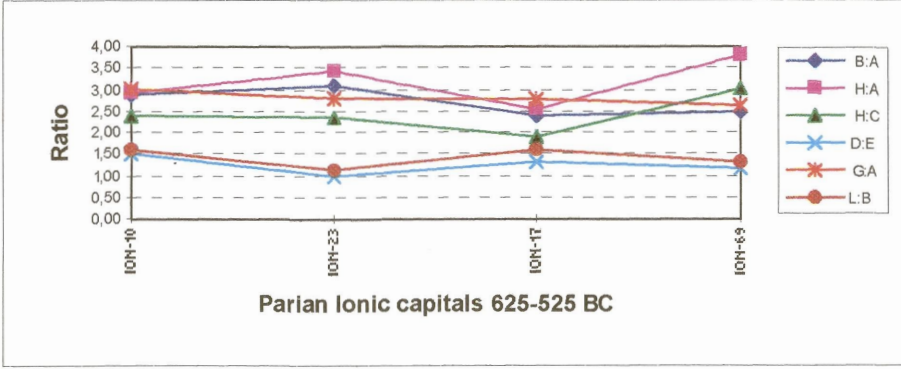
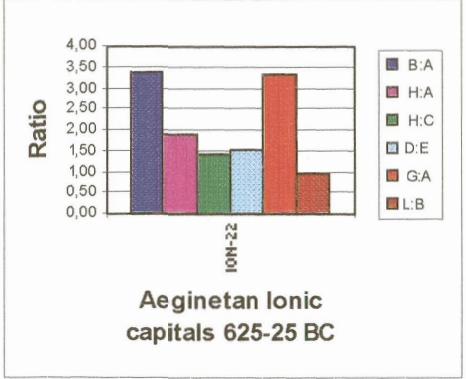
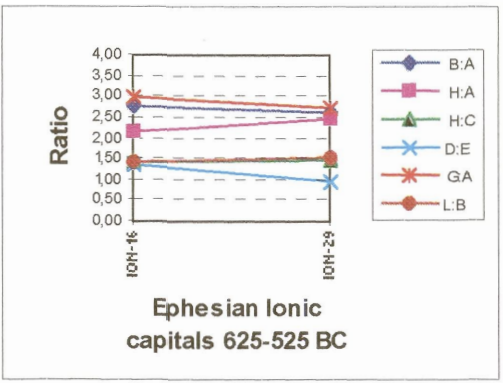
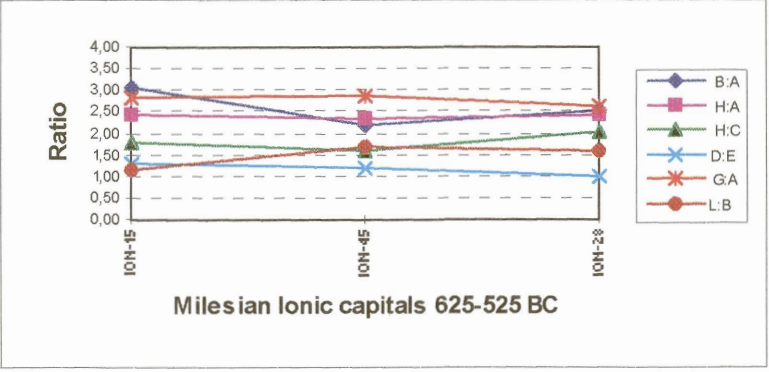
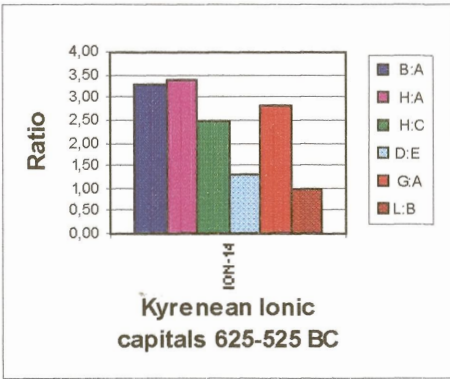
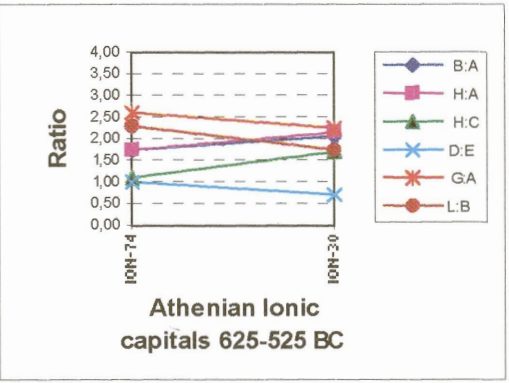


Figure 3.2 Geographically and chronologically put Archaic standard Ionic capitals: Relationship between capital elements

for future construction of a founding theory of the Ionic capital which focuses on the earlier capitals, even though questions pertaining to the relationships between Archaic and Classical capitals are addressed here. The chronology of geographically and chronologically ordered, quantitatively described capitals used for this analysis is provided in Appendix 1, Table 1.3. Table 3.2 above captures the trends for the main capital relationships for each identified geographical region below and Fig.3.2 show the trends (or lack) in a visual way.

The figures speak for themselves, and they are provided in a format suitable for use for purposes of style identification when read together with the chronology of geographically ordered, qualitatively described capitals in Appendix 1, Table 1.4. Read with Table 3.1 and Fig.3.1, the trends may be seen relative to the total Archaic period. Apart from the identification of the trends, the results from Table 1.3 are intended to be used within the process of ascertaining the datums of various regarding morphological typological trends mentioned in 3.2.4 below, and as guide in dating of hitherto undated capitals where no other external evidence is available, or act as corroboratory evidence where available. In terms of Kirchoff's (EIV, p.236-42) findings, the above trends for the ratio D:E for 'Island Ionic' [Naxian and Parian] capitals do not coincide with his.

3.2.2.2 Geographical ordering - Qualitative criteria

From the qualitative description of capitals in Table 2.2, there is a geographically and chronologically ordered, qualitatively described description of capitals in Appendix 1, Table 1.4. From Table 1.4 it is possible to see which morphological qualities are inherent to geographically ordered groups of capitals. In Table 3.3 below the information is ordered in such a way that the occurrence of morphological qualities can be more readily discerned in a chronological and geographical manner. The main qualitative typological characteristics in Table 1.4 must be read with the main qualitative characteristics in Table 1.2 to define the overall typological characteristics of the capitals and the trends involved, for the various regions and in the time period concerned. In section 3.2.4 below this information is used in further analyses.

3.2.3 A chronology of innovations in Aeolicising and first generation Ionic capitals

Identification of innovations in the evolution of the morphology of the Ionic capital was made possible from interpretation pertaining to qualitative criteria, ordered chronologically in Appendix 1, Table 1.2, from the chronology attained in Chapter 2. Knowledge of such innovations is necessary for classification of capitals, and also for insight into the nature of design evolution. In Table 3.4 below the capital in which the innovation occurred is indicated, together with the next - chronologically following - occurrence of the element, its capital indicated in [] brackets. It is clear that all the innovations did not occur in the earliest capitals but continued to happen right through the total Archaic period, and also that certain capitals contained many innovations. The important non-standard Ionic capitals for which there is an indication of

TABLE 3.3			ORGANISATION				PLAN ELEMENTS			FRONT ELEVATION ELEMENTS																			
Ionic capitals 625-525 BC			Front elevation		Bottom plan		Side elevat	Top plane			Canals																		
Qualitative criteria	Place of origin and quantity capitals	Criteria No.	Criteria No.		Criteria No.		Criteria No.	Criteria No.			Criteria No.																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
3	3-Dimensional modular co-ordination	3																											
4	Formal relation between eye & side + top columns	4																											
5	Volute: Involute	5																											
6	Volute: Circle arcs 90°	6																											
7	Volute: Random arcs	7																											
8	Volute: Square	8																											
9	Volute: Circle arcs 90 + square	9																											
10	Square	10																											
11	Hexagon	11																											
12	Octagon	12																											
13	Rectangle	13																											
14	Rectangle reverse	14																											
15	Opposing flutes: Inclined	15																											
16	Opposing flutes: Vertical	16																											
17	Edge corresponds with junction of volute	17																											
18	Enlarged by addition: Spandrel palmetto	18																											
19	Enlarged by addition: Angle	19																											
20	Enlarged by addition: Curved abacus	20																											
21	Enlarged by change in volute outline outward	21																											
22	Flat	22																											
23	Convex	23																											
24	Concave	24																											
25	Decorated	25																											
26	Horizontal channel bottom: Angular	26																											
27	Horizontal channel bottom: Upturned cord	27																											
28	Horizontal channel bottom: Row	28																											
29	Horizontal channel bottom: Cord	29																											
30	Horizontal channel bottom: Tread line straight	30																											
31	Separation between volutes	31																											
32	Vertical (Anolis-like) included for comparison	32																											
33	Volute anterior: Round - double	33																											
34	Volute anterior: Round - single	34																											
35	Round with border	35																											
36	Flat line - painted	36																											
37	Rectangular raised	37																											
38	Absent above echinus / into echinus	38																											
39	Enriched	39																											

Qualitative criteria			FRONT ELEVATION ELEMENTS										SIDE ELEVATION ELEMENTS										
Place of origin and quantity capitals			Eye					Echinus					Form					Ornament					
Qualitative criteria	Place of origin and quantity capitals	Criteria No.	Criteria No.					Criteria No.					Criteria No.					Criteria No.					
			30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
30	Theoretical centre point only	30																					
31	Flat: Painted	31																					
32	Flat: Defined by groove or bead	32																					
33	Flat: Hollow	33																					
34	Convex	34																					
35	Bevels: small (eye)ing (occupying whole volute)	35																					
36	Other profile: Circle with centre point	36																					
37	Other profile: Spiral whole	37																					
38	Ionic cyma: Flat/Round ended leaf / border	38																					
39	Ionic cyma: Flat/Round ended leaf / no border	39																					
40	Ionic cyma: Flat/Round [hanging]	40																					
41	Ionic cyma: Egg-and-sunagon: Rounded	41																					
42	Ionic cyma: Egg-and-sunagon: Pointed	42																					
43	Laebian cyma	43																					
44	Superimposed cyma	44																					
45	Dome	45																					
46	Form-smooth	46																					
47	Form-ribbed	47																					
48	Intermediate space between echinus and canals	48																					
49	Spandrel palmetto on capital lowering offset	49																					
50	Spandrel palmetto in volute/canals angle	50																					
51	Abacus	51																					
52	Double-trumpet cylinder shape	52																					
53	Straight cylinder shape	53																					
54	Block: With/no ornament	54																					
55	Step	55																					
56	Sculpture on Abacus side / Foliate	56																					
57	Fluted	57																					
58	Smooth	58																					
59	2 flutes	59																					
60	3 flutes (* = Flutes on strap)	60																					
61	4 flutes	61																					
62	5 flutes	62																					
63	6 flutes	63																					
64	Round beads between flutes: 1	64																					
65	Round beads between flutes: 2	65																					
66	Round beads between flutes: 3	66																					
67	Round beads between flutes: 4	67																					
68	Triangular beading	68																					

transfer of form aspects - ie the Aeolicising capitals [Ie Iver-1, -2 and 4] or those from other design enclaves like the Levantine-Aeolic and Hellenic-Aeolic [Ie Aeol-1] capitals) - clearly come to the fore. By listing the geographical place where innovations occurred, there is direction for research regarding the design context in which they occurred, and to move toward locating precedents which may have been available. An example would be the volute angle spandrel palmette detail which first occurred in Naxian capitals, leading one to the possible link between this and earlier volute decorations on Naxian pottery showing a spandrel palmette in that position, and so pointing toward a specific item requiring focused research.

3.2.4 Typological developments and experimental forms from the datum

The Archaic Ionic capitals up to 525 BC were subjected to morphologic-typological ordering in terms of qualitative (App.1, Table 1.4) and quantitative (App.1, Table 1.3) criteria above. Table 3.3 above groups the morphological qualities together in geographical and chronological time-periods, and clearly shows the occurrence of morphological typological qualities of the capitals groups in the various regions. Both Table 3.2 and Table 3.3 may further be brought in relation with each other to increase information regarding typological developments in the capitals up to 525 BC, and to show those forms which were experimental, and which became geographically bound interim canonic types. The occurrence of the specific, identified elements in the regional groups and in the time slots 625-550 and 550-525 BC can be clearly read, and the various morphologically defined typological capital groupings are thus compiled. Although these typologies are included in the formulation of App.1, Table 1.2, 1.4 and Table 3.3, there can be no discussion of the geographically bound typologies between 625-525 BC in this section due to the delineation of the study, but the firstmentioned typologies are used in further analysis of the capital in Chapter 4.

The initiating experiments for new form types are identified in the chronological Table 3.4 above. Knowledge included in the above interpretations may already be applied in inquiries into typological aspects of other types of artifacts, after which feedback may further enhance the study of chronologically an geographically bound evolutionary patterns in the morphological typology of the Ionic capitals. The completion of similar interpretation for the Late Archaic capitals may easily be accomplished by applying the accomplished ordering of these capitals to the format of Table 3.3 and 3.4

3.2.4.1 Early regional canons and interim canonic phases in the Archaic period

In the knowledge of a later canonised capital type in the Hellenistic period, the standard capital with system volute identified by Büsing (1987), it must be ascertained whether regional canons did come about in the Archaic period, and as what they should be defined. The detail gained from the analysis of the geographical and chronological ordering should be further enhanced from analysis of the metrological and geometrical content of the capitals, together with detail scrutiny of sculpture style and method, to be correlated with external contextual evidence. The demarcation of capitals into regional, interim canons is identified as a

separate study after completion of the current one, which is restricted in its scope.

3.2.4.2 Identification of the achievement of a Classical interim canonic form of the Ionic capital during the period 620-490 BC

Whilst Büsing (1987) states that Classical capitals do not reach the Hellenistic canonic standard type with system volutes, one may ascertain whether any Archaic capital attained what is deemed to be Classical canonic form. To do this all Archaic capitals have to be brought in relation with all examples of the Classical period within a morphologic-typological framework, similar to the inquiry in the above situation. This is a major undertaking, but may be done alternatively by first identifying a Classical example that is deemed to be representative of the canon, after which a visual search for Archaic capitals which qualitatively match that description may be done from the visual description achieved in Appendix 2 and then correlating it with the information contained in the qualitative description in Appendix 1, Table 1.2. The quantitative criteria of all Archaic capitals may thereafter be matched to the identified example. To be able to come to such a more general preliminary conclusion, the existing interpretation of Classical capitals as done by Theodorescu (LCIG, Table 1; Plate 3) is used, because it is so complete in terms of the Classical capital examples. Because Theodorescu's (LCIG, Plate 3) evolutionary chart indicates the capital of the propylaia at the Athenian Akropolis as a Classical canonic type (as did Mace (1978, p.136)), which type also foreshadows the evolution towards peristyle capitals of the Fourth Century BC Athenaion at Priene and the Artemision 'E', which he sees as Classical progenitors of the Hellenistic/Roman canon - Büsing (1987) identifies the Erechteion capital as an intermediary form, obviously towards a canon slightly different from Theodorescu's. Nevertheless, due to the implied importance of the Athenian propylaia capital, the author proceeded to compare the quantitative and qualitative form criteria of all Archaic capitals to it, but also to the capital of the temple of Athena Nike, which is also widely held as a Classical canonical example.

3.2.4.2.1 Identification of the achievement of the canonic Classical form of the Ionic capital in terms of quantitative criteria

i The capital of the propylaia at the Athenian acropolis - Syntax (Quantitative criteria)

The proportions used for the propylaia capital are those reported by Theodorescu (LCIG, Table 1, No.57), and are shown at the end of Appendix 1, Table 1.1 in Light Green. In Table 1.1 the proportions of those Archaic capitals which show affinity with the Nike capital are likewise marked in Light green. Varied groupings of the main quantitative characteristics of the canonic form which may be expressed as proportional relationships are only found in a few Archaic capitals, but never completely in a single example. From a large group where quite a few of the proportions coincide, there are actually only two capitals that come rather close. The coincidence in Ion-74 (ie the *Enneakrounos* at Athens of 550-25 BC) is remarkable, and in Ion-58 (Heraion IV, Samos, started at 540 BC and top structure begun 500 BC) is very

good. These capitals are identified as significant in the evolution towards the Classical Attic shape, in terms of their proportional constituency.

ii The capital of the temple of Athena Nike - Syntax (Quantitative criteria)

The proportions used for the Nike capital are those reported by Theodorescu (LCIG, Table 1, No.59), and are shown at the end of Appendix 1, Table 1.1 in Purple. In Table 1.1 the proportions of those Archaic capitals which show affinity with the Nike capital are likewise marked in Purple. Varied groupings of the main quantitative characteristics of the canonic form which may be expressed as proportional relationships are only found in a few Archaic capitals, but never completely in a single example. The comparison shows that there are a few that show a reasonable affinity, but those capitals that show the most affinity are Ion-17 (ie votive column [Tr Eklesies], Paros of *ca* 550> BC), Ion-42 (the Apollonion, Massilia of 520-10 BC), Ion-31 (votive column, Selinus of *ca* 500 BC) and again Ion-74 (the *Enneakrounos* at Athens of 550-25 BC) and Ion-12 (votive column from Halkipinar, Smyrna, of [?<] 520 BC - The dimensions used for Ion-12 are not reliable, but as the Smyrna capital has previously also been indicated as an important artifact in terms of the module used in the metrication, remeasurement is proposed). More interpretation is needed to inquire into the transfer of specific proportional traits, and this interpretation only looks at an overall pattern of affinity. The emergence of capital Ion-74 in the study as a significant example in its region seems to be indicated. In terms of an affinity with east Ionian capitals stated in the catalogue, the specific antecedents for this capital may also be pinpointed.

3.2.4.2.2 Identification of the achievement of the canonic Classical form of the Ionic capital in terms of qualitative criteria

i A Classical canonic Ionic capital - Morphology

There is a lot of variety of morphological content in Classical capitals, and a lot of experimentation occurs right through the period. To come to exact conclusions regarding the antecedents of the canonical Classical capital, the Archaic capitals ordered in this study have to be brought into relation with all Classical capitals included in Theodorescu (LCIG, Table 1). However, to be able to formulate a general opinion in this study a Classical canonic capital, the capital of the temple of Athena Nike is used to see which Archaic capitals show the greatest affinity with a prominent example of Classical capital vocabulary. Various capitals obviously have details that are found in the Nike capital, but not one has all of them. Capitals that do show great affinity with the deep sweeping double-trumpet bolster is Ion-18 (of the Naxian sphinx column at Delos) and Ion-23 (Thasos), but also Aeolicising capitals like the early Iver-2 (Paros), Iver 6 (Paros) and Iver-12 (Delos). Closer to home however this bolster shape seems to be the hallmark of most Athenian capitals, like Ion-30,34,36, 67 and 76. In terms of other elements those that stand out are the corner capital Ion-32 from the Propylon II at Delos (The separation between echinus and canalis), Ion-37a from Poseidonia-Paestum (total façade shape) and Ion-50 (the flattish but concave canalis). Even though the

capital of the Heraion IV, namely Ion-58, doesn't have an abacus, the canalis and echinus shapes are very close to that of the Nike capital. The capital of the *Enneakrounos* in Athens, namely Ion-74, shows the three flutes on the bolster, but its bolster is rather of the cylinder double-trumpet type as against the deep double-trumpet type. The canalis, echinus and abacus are also very similar to that of the Nike capital. Capitals Iver-2, Iver-12, Ion-14 and Ion-20 show the bolster strap/s on the bolster midline. The capital from Halkipinar, Smyrna, uses the eye very early, and the large poros (ie Kekrops column) capital from the Athenian Akropolis, capital Ion-75, shows the proportionally big volute eye. One must come to the conclusion that the half century from the beginning of the Classical period saw many more experiments with capital morphology before the canonic examples like the Erechteion and Nike capitals were designed. Just the morphological difference between these two capitals shows the amount of continuous experimentation. Nevertheless, there is a gradual evolution towards the Classical form, rather than an abrupt one.

The reader is referred to the list of innovations above in order to pinpoint the innovations present which are also in the Propylaia capital, as well as the chronologically and geographically put typological interpretation of Archaic Ionic capitals in Table 3.3 above, in order to observe geographically bound design tendencies. The capitals from the *Enneakrounos* are identified as significant as pertaining to the evolution towards the Classical Attic capital form. The conclusions by Mace (1978, p.137) regarding the exclusive use of the concave volute channel in Classical capitals, is refuted by the above analysis.

3.2.5 Statistical evaluation of the effects of introducing data arrived at from damaged capitals and reconstructions of capitals

Within the stated premise that a more representative data base will increase the insight gained from further manipulation of data, the hypothesis was entertained in Chapter 2 that inclusion of dimensions from reconstructed capitals would, in all probability, be a positive step towards supporting the aim of the premise. It is obvious that accurate deductions may only flow from using accurate data. The problem this premise has to deal with is the small amount of available non-damaged capitals. In the catalogue of capitals those damaged capitals that do not allow for any quantitative comparison, ie Ion-9, 13, 19, 21, 34, 41, 57, 60, 68, 69, 72, 73, 75, 76, 81, 82, are clearly excluded. There are however a large number of damaged capitals of which reconstructions are available. For these damaged capitals, any accurate analysis of the percentage-wise accuracy level of their reconstructions would be a major study on its own. (Assessment of this by the reconstructors themselves is acknowledged by them in only a few instances). This would involve assessment from the artifacts themselves, inclusion in the assessment of sister capitals - which hardly ever exist - in architectural instances, personal access to capitals that were historically badly documented for remeasurement, and for the others access to photogrammetrically based documentation (also very rare) or to accurate, large-scaled drawings.

Whilst this objective should not be neglected, for the synthesising view that this study set out to obtain, a

more practical approach is proposed, namely working with the documentation base as it stands at the moment, being aware of the accuracy level of data, and over time increasing the accuracy level of the various artifacts. As explained in the preamble to the catalogue of capitals in Chapter 2.3.3, in order to provide understanding of the level of exactness of capital dimensions where we are dealing with damaged and reconstructed capitals, the author codes the capitals in Table 1.1 as Green (Dimensions accurate and measurable from the artefact), Blue (Some dimensions not measurable but a responsible and accountable reconstruction), and Red (Too fragmentary or impossible to reconstruct to any degree of probable accuracy, or reconstructed dimensions approximate). In this process the author relies on a hitherto understanding of capital typology as relevant researchers' approach to accuracy towards the artefact as emanates from their documentation.

In the proposed approach it nevertheless remains necessary to know to which degree the data are 'tainted' by any conclusions of 'Red' and 'Blue' cases. A statistical evaluation of the above-stated premise is herewith introduced. The two proportional relationships H:A and G:A are identified as being a best-case (Most measurable dimensions present) and worst-case (Least measurable dimensions present) *scenario* respectively. The data is grouped into the three accuracy types (Green, Blue and Red) and three time periods (625-550, 550-525 and 525-490 BC), each providing a reasonable sample size. The exercise is to determine what the statistical effects are, in terms of the statistical properties *mean* and *variance*, and by means of an analysis of variance, if the less reliable data are introduced with the known reliable data. In terms of *mean* of the values, for the best case *scenario* (H:A) there is no difference between the mean values of the three accuracy types (p-value=0,27) or the three periods (p-value=0,31), and for the worst case *scenario* (G:A) there is no difference between the mean values of the three accuracy types (p-value=0,78), but there is a difference between the mean values for the three time periods (p-value=0,07). In terms of the *variance* of the values, for the best-case *scenario* (H:A) there are indications that the variances of the types of data differ in the 2nd and 3rd periods, with an interesting occurrence being that the most reliable data group (Green) shows the the highest variance in the 3rd time period (One must be aware of the small sample). For the worst-case *scenario* (G:A) there are no significant differences in the variances.

From the results of the statistical analyses one may make two deductions, namely that from the analysis of *mean* values, the supposedly less reliable data seem to acceptably fall within the norm provided by the most reliable group, but that from the analysis of *variances* in values, one may clearly see that there is a lack of consistency in the variances of the most reliable group, precluding its use for any test of admissability for the other less reliable groups.

Whilst, on the basis of this analysis only, the inclusion of the Blue and Red group seems to be warranted in manipulation of data for a more synthesising understanding of typological evolution during the Archaic period, for more accurate analysis of trends in various time periods and geographical groupings it is proposed that the Blue group only be added in future. With this, it is recommended that the accuracy level

of the examples of the Blue group be expanded on in the future, and that those examples from the Red group which may be better documented and/or reconstructed, be identified and proceeded with. An added result of doing the statistical analysis is a realisation that knowledge of the mean values and variances in values in the time periods, and eventually also the geographical groupings, may provide clearer understanding of the already achieved analyses of trends.

3.3 FORM TYPOLOGY AND THE DEMANDS POSED BY *TECHNE*

The process of designing and making Ionic capitals occurs within the context of temple and votive column production. Within the period under discussion similarly there was found the production of other artifacts, namely sculpture, kettle stands, altars and ceramic which occur, like the temples and columns, as visible examples of mainly a shared religious belief and expression. The artists' and architects' approach towards the making of these artifacts have been the topic of a multitude of research. In the absence of primary written sources by Archaic architects on an Archaic design approach and theory - Statement of this lack, together with a re-appraisal of Vitruvius's work in this regard, is found in Wesenberg (1996, p.1-15) and Philipp (1968, p.42-4) - and of design pattern['books'] and construction technology, there has been an unabated analysis of the stones themselves in order to define the Archaic design mind. Philipp (1968, p.42, 45) nevertheless identifies a Sixth Century design yearning for precise and differentiating technical terminology and firm (design) rules and relationship of dimensions - but more so after Pythagoras, ie Polyklet - but also a concern for purely technical matters. From the collective interpretation of Hellenic artistic and architectural artifacts many conclusions on the nature of Hellenic design and execution have been expressed. In this sense Porphyrios identifies *techne* as a characteristic of Hellenic art and architecture (*inter alia*), and expresses it as "... a deliberate human intention.....an ordered application of knowledge that is intended to produce a specific product, or achieve a predetermined goal" (1991, p.29-30). The skill and knowledge (Theory of practice) involved in the craft of the *techne* however, is directed towards deepening the understanding of human as 'maker'. It is clear that there is an inherent integration of the pragmatically technical with the aesthetic. Koenigs (1990, p.132) has lately made the statement that in the Hellenic period the aesthetic aspect (expressed for instance in the λόγος, or the use of proportion motivated from a mathematically grounded aesthetic), was the overriding concern, even though the evidence shows there was due consideration - and a balanced view - of technical and functional aspects and the practical advantages inherent in systemising buildings in terms of proportions. In this section the approach to Ionic capital design in the Archaic period, and the nature of the relationship between the technical the and aesthetic, is researched from the data compiled for this study.

3.3.1 The components of form

Whereas the Doric capital is a fairly simple element (and whose evolution has been clearly demonstrated

by Howe (IDO)), the Ionic capital is a complex entity. Based on existing studies and the compiled data one may state that the aesthetic and functional integration of the column-echinus element and the canalis-volute element into one single entity which may be called a standard Ionic capital, is an achievement of the first quarter of the Sixth Century BC, an achievement which clearly relied on a preceding period of experimentation. In this section there is an endeavour to enhance current insight into the form content of the Archaic Ionic capital. Theodorescu's (LCIG, Fig.1; also see Raubitschek (1938)) study clearly managed to pose the Ionic capital as an elemental form composition rather than as a single block with surface decoration. Analysis of the Doric Order (IDO) and other Hellenic artistic artifacts - for example by Boardman (1978, p.65, 241), Karo (1970, [1948], p.104), Holm (1957, p.19), Malraux (1960, p.47) and Howe (IDO, p.317) - suggests that this vision may be universal for Archaic artifacts. In this study there is an attempt to push this description further, and also to gain more insight into the machinations employed to achieve this in the Ionic capital.

3.3.2 The making and ordering of form: An approach and adherence to and evolution of tectonic rules

"*Tectonike* stands as the highest fulfilment of all construction" (Porphyrios, 1991, p.37). This section explores the tectonic interrelationships between elements of the Archaic Ionic standard capital.

3.3.2.1 Abstract tectonic rules of the Archaic Ionic standard capital

In the attempt to further pursue the achieved definition of capital form and to gain further insight into the aesthetic qualities of the Ionic capital in terms of the use of formal aesthetic principles in the design, it was deemed useful to apply to the Ionic capital Howe's (IDO) analysis of the tectonic rules underlying the form and composition of the Doric Order as well as of examples of certain Hellenic minor arts (Despite criticism against his founding theory, this aspect of Howe's work makes a major contribution to Carpenter's (1962) earlier work and to architectural understanding in general). This analysis identifies the tectonic rules underlying the form and composition of the Ionic capital, in terms of its constituent morphology and perceived syntax. This analysis is eventually integrated with that of the Ionic Order and votive column below (See Chapter 3.3.7.2).

In the vision of the Ionic capital as a composition of three-dimensional form elements - posed here as an abstract tool to discern the compositional entity rather than to presuppose an evolutionary founding history - the major elements are the disc-like echinus, the rectangular block-like horizontal channel (canalis) and the two cylindrical polsters, with the lesser elements being the abacus block and the astragal disc on the echinus soffit part, both important but optional elements in the Archaic era (in the case of the astragal the element often occurs as part of the column shaft). The other minor elements of the Archaic form repertoire are the capital-bearing- or bolster spandrel palmette, the volute angle spandrel palmette and the abacus palmette

[Illustration of the elements of the Archaic Ionic capital precedes the illustrations of capitals in Appendix 2]. All these elements exist in various guises through the use of differing decorative schemes and surface treatment (Smooth, decorated with paint or in relief).

The achieved definition of tectonic rules in Table 3.5 below tries to include the various form variations found in the Archaic period, but does not take chronology into account.

Table 3.5 Synopsis of the tectonic rules present in the Archaic Ionic capital.

<p>Morphology nature</p> <p>permissibility</p> <p>proportion</p>	<ul style="list-style-type: none"> * Every pattern element of the capital elevation consists of compact, geometrically derived elements (round volute, rectangular canalis element straight or convexly curved at the bottom, disc-like or domed cyma, rectangular abacus, cylinder- or double trumpet shaped polster and triangular spandrel palmettes and volute angle spandrel palmettes). Some of the elements take on the function of connecting elements, like the spandrel palmette between canalis and volute edge, also connecting canalis and volute to the cyma. * Each pattern element is an individual visual element defined by boundaries or through articulation in parts. * Different forms in elements indicate differing character properties * Open spaces like the inside of the canalis and the eye are seen as voids. * The elements are horizontally reversable due to their symmetry but vertically irreversible due to difference of top and bottom. * Decoration (whorls, rosettes, stars etc) only occur in voids. Decoration occurs mainly on the canalis and eyes. The polster is not seen as void, because only highly structured articulation is allowed (bands, straps, geometric vegetative patterns rather than free forms), or otherwise surface decoration which is both geometrically structured and tends accentuates the surface. * Much variation occurs in terms of detailing, eg spiral border mouldings, section type of the canalis. * Variation [excessive] is not allowed in functional elements on the same elevation of the capital, but is permitted between the opposing faces of the capital. * Variation of volute, abacus, and cyma forms occur. * The separate elements are not as a rule subdivided [apart from early corner capital inside volutes] and only superimposed [cyma in one example] in ways that preserve the integrity of both's form. * There are variations in proportions of the pattern elements, which over time may be clustered in distinct style groups with unique characteristics and proportions.
<p>Syntax position</p> <p>connection</p> <p>ordering</p>	<ul style="list-style-type: none"> * Each element type only occurs within a certain horizontal band. * Only the spandrel palmette is sometimes repeated on another position (volute angle spandrel palmette/angle piece) because it roughly fulfills the same function in both positions, but then its form always differs from that of the volute spandrel palmette. * Curved forms only occur at connections between elements like the canalis bottom and the volute, the canalis bottom and the cyma, the bottom of cyma leaves/eggs. * Connections between horizontal layers of elements are emphasised. The connection between cyma and canalis is accentuated by either a curved line, through extreme linearity or by means of a void. * The horizontal elements that act as connectors in the total Order ensemble, mostly the cyma but also the abacus and astragal where they occur, are most densely articulated with rounded forms that indicate elasticity [There are rectangular abaci, but the rounded is favoured]. The canalis element in between cyma and architrave is a pregnant shape and usually left void in order to signify its very important part as important cushion between visually upwards penetrating shaft and downward bearing architrave. * The elements of the capital are ordered around a vertical axis and which creates the illusion of a supporting line on the axis. The symmetry is likewise extended to the side façade. * The vertical irreversability of elements emphasises the direction of vertical axial ordering. * A hierarchical ordering of the horizontal bands of elements exist, although their proportions do not remain constant
<p>The formal tectonic rules show an attempt at creating a visual fiction which represents the architects understanding of the physical, in this case architectural, reality, but here through the use of the morphology and syntax of the capital elements.</p>	

The analysis identifies the importance of the column capital connection. An important part in the evolution of the capital form is the evolution of the cyma, from torus to cyma with leaves, and thence with *ovoli*, which resulted in the more intense and sharper definition of the meeting place between column shaft and echinus. This very important meeting point is then accentuated even more through the introduction of pointed *ovoli*,

and also in cases with the use of a round moulding or bead-and-reel astragal below the cyma (The astragal first being part of the column shaft, and later becoming a part of the echinus). The identified importance of the connection between capital bearing plane and statue plinth or building architrave, is solved by introducing various elements (spandrel palmette, triangular corner piece, an obtuse volute angle, and also by means of the abacus element. In some architectural capitals however (Ion-7, Naxos Dionysos Temple IV; Ion-15 Myus Lower Temple) there is preference for transition through a smooth curve away from the architrave).

The analysis shows the existence of strong formal aesthetic design rules that reflect a specific Hellenic perception and resulting understanding of a *physis*, here in terms of mechanics like the directional force of gravity, and also in terms of the specific interaction between capital elements. The author would like to draw attention to the inclusion of a dualistic tendency in the design, in that elements of the capital are strongly segregated and well ordered, showing an adherence to geometric and modular control and of together being a static rather than moving form, whilst at the same time the elements show the tension resulting from force, like the tension in the seemingly logarithmic volute helix, the compression of the leaf cyma (and where present of the ovolo echinus), the tension in - where present - the logarithmically curved section of the bolster flutes, the springing nature of the canalis cord form, and so on, clearly interacting with each other in the total form. This interaction is taken through outside the capital form, in that the connection with the epistyle is most strongly expressed as an active point of dialogue, as is the column-capital connection.

The illusion of the elemental composition is so convincing that it is hard to believe that the capital was chiselled down from a six-sided rectangular block form. Following this analysis there is an attempt to increase knowledge of how on the capitals' six block surfaces the designers came to solutions regarding several design problems, namely overall proportion of the sides, relative proportions for individual elements, choice of element form type, articulation and decoration type, as well as the conclusion of the junctions between the elements. One must constantly keep in mind that these solutions had to meet each other deeper into the innards of the stone block.

In this study it is acknowledged that in votive columns the capital had to be integrated with the demands posed by sculpture type (sphinx, standing, seated, striding persons), and in architectural works the capital dimensions had to be integrated into a bigger proportional and structural scheme where functional considerations, in which architrave, capital and column shaft become an integrated unit, had to be meshed with aesthetic considerations involving all the parts of the building elevation as well as the building plan. The first of the analyses focuses on the the use of paint and metal to enhance intentions of design concept.

3.3.3 The making and ordering of form: The role of polychromy and appliqué in the articulation of capital form

The above analysis of tectonic rules inherent to the Ionic capital did not include the use of colour or metal applique, but this is deemed to be an integral part of the expression and definition of the capital - as was it for the total Order. It is not necessary to provide detail of all the instances of the use of polychromy in Hellenic glyptic art and architecture. The examples are well known. The use of polychromy also extends to the Ionic standard capital. Archaic Ionic capitals that still show traces of paint are Ion-21, -30, -35, -36, -62, -67, -68, -81, and Aeolicising capitals Iver-3 and -9. The capital of the Naxian *Oikos* (Ion-24) and the pre-standard architectural stone capitals from Delos (Preion-1) and Didyma (Preion-2) are deemed to have been painted (apart from possible intaglio grooves), and volute-angle spandrel palmettes could have been painted on the Aphaia sphinx column's capital (Ion-22).

Where one should view the use of pigment and metal on timber and stone artwork as traditive and endemic to Hellenic art, there should be exploration of the nature of their use in Ionic capitals. Whereas paintwork on smooth surfaces surely acts as the designated element, its use as overlay on a plastically formed element would designate something different. In a design context, should paint and metal overlays be read as mere ornament, or integral components of a decorative syntax? In terms of the design reasons for using polychromy, Martiensen had this to say regarding the Doric Order: "The architect has achieved by formal plastic means the degree of accent separation and structure that he deems necessary for aesthetic unity.", and "Colour....has primarily an extended function in rendering this modulation independent of transient light conditions." (1942, p.74-5). The important aspect revealed by Martiensen was that [in the Doric Order] colour was not continued over differing units, and was never applied indiscriminately. Rather, specific colours were used for specific elements, in this sense accentuating the differentiation between the elements that was strived for through use of the chisel and of the decorative scheme. This conclusion has been affirmed by the interpretation of Carpenter (1962, p. 233). There is no study on the existence of a canonic manner of doing in the Ionic Order, and less so for the Ionic capital. From the examples above it appears as if colour was often used just to provide detail (Like leaf patterns on smooth *echini*, volute spandrel palmettes on an unmodulated plane, or volute channel line and the volute eye on flat capitals), in other words to differentiate form where this was omitted by other means of articulation like plastic execution or gravure. There are instances where meanders were painted on the abacus, and where the pattern is definitely to be understood as ornamentation rather than decoration. Piet de Jong (In Thompson, 1960, Plate 77.c) has reconstructed the colour of the Classical capital A2972 from the Athenian agora. (The article does not provide the colour, but the author has seen the coloured drawing displayed with the capital, on which traces of paint exist). Even though the concave volute- and canalis channels are defined by rectangular beading, the beading is accentuated in blue, leaving the channels of the capital in plain marble. The lines between the leaves of the modulated volute spandrel palmettes are likewise accentuated in blue and black.

However, similar to the other examples, the smooth abacus and echinus are decorated with painted ovoli in blue and delineated in black, and a black meander appears on the smooth vertical intermediary space between canalis and echinus.

Whereas one could understand the use of colour in the other less plastic examples as due to the lack of, or economy of sculpturally plastic detail, this example is very evocative of the interpretation made by Martienssen above. The colour in the case of the volutes and palmettes is definitely a double differentiation of the separate elements that are part of the tectonic whole, and support the analysis of tectonic form that has been reached above. The use of colour on the Ionic capital, as may be shown for the columns (For example that of capital Ion-30), also reminds us that there was not the preciousness about the 'honest' or brutalistic use of material as has been expressed in Western Modern architecture.

Whereas the full covering of the volute by metal - like the Archaic metal applique volute from Olympia in Herrmann (1996, Fig.1) achieves the same effect as an unpainted volute, the use of elementally separated metalwork seems to define the volute bead, channel and eye better, as with paintwork. Examples are capitals from Kavalla shown by Bakalakis (1936, Fig.10), the metal canalis decoration of the Propylaeon capitals from Athens, and others in Pedersen (1983, Note 76). This similarity in use of colour and metal helps to further underscore the achieved analysis of the tectonic rules inherent in the definition of the capital form. The occurrence of metal and paint help in the evaluation of the probability of the existence of composite pre-forms for the Ionic capital.

3.3.4 The role of geometry and metricated design in the ordering and making of form

Koenigs (1990) has highlighted Hesiod's exposure of the ethical significance implied by the Hellene's voluntary subjection to a limitation of life-style, with a subjection to μέτρον being such a limitation. Numerical and geometrical order may be included in this sphere. Ionic plan form has always been seen as being of a more regulated modularity than the Doric, but overall Ionic architecture is seen as less 'modular' (Coulton (1975, p.70-1, Fig.1) in his definition of the modular system involved in the Ionic Order, extending into the capital). Nevertheless, regarding early Archaic building elements, Ziegenaus (1957a, p.72-4, Fig.1) brought to light the use of metrication and geometry in one of the smallest parts of the South Building at Samos, namely in the design of the gable end tile decoration, and a recently found terracotta antefixa of the First Dipteral Heraion from before 550 BC also shows the use of modular design for a mass produced Ionic building element (See Kienast, 1992, Fig.6). How prevalent was the use of geometry and metrication design in Archaic Ionic capitals? The existence of the use of geometry and metrication in the Classical examples of the Ionic capital has been well documented, but whilst proof for the use of metrication in Archaic Ionic capitals is well documented in terms of the overall elevational proportions, it is less so in terms of the use of geometry. Also, few researchers have focused on the integrated and three-dimensional nature of the

capital design. Here Gruben (1963, p.128-30, Fig. 20-21) has lead the way in putting forward items that may be included in the documentation of the total capital with his work on the capital of the Archaic Didymeion II. His work has shown the existence of proportional, modular ($1\ 038 = 3\ \text{feet} / 2\ \text{ell}$) and geometric ordering of all elements included in the front and bottom elevations of those capitals. Additional to his analysis of proportional relationships, Vallois (1966b, p.199-200) also comments on the existence of plan geometries in the lay-out of Ionic capitals. Theodorescu (LCIG, p.142-59, Plate 4) has only focused on the geometric ordering methods employed in the design of the bottom elevation relationship between the two polsters and the echinus of various capitals. Apart from geometric devices, further work by Theodorescu (LCIG, Table 1, Matrix 0), Kirchhoff (EIV, p.236, Table 1, 3) and Koenigs (1979, p.198; 1980, p.66) show proportional relationships that may be used in analyses, and the author has compiled a comprehensive description model for the capital which includes these relationships and others. The comprehensiveness was deemed necessary to inquire into the *lacunae* posed by Theodorescu, but in the analysis it was found that some identified relationships are not productive in the sense of bringing greater understanding (they are still reflected in the capital description for use by others), and that other relationships are more useful in that they are the regulating relationships from which others originate (these will be employed in the text). The author has gone further than other researchers till now in the sense that the capital's integral relationship to a bigger formal system, ie the votive column/building, is examined. Also, the existing guidelines put by Kirchhoff (EIV, p.236, Table 4) have been augmented by the author to take into account the work on column slenderness ratios by Gruben (1963, Fig.38), in order to enhance insight regarding proportionality within the Ionic Order. The endeavour in this work is to ascertain the earliest instances of rational ordering in terms of the use of geometry and metrication, as well as the evolution of certain of such design aspects.

3.3.4.1 The role of systematic proportioning systems and planning grids in the design of form

The work of Gruben (1963, Fig.21) clearly shows that the design of the capital of the Didymeion II incorporated the use of a proportional system and a design module. He (1963, p.129 note 83; 1960, p.89) mentions other groups of examples where the tripartite arrangement Volute length (D): visible echinus length (E): Volute length (D) follows a predetermined order (ie. 1:1:1, 1:2:1, 3:4:3, 5:6:5 and 6:7:6). Although he never expressly states this, one may come to the conclusion that a (at least rough grained) modular planning grid was employed in the design, and that this follows earlier progress in the use of planning grids in Hellenic glyptic arts from the early Archaic period, as is shown in Chapter 5. The first (Ion-1), was only ordered on the façade. Thereafter, the early Cycladic capitals (starting with Capital Ion-4 on Delos (*ex* Naxos)), non-monumental and monumental capitals were subjected to design with a three-dimensional planning grid, and they show clear signs of the use of both design module and a proportional system (See Tables 1.1 in Appendix 1). Haselberger's (1986, p.213) work on the 'Archilochos' capital (Ion-17) shows use of a design module and proportional ratios, eg $D:E:D=3:4:3$, $A:Q=5:3$, $D:G:B=5:6:7$, $K:J:\text{Volute distance below echinus} = 6:7:5$ all as stated by Haselberger (1986), and the author identifies that

B:G = 7:6 (With Q:B and Q:H = 3: [Approx] 2). It is of note that this capital's volute spirals are not yet as highly geometrised as the modularity and proportioning would suggest. In the example of the Didymeion II mentioned above, similar to the Parian capital, the emphasis seems to be on the use the proportional system for clusters of elements of the capital (eg volute and echinus lengths, capital length and height, capital length and width, echinus and canalis height, etc) rather than linking or lining up significant parts of elements on a visual modular grid. Theodorescu (LCIG, p.4-5, Fig.2) comes to the same conclusion. One may also see this idea of clustering of building elements in Coulton's analysis of the proportional schema for the Ionic Order. The first method is a conceptually more difficult one, and was likewise employed in execution of the *kouroi* figures in Archaic Hellenic glyptic art. From the Didymeion II example it is clear that the complexity of the totality of the Ionic capital design (in contrast to the rather facile Doric capital) lead to exceptional achievements in this regard. (The reader is referred to the design of the Priene capitals, taking note of a reassignment of their positions and re-evaluation of proportions by Koenigs (1983)). The standardisation of the total capital form was only to come much later in the Roman era. (For the latest inquiry into Vitruvian metrication, geometric ordering and proportioning of the Ionic capital, Büsing (1987) and Frey (1992)). The conclusions made by Büsing are far reaching and should be revisited on the Archaic capitals in relation to their volute design - More about this in 3.3.4.2.3 below.

The interesting part of the use of the planning grid is that it provided order, an order which in a wider context of flux also could give stability in a design context - also see Onians (1988, p.9-11) in this regard - but that whilst the grid set certain limits from which artists and architects chose not to divert drastically and which provided a form coherence over time, this order also provided freedom, as the evolution of capital form clearly shows. We may also see that within this freedom of sculptural form there was an intense control of proportions, showing up the dialectic that exists in Hellenic art and architecture.

The effects of the use of the planning grid in the production of form is explored further in a later section on form execution below.

3.3.4.2 The use of geometry in capital design

3.3.4.2.1 The plan of the capital base

The works of Vallois (1966b, p.200), Theodorescu (LCIG, p.142-59, note 256-7, Plate 4) and Gruben (1963, p.128-30, Fig. 20-21; ie the capitals of the Artemision 'D' and the Archaic Didymeion) have shown how the polster extremities and the echinus diameter of a capital are brought into relation through the use of simple geometric shapes. Following on their work, the author has identified the geometric ordering devices employed in all the first generation Archaic capitals, together with some others from the late Archaic era. (Note: All the forms thus ascertained appear as Item 6 on those Tables indicating qualitative criteria).

Because it was found that the geometries are usually formed on the polster interiors on the moulding edge, it is suggested that in future capital descriptions the dimension between the inner edges of capital volutes, together with the dimension between polsters on the capital centre line, be included.

The square (in Ion-1, -24, -18, -19, -23, -27), and rectangle in the length of the capital appear in quite a few capitals up to 550 BC. Only after that the rectangle across the width of the capital appears (in Ion-45, 29, 25, 61, 58). This fact already indicates that the stretched out capital was more prevalent between 600-550 BC, with the exception of all the Naxian examples (Ion-24, 11, 18-9), and that a new compact capital type with volutes closer together than in the preceding phase follows after. The hexagon is first used in the second quarter of the Sixth Century BC (Ion-20), and in the third quarter (Ion-74, -30, -32). The octagon is only used as ordering device from the Classical era.

Apart from the square and the hexagon, rectangles (long or across) with significant dimensions (eg 1:2, 2:3, 2: 4 etc) may be described as premeditated ordering devices. The long rectangle used in the first monumental example Ion-22, has a proportion of $1\frac{1}{2} : 1$. We may say that geometrical ordering devices for the capital bottom plan were used from the time of the monumentalisation of the Ionic capital, that all those ordering devices were premeditated, that the complex hexagon shape was already present in the second quarter of the Sixth Century, that apart from the early presence of the rectangle across at Paros it appears commonly in the third quarter of the Century. Furthermore it seems as if, apart from the earliest examples, that there was no preference for any shape relative to the capital's function (namely architectural or artistic). Even though the first capital (Ion-1) carried a sphinx and had a square as ordering device - the capital is relatively wide, its width : length being 1 : 2,26 - and one Parian capital had a rectangle across, it is of note that all the earliest examples of long rectangular ordering devices were all employed for votive columns carrying sphinxes needing long capitals for the stretched out base (Ion-22, 4, 6). Interestingly enough the extremely slender length : width ratio of the capital of the first monumental example Ion-22 (ie 1 : 3,36), is not repeated in the following examples, which rather come closer to that of capital Ion-1 with the top plan ratio of Ion-4 being 1 : 2,38 and that of Ion-6 being 1 : 2,64. This last model was copied in an architectural example (Ion-7) even though an example (Ion-24) with square device and plan ratio of 1 : 2,54 was already in existence.

Whilst it is illuminating that the first architectural example, (Ion-24, Naxian *Oikos*) follows a new route by employing the square ordering device, it is clear however that, rather than the shape of the bottom plan ordering device, the capital top bearing plane proportion was the significant factor in terms of structural performance in the architectural examples

Further work regarding the metrological content of especially the rectangular ordering devices of the first generation Ionic capitals, but also of the hidden geometries employed in Classical capitals - where double

squares and also the 'golden section' are evident - as well as the ordering devices used for the polster element as such, may lead to further insight in the extent of metrication employed in this era and is certainly a most fruitful study awaiting attention by an intrepid researcher. (There are examples of long capitals used for statues ([Ion-76 and Ion-36 [Alkimachos writer on chair], both presenting side profiles, and also Ion- 62 [Kalimachos statue rectangular due to the running figure being turned sideways to show breast/face front rather than profile], and it seems as only later capitals have a square abacus specifically for statuary [See Raubitschek, 1938, p.171; Also 1943, p.20]. Architectural examples of this are Ion-12 and -74)

This analysis illuminates the importance of the bottom elevation in the design, with resulting effects on the façade proportions. It is to be argued that, if façade proportions - in relation to column proportions - were cardinal in determining capital form, the plan proportions had to follow from there if there was premeditated use of a plan ordering device. This idea will be looked into further in the analysis of façade proportions and volute construction technique. Together with this, further analysis of the influence of the column top diameter on capital façade and plan design is required.

Gruben (1963, p.128-9, Fig.20-1) identified the diagonal line of the ordering rectangles of the capitals of the Ephesian Artemision 'D' and the Polycratian Heraion IV of Samos both complete a 3:4:5 triangle (the Didymeion II was very close to that), indicating a very simple but clear method of gaining a capital plan based on intentionally proportioned geometries which include the diagonal (also see Theodorescu (LCIG, note 257)). The author would like to venture the possibility that, in the design and execution process, the architects and sculptors of the time did not express these geometries only in the form of *paradeichmata*, but that the complexity of these geometries, as well as the scale of the capitals and the clumsiness of a huge cutting compass, required work on a writing surface in terms of drawn experiments or pre-constructions, and also written works - works that Gruben (1966, p.167) alludes to, and which Coulton (1977), Berquist (1967), Philipp (1968) and Wesenberg (1996) accept - in which the philosophical and 'scientific' reasoning behind this most interesting and amazing part of the total Ionic Order probably evolved, and was expounded and transmitted through the Hellenic era, as may be seen from the built examples.

With the insight gained above one may state that the metrication and geometrical ordering of the capital plan evolved in complexity throughout the Archaic era, that the evolution was not linear, that this aspect of the capital gained a great deal of attention, that certain examples may be seen as 'significant', and that the transmittal of 'non visible' knowledge surrounding the capital design seems to be indicated by the examples. Regarding the significant examples, further study needs to be done regarding possible differences in proportional design between peristyle and opisthodomos as part of the spatial experience of buildings, as indicated by Drerup (1954) for the capitals of the Athenaion at Priene. His misinterpretation of the placement of the capitals was borne out by Koenigs (1983; Koenigs sees the longer London capital as the opisthodomos, and the compacter Berlin one as the peristyle capital.

3.3.4.2.2 The use of geometrically generated angles on the capital façade

The angle of transition of the bearing load between bottom and top bearing planes is indicated as ' α ' in the quantitative description, and is part of the decision making process involved in the making of the capital façade. The following trends are identified, and brought in relation with the ratio H:C:

Table 3.6 Relationship between angle of load transition α and ratio H:C.

In the period 600-550 BC in the chronologically put Table 1.1 in Appendix 1 both wide angle of transition up to 49°, as low as 12°, from 550 BC onwards tends to dwell between 20-30° with 15°, 17°, 33° and 40° occurring. One may discern a tendency towards smaller angles from the beginning towards the end of the Archaic era, with the angles being roughly in the 40°s-30°s before 550 BC, and thereafter in the 20°s, but the trend is far from linear.

If one looks at the ratio *bottom bearing diameter : top bearing length* (H : C) for capitals up to 550 BC the ratio begins at 2,25 and ends at 1,25 but with many variations in between peaking at 2,5 and 1,0. Capitals between 550-525 BC show ratios from 2,3 dropping to 1,7, but with peaks at 2,5 and 1,1. The 525 -500 BC capitals begin at 1,7 and end at 1,6, with peaks of 2,0 and 1,0, and the 500-489 BC capitals show ratio beginning at 1,6 and ending at 1,5, with the most around 1,5, but peaks at 2,2 and 1,2. On the whole the ratio comes down from 2,5 to around 1,5 during the Archaic era, and that this reflects the tendency towards a smaller angle of transition over time (It is obvious that the angle of transition changes in relation to the distance between bearing levels).

If only architectural capitals are used in the analysis the following may be discerned. Between 575-525 BC the ratio dwells between 1,25 to 1,8, with peaks 2 and 1,1, and during 525-489 BC there is a very strong tendency around 1,5, but with peaks at 2,2 at the end of the period. It may seem as if the 1,5 ratio became the favoured ratio for architectural works during the Late Archaic era.

About 20% of capitals show angles originating from predetermined geometrical ratios, but there is no chronological pattern to be discerned in terms of a favoured angle.

3.3.4.2.3 The use of geometry and metrication in the design of the volute

Apart from ordering involving the relationship between the various components of the capitals, the ordering of single components may also be analysed. In the ordering of decoration on the echinus and polster components, symmetry is employed almost without exception from the earliest introduction of those decorations, be they painted, engraved or modelled. The examples speak for themselves. However, it is the volute element which as a single component seems to have engaged the attention of the designers from the very start. Whilst Constantinidès (1973, p.141) confirmed that nothing possibly written on this subject by Archaic or Classical designers has come down to us, his study of existing volute ordering methods showed the large amount of variations in ordering methods (about which very little certainty also exists). Whilst many theories for volute geometry construction have been put forward and just as many discredited, previous (eg Koenigs, 1979) and continuing painstaking work of documentation and interpretation (eg Korrés (1996) and others) is steadily increasing knowledge on the subject.

The succinct work of Büsing (1987), where capitals are re-evaluated from the well-known Vitruvian (Book III.V.5-7) model, casts a completely new light on the system or logic contained in the volute design of certain well known Hellenistic capitals, which he terms 'additive' and 'duplicating' system-volutes, and also the 'pulsating' volutes, like those of the Classical Erechteion experiment which he shows to be part of the

evolution in the direction of becoming system-volutes. Whilst expanding our current knowledge of the Vitruvian-based volute construction method, in his new analysis it is clear how the volute eye and the square ordering device (of eye radius length and width) contained in the eye centre, not only regulate the volute spiral construction of system-volutes but is also closely interwoven with the volute and capital façade size. Büsing (1987, p.338) points to the necessity of studying more Attic examples to trace the evolution towards the 'pulsating' and then 'additive/duplicating' types. This sentiment is echoed by Korrens (1996, p.97). His (1996, p.95-8, Fig.8-12) work shows that, whilst there was a high degree of standardisation in Classical volute design, the 'system volute' was as yet not a standard part of the Ionic repertoire. In order to complete the evolutionary train, the need to analyse the Archaic examples could be even greater, with the volute geometries of only a few capitals having received attention (eg Bakalakis (1936), Gruben (1963), Koenigs (1979), Ohnesorg (1993b, p.117), Gruben (1997, Fig.49), as shown in Fig.3.3a; Wherever geometries have been identified by others, the references are so mentioned in the catalogue in Chapter 2) .

The scope and limitations placed on this study precludes full analysis for all capitals as per Büsing's work (ie radii reductions and geometric ordering). Furthermore, it is only possible to accurately assess volute geometries from accurate drawings or corrected photogrammetric prints. Nevertheless, the author deems it useful to do a preliminary exploration of Archaic capitals - in the spirit of a reconnaissance - towards assessing which capitals show geometric ordering in the volute design and which could possibly have foreshadowed the later system volutes so that they be identified for further analysis, to ascertain at which stage a more formal approach to volute design came into being, and to heighten current insight into the evolution of geometric ordering for the early Archaic Ionic capitals somewhat (Fig.3.3c). Due to practical reasons (eg lack of proper drawings/photos, distance from artefacts and administration involved in getting research access to capitals) this first exploration is on a level permissible by the state of the documentation available to the author - the varying levels of reliability of documentation are again indicated in the examples. Whilst analysis of 525 BC Late Archaic capitals is mostly excluded here, it is imperative that these examples together with the abovementioned Attic examples, as well as a more detailed analysis of the early Archaic examples than that attempted here, be undertaken to close the gap in knowledge opened up by Büsing, and to heighten understanding regarding the typological evolution of Ionic capitals as a whole.

All volute geometries of the examples analysed in Fig.3.3c below are as yet unpublished, except for four examples by others. The analytical drawings of the spiral constructions are to be read as sketches, as most of the author's drawn analyses of spiral constructions were done as overlays on enlargements of existing publications and photographs, rather than on tracings from the primary sources. Scale variations and distortions resulting from blowing up the sometimes small published drawings will lead to distortions in results. It is again stated categorically that this study shows up the necessity for other researchers to compile an inventory of volute spirals at a scale of 1:1 from the existing examples. The method used is here is merely an exploration for an inquiry into the possibility of major design patterns existing before the system-

volute types of the Classical era. After the exploration of the Archaic examples, and referring to examples of volute construction published already, the author suggests that there are four different volute construction methods employed in the Archaic Hellenic period, namely:

Table 3.7 Types of volute construction employed in Archaic Ionic capitals.

A	The involute scroll, well used in Mycenaean times, is a spiral in which the distance between the spirals remain constant, and which may be constructed by unwinding a string from a cylinder resulting in the involute of the cylinder circle, but also by drawing 90° arcs originating from the four cardinal points of a circle at the volute centre. [called 'Involute'arcs in Appendix 1, Table 1.2]
B	The free-system [Freigeformte] point-and-arc helix, constructed from 90° arcs originating from more freely selected points ordered within a rectangle or square at the origin of the volute, or from both a rectangle and circle at the origin [called 'Circle arcs [90°]' in Appendix 1, Table 1.2], and which system could possibly be identified as the earliest progenitor of the system-volute,
C	The random-system point-and-arc helix, constructed from unmetricated arcs originating from points of unmetricated nature [called 'Random' arcs in Appendix 1, Table 1.2], and lastly
D	the rastered square, additive-system point-and-arc helix, constructed from 90° arcs originating from points on a rastered square inscribed within a circle at the origin of the volute (and some within a square at 45° angle within a circle), which leads to volutes similar to those eventually canonised as the Vitruvian 'system-volute' described by Büsing [called 'Square-arcs [90°]' in Appendix 1].

The initial exploration (See Table 3.8 below) shows geometrical ordering of various intensities and indicates a strong probability that there were various experiments with capital volute design [of the main types A-D] in the time up to 525 BC, and the few examples from after that show that this continued throughout the Archaic period. It is of note that there is use of ordering devices at the heart of the volutes, and that a few capitals [Ion-58, -23 {With Ion-12 having to be re-investigated from better source material}] move in the direction of method D, and that there is a capital following method D [Ion-50 from Kavalla] in the Archaic period. The examples also show that method D came about through a series of experimentations with pre-existing methods. It is argued that the geometrical method of constructing the involute scroll (Method A) is the early root of method D, although it could not provide the helix. The ordering device of the geometrically constructed involute scroll is a circle at the volute centre, bisected horizontally and vertically, and with the volute arcs originating from the cardinal points on the circle situated on the line where the arc terminates. The evolutionary process through method B provided the transition to arrive at the simple method of volute construction which again used the circle as ordering device. Whether one accepts Constantinidès's (1973, Fig.4) 'Goldman type' volute ordering device for the Erechteion east hall capitals, or the system volute of Büsing (1987, Fig.28), it is clear that Method B went through a process of evolution, and that both methods are refinements of a pre-existing, geometrical method. Whilst there are many Archaic capitals (Ion-12, 20, 23, 26, 27, 30-2, 35-42, 46, 48, 50-56, 66-7, and -74) with volute eyes which may, and should, be analysed within Büsing's (1987) method, the volute construction geometries of all the Archaic capitals should be brought into relation with the main façade lay-out lines in a graphical way in order to ascertain the relationship between volute construction and total façade design. This analysis will identify the relationship between volute design and the capital proportioning system employed. As mentioned, addressing the full spectrum of capitals in this manner is presently outside the scope of the study, but there

will be further exploration. Because capitals Ion-6 - whose missing canal does not hamper the investigation - and Ion-50 (which has slight volute damage but, due to the sharpness of detail of the capital, allows for reliable reconstruction work of the volutes bottom and outer side) are well documented, they may produce useful and reliable results. Using Büsing as guide, their volute geometries, relative to their façades, are analysed as examples of capitals without and with volute eyes (Fig.3.3b). In Ion-6 we see that diagonals of the centre of the square formed by the volute height seem to be lines on which r^1 and r^2 are situated. Also, the bottom of the echinus seems to be formed by the intersection of the vertical line on the inner volute edge and the diagonal of the square formed by the volute height. A 1:1 drawing should be made of capital Ion-6 and this geometrical co-incidence, as well as the volute construction, redetermined. It nevertheless does seem as if the volute design is closely related to greater concerns regarding façade proportion. In Ion-50 there is a remarkable co-incidence with the 'duplicating' system-volute construction method identified by Büsing (1987), with only the inner reduction of the volute lay-out square being slightly larger than one volute eye diameter. The volute channel of the first quadrant is two eye diameters high, and the volute channel distances on the main arc quadrants are as the duplicating system-volute type. The distance between the volutes of Ion-50 are four eye diameters, and although less than the later standard system-volute capitals of the Hellenistic era, this still proves that the volute eye was used as module. The top of the echinus lies on the midline of the volute square, and the space between the volutes are made up of two squares on top of each other. It is proposed that this capital is an ideal candidate for further analysis in terms of the progression of radius lengths, and correlated with the systems identified by Büsing (1987) as well as with the standard base dimension identified.

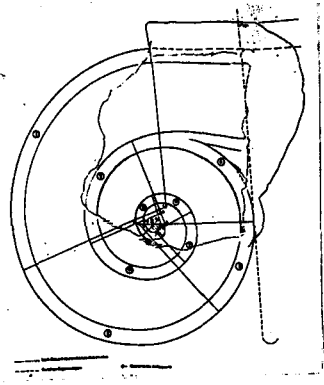
Regarding the geometrical content, this remarkable example not only indicates that volute geometry and capital layout are very much interlinked, but that there were Archaic examples where the system-volute was invented, most probably following up from earlier experiments towards it. It shows that Büsing's analysis should gain a lot more attention and generate more research. The author has included the dimensions from the volute extremities to the volute origin in the manner of Theodorescu (LCIG), namely I^1 , I^2 , I^3 , I^4 , and as Gruben (1963, Fig.21) did for the capital of the Archaic Didymeion.

From the insights brought by Büsing there is a realisation that for those Archaic capitals which have volute eyes this identification of the volute origin is not required, but that this system is really useful only for volutes following ordering method B. For methods B and D there should also be an indication of the first four quarter circle radii (Which should rather read r^1 , r^2 , etc to fall in line with accepted nomenclature). The author identifies as necessary future activity that the geometries of volutes using ordering method B be brought in relation with their capital façade planning grids to ascertain if a significant point may be discerned in every capital - per example Koenigs, 1979, Beilage 2 - which is related to the overall proportional system and which governs the planning grid like the centre of the square around the volute does in the volute-system capitals.

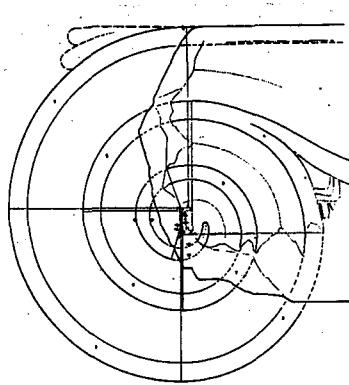


Table 3.8 Exploration of volute ordering methods for selected Archaic Ionic capitals.

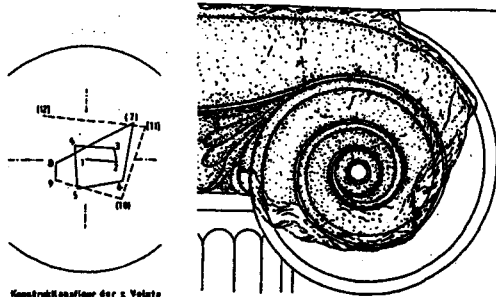
Capital No + reliability	Volute type	Description of construction method
Ion-22. Sphinx column, Aphaia	A	The Aeginetan capital shows the beginnings of a helix in the first 1½ turns, where after it becomes an involute spiral.
Ion-1. Votive Sangri, Naxos.	B with circle	The first 90° arc is followed by a 90° arc with a r ² being 1/5 less than r ¹ , followed by r ³ and r ⁴ with radii both consecutively less 1/10. A circle is described around the point of origin of r ² , the radius of the circle outline bisecting the point of r ² . Lines resulting from the intersection of the geometries of these forms are constructed in a vertically long rectangle of 2:10 with its centre at the origin of r ¹ , and neatly centred within the circle which becomes the eye of the capital volute, and with all the arc originating points following a rectangular grid pattern described in the rectangle.
Ion-4. Votive, Naxos.	B with rectangle	The reduction of the r ¹ to r ² , and to r ³ are 1/5 and 1/10, resulting in the formation of a horizontally long rectangle of 4:10 within the radius line and on the origin of r ¹ , with arc points ordered on a grid within the rectangle, and with the volute origin coinciding with the centre of the rectangle.
Ion-24. Naxian oikos interior	B with rectangle	The capital is damaged. Although nothing final may be concluded, Kaster's reconstruction (Otnesorg, 1996, Fig. 1) allows the first three arcs of the capital volute outline to be examined. From the reconstruction method B is used for the volute spiral construction, with r ² ca 1/20 less than r ¹ and the r ³ ca 1/10 less than r ² , forming a vertical rectangular ordering device of 1:2 [ca 6,3 x 12,6 mm]. Martin's reconstruction with obtuse outline is not accepted.
Ion-6. Naxian sphinx column, Delphi	B with square	The second arc does not originate from the edge of arc one, but is shifted downward to create a deeper volute. After this the normal pattern of Method B with a rectangular ordering device is followed for arcs three and four after which arc five is moved into arc four, but with arc six coinciding exactly with arc two. There is no apparent reason, until one sees the diagonal lines from the volute origin, on which r ¹ , r ² , and r ³ seem to lie.
Ion-7a. Dionysos temple IV, Iria, Naxos	B with square	The reduction of the arc radius from r ¹ to r ² is ¼, also resulting in an ordering device in the form of a gridded square (at rest) on the volute origin, but the arc points fall on different parts of the grid than that of Ion-6. The inside border of the volute tangentially meets the 45° line described between the bottom bearing plane's extremity and the point where the top bearing level starts its descent as a volute.
Ion-16 Artemision 'D'	B with rectangle	The reduction of r ² is 10%, and of r ³ is 15%, with the resulting ordering device being a vertically long rectangle of 3:4, but with the volute origin falling below the rectangle centre.
Ion-20. Capital from Delos	B with arc shift	The radii of r ² and r ³ do not originate from the boundaries of the first and third arcs, but are rather shifted away (ie r ² downward and r ³ upward), as in capital Ion-24.
Ion-14. Kyrene sphinx column	B with arc shift	In the vertically long volutes the reduction of r ² to r ³ is 16,6%, but thereafter the arc points do not fall on the boundaries of preceding arcs, but the vertical lines of arcs are rather shifted over that of the preceding arc, resulting in the vertical emphasis of the volute.
Ion-15 Lower Temple at Myus	B with arc separation	This capital is a theoretical reconstruction. From analysing the model the first quadrants r ¹ to r ⁴ are all separated from each other, together forming an upright ordering rectangle of ca 3:4. From r ¹ onwards the originating points fall on the lines of the first four quadrants.
Ion-45. Temple, Mileto-Yeniköy	B with arc shift	The volute geometry was established by Koenigs (1979, Beil.2). It is similar to Ion-15, but there is an attempt to shift the originating points of r ² closer to the capital centre.
Ion-28a. Archaic Didymeion	B with arc shift and rotation	Whilst the originating point of the capital is placed within a proportional system, Gruben (1963, Note 70) says the volute contains no mathematical/circle ordering. [Check his Fig.16 again]. The author has found that for the construction of the volute an additional arc was drawn (with a radius of r ¹ + 1/9 of arc one, the addition then being 11% of the length of the radius of the additional arc) against the vertical boundary of arc one in the capital inside on the spandrel palmate/omalia space. This ensemble of two combined arcs was turned by 26,565° away from the capital axis by means of constructing a triangle of 1:2 against the outside face of the additional arc [Tan 26,565° = 1+2 = 0,5; It is clear this was a geometrical construction resulting in a specific angle]. Here after method B is employed in so far that the r ² is reduced by 11% to gain the r ² , and r ³ thereafter follows the set pattern to form a rectangle (almost a square) around the volute origin. Some of the originating points of the following arcs are shifted towards the centre as for Ion-45.
Ion-58a Heraion IV, Samos	B with rectangle with arc shift and volute increase	The enlargement of the first turn of the volute is gained by increasing the horizontal edge of arc one by 1/6 past the originating point of the arc, from which point a bigger arc is drawn towards the top of the capital, and a tangent is drawn on that arc upwards to the bearing level, so creating the capital bearing offset. Both a section of the arc and the tangent become the new outline of the volute. The rest of the spiral ordering follows method B, with r ² being 1/10 less than r ¹ , r ² 1/6 less than r ¹ , r ³ 1/7 less than r ² , r ³ 1/6 less than r ² , and so on. Some of the originating points of the arcs are also shifted closer to the volute origin. The originating points are plotted on the rectangular grid formed by all the radii. The points follow a rotary movement from outside to inside the grid, almost describing a diagonal cross. It is believed that an early version of ordering method D may be seen at work here. Furthermore, Gruben (1963, p.87) relates that the relative position of the volute origin (here given for the left volute in anti clockwise order from the top) is 10/8, 9/8, 8/8 and 6/8. Because the rest of the capital also follows the module of portions of eighth, it might be possible that, during the volute design, a fixed point is found for the volute origin within the given block proportion apportioned to the volute. If the reduction in the radii of only the first two arcs is decided upon beforehand, it is quite easy to space the first three originating points around the chosen volute origin.
Ion-64 Votive, Sangri, Naxos	B with arc shift	The arcs are constructed in order to emphasise the horizontality of the volute.
Ion-74. Enneakrounos in Athens	B with arc separation	The first four arcs are separated from each other, more so in the vertical direction, resulting in a very long volute with oval eye.
Ion-43. Mileto (Milet city area)	C	Volute construction was identified by Koenigs (1979, Beil.4). There is addition of various circle segments of differing sizes, both greater and less than 90°, in the construction of the volute, definitely indicating that the block outline dimensions of the volute element were predetermined.
Ion-10 capital Katapollis, Paros	C	No comment.
Ion-32 Delos	C	The random placing of the arc points is shown on the drawing by Gruben (1997, Fig.49). The existing volute of the corner capital was used, not the reconstructed hypothetical standard capital.
Ion-78 Milet	C	No comment.
Ion-25 Naxian stoa on Delos	B+C	Methods B and C with the first arc rotated downwards by 18,4° (tan 18,4° = 0,3333 = 1/3 + radius of 4/3a). The capital top bearing plane has been extended by adding a bigger curve with radius 1/5 larger than that of r ¹ , and r ² is 1/5 less than r ¹ .
Ion-17 Archilochoa capital, Paros	B+C	Haselberger (1986, p.213) indicates that it has a free formed volute, but the author finds a mix of methods B and C using his excellent drawing. The first and fourth and seventh arcs are quarter circles [The use of the first arc as quarter circle is as is the norm in method B], with arcs two and three as well as five and six having angles less than 45°, and arcs two and six springing from the sides of the quarter arcs. This capital also clearly shows the predetermined nature of the volute block outline, showing that in this phase the main elements were first fixed within an overall proportion system (here a module 18,44 dactyl large) after which the volutes were constructed.
Ion-50a. Artemis Temple, Neapolis	D	Bakalakis (1936, Fig.13) identified the construction method. It shows how the origin of this method derives from method B in that the position of the volute origin is also geometrically constructed. It differs in that r ² is r ¹ reduced by an amount, after which r ² and r ³ are reduced by the same amount, thus forming a square (Position at rest). The square is divided into a raster of 6x6, with the points on the diagonals in clockwise rotation inwards becoming the points of origin for r ² . The back side differs from the front in that it has a spiral without eye, whilst the method of ordering remains the same (See Bakalakis (1936, Fig.13b)).
Ion-23. Votive, Thasos	B+D	The ordering device is a vertical rectangle and a square described within the volute eye, and with the arc originating points occurring on the corners of the 1:5 rectangle and square, as well as inside the square, following an orderly, rotational motion around the forms (Radii r ² and r ³ were formed by reductions of 1/8 and 1/6 of the preceding radii). This hybrid pattern is definitely a precursor of the later method D, and can be seen as a first tentative step towards it.
Capitals of which the form and detail are not reliable. Further research in terms of documentation is suggested, and suggested geometries are to be verified.	Varies	The volute constructions of the following capitals cannot be ascertained correctly, but are deemed to fall within the following categories (These capitals are identified for redocumentation of volutes): Method B: Capital Ion-9, Votive, Naxos [It seems as if the vertically long rectangle within which the arc points are ordered falls inside the radius line but not on the origin of r ¹]; Capital Ion-30 from Athens; Capital Ion-68, Paros; Capital Ion-76, of the Ameinias column, Athens [It seems as if r ² is ca 1/6 shorter than r ¹ , and r ³ ca 2/15 shorter than r ²]; Capital Ion-5, Prastodn Naxian Oikos IIc [It is possible that the horizontally very long capital results from a new innovation where the reduction of r ¹ to r ² 1/5, and where a circle is inscribed around the originating point of r ¹ , with its diameter coinciding with the originating point of r ² . The horizontal median of the circle is subdivided into quarters, and vertical lines inscribed through them, forming a rectangle in the circle. The originating points of the onfollowing arcs possibly follow a grid pattern originating from the intersection of the geometries of both forms]; Ion-29 [The first two arcs are almost identical]. Method C: In Ion-54, of the Megaron at Larisa-O-4-Harmon, this method seems too have been used even though the capital has a volute eye; Capital Ion-69. Method D: Capital Ion-12 [a few of the arcs on the badly damaged volute clearly seem to originate on the 45° lines diagonally crossing the centre of the circle, with the centre point of this eye seemingly situated on the line where the column top and capital bearing meet].



Ion-43 (Koenigs, 1979, Beil.4)

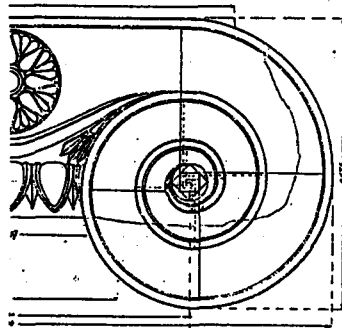


Ion-45 (Koenigs, 1979, Beil.2)

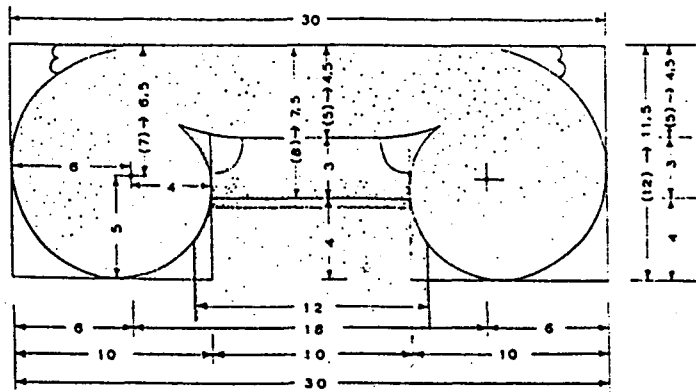


Konstruktionsfigur der v. Volute
(1) = unklar, (1) = Konstruktion

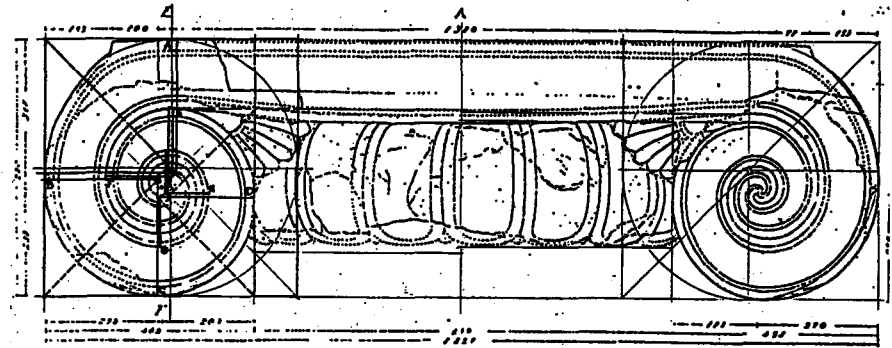
Ion-32 (Gruben, 1997, Fig.49 [portion])



Ion-50 (Bakalakis, 1936, Fig.13)



Ion-28a (Gruben, 1963, Fig.21 [top left])



Ion-6 (Using Amandry, 1953, Plate 11)

Ion-50 (Using Bakalakis, 1936, Fig.13)

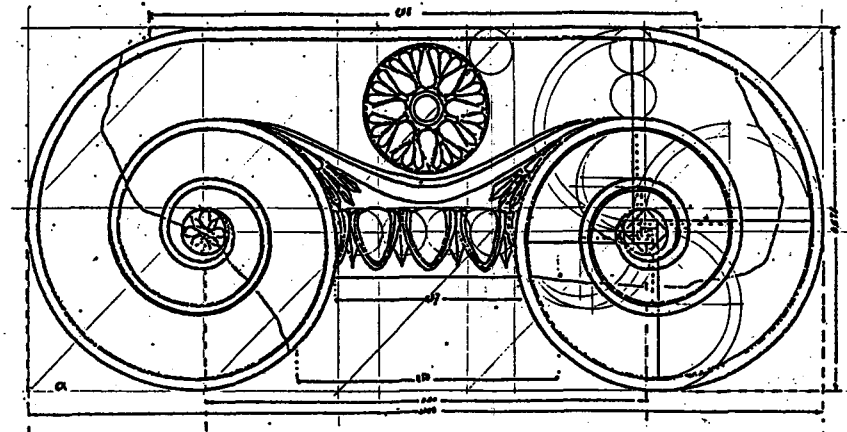
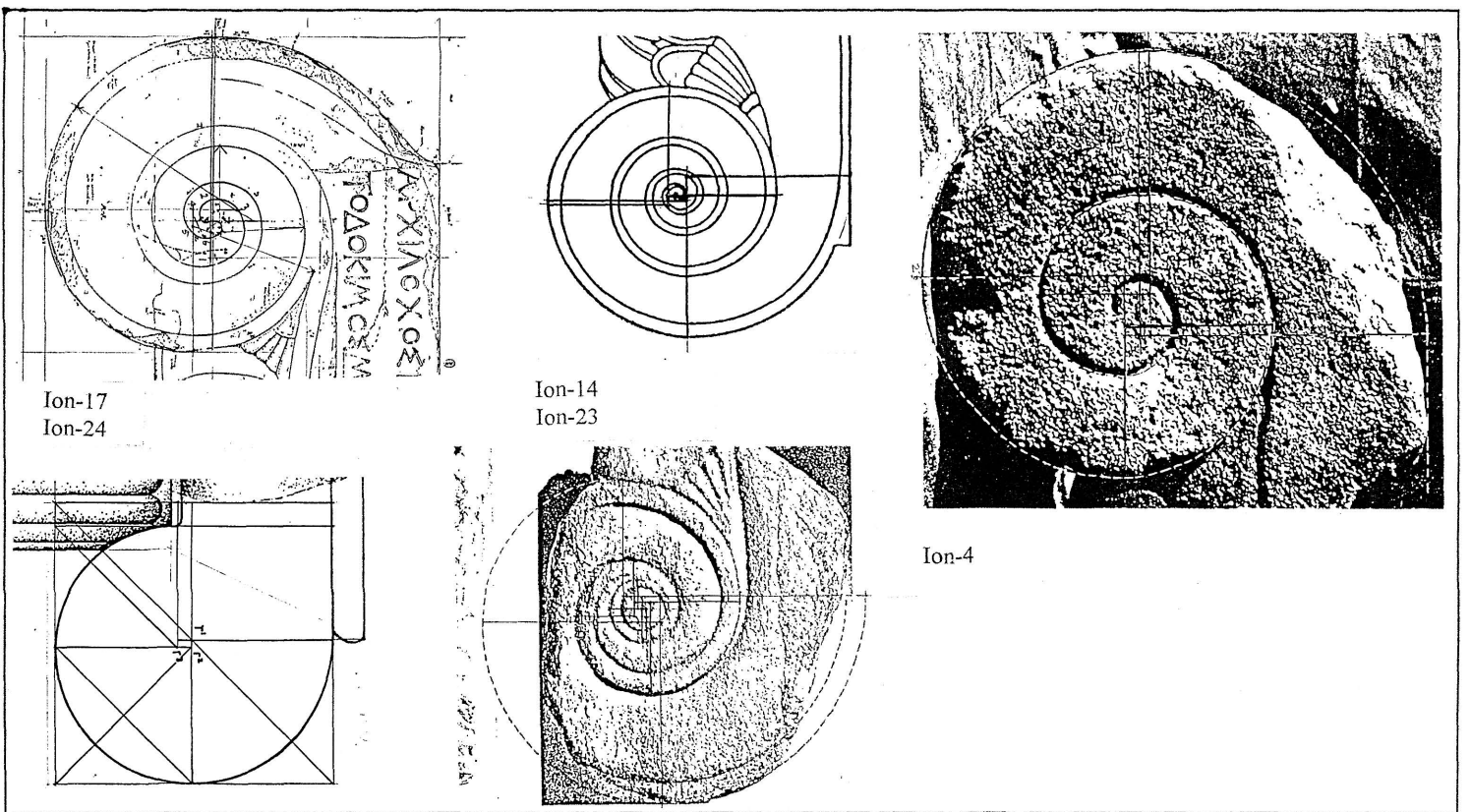
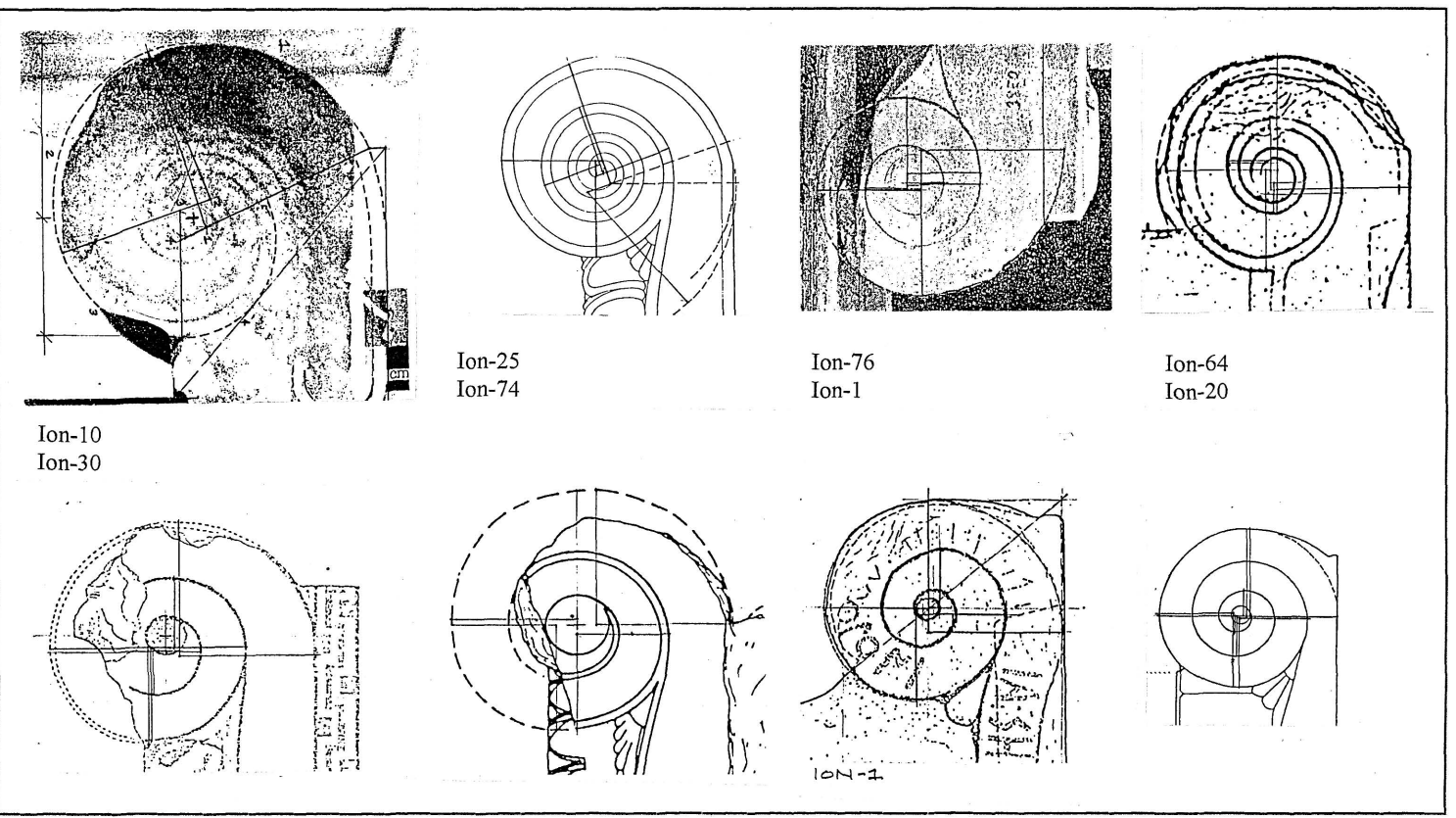
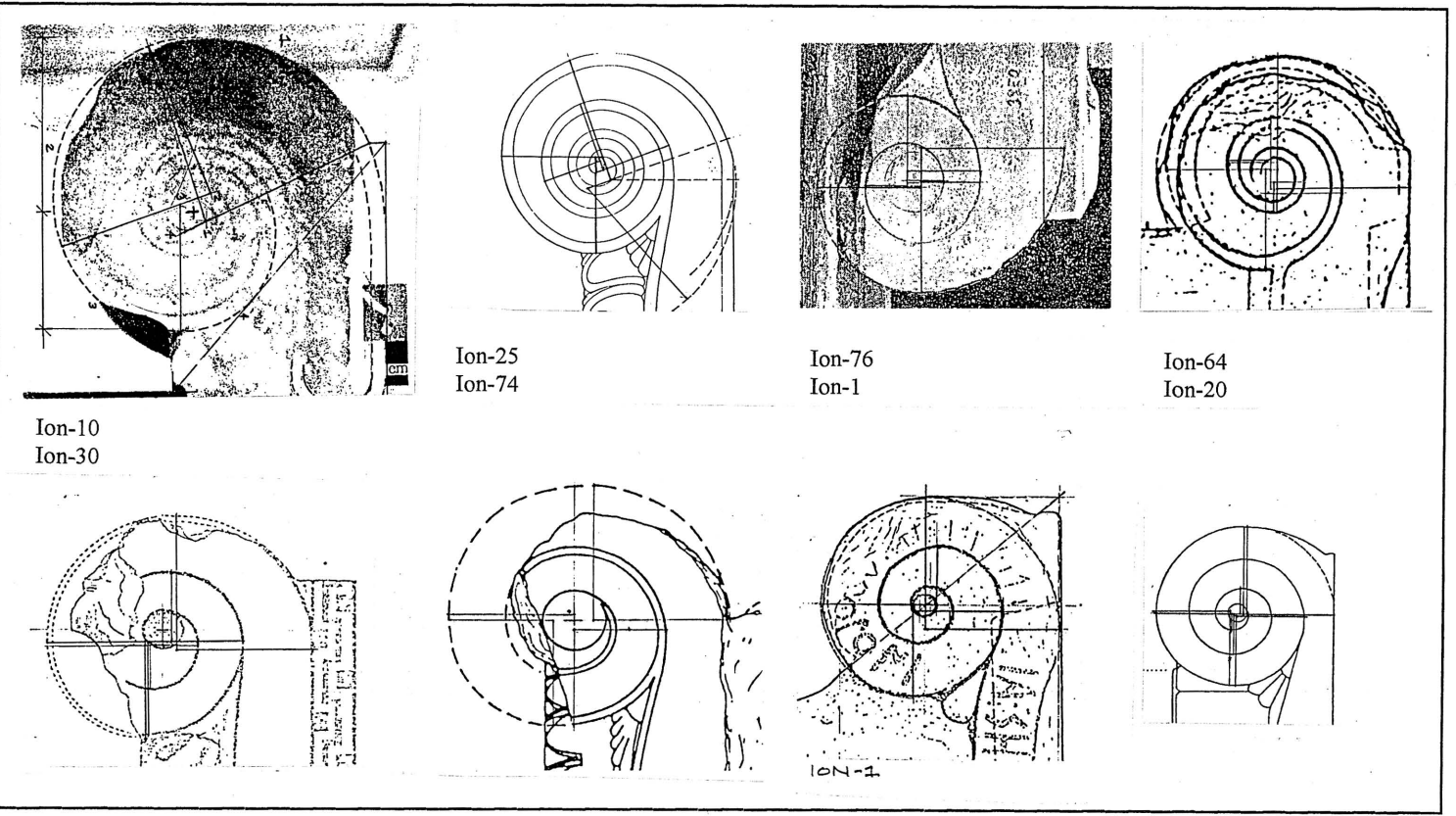
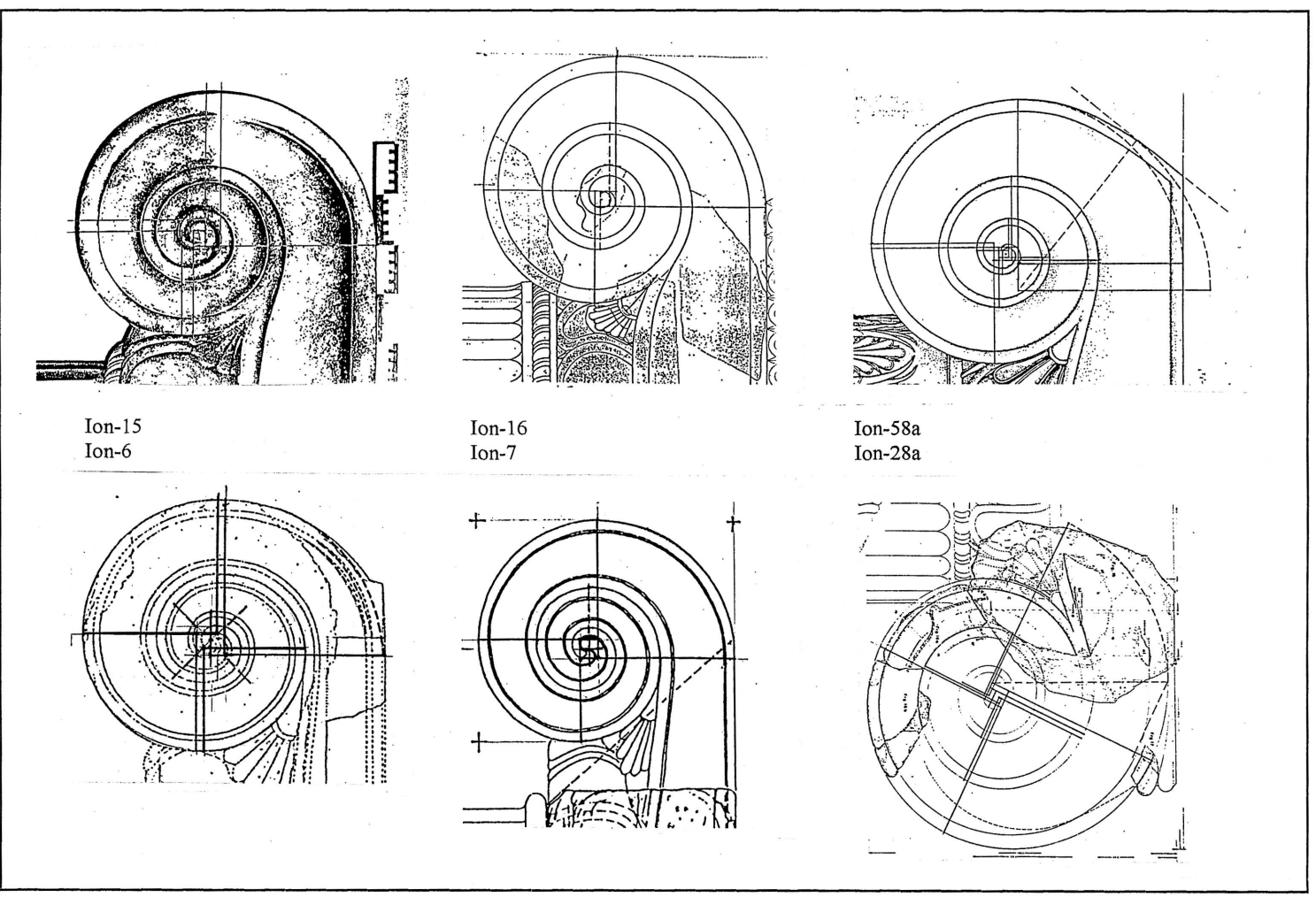


Figure 3.3b Explorative fascade analysis of capital Ion-6 and Ion-50 using Büsing's (1987) method.

Figure 3.3a Volute construction diagrams of Archaic Ionic capitals by various authors (Also refer to Table 3.8).

Figure 3.3c Explorative diagrams of volute ordering methods of selected Archaic Ionic capitals (Refer to Table 3.8).



To conclude, the first generation examples, together with some others (Seen as representative of Archaic examples) show that volute construction was an area of intense concern for the designers of the Ionic capitals from the very beginning. The very first stone example of the Ionic volute shows a degree of ordering through metrication together with the use of simple geometric forms mainly arrived at through the use of the compass. This conclusion vindicates knowledge and use of the cutting compass in Early Archaic sculpture, corresponding with the later Vitruvian ideal of architectural reliance on the ruler and compass, as mentioned in Constantinidès (1973, p.137).

It has been shown that the design evolution was not linear, that cross lending of method occurred, that any canon was subject to adjustment due to refinement on the work itself, and that a greater amount of standardisation occurs in the later Archaic examples. The designers's concern with the volute was sustained throughout the Archaic period in terms of the continued employment and refinement of the four distinct volute ordering methods, with method A being a very shortlived archaism, and with methods B and D eventually being canonised in their refined form in the Classical to Hellenistic era in the manner suggested by Büsing, ie standard capitals with system-volutes.

3.3.4.2.4 Desing co-ordination between volute centre and echinus bottom bearing and -side

Analysis of this aspect should be included in the re-evaluation of volute geometries and capital planning grids, but the author has, through analysis of the relationships of the capital dimensions pertaining to the position of the eye or (a supposed) originating point of the spiral, in vertical relation to the bottom of the echinus (Item N in quantitative descriptions) and in horizontal relation to the side of the echinus bearing surface (our item P in quantitative descriptions). In reality the volute centre cannot be related to the column top and side because the tops of columns are not readily available for analysis. For volute centres of capitals using volute ordering method B, the centre of the ordering device was used. Without going into detail, the analyses show that in the design of many capitals there seems to be a premeditated relationship pertaining to the both values (A few examples where the credibility of dimensions may permit a conclusion would be capitals Ion-23, -28, and -58. That of Ion-12 does not permit such a conclusion, and is identified for further scrutiny. Nevertheless, just a visual inspection shows clearly that the Halkipinar capital's eye is on the line defined by the capital bottom/column top. There may be many more, but due to the fact that not all the base dimensions of capitals are known, this relationship cannot be deciphered. It is still possible to state, however, that co-ordination of this kind does not seem to have been a groundswell trend in the Archaic period. The work by Büsing (1987, Fig.27) does however show the co-ordination of volute eye and capital bottom for the later Didymeion. It is identified that further work in this area would be fruitful for both Archaic and Classical/Hellenistic capitals.

3.3.4.3 The role of standard dimensions as base dimensions in the design of form

Standard units of measure like the foot (πούς) and dactyl (δάχτυλος) are mentioned in Greek building inscriptions (See Bankel (1983, p.67, 94); Koenigs (1990, p.124)), and were used as base dimensions for modular setting out of the main parts and in proportioning the Orders in Hellenic buildings. Whilst there is direct reference to Fifth Century Classical works, our most well known reference claiming such application in the Sixth Century remains Vitruvius, who ultimately refers to sources referring to the works of Theodoros and Chersiphon and Metagenes (See Wesenberg (1996); Philipp (1968)).

Much research has been done regarding the use of base dimensions based on standard units of measure in Archaic Ionic temple design. Lately Bankel (1983, p.95-9) tests existing interpretation, and Koenigs (1990, p.126) indicates the range of those variations of which certainty exists.

Table 3.9 Existing research indicating standard units of measure, variations and their use as base dimensions in Archaic Ionic buildings.

Base dimension	Unit of measure	Ionic building examples	Author
347-9 293-5 325-8	Certain variations in Ionic foot standard Certain variations in Attic foot standard Certain variations in Doric-Pheidonic foot standard	- - -	Koenigs, 1990, p.126 ditto ditto
293,66-296,4 326,74	Ionic foot standard in Attic buildings Erechtheion foot base dimension now seen as Doric foot standard	Nike, Parthenon Erechtheion	Bankel, 1983, p.94 Bankel, 1983, p.93
326-8 327 [esp Attic] 328 [esp Attic] 328	Doric-Pheidonian foot standard Doric-Pheidonian foot standard Doric-Pheidonian foot standard Doric-Pheidonic foot standard	- - - Temple 'A', Histria	Mertens, 1979, p.114 Gruben, 1972, p.325 Drerup, 1937, p.234 Theodorescu, 1980 [LCIG]
346	East Ionian foot standard	-	Gruben, 1972, p.324, note 11
349-50 349,5 349 349 350	Samian foot standard Samian foot standard Samian foot standard Samian foot standard Samian foot standard	- First Dipteral Haraion and IV - Didymeion II Temple, Miletos	Gruben, 1972, p.321 Mertens, 1979, p.114 Gruben, 1963, p.127 Koenigs, 1979, p.198
Ca 330	Delian foot standard	Naxian stoa, Delos	Hellman & Fraisse, 1979, p.111
294-5 296 294,8	Solonic-Attic foot standard Solonic-Attic foot standard Solonic-Attic foot standard	- [Statuary] Apollo Temple, Palati	Gruben, 1972, p.321, 324 Guralnick, 1996, p.520 Gruben, 1972, p.323
291,4 295,5 293-4 293 293,5 294	Cycladic variations of Solonic-Attic foot Cycladic variations of Solonic-Attic foot Attic-Cycladic foot standard Cycladic variations of Solonic-Attic foot Cycladic variation of Solonic-Attic foot Cycladic variation of Solonic-Attic foot	Dionysos temple, Iria, Naxos Temple 'A', Paros - Temple 'D', Metapontum Building 'B', Paros Building 'C', Paros	Gruben et al, 1987, p.595-7 Gruben, 1972, p.323 Mertens, 1979, p.114 Mertens, 1979, p.114-5 Gruben, 1972, p.323 Gruben, 1972, p.323
523-525	Ell of 1,5 x 349 [Samian ft]		Gruben, 1972, p.321

The base dimensions of many variant examples may be regional variants of the standard units of measure, or may merely be singularly used base dimensions. (Koenigs (1990, p.128) indicates remaining uncertainty surrounding the discernment of these). From examples pertinent to this thesis, shown in Table 3.8 above, it is clear that there are many attempts in current archaeological research to come to grips with the eccentricities of local variations on the mainly employed units of measure. The earlier attempts by Dörpfeld, Riemann and Dinsmoor are not included here (See Bankel (1983, p.65-7, Notes 1-20)). Similarly, researchers have already established many of the standard units of measure used as base dimension for the setting out and proportioning of specific Ionic capital designs. Table 3.10 below shows existing known and speculated base dimensions of relevant Archaic Ionic capitals. Whilst most of these identified base dimensions are established on sound research principles (Even that of Ion-58, where Gruben desisted from starting with a proportion system but rather followed from dimensions shown up in the column design analysis, and where the error range is kept within acceptable boundaries), further analysis of other Archaic capitals can definitely extend knowledge in this area. Drerup (1937, p.234) ascertained the prevalent use

Table 3.10 Standard dimensions used as base dimensions in Archaic Ionic capitals.

Base dimension	Unit of measure	Ionic capital	Author
87,25	[¼ of] 349 Samian ft standard	Ion-28: Reconstruction capital, Didymeion II, Didyma [known bldg base dim 349]	Gruben, 1963, p.127, 129, Fig.29
82	[¼ of] 328 Doric-Pheidonian ft standard	Ion-37: Reconstruction pronaos capital, Athenaion, Paestum	Krauss, 1959, p.43-8
whole fractions of 502	A job specific, reduced ell of 502, used in column design	Ion-58: Reconstruction capital, Heraion IV [See discussion at capital description Chpt 2]	Gruben, 1960, p.86
82,0	[¼ of] 328 Doric-Pheidonian ft standard	Ion-39: Partial reconstruction capital Temple 'A', Histria	Theodorescu, 1980 [LCIG]
dactyl = 21,87	[1/16 of] 350 Samian ft standard	Ion-45: Capital, temple (?), Miletos (Milet-Yenikoy)	Koenigs, 1979, p.198
inch of 27,5	[1/12 of] 330 Delian ft standard [qt ft 82,5]	Ion-25: Capital, Naxian Stoa, Delos [Known bldg base dim of ca 330]	Hellman et al, 1979
73,25	[¼ of] 293 Cycladic Solonic-Attic ft standard	Ion-46: Capital, Temple 'D', Metapontum	Mertens, 1979, p.114-5
dactyl = 18,44	[1/16 of] 295 Solonic-Attic ft standard	Ion-17: Capital, votive column, Ag. Tris Eklesies, Paros	Haselberger, 1986, p.213
dactyl = 21,87	1/16 of 350 Samian ft standard	Ion-43: Hypoth standard capital, Temple, Miletos (city area, Milet)	Koenigs, 1979, note 350

of the 328 Pheidonic foot standard as design module for most Attic Ionic capitals. Gruben (1963, p.129, Fig.21; 1960, p.86) identified the use of a module based on a foot standard in the design of the capital of the Didymeion II (A ¼ of the foot standard) and, in the case of the Heraion IV (Gruben, 1960, p.85), the use of fractions of a reduced non-standard ell of 502, as employed in the column dimensioning (Being unsuccessful in establishing a foot standard as base dimension, he links the module used in the column to the capital design. Although theoretical, the established base dimension points the way towards possible

metrication). Koenigs' (1983, p.150) latest work on the Athenaion of Priene identifies the foot standard of 294,4 (+/-10 with V:E:V = 6:10:6) as base dimension. The discovery by Gruben *et al* (1987, p.595-7) of a hitherto unknown foot standard used as modular dimension at the Dionysos temple at Iria, Naxos, is one example of local variations of standards used during the Archaic period.

Bankel (1983, p.68) illustrates the necessity of not starting a search for base dimensions in the large overall dimensions of buildings. It is especially in the smaller repetitive dimensions (like the column centres and other) that a certainty may emerge. His (1983, Fig.1) comparative table also shows how the base dimension with the greatest number of incidences may emerge from the analysis. Because we have seen that other researchers have already established that foot standards were used as base dimension for the design of Ionic capitals, as well as for the other elements of building design, it is accepted that other Ionic capitals may be made subject to such inquiry. Bankel (1983, p.67-68, 92) indicates the use of the dactyl, $\frac{1}{2}$ dactyl, $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{8}$ foot. The above inquiry has shown that the $\frac{1}{4}$ foot was also used, as was the $\frac{1}{12}$. The author, very much in the spirit of an exploratory metrological search, uses the guidelines by Koenigs (1990, p.129) to indicate the possible design modules of the first generation Archaic Ionic capitals (Up to 525 BC). In this process existing research by others is taken into account. As shown in the metrological *skala* by Bankel (1983, p.69), pertinent peristyle dimensions may be used to come to a discovery of a base dimension. The author uses the dimensions of the First Generation Archaic buildings in Chapter 2 to ascertain possible base dimensions of buildings, for which these have not already ascertained in existing research, which can act as guide in defining base dimensions (Due to space restrictions, arguments cannot be entertained in the text). For every capital these possible foot standard base dimensions are tested on the possible main capital dimensions, and the most responsive candidate is mentioned in Table 1.1 in Appendix 1.

Neutral metric capital dimensions were used as a starting point. Capital dimensions were subdivided by the known foot standards in a search for simple, subdivisional units, being either whole numbers or 'true' fractions like $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{3}$, $\frac{2}{3}$ etc. Gruben's (1960, p.86) analysis of the Heraion IV capitals, with the base dimension described in a fractional sense, and Drerup's (1954, p.5) identification of the $\frac{1}{8}$ part of the Attic foot of 294 for the capital of the Athenaion at Priene, and with all dimensions expressed as $n/8$, show the type of clarity that comes forth. If these did not apply, further exploration proceeded, keeping in mind to find simple fractions, which will however have to be tested to other works from the regions in question, to ascertain any predilection for their use. The author has restricted the search to the use of $\frac{1}{4}$ foot units and in some cases dactyls, and it is accepted that further work must be done with dactyl dimensions (whole and half). As in the analyses by Gruben and Drerup, the initial search by the author finds that fractions of the base dimensions were used, already indicating a strong sense of proportional refinement in the execution of the final products.

During this process one remains mindful of the type of capital element dimensions that would probably have

been subjected to modularisation, depending on the logic in capital design and construction/sculpting. Further work on finding proportions follows from this, keeping in mind the type of resonation between elements inherent to, and the inner logic present in, Greek built work (These aspects are taken up below). In all this, knowledge of the the exactness of dimensions plays a governing role: Obviously only those modules gained from well preserved capitals where all dimensions may be measured physically - for pre-525 BC capitals they are rare, ie Ion-6, -11, -69, 45 - and are trustworthy. Even in the good cases one should take note of the known occurrence of differences in dimensions of capital groups which are supposed to be of similar size - for instance the variations in dimensions for a group of the Athenaion at Priene (See Koenigs (1983)) and the Naxian stoa (See Hellman *et al* (1979)). In such cases base dimensions are identified as being representative of a varying sample group. Also, most artefacts have undergone weathering, resulting in diminished dimensions, or have been manhandled, resulting in missing elements that cannot be physically measured. Gruben's, Drerup's and Koenigs's work also show that in eventually deciding on a base dimension, one must take into account the discrepancy between the conceptual dimensions applied on the unworked block and that of the the finished product. The analyst must rather try to come into tune with the underlying reasoning involved in the capital design, than to get bogged down with his/her calculator - one thinks of the difficulty in dimensioning stonework to extremely fine tolerances (See Guralnik (1996). The approach throughout the analysis has been that the pattern must stand out clearly before a design base dimension module is proposed.

Whilst the quality of many of these capitals has allowed theoretical reconstruction to a high degree of probable exactness by the archaeological fraternity, many are in such a state that their reconstructions are in actuality merely inexact representation sketches. In order to provide understanding of the level of exactness of those dimensions we are dealing with, the author employs the evaluation of the reliability of capital dimensions already discussed in Chapter 2 (Green (Dimensions accurate and measurable from the artefact), Blue (Responsible and accountable reconstruction), and Red (Too fragmentary or impossible to reconstruct to any degree of probable accuracy)). From this further evaluation of the propobability of modularity was achieved. Those capitals where dimensions are within an acceptable range of accuracy (Green and Blue), and where the evaluation of modular content proves to be Good to Fair, may identified as probably having been designed with the base dimensions that are identified. As Bankel (1983, p.92) also admonishes, these should however be further confirmed through closer scrutiny of measurable dimensions on the capitals themselves. Such action could be followed by the compilation of ideal capital dimensions as based on the base dimension, the ascertaining of standard deviations from the ideal, interpreting the Z-scores and finally evaluating the existence of the base dimension - here refer for example to Guralnick (1996, p.521) and, to an extent, Gruben (1960). In the case of the buildings where base dimensions have not been confirmed through archaeological means, but where base dimensions correlate with those provisionally identified for the other elements of the buildings, both capital and building base dimension

Table 3.11 Evaluation of the occurrence of probable base dimensions in pre-525 BC Ionic capitals.

Dimension accuracy status	Capital No.	Building/Votive column	Possible base dimension	Standard unit of measure	Probability of modularity
Blue Blue Blue	Ion-1 Ion-14 Ion-15	Votive, Demeter and Apollo Sanctuary, Sangri. Kyrene sphinx column [Theoretical reconstruction] Lower Temple, Myus [base dim [Possib base dim 295,5 or 293,75]	73,875 73,95 73,875	295,5 295,8 295,5	Good Very good Good
Blue Blue Green Blue Blue	Ion-4 Ion-22 Ion-6 Ion-7 Ion-23	[Reconstruction] Naxian votive, Delos Sphinx column, Aegina Naxian sphinx column, Delphi Dionysos temple, Iria [known base dim 291,4] [Reconstruction] Votive, Thasos	72,85 72,85 72,85 72,85 72,85	291,4	Fair to good Good [Main dims] Fair [Few defin] Good Fair
Blue	Ion-16	Artemision 'D', Ephesos [Possib base dim: Ell 523, ft 293,75]	73,4375	293,75	Good
Blue Blue	Ion-24 Ion-20	Naxian <i>oikos</i> Naxian (?) votive column, [theatre] Delos	87,5 87,5	350	Fair
Blue Blue Green	Ion-69 Ion-64 Ion-18	Votive, Paros Votive, Demeter and Apollo sanctuary, Sangri [Reconstruction] Naxian sphinx column, Artemision, Delos	87,25	349	Good Fair Good
Blue Red Red Blue Blue	Ion-10 Ion-29 Ion-32 Ion-27 Ion-48	Parian votive [Katapoliani] unidentified Ephesian building Hypoth std capital Propylon II, Delos In-antis façade Propylon II, Delos [Nieborow] Prostyle façade Propylon II, Delos [Pheia]	86,5 86,5 86,5 86,5 86,5	346	Good Poor Poor Fair Fair
Blue Red Green	Ion-74 Ion-30 Ion-11	Athenian Enneakrounos Athenian memorial column Erzats capital, Competaliast agora, Delos	82,0	328	Good Poor Fair
Blue	Ion-5	<i>Prostoön</i> of the Naxian <i>Oikos</i> [base dim 286]	71,5	-	Fair

should be confirmed by further investigation. The reader will note that many base dimensions are of the non-standard types. Further investigation is needed to identify whether such base dimensions used are regional variants of the main foot standards or singularly used modules.

The explorative analysis is deemed to have been successful in pointing the way towards further research, and it is also deemed as having been adequate to show that Ionic capitals were subject to noetic control in terms of modular design from the start, with a few exceptions where dimensions are not trustworthy or not obtainable, or in capitals of a possibly more whimsical nature. It is significant that the earliest standard capitals (Ion-4, -24, -6, -7, -10) already show the application of a design base dimension in most elements. Whilst the capitals analysed by Gruben, namely that of the Archaic Didymeion (Ion-28) and the Heraion IV (Ion-58), show its use for every element, one clearly sees that in most capitals only a few of the main dimensions were regulated by the base dimension, and that many dimensions approach or just overshoot some ideal dimension. The reasons for this could be manyfold. Also, it is clear that most capitals use $\frac{1}{4}$ foot fractions based on foot standards, but also the dactyl, in the designs to the Hellenic design sphere - the excellent work by Guralnik (1996, p.520) on the Isches *kouros* from Samos has borne out the transference

of a $\frac{1}{4}$ foot (One Royal cubit = 6 palms, and one Egyptian foot equals 4 palms), and the dominance of $\frac{1}{4}$ foot modules regarding to capital design in the Ionian sphere - indicates the direct transference of the method, with obvious acknowledgement of the local variations in terms of the length of the standard foot applied. As an aside, the large number of different modular systems applied by the Naxians on buildings, votive columns and their capitals on Delos, give reason for further research regarding detail surrounding the use of foreign modular systems, apart from those mentioned in this study.

In terms of post-525 BC Archaic Ionic capitals, using the same process of exploratory evaluation, the preliminary exploration has identified the following application of base dimensions: 72,85: Ion-52, Anta capital of a temple, Thasos [Green, fair]; 72,85: Ion-53, partial reconstruction of capital of a temple, Thasos [Blue, fair]; 72,85: =Ion-38, capital of votive, Thasos [Green, fair]; 72,85: Ion-12, capital [Red, fair and worthy of theoretical reconstruction and re-evaluation]); 21,87: = Ion-43 [Blue, good]; 87,25: Ion-59 [Green, good]), 82: Ion-67, votive 135, akropolis, Athens [Red, poor]; 82: Ion-35, votive No.3853, akropolis, Athens [Red, fair and worthy of redocumentation and re-evaluation]. Other post-525 BC Archaic capitals must be subjected to the same analysis. To conclude, it is indicated that the design base dimension was used in the conceptual phase of design, with certain proportional rules being applied, but that the artists/architects did not hesitate to alter the dimensions of certain elements if they did not 'feel' right - for example Gruben (1963, Note 70) where he indicates freedom of execution, regardless of the chosen module. This freedom to change canonic proportion systems and of artistic expression within the predisposed schema, is mirrored in the glyptic arts of the time.

3.3.5 Integrating the idea with the execution - making the capitals

3.3.5.1 The total capital

From the analysis of the tectonic rules inherent to the capital form it is clear that the capital was seen as being made up of different form elements. In practice these form elements were not assembled and fixed together, but had to be drawn out of a cubic stone form. We have also shown the use of the modular planning grid. It is necessary to understand how the grid was used in the process of making capital form. The same law of frontality (Schäfer, 1974 [1919], p.316) that would apply for the grids used for statues, would apply for the capital in the setting out process on all six the faces of the blocked out stone form. With the bottom plane as starting point - where in architectural capitals there first had to be proportional coordination with building elements in terms of column diameter and in terms of distance between columns - the relative size of the capital length and echinus were determined relative to the volutes (and later the volute eye position), and also the capital width. The main lines were then also projected on the front, back and side elevations of the stone block. Here the bottom plan's ordering device came into play in tying the capital form to the column, and to a great extent setting the trend for what was to follow in a design. From

here the detailed setting out and further proportioning of elements of the capital façades could follow. The decision of capital height gave the general proportion of the front façade, and from this decision the upper extremities of the vertical face could be projected around the block, and the excess material be removed outside the bordering lines. The importance of the volute design at this point of the execution is dealt with below. Even though they were determined, any decisions regarding volute type, spiral type, quantity of windings of the spiral, the position of the eye and the ordering technique used were not necessarily applied to the stone block initially, because the volute surface is inside the echinus's outer extremity.

The volute : echinus proportion already decided the the length of the canalis, but the next decision regarding the top to bottom capital bearing height set limits to its possible proportion, due to subsequent vertical subdivision. This height had a great effect on the appearance of the capital's overall proportion and set the trend in terms of its squatness or slenderness. The required angle of load transition also had a lot to do with these decisions. The next subdivision was the echinus height relative to canalis height. The next decision that had to be marked on the block was the required length of the top bearing surface. The bolster fascade, the width of which was initially determined from the bottom plan lay-out, had to be constructed. There were the decisions on bolster form and vertical subdivisions of the form. The width of the capital's bolster had a huge effect on the experience of the echinus disc on the front façade, and the place where the third quarter arc of the vertical volute face would meet the horizontal arc of the echinus side. Next followed the placing of elements like the volute angle palmettes and bolster palmettes, ordering the echinus parts on the bottom plane and, depending on the echinus's relationship with the volute, designing the connection between bolster and echinus where it disappears from sight under the bolsters. Final adjustments to proportions followed. The dressing of the vertical façades of the stone to the volute surface could then proceed. By now the planning grid had dissappeared, new detail had to be drawn on the façade, and volute spirals had to be cut with the cutting compass from the constructed or marked setting out points. The execution of detail could then proceed.

From this analysis there is the realisation of the possible existence of design on a smaller, more controllable scale before the realisation of the project, followed by the enlargement of scale and detail with the help of the planning grid and easily repeatable geometrical patterns. Although no examples of rough capital blocks with planning grids and carved outlines exist, in the case of architectural capitals there is sure to have been a *paradeigma*, in order that a model or specimen that could be re-measured by calipers to ensure conformity and likeness, was present on site. The *anagrapheos*, from evidence meant to be a template (Coulton, 1977, p.55), was most probably used for difficult contours (like abacus leaf patterns - and maybe even bent templates for difficult cyma leaf outlines), devised by a master artist to be followed by lesser skilled artisans. The same has been demonstrated for the volute form.

Within this process there obviously occurred experimentation and in-process proportional adjustment, as

well as insights into new, easier or more logical ways of reaching certain goals. From a chronologically based inspection of capital form the earlier forms clearly show an adherence to the outline and surface level of the basic form of the block, and over time it appears as if the planes of the block forms, which as was shown were always the starting point, disappear and the capital form is animated, with a life of its own, just like the earlier *xoanon* sculpture type was in later work freed from its stereometric form to expressive plastic form.

3.3.5.2 The volute

It is necessary to linger on the design and construction sequence involved in making the Ionic capital volute. From Büsing's (1987, p.326, Fig.20-2) work it is clear that in capitals with system-volutes, the volute extremities are mainly predetermined by the distance between the volute eyes relative to the capital size, and further regulated through the modular workings of the eye. In the making of such cases only the square which bounded the main volute lay-out was necessary as guide for chiseling down the block form of the capital face, after which the four subsquares, volute eye, and volute *radii* could be applied. However, in the face of less systemised volute construction shown above for Archaic capitals, one must explore how the more cumbersome technique of volute construction impacted on the construction process.

Because the volute face is deeper into the rough capital block than the outer edge of the echinus, it seems quite improbable that a clumsily constructed and detailed volute spiral outline would be dressed upon the outer skin of the blocked out surface, only to have that whole surface chiseled away in order to reach the eventual volute face surface. It is clear that it was in the best interest that the design had to very simple to apply, in order that it could easily provide a blocking out guide before the block's surface was chiselled down towards the eventual volute face surface. One could think that a rectangular form of certain proportion was used, on which a known spiral form could have been constructed at the time of reaching the volute surface in the block. It has been shown that the proportion of such a rectangle would be dependent on the chosen total modular coherence of the three-dimensional capital form, as well as the type of volute required (For example vertically long, horizontally wide and so forth). It might also not be unreasonable to think that basic guidelines regarding the reduction ratio of consecutive volute arc *radii*, required to achieve certain volute forms, could have been stock-in-trade patterns of design studios. Examples of capitals with an unfinished back façade, like that of the Monopteros II at Samos (See Ziegenaus [1957b, Beil.108.2] and Ion-59) and a possibly 'unfinished' capital like Ion-78 from Mengerevtepe, Milet (See Weber [1995, Fig.34-6] - Lately Weber [1996, p. 86] believes its smooth surface to be intentional), clearly show that no volute spiral construction had been attempted even though the volute outline had been completed. There may still have been further refinement of this idea.

The analysis above shows that once decisions regarding overall capital proportions had been defined,

including decisions about the volute form, the rectangle within which the volute had to be described could easily be devised in terms of the ordering device resulting from the progression of the first four quarter circle volute arcs (Method B). The author proposes as an idea to be tested that, for multiple architectural capitals, the outline of the volute, as well as the form of the ordering device and the cardinal volute arc points, could have been made in the form of a master template with little drilled holes, in order to easily transfer the essential basis for the volute construction on the block surface. In terms of the volutes devised from circle segments of various sizes (Method C), it is obvious that the rectangle for the volute, or even the volute outline itself, followed a far more willful schema. With Method D, the centre point used for the construction of the rectangles and later diagonals used for the originating points of the volute arcs definitely needs to be positioned before construction of the total volute may proceed, and this was indeed possible, either on the block surface as shown above or through use of a template, as indicated in the analyses above.

The author has shown that a geometrical method was at the heart of Archaic volute design, which method eventually evolved into the design canon which was later to become universally applied (The mentioned use of a very simple composition of rectangular forms, systematic proportioning and a planning grid in the Vitruvian schema for the Ionic capital demonstrated by Büsing (1987), but also by Frey (1992, Fig.2, 6, 8)). Based on the techniques used in constructing an involute scroll, one might argue against the predetermination of the volute ordering rectangle in Method B. It is however a simple matter to increase or decrease the diameter of an involute scroll. In order to fit the involute scroll into a pre-determined square if the string method is used, the diameter is easily increased or decreased by manipulating the diameter of the cylinder one uses to unwind the string with cutting tool attached. If the geometric method is used (See Penrose (1902, Fig.6)) the central circle taken as originating point for inscribing the increasing quarter arcs with the cutting compass might just as easily be increased or decreased. The above reconstruction of the volute spiral lay-out sequences further emphasises the reliance on a simple system of proportioning and the use of the planning grid, which devices were used in monumental sculpture at the time of the appearance of the first Ionic stone capital.

3.3.5.3 Lifting and placing the completed capital

Due to the intricacies of capital design and execution the capitals are deemed to have been finished on the ground before being lifted and placed in position. The lifting process must have proceeded after the final dressing of the column shaft or the final drum, due to the difficulties the volutes would present for working on the column neck and top after placement of the capitals. From research by Coulton (1977) we should assume that, up to the architectural use of hoist with compound pulley by *ca* 515 BC, major building elements like capitals were elevated through use of earth ramps, mostly due to the weight of the massive capitals which were beyond the capabilities of the simple hoist - there is proof of this for the Artemision 'D' epistyle. The intricacies involved in not damaging the bolsters and fragile volute edges, just in dragging

the capital up a ramp, must have been very great, unless if it was taken up on a sled. One could argue that the echinus of the capital could simply have been moved over the column top bearing, but the smaller volute distance would have prevented this. With a monumental capital where the echinus bottom and volutes were at the same plane (Like the Aphaia sphinx column) this would present less of a problem, but at the Artemision 'D' for example (Like most other capitals), where the space between volutes was less than the column's diameter, where the echinus bottom was well above the volute bottom, and where the capital fitted on top of a cylindrical joining element projecting from the column, other methods must have been used for the final positioning. The earth bank may have been constructed slightly higher than the column top, and the capital lowered by removing sand in between the bolsters first and then under the bolsters. Alternatively the capital may have been slid from a sled, onto a sandbag on top of the column's top, after which it was let down slowly, the last section supported by levers in order that the empty bag be removed. However, capitals show no U-holes on top or holes on the sides required for this action, and none of the known uncomplete capitals have been found with handling bosses present. The most probable method would have been that of lifting the capital bottom with a fulcrum lever positioned in a hole under the capital, lifting and swinging the capital over to its final position with the bolsters resting on a raised sand section, and slowly letting it drop into position. There is some doubt in the author's mind about the ability of the *naos* wall to withstand a bending moment caused by earth being placed right up to its top level, unless if it was temporarily braced or if the opposite side was also filled in (Usual in Egypt), not a bad idea if one thinks that the inner columns also needed capitals. One may think that scaffolding could have played a part in the placing stage. If the earth bank did not completely surround the column up to the *naos* wall, in order for the column to withstand the forces applied during the shifting and placing of the capital, it would have had to be braced, and scaffolding may have been used to connect with the earth bank as well as to provide a point of leverage for swinging the capital, with the capital's bottom hole on the peg of a rotating lever on a fulcrum, temporarily higher than the support platform in order to lift and drop the capital into position through various means available. The sheer weight of the capitals however make such arguments less probable if one thinks of the stability and strength of scaffolding. However, history has shown the inventiveness employed in such instances, with the scaffolding and support structures often being more innovative than the building structure itself.

Smaller capitals were most probably hoisted with a simple winch, with two ropes passed through V-shaped holes at the top of the capital at equidistant points from the axis (Coulton, 1977, p.3), or fixed to lifting tongs positioned in the volute eye opening where they occurred (See Ion-42), or even with ropes slung under the capital at the meeting point of the volutes and echinus, leaving the capital bottom bearing plane almost free. Whilst the possible damage to the fragile edge of the volutes may logically count against this idea, the lack of lifting holes for wedges and tongs in the drawings or photographs of Archaic capitals make it seem feasible (apart from fixing holes for statuary, most holes are of the type used for pouring in lead-filling for the capital-to-column connection). The whole aspect of lifting and placing is here identified as topic for

further research on the artefacts. Ionic capitals show a relative decrease in physical size over time. Whilst previous analyses has shown this is probably rather due to aesthetic adjustment, recognition of the advantages of using smaller blocks that may be used with compound pulleys could likewise have reflected in the general trend towards using smaller building blocks.

3.3.6 A search for synchronicity in sculpting of capital detail and sculpture technique

Shiloh (1979, Fig.9-10) shows Phoenician sculpting techniques like blocking out, dressing the capital outline and smooth dressing the surface before the capital relief was carved from the relief pattern outlines. His analysis indicates that all the elements were defined by grooves and/or beads, and that no beads projected out of the block surface, indicating that only incision was used. These methods were available to the early capital makers, and is indeed very similar to the early Naxian/Samian capitals where only incision and abrasion (with emery from the island Naxos) was used to define elements, a sculpture technique apparently endemic to the Cyclades.

The use of the claw chisel - invented from 575-50 BC; Also see Gruben (1997, Note206) - is speculated for the manufacture of a deep concave flute and canalis. However, the first really deep flutes on a bolster appear at the capitals [Ion-16] of the Artemision 'D' of just before 550 BC. The capitals (Ion28) of the Didymeion II of *ca* 540 BC had slightly deeper bolster flutes. The deep concave canalis only appears by 510 BC in capital Ion-53, an anta column capital from Thasos. Really deep examples appear after 500 BC, like capital Ion-54 from the 'Megaronbau' at Larisa. The use of the claw and flat chisel is speculated for volute mouldings with a rectangular borders, like the first instance at capital Ion-74 of 550-25 BC. Archaic Hellenic sculpture shows a predilection for surface decoration from after 550 BC. One finds the use of scales on the abacus of the Athenian memorial column capital Ion-67 of 520 BC and on the bolsters of capital Ion-31 and Ion-46 after 500 BC; Plant forms appear from 520-10 BC on Athenian examples, and on the bolsters of capitals Ion-58 of the Heraion IV which only went up after *ca* 500 BC.

The above shows that evolving sculpting technique is closely followed by evolution of new execution detail in the Ionic capital. Further research in synchronicity in capital typology and sculpture types is recommended.

3.3.7 Aspects relevant to a contextual analysis

Even though Hellenic architecture and memorial columns had their own functional and aesthetic design programmes, there is already indication that there was much cross fertilisation and even possible simultaneous experimentation. Whilst one can argue that the architecture, having had a tradition of timber brackets (decorated or not) and entablatures in the Geometric and Early Archaic periods, had its own

independant development towards a stone Ionic capital through a stone voluted bracket capital and /or a (decorated or undecorated) timber- bracket-with-stone-torus capital, the chronology shows that the stone Ionic standard capital in the votive column was a major event towards achieving the standard capital form. It seems to be advisable to jointly look at votive column and building design up to the achievement of the first known architectural standard capital.

In terms of the memorial column capital, from work by Jacob-Felsch (1969), there is knowledge of the design interaction between sculpture and memorial column, in terms of aesthetic aspects like balance, proportional relationships between elements and overall proportion, both indicating that the capital must also have played an important role in this. From others like Raubitschek (1938, 1940, 1943), we understand the functional demands posed by the form of the statue and methods of fixing, which were necessary to prevent side forces from letting the statue tilt. In this sense one understands why the canalis would rather not be a loose element on the echinus, as it sometimes was - and could have been structurally sound - in the architectural timber bracket *cum* stone torus experiments, and why the male-female cylindrical, slotted joint between capital and column would have evolved. The early Aphaia capital shows this understanding in another way, because even though appearing to have been made of two pieces, the canalis was fixed to the domed echinus, itself a very stable form which was well fixed to the column. In any event, there is need for further exploration of the relationship between the capital and total column.

The architectural *scenario* is different. Even though an architectural trabeated system is relatively more static than the memorial column type, and the additive composition of column, capital and epistyle is relatively simple and results in a stable composition, there are complexities forthcoming from other sources. Apart from the noetic control in terms of proportions, modularity and tectonic rules, we may realise that the major architectural considerations of performance of materials, the relationship between material performance, element size and possible span lengths or resistance against load, were important factors that had to be brought towards an empiric understanding of what a capital should and could do in the ensemble of the Order.

Analysis of the Ionic buildings and Ionic Order will show up the intricacies of the architectural design and the capital's integration therein.

3.3.7.1 Formal aesthetics and the Ionic Order and -votive column

The founding process will be discussed in the following chapter. Here there is an inquiry into the aesthetic content of what may be termed a nascent Ionic Order with base, shaft, standard Ionic capital of various variations, epistyle, optional frieze strip, dividing elements of various kinds between last two, and a concluding cornice. In terms of the votive column, it would be similar excluding the entablature, but

including the sculpture. Van den Berg's (1972, p.269-325) analysis of monumental Hellenic sculpture provides the guidelines for criteria that may be employed in terms of the nature and content of the artifacts. These are scale, form, proportion, rhythm, pattern, symmetry, connections, articulation and proportions. Only form, pattern, symmetry, articulation and connections are dealt with in the analysis of the tectonic rules of the Order below.

The Ionic Order employs a scale that is anthropometrically based, but which is of a monumental order. This is similar to the achievement of the monumental *kouros*, which elevates the work of art to a godly dimension. From study of proportions included in Hellenic minor arts and glyptic arts, the use of simple proportions within a regulating system like a planning grid is indicated (See Curtius, 1923, p.218, Fig.159-60; Schäfer, 1974 [1919], Fig.323, 327, Robertson, 1975b, Fig.13a; 17b; Boardman, 1978, p.20-1, 77, Fig.250, Lambrinoudakis, 1980, Fig.1-3, Kienast, 1985, p.381; 383; 391, Hübner, 1994, p.341; 347; Fig.20-1). This is similar in the early examples of the Ionic Order, as may be seen of an analysis of noetic content. Rhythm in the horizontal dimension of the Order is mostly repetitive, like for column spacing and fluting, but complex rhythms are set up in the vertical dimension of the hierarchical progression of the elements contained in the Order, in terms of the relationships between the elements (from the base to architrave, abacus and entablature elements). Much archaeological detail is still required to fill in the achievement of the Archaic period in this regard. Even though detailed information is included in the references in Chapter 2, the detail is not complete enough to unlock these specific relationships. More is said of the quantitative aspect under 3.3.7.3.

Syntactically speaking, what is important is that the Order is horizontally layered like the capital, with most elements - apart from the early unrabbeted epistyle and undecorated frieze - being vertically non-reversible, but horizontally so, similar to the capital. Symmetry is employed in the total composition of the Order, in terms of the existence of a vertical centreline around which all vertical elements are symmetrically placed, and around which the horizontal elements are centred, also as the capital. This frontal symmetry is very prevalent in most Archaic Hellenic artworks, from earthenware to *kouros* statues - but not in the *kore* type, and also not in the *kouros* type where a god carries an attribute, like the Apollo statue at Delos. The columns are symmetrically composed around a vertical axis running down the column centreline and which regulates the form of the capital, echinus and column flutes (and plinth if present). Other than the flutes, echinus decoration and plinth, axial symmetry is differently expressed in the capital, having two similar long front and two similar short side faces, resulting in a very strong 'frontal' impression - the equisided Ionic capital only becomes a reality much later - which is extended to the other elements and façade composition. This idea of frontality is similarly present in the sphinx statue votive column type, as well as in the *kouros/kore* types - even though there is no symmetry in terms of front and back - but not in the Doric column which is equisided. This specific nature of the Ionic capital is one of the factors which is identified as providing for much of the complexity within the Ionic Order. In terms of these aesthetic aspects, it may

also be said that the Ionic Order takes up the existing themes of Hellenic artworks.

Close scrutiny of the first monumental votive columns (the Ionic Aphaia sphinx column and the Naxian sphinx column at Delphi) and the columns of the first total stone examples of Ionic architecture (the interior columns of the Naxian *Oikos*, Delos, and the columns of the Dionysos temple, Iria), shows that there is a great deal of similarity in the morphology and syntax of the constituent elements. Due to this, the author deems it unnecessary to duplicate the analysis of formal aesthetic content achieved for early Ionic architecture. For all practical purposes the columns are deemed to be homologue, with the important difference that the epistyle with its continuous horizontal bottom line is replaced by a sphinx statue base which ends at the point of descent of the volutes. From the achieved chronology, the author identifies as hypothesis that the functional demands of the long form of the base of a sitting sphinx (rather than the idea of enlarging the bearing plane of the architectural capital), as found in the Sangri column, must be seen as instigating the evolution of ways of dealing with enlarging the capital's top bearing plane without enlarging the total capital, a design aspect not yet visible in the known Late Seventh Century stone voluted architectural capitals. In a sphinx column the sphinx is shown from the side, together with the front of the capital - this may be understood as using the image of the sphinx that had evolved in the two-dimensional representations in the minor arts. In the examples of sphinx columns before total stone Ionic architecture, the length of the top bearing plane of the capital was extended in three ways, namely with rectangularly edged additions to enlarge the horizontal bearing area for the sphinx base, by bolster spandrel palmettes and by volutes which were enlarged by meeting the top bearing plane with an obtuse angle rather than on the tangential. These early examples had to deal with the problem of meeting the horizontal plane in exactly the same manner than the later capitals of the Ionic Order, but within another visual form syntax. Similar to the sphinx statues which showed their side profile, the early votive column sculptures depicting humans - *kouros/kore* types, *Nike* figures and representational depictions of citizens of the *polis* - could not be placed in such a way that they showed a frontal view due to the demands that the long capital form placed on the positioning of the feet of the sculptures (Ion-76 and Ion-36 [Alkimachos writer on chair] presented side profiles, and also Ion- 62 [Kallimachos statue] with a running *Nike* figure, interestingly with turned torso). Raubitschek (1943, p.20) states that the transverse placement of sculpture feet only happened in the Fifth Century BC - where the square abacus is commonplace - but the author's analysis has shown that capital Ion-12 from Smyrna could have had a frontally directioned statue, possibly the first example of a non-architectural capital to have a square top bearing plane.

The homologue form relationship shown to have existed between early memorial column and columns of the Ionic Order, is taken as being an indication of the existence of a shared heritage and continuous conceptual 'fit' between Ionic architecture and votive column aesthetics. The validity of this statement will be further looked at in terms of tectonic rules below. Nevertheless, the analysis of detail on capitals shows that there was more chance for individual expression in the 'once of' votive column designs than in

architecture, where design considerations encompassed a far greater problematic. This problematic will be explored in the a following section.

3.3.7.2 Abstract tectonic rules of the Archaic Ionic façade and votive column

Gruben gives a very apt description of the dualistic tectonic nature of the Ionic Order as he finds it in the Archaic Didymeion. He points at a tendency in Ionic architecture where the static framework of a building may be decorated with plastic forms - for example the sphinxes and lions on, as he believed, the architrave corners, now known to also be on the frieze section - and where stereometric elements like the epistyle, column, wall, cornice and raking sima are transformed into organic liveliness through the medium of vegetative ornament (leaf moldings, volutes and palmettes), plastic friezes, swelling, richly profiled bases and powerful capitals - to him unrelated to structural performance in terms of form - in direct contrast to the rationality of the extreme metrication and schematism of the building plans, which to him indicate "einer letztlich unlösbaren undunbewältigten Antinomie." (1963, p.176). It is deemed useful to inquire into the formal tectonic rules of the early Ionic architectural façade (Following Howe's [IDO, p.93-113] useful analysis of the tectonic rules underlying the Doric Order, as followed from conclusions of his similar work on MG II pottery and Early Archaic *kouroi*). From this, the role which the Ionic capitals had to perform in a wider architectural context may be more clearly defined, after which a statement will be made regarding the artistic counterparts in votive columns (See Table 3.12 below).

Firstly the analysis of the tectonic rules included in the Archaic Ionic façade show an amazing correspondence with those rules formulated for the Doric Order by Howe. This indicates that on the whole the Doric and Ionic architects worked from the same tectonic framework and shared a similar abstract vision of how to express a physical reality in the abstract terms of architectural morphology and syntax. The analysis indicates that Ionic architecture (In terms of façade), far from being undisciplined or 'decadent', showed the same rigorous adherence to predetermined rules, and tried to resolve the same tectonic issues. In this attempt, the Ionic capital as single element in the façade (see the analysis of tectonic rules), follows the same rules showed to be inherent to the Ionic façade and very strongly so, even if the form did allow for much experimentation. Secondly, the main differences between the Doric and Ionic façade ensembles come about in the allowance of decoration on 'functional' elements rather than only in 'non-functional voids', in the allowance of subdivision of elements - rarely applied on the corner capital inside volutes - and most importantly in the allowance of a wide range of proportional latitude for specific forms.

Secondly, the main differences between the Doric and Ionic façade ensembles come about in the allowance of decoration on 'functional elements rather than on 'non-functional voids', in the allowance of subdivision of elements - rarely applied on the corner capital inside volutes - and most importantly, in the allowance of a wide range of proportional latitude for specific forms.

Table 3.12 Synopsis of the tectonic rules present in the Archaic Ionic façade.

<p>Morphology nature</p> <p>allowability</p> <p>proportion</p>	<ul style="list-style-type: none"> * Every element of the Archaic façade elevation consists of compact, convex elements (horizontal capital element, tapering shaft, krepis) and discrete connecting elements between them (moldings, echinus, abacus, spira and torus base elements). Known concave elements like the conical echinus and the outward flaring leaf-cyma column base appear very sporadically. * Each structural element is an individual visual element * Different forms in elements indicate differing character properties * The elements are horizontally reversible due to their symmetry but vertically irreversible due to differences of top and bottom. * Open spaces are seen as voids (space between entablature moldings, tympanum, capital bolster). However, some of the structural elements like the architrave corners, the column bottom and top ends, as well as the capital canal and volute origin are also used for decoration. * Variation is allowed in functionally identical elements and in voids * Elements are sometimes subdivided (corner capital volute inner corners; canal middle section) or superimposed (in one instance a double cyma) * There is wide variety in proportion of specific elements
<p>Syntax position</p> <p>connection</p> <p>ordering</p>	<ul style="list-style-type: none"> * Each element type only occurs within its own horizontal band * Only molding elements are repeated in various positions within the façade * Horizontal connections between elements are emphasised * Curved forms do not only occur at connections, but they do occur there and indicate elasticity * Elements become progressively lighter from the bottom up * The vertically layered ordering accentuates any vertical axial ordering * The vertical irreversibility of elements emphasises the direction of vertical axial ordering. * The elements are co-ordinated in the vertical which creates the illusion of supporting lines * An hierarchical ordering of connections exists, of which the connection between column and architrave [ie capital] is the most important through the strong downward curve of the volute. In the large scale of the total ensemble of the Ionic façade the cyma acts as connecting element between canal and column shaft, and the abacus [where it occurs] acts as connecting element between capital and architrave/sculpture base. In the case of the capitals with obtuse angles and without abaci, the connection is emphasised through extreme contrast of angle. * The connection between column and crepidoma shows an evolution over time, ie from strong conical base elements for early columns in which contrasting angles play the major part, towards strong accentuation through use of multiple convex elements divided by concave elements. Here there is another evolution towards an interplay between the concave and convex elements which culminates in the Attic base form. * A hierarchical ordering of the horizontal bands exist, and their proportions do not remain constant
<p>The formal tectonic rules formulated also show an attempt, as is the case with the Geometric pottery and Archaic <i>kouroi</i>, at creating a visual fiction which represents the architects understanding of the physical, in this case architectural, reality, and as in the Doric Order through the use of the morphology and syntax of the colonnade.</p> <p>However, there is much more experimentation in terms of possible form elements, the overall content of every individual building's 'Order', as well as in terms of the positioning of decoration. The process of attaining the final canonic form of the Ionic Order took place over a period of over 100 years, and even in the Classical era much experimentation is evident.</p>	

The evolution of Doric capital form, which shows a wide latitude in terms of proportions, and similarly the column slenderness ratio, happened in a very short span of time. Due to this, the Doric Order is perceived as more static in this regard. In the Ionic architecture, the evolution towards canonic form evolved from the Seventh Century right into the Classical period, leaving the impression of freedom and uncanonic design. It is clear that the base and capital of the Ionic column are more complex than any form included in the Doric Order, and allowed for far greater experimentation and manipulation. Far from being unprincipled, the analysis of the First Generation Archaic Ionic façades shows a steady increase in noetic control, lots of experimentation with horizontal and vertical proportions, but also, at least in terms of the base and capital element, the achievement of interim, regionally bound canonic form and proportion. Due to the fact that the Ionic column and capital were similarly used as memorial column element, even more experimentation occurred outside the strictures of the demands posed by systematic building.

The allowance of decoration on 'functional' elements definitely lead to less abstract form than that of the Doric. Nevertheless, this decoration was always controlled and bounded within the outline of permissible

areas, definitely decoration rather than ornamentation. In terms of the subdivision of elements, this happened so seldom, like at the inner volutes of the corner capital, that it is almost of no importance. Finally, a major difference between the Doric and Ionic is that whereas the Doric became more rigid and contained within stark, pure geometric form outlines over time, the Ionic started off like that, and evolved into ever more independent forms that defied the three-dimensional stone forms from which they originated. Rather than this being seen as a flight from rational order and control, the study has shown the simultaneous increase in noetic control of form, echoing the Doric evolution but in a radically different way.

This vision of the Ionic Order shows the simultaneous existence of freedom and control within one overarching idea, but rather than an being an irreconcilable antinomy as interpreted by Gruben above, there exists a dialectic that is indicative of interrelatedness and mutual supportiveness rather than exclusiveness and discord, a complex but coherent dialogue between two poles rather than mere opposing co-existing elements. It is deemed of importance that the Ionic capital is a very important and active element in this total dialectic, rather than merely a non-structural, decorative element. This interpretation of the Ionic façade is in contrast to the prevailing descriptions, and may serve to place Ionic architecture next to the Doric in terms of the achievement of a coherent tectonic vision.

3.3.7.3 A synoptic view of architectural standardisation of dimensions and systemised planning

Because the use of standardised dimensions is well covered in the analysis of the capital, a more cursory mention suffices here. The common ordering device for the long hall type Geometric temple was the 100 foot length (Similar to Syria and Cyprus). In suddenly dealing with a large scale stone architecture the Ionic architects also had enough access to architectures where the problems of co-ordination of walls and colonnades had been adequately dealt with. Nevertheless, the first examples of Doric architecture were not flawless, with irregularities in dimensioning occurring in the entablature, in column spacing and in the crepidoma form (The Heraion of Olympia is the commonly put example). Coulton (1977, p.64) indicates that the strictures of Doric entablature design was a new dimension that had to be grappled with, in other words three-dimensional co-ordination, because it did not exist in such complexity in foreign architectures. This aspect of three-dimensional co-ordination is dealt with later in terms of the Ionic Order. Coulton (1977, p.71) also says that there is little evidence of Ionic design method before the Hellenistic period, apart from close co-ordination between column axes and *naos* wall axes. The validity of this statement is taken in hand below, and replied to.

From the interpretation of information related in the description of buildings in Chapter 2, there is an indication of the prevalent use of the (regionally bound) foot standard, fractions of the foot standard ($\frac{1}{4}$ foot or palm, $\frac{1}{8}$'s and $\frac{1}{16}$ 'ths of feet) and ell modules for many of the elements of the Order, but they are not always applied consistently for all elements of the different examples. (Due to the limitations placed on this

study the detail analysis of dimensions cannot be displayed). Where the stylobate, walls, column base, column shaft, column top and bottom diameters, capital height and architrave height are most often described in terms of base dimensions or modules based on foot standards, the total column height is most often rather expressed as multiples of the column diameter, but also sometimes in foot and ell modules. The column interaxis is often expressed in ell modules, and sometimes the column base height and width - but at the Artemision 'D' the plinth width which becomes the regulating module in horizontal and vertical dimensioning (despite Gruben's (1996, p.76) and Wesenberg's (1983a, p.44 flw) difference in interpretation of what constitutes the column 'base' in this specific case). Wesenberg (1983a, p.103-4, 179) has recently indicated the bottom of the column [UD] rather than the shaft diameter just above the apophyge [ud] and total Order height [$SH+GH$] as determinant of much of the façade relationships (See also Gruben (1963, p.158) re the round 50ft figure for the Didymeion's Order height). Unfortunately the entablature dimensions are lacking for most Archaic buildings in this study, making further such calculations impossible. Regarding the column diameter, one notes Gruben's (1996, p.74, 76) acceptance of *vestigia* meaning bottom bearing - in the case of the Artemision, being the spira rather than the column bottom - together with his plea for the use of measured dimensions rather than Roman text. Koenigs (1985, p.448) clearly indicates the sequence of setting out the column from the shaft diameter above the apophyge (ud) towards the bottom extremity of the apophyge [UD], as shown by Haselberger's (1983) work on the technical design drawings found at Didyma. In this study the shaft dimension is still used.

If the particulars of this inquiry are then brought in relation with the similar inquiry regarding the Archaic Ionic capital above (Taking into account that a detailed inquiry not part of this particular study), it may be generally said that there was in use a system of three-dimensional, modular dimensioning which used the ell - mostly - for the stylobate, base and interaxial dimensions, and for the vertical dimensions of the Order the column diameter was (Most often) used to determine total column height. Within this broad framework, all the remaining dimensions were expressed in feet and $\frac{1}{4}$ feet (sometimes also the dactyl), the base dimensions more often than not being standardised foot dimensions. Through this system the capital was integrated in the dimensional system of the Order and the plan, seemingly most importantly through the workings of the column diameter at the top (due to the lack of extant members in analyses often only to be deduced from the capital bottom). There is no space for detailed inquiry into the history of these standardised dimensions, but the use of standardised foot dimensions as base dimensions before the emergence of both Ionic and Doric Orders may be indicated by the early Archaic use of the foot and quarter foot (a palm) module in Archaic monumental statuary, especially for the *kouros*, which was similar to that of the Egyptian manner of application and subdivision of the reformed Seventh Century four palm foot standard (see Guralnick (1996, p.516-20)). In Hellenic architecture we find the additional use of ell standards, directly relatable to the use of the 525 Royal cubit in Egyptian architecture and a similar dimension used in north Syrian architecture (ie the long Royal cubit of 520 as in Ugarit, shown by Wright (1985, p.118)). Archaic stone Ionic architecture follows firmly in the achievements of the pioneer

generation before its founding, and ultimately on preceding foreign architectures, but it makes its own mark. Within the Archaic Ionic architecture of the First Generation, dimensional standardisation and modularity takes on a specific character demanded by the rapid evolution of the Order and regional idiosyncrasies.

From analysis of the building plans of Ionic buildings from 600-525 BC it is clear that there was noetic control of the Ionic plan form from the start, especially in terms of the use of standardised base dimensions as modules, and also in terms of co-ordination between elements, and that this control intensified in general, but dramatically in certain buildings, especially at the Artemision 'D' at Ephesos, the Lower Temple at Myus and the dipteral Archaic Didymeion at Didyma. In Delos, as in the first examples of Doric architecture - like the Heraion at Olympia with its irregular spacing of columns and the skew *crepidoma* - there seems to have been very little concern with modular co-ordination of the elements on plan. In Naxos, and soon after also at Ephesos and Myus, the jump is far and clear. In the Archaic Didymeion the supposed achievement of clear modular co-ordination is not certain yet. Despite the huge advances regarding our knowledge of the plan of the First Dipteral Heraion from the work of Kienast, with only uncertainty around some of the intercolumnation dimensions remaining, there is certainty that the early modular regularity of modularity apportioned to this building by Buschor (1930) is under review. At the Samian Heraion IV and its Monopteros there isn't the clear and concise modular design as exists in the eastern Ionian examples.

When the Ionic Order reached Athens, there was no clear vision of the use of modular design in this Order there - in contrast to the highly sophisticated capital design. Analysis of plans (not shown) demonstrates the evolution of and the increase in use of the planning grid, square in some instances. In this regard the above statement by Coulton is valid. One may see that the temple plan came about by the use of plan conventions rather than from detailed drawings of the whole. Importantly, the modular ordering of the *naos* portion of the temples become more readable, showing the simple but significant proportions which were co-ordinated with the outer column arrangements. The similarity in proportion of the main interior space of the *naos* of both Artemision 'D' and the Archaic Didymeion, namely 1:3, and the 1:1 proportion of the *pronaos* of the Archaic Didymeion - still using Gruben's (1963) plan - is notable. It seems as if there is a definite correspondence in the manner of ordering building plan forms and capital form. There was however much more. Apart from the use of significant proportions regarding relationships between column diameters and column interaxis and intercolumnation, analysis of the First Generation Ionic Order has shown that the noetic control went far beyond the simple use of a planning grid for co-ordination of columns and walls, but transcended the plan into the third dimension.

3.3.7.4 Integration of the Ionic capital in the proportional syntax of the first generation Archaic Ionic Order - A quantitative analysis

In order that the relationship between the Archaic Ionic capital and the Order in which it appears may be

elucidated, the author deems as adequate for the purposes of this study the inquiry into quantitative relationships between elements of the first generation Ionic façades only. (Not included is the identification of typological developments within distinct morphological developmental stadia). Mention will be made to documented examples of Archaic Ionic buildings after 525 BC, but as mentioned before the analysis of all Archaic Ionic buildings still requires a lot of attention in the archaeological domain: A synopsis of all Archaic buildings including all relevant dimensions, along the line of Wesenberg (1983a, p.105), is a necessary tool and is identified as a future research goal. The building dimensions included in Table 1.5 in Appendix 1 is initially used for calculating the relationships.

In Gruben's (1963, p.89,127, 138, Fig.21, 38) work on the proportioning of a few elements of the Order of the Archaic dipteral Didymeion (Bld-6d) together with its capital, the interaxial and intercolumnial proportions of a few other Archaic buildings are also dealt with in terms of column diameter (which results were revised in his [1996, p.74, Fig.17-8] later work). Furthermore, the relationship between the Didymeion's capital and Order, as well as the integration of the epistyle in the ordering system of the total building, is demonstrated in his work. Due to the loss of the epistyles of most of the first generation Ionic buildings, a similar interpretation which includes epistyles cannot be performed for all Archaic examples, but inquiry into the nature and chronological tendencies of proportional relationships between the elements of the Order below the epistyle, and the capital's role therein, is still possible. The First Dipteral Heraion (Bld-1d) with a torus capital from column group 'E' (shaft length hypothetical) is added for interest due to its important role and position in the chronology - the timber bracket's role cannot be included. The Demeter Temple at Sangri (Bld-29) is excluded due to its lack of Ionic capital, but with due acknowledgement of its importance in terms of transference of Ionic design principles.

Table 3.13 Discernable proportional relationships in the façades of pre-525 BC Archaic Ionic buildings.

Building	1d	12b	3d	12c	2d	21	6d	22	23	1e	26	27	28
	Heraion	Oikos W	Dionysos	Oikos E	Artemision	Myus	Didymeion	Nax Stoa	Palati	Hera IV	Pharai	Ermeakroin	Temple A
Y/R	0,96	72	86	88	76	83	79	73	not measrb	0,79	87	86	0,81
OSLM/R	6,51**	12,25*	1048	779	12,0**	12,00	1180	893	not measrb	10,54	1200	not measrb	9,23
Z/R	3,26 [E]	67	530	609	332	425	320	667	271	250	370	456	3,12
T/R	2,26	592	430	475	232	325	220	550	171	150	270	356	2,12
Z/OSLM	0,5	0,4	0,5	0,78	0,27	0,35	0,27	0,75	not measrb	0,24	-	not measrb	0,33
X/OSLM	0,32**	41	35	63	0,17**	20	13	60	not measrb	0,11	18	not measrb	not measrb
U/A	2,14	273	129	240	70	65	60	234	not measrb	0,55	70	204	not measrb
X/C	2,37	419	220	411	154	124	91	425	not measrb	0,88	150	349	not measrb
Z/A	N Appl	373	229	340	170	165	160	334	not measrb	1,35	170	304	not measrb
Z/C	N Appl	519	320	511	254	224	191	525	not measrb	1,88	250	449	not measrb

The proportional relationships derived from Table 1.5 in App. 1, together with the key to the symbols of building elements used, are chronologically put in Table 3.13 above as decimal values (the demands of the calculations, as well as space limitations, prohibit display of the relationships as fractions as would have been used in the founding context originally, but those fractions that are whole are easily discernable. Graphs showing all proportional trends visually are similarly precluded through space limitations). A few aspects need to be

highlighted. It is very important to note that all proportions are from outer colonnades - including the new *Oikos* west prodomos reconstruction - in order that comparative deductions are possible. The exterior west façade columns of the Naxian *Oikos* show an extremely slender start for Ionic columns, emulated - in the range above 1:10 - by most of the other buildings apart from the First Dipteral Heraion (Bld-1d, included for illustrative reasons only, and out of its chronological order), and also the three profane buildings, ie the *prostōon* of the Naxian *Oikos* (Bld.12c), the Stoa of the Naxians at Delos (Bld.22 - using the dimensions of Hellmann *et al* (1979)), and the *Enneakrounos* at Athens (Bld.27) where the ratios fall far outside a pattern that seems to emerge for the temples.

Due to the realities of the *prostōon* addition of the Naxian *Oikos* the slenderness ratio [R : OSLM] is far less than the other first generation temples, and is not very suitable to use in determining trends. Therefore one may say that the Stoa of the Naxians and the *Enneakrounos* building seem to follow a similar pattern, indicating the use of a proportioning system for profane buildings quite different to that of temple buildings. The author early on realised that the inner colonnades of Archaic Ionic architecture were quite more slender than the outer ones, a fact also mentioned by Gruben (1996, p.74; 1997, p.347). The column diameter : column height ratio [R:OSLM] of 1:13,27 of the *Oikos* (Bld-12b) interior column, as opposed to the exterior of 1:12,5* (* so designated by Gruben (1997, p.348) whilst his dimensions give a result of 1:13,25), should be seen in this light, and we should not forget the known, more daring interior columns - the extreme being at Sangri, Naxos (Bld-29, not included above because of its style characteristics) - when looking at the nature of Ionic column design. The chronologically placed R:OSLM ratios in Fig.3.4 below, are discussed to illustrate the amount of experimentation in first generation buildings. Note - 'Others' refer to dimensions from Table 1.5 in App.1, and stated as relationships in Table 3.11, and 'Gruben' refers to new work in Gruben (1996, Fig.17) and (1997), as provided in App.1, Table 1.6.

The ratio starts at 1:12,5 [*13,27] and would hover between 1:10 and 1:12 for the temple buildings - except for the First Dipteral Heraion (Bld-1d) - seemingly close to a canon, and a with daring approach to column slenderness at that. However, from latest research of the Dionysos IV temple (Bld-3d), shown - but not fully published - in Gruben (1996, p.74, Fig.17), and from re-evaluation of the Artemision 'D' (Bld-2d) column height - using the spira rather than plinth as *vestigium a la* Gruben (1996, note 40) [or column below the apophyge, *a la* Wesenberg (1983a)] - as well as the other revisions of column height in Gruben (1996, Fig.17), all shown in Appendix 1, Table 1.6, our Fig.3.6 below clearly shows a more experimental curve in the ratios, and there almost being two distinct column types. These are the very slender and the rather squat, but with the whole being very 'uncanonical' (Wesenberg (1983a, p.105) reached a similar conclusion for both column diameter types [ie *UD* and *ud*]).

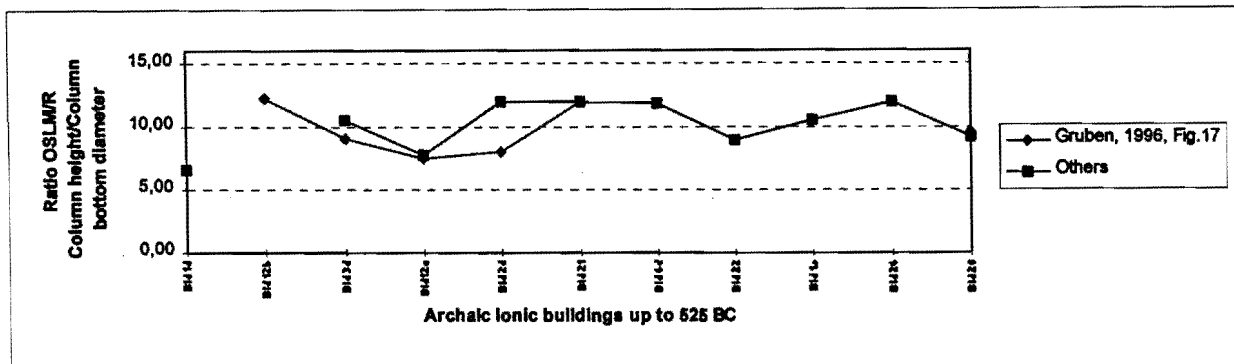


Figure 3.4 Chronological trend of column slenderness ratio of relevant Archaic Ionic buildings up to 525 BC.

If the relevant early, monumental votive columns are added to the list in Fig.3.5 below, it may be seen that

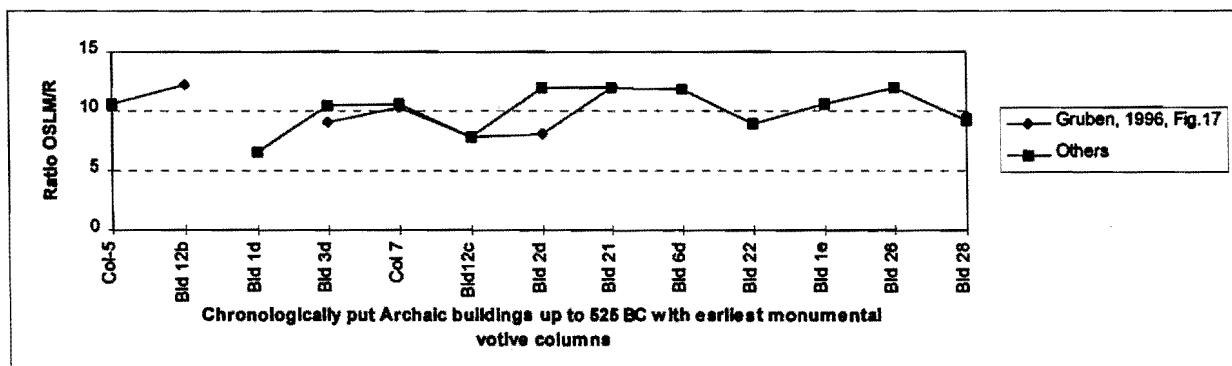


Figure 3.5 Chronological trend of column slenderness ratio for Archaic Ionic buildings up to 525 BC together with the earliest Ionic monumental votive columns.

they remain in the higher group of over 1:10, possibly indicating in the artistic *scenario* a lesser anxiety regarding bearing failure due to constructional forces, or alternatively the aspiration towards greater visual effect in the *temenos* space. The reader may peruse further trends for other ratios in Table 3.13 or App.1, Table 1.5-6. Looking at the role of the capital in the façade proportions in Table 3.13, the temple buildings show that the proportions of Capital length : Distance between capitals (A:U), Capital bearing length : Distance between capital bearing length (C:X), Capital length : Column interaxis (A:Z) and Capital bearing length : Column interaxis (C:Z) all show a relative decrease over time, again the profane buildings excluded. In order to shed light on the technical versus aesthetical, form-related nature of the design decisions involved in the design of the Ionic capital, one has to look at the relationship between Capital length (A) : Interaxial column spacing (Z) together with the relative capital length from ratio A : H (see Chapter 3, Table 3.1, Fig.3.1) in order to gain an integrated answer. (Even though there are still many other variables that come into play in the design of the Ionic Order, like inclusion of aspects like roof weight, architrave sizes and so forth, evaluation of these are not possible due to the lack of evidence). The author's analysis of Archaic

capitals as a whole and more specifically the Archaic architectural capitals in terms of the ratio of A : Z and A : H indicate that, in Archaic Ionic architecture, the biggest factor influencing the declining ratios is the columns that come relatively closer over time (ie decreasing beam spans!) rather than the decrease in relative capital length, within a very limited range. Conversely, the approach towards the dimensioning of relative capital length is concurrent with evolution in terms of structural understanding, but with a realisation of the boundaries of propriety in terms of proportion. The interesting aspect of the evolution is that there is a definite predilection to the demands of an aesthetic programme taken into account, showing that one cannot define an Hellenic building only in terms of structural performance. The juggling act that the Ionic capital had to perform in its architectural format comes to the fore.

When one looks at the given examples of proportional relationships in Table 3.13 above, or on Gruben's revised work (shown in Appendix 1, Table 1.6), but in terms of fractions rather than decimal values - fractions may be easily discerned - it becomes clear that many of the proportions show that they had been premeditated and were devised to fit into a wider aesthetic schema. This is particularly obvious for the proportion Column diameter : Column height (R:OSLM). In Table 3.13 the relationship Column total height : Column interaxis (OSLM:Z) there was a very high incidence of simple ratios, but in Gruben's revised work shown in Appendix 1, Table 1.6 this simplicity does not appear any more. In terms of the relationships Column total height : distance between capitals (OSLM:X), Column diameter : Column interaxis (R:Z) and Column diameter : Intercolumnation (R:T) - Bankel (1983, p.92-3) again stresses the importance of the use of simple proportions here - as well as Capital bearing length : Distance between capital bearings (C:X) and Capital bearing length : Column interaxis (C:Z), there are frequent significant relationships in both versions of the work. This indicates a high degree of interrelationship between elements of the Order which includes the capital, and from the early examples of Ionic architecture. Buildings where this interrelationship seems to have been applied most are the Artemision 'D' (Bld-2d), the Lower Temple at Myus (Bld-21) and the *Enneakrounos* (Bld-27). However, the still hypothetical nature of some of the dimensions on the façades of these buildings asks that these conclusions be reviewed in future. The tentativeness of façade design (below the epistyle) on the Dionysos IV temple (Bld-3d) and the Archaic Didymeion (Bld-6d) is curious, given the rigour found in the execution of the plan and elements of the first, and in the full Order height and the plan of the latter, as found by Gruben (1989; 1991; 1963).

From the analysis of capital proportions earlier, it may nevertheless be shown how the complex sets of proportional groupings present in the Ionic capital are brought into relation with the total Order by means of manipulation of the proportional sets which include the dimension of the column top diameter. From this interpretation, as well as the interpretation above relating to both modular dimensioning and proportioning of the Order, it is indicated that the capital element was fully integrated in the design of every example of the Order from the conceptual design stage. The reader will follow that, with the new slant Gruben (1996; 1997) has placed on the issue, revisions to the above deductions will have to be made in due course. Whilst

the column lengths (OSLM) and column diameters (R) are provided by Gruben, he does not revisit the other façade dimensions - whilst he does so for the Dionysos IV temple [Bld-3d] column spacings - which brings the analysis in question. Furthermore, revised dimensions of many others are still in the process of being readied for publication. With this in mind, the author desists from further work in this regard, whilst reiterating Gruben's findings that the early Ionic buildings were definitely uncanonic when seen as a whole. This is likewise reflected in the capital design.

The documented examples of full façades [ie Order and pediment], namely the Archaic Didymeion (Gruben [1963, p.158] including Schattner's [1996, p.1-23] contribution), as well as Temple 'D' at Metapontum (Mertens [1979, p.114-5, 130]), show the amount of pre-meditation relative to in-process adjustment, and fully expose an extent of noetic control in Archaic Ionic architecture that was previously not deemed to be there (eg by Coulton [1977, p.71]). The present study has shown that the intricacies of proportioning in the full Ionic Order are not revealed so easily. Future testing of Coulton's (1975, p.71, Fig.1) graphic explanation of the design framework underlying the proportional relationships inherent to the Ionic Order, from the combined information compiled in this study (and augmented by work on the other post-625 BC Archaic examples as are available, as well as that of Fifth Century examples like Mertens (1979, p.138-9)), and further re-examining the role of the Ionic capital within that framework, is herewith identified as a fruitful field of future research. This work should also be extended to test, from a fuller sample, the format now devised for the columnar portion of the Order by Wesenberg (1983a). Such a study will make a great contribution to the understanding of the early Ionic Order and its evolution in the early Classical examples. For now one may say that some of Coulton's conclusions seem to be corroborated from the contribution made in this study, like his - well known - indication of the prevalent use of the column diameter to determine the column height, but his statement that "the rules for Ionic temples are far from being modular" (1975, p.71) does not seem to do the first generation examples justice. One may also refute Coulton's (1977, p.71) statement regarding the lack of design method (apart from close co-ordination between column axes and *naos* wall axes) in Ionic architecture until the Hellenistic period. From the discovery of detailed working drawings of the columns of the Didymeion III on the *sekos*'s interior walls - one refers to the drawing and photographs in Tuchelt (1986a, Fig.2-3) and also Haselberger (1983) - the later sophistication of premeditated design is now clear to see in another graphic dimension, and the author has come to the realisation that this method of design had its precedents in the Archaic period, which included capital design.

Both the Ionic and Aeolic architectural capital had as task the transference of weight from a linear horizontal epistyle to a vertical round column, in a way explaining their shapes. Was the one shape more driven by structural efficiency than the other? In terms of the relationship between structural performance of the Aeolic and Ionic capitals, Betancourt (TES, p.131) aired the opinion that the earlier Aeolic capitals had to carry a lighter timber entablature than the early monumental Ionic temples. In his analysis he finds that,

possibly to be able to carry increasingly bigger loads, Archaic Aeolic capitals become increasingly longer (at the top), in other words more horizontal in nature. Kirchoff (EIV, Table 1.5, 2.5, p.205) has found that the converse is true for the Ionic capital, namely that capital lengths actually decrease over time. It is apparent, from studying the Ionic and Aeolic buildings involved, the immense differences in form types, of scales employed and of materials used for the columns and entablatures for different building projects, that a simple analysis like the above is meaningless if any insight is to be gained re the relative length and structural role of capitals. Both these analyses do not relate capital length to any portion of the buildings. It was decided to test Betancourt's findings again, but in a contextual sense, and to relate it with newer analysis of Ionic capitals as derived from this study. The author's analysis of trends of Ionic capitals in Chapter 3, using the relationship Capital length : Capital bottom bearing diameter (A: H [Used because of a lack of column top diameter dimensions]), tries in a simple way to relate capital size to their built context. As mentioned, they indicate that this relative Ionic capital length decreases over time. Within this framework the decrease may be seen in two phases: The pre-550 BC relative capital lengths remain constant around 2,5 x column top diameter, and the post-550 BC relative capital lengths remain constant around 2,0 x column top diameter. Similarly, the decrease also occurs for the relationship Capital bearing length : Capital bottom bearing diameter (C:H). In terms of the relationship A : Z (Interaxial spacing) it was shown that it was actually the column spacing which became increasingly inefficient in a structural sense, rather than the capital design.

According to the author's similar analysis of the ordered group of Aeolic capitals in Table 3.14 below, the

Table 3.14 Ratios H:A and H:C for chronologically ordered Aeolic capitals.

Aeolic Capital	Date	Ratio H:A	Ratio H:C
Aeol-3 Larisa building	575-50 BC	1: 3,05	1 : 2,07
Aeol-2 Neandria temple [Larger front capitals]	ca 550 BC	1 : 30	1 : 1,26
Aeol-4 Larisa Old Palace	550 BC	1 : 3,17	1 : 1,89
Aeol-5 Klopodi temple	530-500 BC	1 : 2,8	1 : 1,83
Aeol-6 Klopodi/Mytiline temple	Late 6th Cent BC	1 : 3,2-5	1 : 2,0-17
Aeol-7 Eressos building	550-500> BC	1 : 1,88	1 : 1,52

finding was made that capital lengths, relative to column diameters - again expressed as capital bottom bearing diameters due to the reason stated before - remained fairly constant in the Sixth Century, and rather getting smaller to the end of that period. There is a definite correspondence between the trends in Ionic and Aeolic capital design in this regard, refuting Betancourt's finding. In terms of the relationship Capital top bearing length : Capital bottom bearing length (C: H) for Aeolic capitals, there is also a decline, but much more visible and steady than the previous analysis - however with the Neandria temple showing a temporary experiment with carrying the epistyle only on the middle spandrel, rather than using the volute palmettes as well as elsewhere on the top level. Again Betancourt's finding is refuted. Sadly there is not enough material evidence - even with the new plan of the Temple at Neandria by Wiegartz (1994) - and detail to

repeat the façade analysis, using the proportions A:Z and A:H to look at efficiency evolution of Aeolic structural design and its relation to aesthetic predilections. It is therefore at this moment still not possible to state whether, structurally speaking, the Aeolic and Ionic capitals functioned differently in the two systems, and whether the Aeolic was more structurally efficient than the Ionic, which became more aesthetically efficient in a stylistic system where the structurally efficient form and size of the capital, relative to other elements in that system, had been relatively fixed at a quite early stage - at least as far as the capital's relative length was concerned, but not the top bearing to bottom bearing height - but where column spacing was structurally less efficient over time.

3.3.8 Recapitulation

The typological analysis increased knowledge on capital form design and manufacture. There is more insight into the tectonic nature of the capital and its context which meshes with other previous studies, as well as the manner in which capital design was achieved by rational means on the originating block form. There is more clarity about the subproblems that every side of the block presented and the resolution that was required before the execution of the work could start, for example the size and proportions of the volutes and the geometry of the spirals, the inner diameter of the bolster and its co-ordination with the echinus, as well as the diameter of the echinus and its co-ordination with the volutes. Coupled to this, there is an increase in understanding of considerations of a three-dimensional character, like the co-ordination of the angle of transition (called α) from the capital top to bottom bearing surface with the overall capital proportion, together with the size of the individual elements that make up the capital element. The study considered the formal collision of two façades at the corner of a building, as defined by the corner volute. There is greater understanding of the importance of the considerations that spring from Ionic capitals' functional contexts: In votive columns the considerations being the resolution of the size and proportion of the capital relative to the size, proportion composition and weight of the artifact that was carried, as well as to the size and slenderness ratio of the column that bore it, and in architectural capitals the integration within the total Order. From this analysis it becomes amply clear that the capital should be seen as an element that was fully integrated in the total design of the column from the time of the conceptual phase of the design, and in terms of proportions, that it was a very active partner in the aesthetic presence of the totality of the column. The typological analysis also provided new insight into the relationship between Ionic and Aeolic capital proportions.

3.4 CHAPTER CONCLUSION

The aim of gaining typological understanding of the relevant artifacts was achieved through interpretation of an ordered *corpus* of early Ionic capitals from a typological and contextual perspective, and current interpretation has been altered and increased.

CHAPTER 4 - TOWARDS THE FOUNDING OF THE ARCHAIC IONIC CAPITAL

Sub problem 3 To describe the process of form-making during the founding process and to isolate those remaining aspects necessary for the construction of a probable founding narrative for the early Ionic capital.

Hypothesis 3 Discernment of significant elements of the achieved ordering and analysis of the early Ionic capital and related artifacts will provide a basis for a future formulation of a probable founding narrative for the early Ionic capital.

4.1 TOWARDS A FORMAL SYNTHESIS: THE EARLY IONIC CAPITAL

4.1.1 Design of form: An evolution from voluted non-standard to standard Ionic capital

4.1.1.1 Early experiments with articulated form

In the Geometric and Archaic religious buildings, in which timber columns rest on stone column bases, we find at the Phase III Dionysos Temple (Bld-3c) at Iria of *ca* 700 BC the first known Hellenic architectural use of marble, together with a conscious attempt at formally articulating the base form. This detail, as well as the detail of square stylobate stones under the columns and [the proposed] formalisation of wall copings, encourages one to ponder the probability for the use of stone capitals, like stone disks or brackets, rather than timber (The form proposed by Gruben (1996, Fig.2)). Because the extensive archaeological remains, which allowed for detailed reconstruction of the four phases of this building, do not show up any such stone pieces, the use of timber apparently is a foregone conclusion. Whilst we know that Hellenic sculpture in stone emerged roughly in the same period, the lack of stone capitals for this temple demands that we should see this attempt at architectural articulation of the bases as explorative and in advance of similar experiments with the rest of the column. The aforementioned information also requires us to reconsider the probability of the use of timber construction for the column-beam connection, which in the tradition of half-timber construction, was most probably a bracket with volute decoration of differing types [*intaglio* or metal appliqué, noting that at this point there is nothing with which to prove that the bracket would have fully formed, hanging volutes]. The use of round timber columns in this building, as well as the scale of the temple, unfortunately opens the debate again. As a start, a more informed speculation of the type of capital used for this temple may possibly come from working backwards from the earliest known examples of Hellenic stone voluted capitals that we have, namely those from Delos [Preion-1] and Didyma [Preion-2].

From our chronology and description of buildings in Chapter 2 it appears that any evolution of voluted capital design before these two could have occurred in the colonnade of the Artemision 'B' (Bld-2b), the prostyle of the *Hekatompedos* II (Bld-2c) at Samos, the hypothesised amphi-prostyle Temple 'X' (See Note on Table 2.6)

at Delos of which no remains exist, and the single column in the pronaos of the Older Athena Temple (Bld-9) at Miletos (The typology of the temple with gorgon on Paros, identified by Gruben [1997, p.411] is not known. See Note on Table 2.6) Whilst the colonnades of the first two examples are deemed to have been all-timber structures, there are no stone remains from the colonnade of the Delian example and the interior or *in-antis* column of the Miletian example to prove the existence of stone voluted capitals before our oldest known stone examples. All this speaks in favour of a timber capital for our Iria Phase III (Bld-3c) temple but, just to argue the case, others could argue that any extant stone bracket capital examples may have been so fragmented as to hamper identification of the remains as being parts of capitals, identification already coloured by a view that Seventh Century architecture necessarily employed timber bracket capitals.

It is necessary to look more closely at our first known examples of stone voluted capitals from just before 600 BC. Both occur in a tradition of articulated architecture with rectangular/square timber columns, rather than round. The stone bracket capital Preion-1 (supposedly from the amphi-prostyle Artemision, Bld-14) of Delos would have rested on a rectangular column of *ca* 130 x 450 (The short side on elevation!), and the stone bracket capital Preion-2 from Didyma, also on a timber column, but of unknown dimension. (Whilst the depth of the capital fragment has never been published, and the length remains speculative, the photograph would suggest a rectangular column with the long side on elevation). One sees that this architecture already had two distinct capital types, one longer stretched out type with Height : Length (G:A [*Gesamt Höhe Volute: Gesamt Länge Kapitell*]) = approx 1 : 2,5 and with smoothly descending volutes (hereafter to be formalised in the design of the Naxian sphinx column and the Dionysos Phase IV temple at Iria, and at the one end of the spectrum of preferred Archaic capital lengths shown in the analysis in Chapter 3), and the other shorter and deeper (If the length is correctly reconstructed from the fragment) with Height : Length [G:A] = approx 1 : 2,0 (Being at the other end of the preferred Archaic capital length spectrum) and with what already appears as a rudimentary abacus (an architectural capital form type later formalised in the design of the Naxian *Oikos* which, although it is more stretched out [G:A = 1:2,7, not least due to the demands on capital design posed by the use of round columns], still showed the distance between volutes being shorter than the depth of the bolster, rather than longer). Furthermore, both capitals are not very plastic in their execution, indicating a very exploratory phase of the form in a period when some form of softness in execution had already been achieved in sculpture through the use of chisels and abrasion techniques. Importantly, there is no chance (Again if the supposed length of capital Preion-2 is correctly reconstructed) that any decoration in the middle section of the *canalis* could have been of the vertically ascending volute channel ascribed to the Aeolic/Aeolicising capital type. The capitals are clearly of a different outline, horizontal, and in short, 'Ionic'. Whilst these forms may be said to mimic block-like timber forms, it is known that the nature of Early Archaic stone-work technique was itself very dependent on and closely resembled the earlier tradition in timber, making such a supposition less certain. There will be later discussion of the later effect these capitals may have had in the design of block-like Archaic Ionic capitals, most notably those from Athens.

Firstly one realises from these early capitals that one has to do with the beginnings of a type, rather than an evolved type. Again the argument for the capitals of the Dionysos III temple being timber is strengthened. However, an equally important realisation provided from analysing this voluted stone bracket on a rectangular support is that, in accepting the existence of similar capitals in the parallel tradition of architecture with round timber columns, it is exactly the use of a round column wider than the *canalis* which must have prompted the introduction of the stone disk form (an echinus or cyma) between column and *canalis* of the standard Ionic capital form. (A *canalis* wider than the column would obviate the echinus, as capital Iver-3 clearly shows). One will have to reach a conclusion about whether the fact that we have no relevant remains of stone [echinus] disks in the archaeological record for architecture with round timber columns, means that the record is not representative, alternatively that early stone bracket examples for round timber columns - of which we have no extant examples - could have been placed on the column tops without echini (asking how these column tops would have been protected), or lastly that the evolution may have occurred in the parallel tradition of votive column design, where any archaeological find of a round stone disk may not have lead a researcher to the conclusion of a composite column form? Until remains are brought to light, any conclusion must remain pending. Some of these questions will however be taken up in the last section of the Chapter.

Whilst it is tempting to ascribe an Ionic capital to the [surmised amphi-in-antis] 'Marble *Hekatompedos*' at Ephesos from the turn of the century, knowledge thereof and the remains of the building are too scant to pass any comment at this point. There are no known traces of columns for the exterior, however their potential presence may not be ignored in future research. Like for Walter-Karydi (1987, p.49; 1994, p.128), it was and still is,tempting to hypothesise an Ionic capital for the monumental stone column of Ionic type from Kolonna (See discussion Chapter 2, Col-8), dated to 620 BC due to the detail of a sphinx sculpture deemed to relate to the column, but which relation cannot be proven. The date is very early for a monumental stone column of this stature and detail, if related to contemporaneous architecture and votive columns. The column may therefore be older, at the youngest just before the similar Aphaia column with Ionic capital of *ca* just after 600 BC, if the fluting detail is anything to go by. Likewise, the presence of this column should feature in future research.

4.1.1.2 The pioneering group: The earliest stone standard Ionic, Aeolicising and Aeolic examples

In order to proceed, one must turn attention to the stone sphinx column type which emerged in the Cyclades, followed by experiments in the architectural domain referring to its capital form. Chronologically seen, the achievement of a stone colonnette (Col-1) with Ionic capital (Ion-1) at Sangri, Naxos is followed by three Delian Aeolicising capitals (Iver-1, -3 and -4), also a first attempt at monumentalisation of the capital (Ion-22) at Aphaia, Aegina (Col-5), and another contemporaneous experiment in Ionic capital design from Naxos on Delos (Ion-4; Lost votive column), all in the early Sixth Century BC. These early examples are joined by the first architectural application of the Ionic standard capital on Delos (Ion-24; Bld-) and a capital of a lost votive column from Naxos (Ion-9), both showing a steady evolution towards a monumental form of the type. The

Cycladic examples alone indicate intense experimentation within the period of a decade, followed by two mature, contemporaneous Naxian works, namely the Dionysos Temple IV at Iria (Ion-7; Bld-) and the Naxian made monumental sphinx column erected at Delphi (Ion-6; Col-7), both of which may be seen as the culmination of a (in itself initiating) regional monumentalisation process and the achievement of precision on a monumental scale in marble. These earlier stone experiments are preceded by examples like the palm capiteled column from Arkades, the small *kouros* column from Thebes and the monumentalised Samian stone kettle-stands with torus capitals (Tor-3; Col-9 and Ion-4; Col-10), and also accompanied by others, like the Aeolic architectural experiments at Old Smyrna (Aeol-1; Bld-Aeol3) and Larisa (Aeol-3; Bld-Aeol8), a supposed Aeolic leaf-cyma capital from Phocaea (Cym-8) and an architectural experiment with torus capitals at the First Dipteral Heraion at Samos (Tor-1; Bld-1d). All these capitals will also receive their share of attention.

4.1.1.3 Samian experiments in column type - A new formalised stone capital in the Ionic sphere

From the context in which Buschor (1930, p.46) describes the age of the earliest known stone kettle-stand column type from Samos (The example Col-9 being a smaller stone imitation of the real stands), a date at the end of the Seventh Century seems to be indicated. In the changes required in monumentalising bronze monumental kettle stands (Fig.4.1.3) as such stone stands (There is no evidence for the timber-and-bronze phase posed by Kirchhoff (EIV, p.148)), the attention given to the connection between shaft and kettle-form remained. The Samian kettle-stand replica's smooth column shaft, itself ended with a turned smooth 'rundstab', is topped by a rather disk-like torus shape (Tor-3), faceted by chisel on a turning-wheel (The turning marks may also be seen on the shaft). Column and capital detail alike are clearly derived from the technique employed to manufacture them, and importantly, show clearly articulated parts. The larger scale kettle-stands may very well have had separate shafts and tori. This example makes it clear that the disk-like torus shape was a very early part of the Ionic stone form vocabulary. One must indicate that, whilst this column-capital ensemble was the product of a turning wheel, the making of a simpler disk shape is not dependent on it, and in other artifacts could have been manufactured earlier. Whilst this artefact manifests the disk-like echinus form as connector form-type to be used in further evolutionary experiments in round-columned architecture and in votive columns, one would want to during the course of the analysis explore further whether the disk-like capital shape could have referred to earlier stone disks on round architectural timber columns, or to a previously evolving timber sphinx column type.

4.1.1.4 The Cycladic achievement - the datum for the stone, standard Ionic capital

In looking at the achievement of the datum of the Ionic standard capital, we must first visit some relevant and important finds, the first being fragments of a stone column for a *kouros*, harking from Thebes [in Attica] (See Ducat (1971, p.386, No.386, Plate 131 No.239)). The illustration shows a smooth torus capital monolithically fixed to an unfluted column, and on top of this, a long rectangular tablet for fixing the statue's feet. There is

no established date for this piece, but Ducat himself - and also Kirchoff (EIV, p.164, Note 563) - sees this piece as a pre-form for the (to him oldest) Ionic votive column from Delos (the one with capital Ion-4, which harks from *ca* 600 BC). Ducat therefore sees the piece as existing before the Sixth Century BC. The important aspect of the form, being a horizontal base for a standing *kouros*, is the combination of disk torus and horizontal element, two of the main components for the Ionic capital, as completed form just waiting for the addition of volutes to the side of the cubic tablet form which would result in the early capital shape like the oldest one from Naxos (Ion-1). This idea is strengthened by a specific illustration from pottery shards from Perachora of 650 BC (as shown in IDO, p.403, Fig.139), where a very similar column with torus (Either completely stone or stone torus on timber column), carrying a rectangular tablet, is portrayed.

The position of the Sangri votive colonnette capital (Ion-1; Col-1) as the datum for the Ionic standard capital form is indicated by its established date. Its position as datum has, up till now, not been challenged. This capital is contemporaneous with the two stone voluted bracket capitals on rectangular columns from Delos (Preion-1) and Didyma (Preion-2), but precedes the earliest known Aeolic stone capital experiment at Old Smyrna (Aeol-1, dealt with later). The Naxian achievement, incorporated in defining this specific form, cannot be overemphasised. Because of Gruben's (1989; 1996) assertion that the Sangri colonnette is a stone concretisation of a preceding timber form of Ionic architecture, it begs the question regarding the form of a timber Ionic architecture with round timber columns - like that of the Older Athena temple (Bld-9) from Miletos mentioned above - be further explored. Such an exploration follows this section in Chapter 4, and will be brought in relation with artifacts from the minor arts, like the Thebes column and others. For now there is concentration on the capital form of the Sangri colonnette (Col-1), in order to establish its role in the contemporaneous and further evolution of capital form, as well as leads regarding its possible heritage.

Similar to the contemporaneous small stone Samian imitation of a kettle-stand (Col-9), the Sangri colonnette's shaft and capital are monolithic. Due to the round section (actually oval, incidentally then not literally referring to a round timber column derived from a tree-trunk) of the votive colonnette's column, the monolithic connection between capital and column was a design issue quite different from the rectangular connection between the Delos (Preion-1) and Didyma (Preion-2) capitals and their rectangular columns. The torus echinus of capital Ion-1 is both physically and visually very much part of the column, with the capital façade at first glance appearing as a rectangular tablet with large, U-shaped, hanging additions. Seen as a three-dimensional object, one sees that the U-shapes are cylindrically shaped bolsters with vertical sides terminating in an overhanging ridge at the top. The vertical bolster sides are the result of the obtuse angle in which the volute side meets the top bearing plane as well as an additional increase of the top bearing surface through the addition of angular pieces at the top edges of the bolster cylinder [Such extension of the top bearing plane, ie by means of abstractions of the bolster palmette motif, was already common in non-Hellenic Aeolic examples preceding this capital, eg Shiloh (1979, Fig.11.E, Plate 13.3, 15.2)]. The reason for having a different capital shape than Preion-1 and -2 through elongation of the capital's top bearing surface is obvious (as is possibly

the width), if one takes the function of the column into account. Kirchoff (EIV, p.177) rightly argues (and this will be taken up later) that the capital shape was dependent on its function as statue carrier (specifically a sphinx statue). Although the capital totality could be read by some as a block with U-shaped forms suspended from a horizontal top part, as for a much younger Aeolicising capital from Delos (Iver-3), on closer scrutiny one realises the intention: The capital is a unified form, but reached through a composition of discretely separate well known elements: A discretely articulated, linear canalis element (used for the inscription) with two volute elements (also used for inscription), complete with volute-angle spandrel palmette, added quite abruptly (with an offset) onto both sides of the canalis. (Further discussion of this offset-type of connection of volute element and straight canalis will appear in the analysis of other examples later on). If the angular pieces on the bolster top were to be, visually speaking, 'removed', the so-articulated volute sections appear, in shape, exactly like the volute elements (with spandrel palmette in the canonic position at the opening of the volute) used as decorative elements in Cycladic minor arts of the Orientalising period immediately preceding the manufacture of the capital (eg Hampe *et al.*, 1981, Fig.260 [Thasos Museum] and Schefold, 1966, Fig.10 [National Museum, Athens]). From this 'deconstruction' of the capital form the remaining canalis section is isolated as a vertically thin and horizontally very short element. This visual reading is to become important in the argument regarding the probability of the Sangri capital (Ion-1) exactly mimicking a timber Ionic pre-capital, an argument in which older, hypothetically possible stone capitals could also be involved. For now, from close analysis of this portion of the capital, one can state that the capital appears much more as statue plinth with added volutes, than as voluted bracket.

An important achievement of this capital is the good resolution of the connection between canalis, volute and echinus by means of the first known plastic application of the volute-angle spandrel decoration, here in the shape of a droplet or bulged leaf and little triangular pieces alongside. The offset connection between volutes and canalis needs comment: From the lack of evidence one cannot state that the use of the decorative scheme of two connected volute elements with bow-shaped canalis was known from any previous stone example, but such a scheme was a very well-known form which had been artistically transferred through many cultures from the Aegean right up to the Hellenic Archaic period in both pottery and metal examples, and also in the Cycladic artistic sphere long before the making of this capital, eg the vases from Kamini, Naxos [Naxos Museum]. We cannot therefore surmise an inability to copy the well-known bow shaped decorative line. Neither can the straightening of the bow-shape in this specific composition be surmised from a need for a straight band for lettering, because the inscription continues on the curving volutes. The offset connection was the result of the specific additive composition of form, together with the fact that the thin letter band on the canalis was dropped down to touch the echinus top so in order that there be no gap left underneath which would have been an unclear connection (and which only appeared in capital design in Attic examples much later). The use of the volute-angle spandrel element shows a similar concern for clear connections, by filling in the gap between canalis and echinus.

The volute channels are only defined by an incised or *intaglio* groove, terminating in a small, not well-defined eye. The volute surface does not seem to be referring to three-dimensionally shaped metal appliqué work, but rather looks like a rolled metalwork or clay volute with flattened surface, or else a flat metal plate with incised volute lines. Although being of flat section, the capital's canalis and volute lines are nevertheless very plastic in their expression, achieving an integration of the vertical and horizontal dimension of the capital by the size and spacing of the volutes relative to the canalis. The capital front has a very compact form, with the volute : distance between volute (D:E) ratio being 1:1,45. The analysis of the capital indicates metrication and three-dimensional co-ordination by the possible use of a 295,5 foot standard (an early variation on the Solonic-Attic foot standard of 294-6), rather than the slightly later 291,4, as well as the use of a helix spiral, a form already achieved in decoration in other Orientalising minor arts, here geometrically constructed from 90° arcs around an ordering rectangle.

The Sangri capital (Ion-1) definitely shows a search for an integration of column, torus shaped echinus and canalis, but its totality presents the viewer with a dualist content (similar to most Hellenic glyptic art in the Archaic and Classical era): On the one hand we experience the capital as a very plastic, three-dimensional form, and on the other we know it to be a composition employing the principle of addition of discrete elements based on metric order and geometric fundamentals. The appearance as sculptural unit in this case is more pronounced than in the later Aphaia example (Ion-22) and following capitals with their separate but interconnected, geometrically shaped tectonic elements. As sculptural form, the capital does show a strong similarity to very plastic metalwork forms like those from Geometric Cypriot works (Eg that shown by Matthäus (1985, No.708, Table 108); Detail drawing by H.G. Buchholz & V. Karageorghis [1973, *Prehistoric Greece and Cyprus*, London, Plate 1865b] in Shiloh (1979, Fig.48)). Whilst this similarity is strong, the vision of a flat, rectangular plate-like element - one would rather think of a plate or plinth than a bracket, which has a much larger height - on an echinus and decorated with volutes added to the sides, competes with it.

From the side capital width is slightly wider than the column shaft, and only slightly narrower than the echinus diameter. We saw above that the echinus is more part of the column than of the capital form, and even though there is a slight vertical aspect to the side of the torus bulge, it reminds of a smooth, metalwork form, or alternatively a broadly faceted, turned stone form (although it wasn't in actuality turned). The idea that the Thebean stone column example with torus (as mentioned above) could be related to the torus and the horizontal portion of the Sangri capital's canalis, is partly suggested by the small height of the Sangri capital's canalis relative to size of the torus. In relating these two artifacts, the large abacus (with engraved spiral decorations) on top of the Seventh Century BC Cretan palm capital from Arkades (Demargne, 1964, Fig.508; [Herakleion Museum]; Also see Wesenberg, 1971, p.45) should also come into play, as should possibly the Doric abacus as existing at this time. These relationships must eventually help one to decide whether Kirchhoff's (EIV) idea that the *terracotta* kettle stand with torus (some with little volutes at the connection

with the kettle), and later a hypothetical *terracotta* votive column topped with a flat rectangular tablet decorated with clay or metal appliqué work (ie the statue plinth), should be seen as precursor for the Sangri capital Ion-1, or whether we should look at timber forebears, or other as yet unmentioned alternatives. In the light of the form and position of the stone abacus forms mentioned above, as well as the analysis of the capital, it is Kirchhoff's idea of small volute additions to the sides of the *terracotta* tablet which may yet find application. Visually, this composition of a rectangular tablet with two U-shaped attachments on which the volutes and canalis were decoratively applied and placed on a column with torus element, would read as two, separate superimposed elements. This is indeed the case for the Sangri column (Col-1) which, even though made of one piece of stone, is expressed as divided into canalis and torus through the thin divisionary line below the canalis, even though this division is actually underplayed and is almost fused due to the fact that the Sangri torus does not project that much past the canalis façade. The clear expression of wide, disk-shaped echinus and narrow canalis form on top only happens later, with the capital (Ion-4) at Delos and thereafter in the capital of the Naxian sphinx column (Col-7) at Delphi. In Sangri the additive nature of the totality, as expressed through its articulation, in all probability showed the way towards the possibility of the insertion of a flatter, larger and more disk-like object between canalis and column (like the disk shape achieved in the Samian kettle-stand and the stone column with abacus from Thebes). Whilst this disk form in all probability was previously known both in Hellas and abroad, its attachment to a rectangular canalis form rather than to a column before now seems improbable: If such an element had existed by this point, the Sangri capital would surely have taken note if this invention?

From the above the author express the idea that the capital is a compositional creation rather than a mere copy of any one, already existing, *terracotta* or stone artifact, and also that it is the plate (abacus) or plinth typology, rather than the bracket capital typology, with incorporation of visual clues from other artifacts, which in the Sangri example is transformed into a more plastic additive entity. The analysis shows that whilst the idea of a long, relatively deep bracket capital is not present in this compositional creation, it may have been part of the 'memory' of a bracket in another way, namely in the sense of reminding one of the decoration on the architectural bracket capital. We also should accept that the Samian (Tor-3) and Thebean torus capitals (or similar types), or the possibility of separate stone echinus disks in hybrid timber-stone architecture, may just as well be seen as impetus to the 'bulge' of the Sangri capital's echinus rather than the 'bulge' of any pre-existing timber column. (This timber detail will be dealt with later). In terms of the Sangri colonnette's shape, the smooth, oval shaft shows a searching, voluminous and sculptural approach towards making a new form, which in totality does not owe much allegiance to timber columns or the roughly contemporaneous Thebes or Samos columns, but rather looks like that of *terracotta* or metal standers (The conical bronze plate type rather than the three-legged type described in Kienast (1985, p.384, Fig. 15-16), which existed at the time. One must acknowledge that, as regards the shape of the Sangri colonnette's shaft, Kirchhoff's choice of *terracotta* preform which tapers concavely upwards and terminates in a torus, may be right and therefore adds more weight to his identified capital pre-form. As regards the volute detail, the form expressed at Sangri leans

towards the voluminous metalwork forms found in the Cypriot bronze kettle stands, as well as in north Syrian and Phoenician clay model temples and houses, in which the scale conversion makes for very broadly rolled up volutes, but also to that of the contemporaneous stone bracket capital Preion-I of Delos, definitely reminiscent of incised metalwork. If the capital is to be seen as a xylolithic copy of an architectural timber capital of approximately 100 years before (ie of the Dionysos III temple), the fact that the capital is part of a one-off artwork in which an idea can find free expression free from the rigours of tectonic interactivity and manufacture, stands in the way of coming to a clear and rational decision. Just as the case of illustrations of architecture on Hellenic pottery, where there is artistic license in the depiction, one must be careful in the case of the Sangri capital.

From the above, the author poses that other than merely a timber voluted capital there is a series of *scenarios* for the impetus of the concretisation of the datum of the standard Ionic stone capital which must still be regarded before a final verdict can be formed. These *scenarios* will be further embroidered upon in a following section of this Chapter.

4.1.1.5 The Aeginetan experiment with monumental form

After the small colonnette from Sangri, and contemporaneous with other early Cycladic experiments described below, there is a bold attempt to monumentalise the sphinx column type at Aphaia, Aegina (Col-5). Whilst the capital of the Aphaia sanctuary in Aegina consists of many elements which are deemed to be essentially part of the Ionic standard capital, namely the (first known) cord shaped canalis, the (first-known) shallow double trumpet shape for the bolster, and an echinus completed on the inside of the bolster, it may be seen as a distinctly separate type of standard capital. The capital was clearly not conceptualised to read as a single plastic form, as the Sangri capital was (even though it was an additive composition), but was an additive junction of two simple 3-dimensional geometric forms, ie the dome and block-like bracket, together providing a tectonically plausible capital for carrying a sphinx. The capital is innovative in that the domed leaf-crown echinus, possibly referring to a metalwork appliqué crown of a timber votive or other metalwork forms but up till now not used in Hellenic monumental stonework in the leaf cyma format (The preceding Arkades capital used the palm leaf format), was paired with the simple architectural bracket shape, decorated with volutes and in the space remaining above the dome, with a cord shaped canalis. The form nevertheless visually appears to be following the dictates of rudimentary stone-cutting technique and form making. In trying to fathom the evolution towards this capital form, one must re-acknowledge that the round column with domed, metal sheathed top may have been a well-known type of free-standing timber column form, but that one requires an explanation for the combination of the dome with a bracket shape in timber votives or architectural pre-forms. Did free-standing, domed timber votive columns have volutes sprouting from the dome as in a bronze decoration from Olympia (Shown in Wurz *et al*, 1925, p.95, Fig.240 [They refer to Curtius & Adler. *Die Bronzen von Olympia*. Bd.IV, Table.XLVIII, Nr.824]). From recent inquiry it was ascertained that this

piece has still not been dated. Whilst we can in no way connect the artefact to the Aphaia capital, there are interesting parallels. The little bronze decoration shows a domed shape projecting above the horizontal elements, and with wide volute channels - much like the channels of the capital from Sangri, Naxos (Ion-1) and Delos (Ion-4)), apparently sprouting from the dome. As an aside: The volute spandrel palmette in the form of a droplet also appears in the canonic position - much like the capital from Sangri (Ion-1) - in this artefact. It is clear the small bronze decoration, part of a ritual instrument or small votive, did not carry something on top, and clearly the form was not immediately suitable as form for a sphinx-column capital. From this analysis it appears as if one should see the Aphaia capital as a new stone experiment dealing with both being a carrier for a statue as well as solving the junction between a rectangular (canalis) and cylindrical element (the column shaft). Whilst this experiment seemingly had in part an artistic timber prequel, could it be possible that the raising of the canalis/bracket surface higher than the dome top to carry an element could have related to previous architectural antecedents for this capital form, where the timber epistyle had to be carried? If so, there must have been a tradition of round columned timber architecture in which the connection between column and bracket had already been solved, a solution which would have been available as pre-form for the Sangri capital (and the Cycladic capitals following the Aphaia capital). Because this solution was not used at Sangri and soon afterwards, one may pose that the Aphaia capital seems to have been a separate experimental form, combining separate elements from art and architecture in a novel way. In itself this experimental inventiveness and bold combination of known forms is an important indication for our study, one that will be revisited in the last section of the Chapter.

In visually "slotting the bracket into" the domed echinus, the canalis decoration appears to be above and separate from the echinus, resulting in a relatively very small canalis depth in relation to the echinus, very much like the previous Sangri capital and those immediately following. Apart from this similarity, the Aphaia capital otherwise does not follow any of the main proportions of the Sangri capital. The Aphaia capital's incised volute is of the involute type, the first not to show a defined centre point. The volute and canalis together, applied as decoration, seem to refer (More clearly than the Sangri capital) to earlier traditions of incised decoration on timber brackets. Painted volute angle palmettes may have appeared on the façade for the first time in paint. This capital may have shown ordering through three-dimensional modular coordination and metrication. Cycladic sculptural influence has been indicated for the column's capital and shaft. Due to the fact that metrication may be proven in Cycladic capitals before this column, the author identified possible use of the 291,4 Cycladic variation on the Solonic-Attic foot standard of 294-296 as base dimension.

Even though the existence of a similar capital for a similar column at Kolonna (Col-8) is not an archaeological fact but archaeological speculation, a context related argument has been proposed by Walter-Karydi (1994) for its existence. Also, the fact that the early monumental columns of Ionic type were without exception used as sphinx columns, together with the existence of the Kolonna sphinx used by Gruben in his Aphaia reconstruction, poses us with a still to be solved possibility of either the very early (*ca* 620 BC) existence of

a stone, standard Ionic capital, or at least one that is contemporaneous with the Aphaia capital. In the first *scenario* the history of the Ionic capital will look much different, and require a re-evaluation of the Cycladic roots of the standard capital form. The founding context indicates an Aeginetan artistic system working in *poros* and Cycladic marble between 700-650 BC, where the Aeginetan masons were manufacturing the first Hellenic *stèle*, and were also applying representational decorative schemes to the stone. Apart from the idea that Cycladic artists often accompanied the sought after stone, the extent of their involvement in the start-up of the Aeginetan school remains speculative. The close links between Aegina and Crete, the early emergence of a sculptural tradition in stone on Crete (which in its turn was stimulated by the strong presence of Near Eastern artists there from the Eighth Century BC), the achievement of the making of a stone votive column in Arkades, Crete, by the mid Seventh Century BC, and the emergence of the idea of monumental stone sculpture in Gortyn and Prinias on Crete preceding the limestone Kolonna and *poros* Aphaia column and also a marble sphinx from Kolonna, is speculated to be the most important artistic influence in the evolution towards monumental sculptural works, specifically the evolution of the monumental column by the Aeginetan school. It has earlier been shown that the monumentalised marble sphinx from Aegina follows from earlier examples on the Hellenic mainland. From current interpretation of Aeginetan sculpture however, it seems as if the Aeginetan sculptural school was a fully fledged and influential artistic entity at the time of the emergence of a monumental sphinx statue at Kolonna, concurrent with the making of the sphinx at Kolonna (To Walter-Karydi [1994, p. 128, Note 6] apparently in 620 BC, but possibly contemporaneous with the Aphaia column), implying that many of the possible influences and preceding foreign impetus had been integrated and applied beforehand.

Apart from the innovations mentioned above, there are significant form aspects of the capital (Ion-22) which pre-empt others, like the aesthetic use of vertically inclined volute faces and the ordering of echinus leaves around the capital axis. Because it is not dealt with later, it is stated here that the Athenian capital type with domed echinus (For example Ion-67) clearly refers to the Aphaia example.

4.1.1.6 The Cycladic evolution toward monumental form

The Aeginetan monumentalisation process of the Ionic votive column occurs contemporaneously with further small scale experimentation in the Cyclades. Two marble Aeolicising columns from Delos (Capitals Iver-3 and 4), due to the material probably manufactured in a Cycladic workshop, are similarly very geometric and block-like in form, but show no indication of the sophistication achieved in the Aeginetan capital form and ordering. They have no echinus, and whilst volutes are incised like the example from Sangri (Ion-1) before, there is no plasticity on the volute surfaces. Both have bolster elements which at the bottom are cylindrical like the example from Sangri (Ion-1), but the bolster sides of Iver-3 are vertical, geometrically block-like rather than the similar but softer form of Ion-1. These forms are compositions in an outline which are approximating the thus far achieved Ionic capital shapes, but rather than being pre-forms for the standard Ionic capital

(already achieved) are searching for experiments in their own right. Importantly, these capitals appear before the first known stone Aeolic capital from Smyrna, discussed below. The bottom plane of capital Iver-4 stretches to the underside of the bolsters, and whilst this form could indicate its timber antecedents, from all appearances it may have had a rectangular connection to its [lost] column. Capital Iver-3 however has a round fluted column piece (in one piece with the capital), a detail which becomes incredibly important in the light of the now held idea (Kuhn, 1986, p.57 [Earlier Wesenberg, 1971, p.83]) that the first Aeolic capital reflects a heritage of timber buildings with rectangular columns. We apparently witness in Iver-3 a stone evolution of a timber bracket capital type in that the new material allowed the volutes to hang past the bracket form similar to the early stone capitals Preion-1 and -2, and furthermore an achieved form with 'Aeolic' capital motif which was designed for a round column, but without echinus. This means that a similar 'missing link' block like stone capital, but with 'Ionic' capital motive as decoration and designed for a round (timber or stone) column, may have existed somewhere as part of the evolutionary process. (See the author's introduction, and example in Fig.4.1.19). An important detail is again a capital wider than the round column, and the lack of echinus. Are we witnessing an Aeolic approach to capital connection here, or does this mean that historically capitals, even the timber ones, were routinely wider than the *round* columns because the disk connection was not yet used? The floral motive between the volutes of Iver-3 is a detail only copied in much later Ionic capitals, but the clear definition of the volute eye is a significant addition to Ionic capital design, oddly not initially pursued in the Cycladic sphere.

An Ionic votive column (since lost) from Naxos, dedicated on Delos, with standard capital form (Ion-4), is a contemporary to the above series of columns from Naxos, Aegina and Delos. The capital takes up the theme of the first Naxian capital from Sangri (Ion-1), in that there is a very good integration of the volute, canalis and echinus elements. In terms of proportions, there is correspondence only in the proportions B:A [*Tiefe Polster insg.: Gesamt Länge Kapitell*] and H:A [*ød. unteren Auflagers: Gesamt Länge Kapitell*]. In terms of its morphology, the capital shows the integration of various advances in capital design thus far, as well as further evolution. The volutes and canalis are harmoniously united, but a radically new design approach may be seen for the echinus. The shape is flat and disk-like. It is important to see that the echinus visually reads as being a separating, cushioning element between column shaft and canalis. It is well defined, flat and disk-like, again sticking out past the canalis side on the front and back elevations (due to the relative smallness in depth of the canalis, like in the Aphaia example), and being resolved as a continuous form next to the bolster insides, and united to the canalis and volutes by means of a flat, leaf shaped spandrel palmette, thus being the first capital where this canonical, unified composition is reached in full. Like the Aphaia capital, the capital width is less than the column diameter. The canalis which, like the others before still a very stretched out horizontal member, now has a much more bracket like form, a trend that will be continued in later Naxian capitals as well as soon after at Ephesos. The canalis bottom is still flat like the Sangri (Ion-1) example, with a hardly noticeable curvature. The volute outlines are now descending in the standard fashion, and the bearing surface is defined by two angle pieces (not palmette spandrels) where the volutes start descending, a theme

taken up in many later capitals using this device. The volute angle spandrel palmette now has a distinct leaf shape. The total capital form is flat and stretched out, with a Volute : Distance between volute [D : E {or V:Va}] ratio of 1:2,2. In respect of this formal resolution of the main elements of the Ionic capital and the overall proportion this example defines a first interim canonic phase. However, the volutes surfaces are still flat and incised like the Sangri precursor (Ion-1), but the bolster now takes up the double trumpet shape, flat-like as in the earlier example from Aphaia (Ion-22). The reconstruction of the capital shows the use of a smooth torus for the echinus shape, as the Sangri precursor. The typological analysis interpretation shows the possible use of the Cycladic Ionic foot standard of 291,4 in the modular co-ordination of the capital, and volutes geometrically constructed employing 90° arcs around an ordering rectangle. Like the early capital from Didyma (Preion-2), the volutes are not defined by a centre point, a method to be followed in Naxian examples henceforth.

4.1.1.7 The datum for the architectural standard Ionic capital - The Naxian *Oikos*

Our architectural datum for the standard Ionic capital (Ion-24), the capital of the interior and in-antis tristyle [As per Gruben, 1997] west façade of the Naxian *Oikos* at Delos (Bld-12b), which follows the above capitals, is marked by its bold new direction in terms of form. Although the *Oikos* capitals' façades are badly damaged, and no reconstruction of the echinus decoration is definite, Kaster's reconstruction (See Ohnesorg (1996, Fig.1)) allows for certain comparisons. In terms of its morphology, an abacus appears for the first time in a standard capital (Both Kaster and Courbin [1980, Fig.6, Plate 49] agree on the abacus. Martin's [1973, Fig.18] reconstruction showed an obtuse angle at the volute and top bearing plane meeting point, but for those who have not seen the capital, Courbin's photograph clearly shows the abacus). The abacus here echoes the earlier architectural use on Delos, described at Preion-1 above. The prevalent use of the horizontal connecting device in metalwork examples with proto-Ionic capital forms and linear elements above them most probably suggested the aesthetic possibilities in expressing tectonic qualities that were later expressed in the formal tectonic rules inherent to the Ionic Order and capital (Refer to the analysis completed in Chapter 3). Whilst the abacus was a common form in earlier capitals of Syria and Cyprus (Shiloh's (1979, p.19) types C and E), this artistic form may also be advanced as part of the heritage of the abacus. Due to the Ionic capital's specific physical link with the sphinx image up till now, the author would like to put forward the idea that the relatively thin linear horizontal base of the sphinx statue provided another visual clue for the inclusion of the abacus into the Ionic architectural capital, where a base for sculpture was obviously not needed, but provided a clue as to how to visually separate capital and epistyle.

The volutes of the *Oikos* capital seem to be extensions of a straight canalis element of flat section, with volutes either incised or painted. However, after the first full winding of the volute element the capital is too badly damaged to be sure of anything. Martin's reconstruction with volute spirals which consists of four complete and tightly spaced windings - with the first three known 90° arcs of the volute then ordered around a rectangle-

is pure speculation, and may just as soon have had less windings. The bolsters both have a very deep, completely smooth double trumpet shape, partly cylindrical in the middle section, but ending in a broad, flat edge on the sides.

The canalis section of the capital is very small in height, and as in the Sangri capital Ion-1, there is no definite reference to a substantial bracket element. However, different from Sangri, the relatively large size of the volutes take away any illusion of the capital being a plinth shape. Kaster's 1962 reconstruction of the capital (See Ohnesorg, 1996, Fig.1) shows a pronounced, smooth echinus, with a smoothly round rather than perpendicular connection to the thin canalis above, the resulting section of the echinus being in the shape of a 'hanging' Ionian cyma similar to the profile of the temple's east cornice (See Courbin, 1980, Plate 31; Ohnesorg, 1996, Fig.2). Whilst the detail of decoration has disappeared from the cyma, it nevertheless shows the hollowed out underside overhanging the column. This hollow is deemed to be an important detail, in that (Even though this detail occurs on an inner capital) prior knowledge of the problems of water falling on architectural façades is indicated by a cyma detail present where there was no need to express direct representation of falling leaves. From the dimensions known, the cyma bottom bearing plane actually overhangs the column top. From Kaster's drawing one may say that this torus form and its connection to the canalis does not refer to a pre-existing idea of a separate echinus disk between column top and bracket capital, which from the polster elevation would have had a perpendicular division of horizontal disk and vertical bracket face, but rather refers to a bracket fixed in a more domed shape column crown. However, Courbin's (1980, Plate 49.2) photo shows a more definite perpendicular connection, indicating a definite disk shape, indicating the existence of a definite trend in Ionic capitals excluding the Sangri capital. Nevertheless, the canalis and echinus were one, differently from the Sangri capital. One could argue that, if that capital expressed a tradition in timber architecture, this first Ionic standard architectural capital would take up and continue the tradition. Again we should come to the conclusion that the Sangri colonnette could have rather referred to the stone torus detail. Another important detail is the close similarity in width of the polster and the shaft at the apophyge. The author reads in this a correlation between beam width and column diameter, an expression of boldness in structural design, similarly echoed in the extreme slenderness of the columns (inside and slightly less outside).

Regarding its proportions, there is resemblance with the overall outer dimensions of the Sangri capital in terms of proportions G:A [*Gesamt Höhe Volute: Gesamt Länge Kapitell*], B:A [*Tiefe Polster insg.: Gesamt Länge Kapitell*] and H:A [*∅d. unteren Auflagers: Gesamt Länge Kapitell*], but other proportions give it a radically different appearance. The Volute width : Distance between volute (D:E {or *V:Va*}) ratio of the capital is 1:0,9, resulting in a very dense capital shape, much more so than the Sangri capital (Ion-1) of 1:1,45. The volutes appear huge, as a result of the small space between them and the canalis-echinus depth, and with volutes on the façade being moved in past the column width. This compact capital shape is at this early stage very much like the Late Archaic capital form. The important realisation from this capital is that the first known

architectural application of the standard type is so startlingly different from the first known artistic example. As mentioned in the discussion around the Sangri colonnette, the rigours of tectonic execution in the architectural realm bring ratio and preciseness to the creation. From the abacus length relative to the echinus bearing diameter, as well as the capital width, one sees the mind of an architect involved with tectonic issues: Forces, integration of elements in a structural whole, integration of elements within a stereometric façade composition, parsimony, and so forth. The abacus length is long enough to carry a known load, rather than to support a sculptural object (Deviation from this structural logic however occurs in the next major architectural work, the Dionysos IV temple at Iria (Capital Ion-7; Bld-3d). What is astonishing is the amount with which the *Oikos* capitals (and column shafts) are more sophisticated than that of the Sangri colonnette. Given the small time lapse from then to the start of the *Oikos*, it remains astonishing how much sophistication was gained from the time of the Aphaia column[s] and the preceding Cycladic votive columns.

4.1.1.8 Aeolic beginnings in stone

Soon after the Naxian *Oikos*, by *ca* 580 BC, there is a new stone experiment with architectural language at the Athena Temple II (Bld-Aeol3) at Old Smyrna. From Kuhn's (1986) recent re-evaluation of the building, as well as (as much as is possible) reconstruction of its capital (Aeol-1), the following becomes pertinent: The first stone Aeolic capital follows earlier Ionic examples, the capital has no echinus (the leaf cyma found at the site is the column base), the highly ornamented capital shows vertically growing, bound volute channels, and lastly also a rectangular bearing surface at the bottom. (See Kuhn, 1986, p.52, Fig.4). Whilst the opposing, bound, double volute motif clearly has a different origin than the flat, double volute motif of the Ionic capital, the rectangular bottom surface flowing from this motif is here a clear indication, much clearer than for the Ionic, that the capital form had a rich evolutionary phase as capital in timber architecture with rectangular columns. The capital design did not have to deal with the difficult transition from vertical column to horizontal canalis. Whilst the Old Smyrna temple had round stone columns, the first stone form of the Aeolic capital shows that it was still an experimental form which did not connect well with the round column top, a realisation one would never have gained without Kuhn's realisation of the more probable position for the bulging leaf cyma, namely as base element. Finally there is a further confirmation of Wesenberg's (1971, p.78, 128, 133, Note 54, Fig. 164) realisation of the importance of the leaf cyma as Aeolic base type (shown in his reconstruction of the outer colonnade at Neandria).

In the light of this new realisation of the evolutionary history of the Aeolic capital, one must see the "Aeolicising" capitals from Delos in a different light: Whilst Iver-3 used the vertically ascending volute motif it was clearly a search for form from another origin, from the Ionic capital form, but without having grasped the possibility of the connection to the column shaft with an intermediary disk form. Capital Iver-4 on the other hand, shows all the traits of having been an antecedent in the line of the Aeolic form type, immediately springing from a rectangular vertical support.

Although existing later than a few of the Ionic capitals discussed in the chronology hereafter, it is opportune to discuss the use or non-use of leaf cyma echini in later Aeolic capitals. For the architectural capital from Larisa (Aeol-3) of ca 575-50 BC, Wesenberg (1971, p.79) earlier argued, on the strength of his reconstruction of the Neandria (Aeol-2) capital-shaft-base ensemble, that the Larisa capital did not have a leaf cyma echinus as postulated by Akurgal and Martin (See Wesenberg, 1971, p.78, Notes 383-5). In the light of the now re-stated lack of leaf cyma as echinus for the Old Smyrna capital Aeol-1, and Wiegartz's (1994, p.130) identification of the bulging leaf cyma as base for the peripteros with small (side/back) and larger (front) Aeolic capitals, and an inner colonnade with leaf cyma capitals, Wesenberg's early stated opinion is deemed to be even more grounded. Another leaf cyma from this period, the cyma from Phocaea placed in the catalogue as Cym-8, was apportioned as echinus for a (missing) Aeolic capital for the Athenaion I by both Akurgal and Martin (See references at Cym-8), but in the light of these realisations surrounding the role of the leaf cyma in Aeolic architecture the piece will have to be re-evaluated. Analysis of the Larisa and Neandria capitals show that the use of the cylindrical shaft piece as bottom connection for the capital at Larisa, and later the cylindrical shaft piece and thin torus moulding for the capital bottom connection at Neandria by ca 550 BC, is yet another attempt at solving the connection of an essentially orthogonal capital form with a round column shaft, a connection only really satisfactorily solved at Klopeđi (Aeol-5; Bld-Aeol2b). From these two examples we may state that, at the early phase of stone Aeolic architecture, the capital design had to grapple with the issue of connection in a totally different way than the Ionic. We can also see that the early Aeolicising capitals from Delos were dialogues in the Aeolic tradition (One more than the other), but that after that the early Ionic capitals forged ahead without much transference of ideas from the Aeolic system, with the later Aeolicising capitals with developed echinus drew more from Ionic resolution than from the Aeolic. The startling new realisation that the Aeolic capital did not use a leaf cyma echinus, indicates that the Ionic inclusion of that form element was divorced from the Aeolic design enclave. There are two Aeolic capitals which are deemed to have had leaf cyma echini. The first is the ca 550 BC capital from Aegae (Aeol-9). Due to size and proximity the capital could be linked to a pronounced, bulging leaf cyma (possibly Archaic), but Radt (1991, p.483) indicates there is no definite proof for their connection as yet. Secondly, Martin (1958, p.125), in similar vein to his argument for the Larisa cyma, argues that the leaf cyma from Thasos, described in this study as Aeol-8, is part of an Aeolic capital ensemble. Because his argument was linked to that for the Old Smyrna capital, this idea must be re-evaluated.

4.1.1.9 The Cycladic Ionic experiment with monumental form continues

The next slightly later (lost) votive column of 580-70 BC, like the first stone Ionic colonnette, also heralds from Sangri, Naxos. Its capital Ion-9 (of which only a volute segment remains) takes up the same theme as its earlier sister capital Ion-1, namely the vertical side to the bolster, formed by a large bolster palmette, and the volutes descending in the standard way. Whilst the capital is too damaged to allow analysis of its total form and its proportions, the existing volute details show that there is a strong relationship in design with capital

Ion-1 (and also later Athenian block-like forms). The volutes are still defined by an incised line, and show a lack of defined centre point as the previous Naxian capital Ion-4 from Delos. However, here the volute channel is abraded to a concave form, and the edges on both sides of the channel have a smooth upstanding round shape on each side, almost appearing as double round beads where the volute channels abuts. This motif becomes a recognising feature of Naxian capitals. The hint of a volute spandrel palmette creates the impression that the form achieved thus far was continued in this example.

The next Cycladic examples are capital Ion-7 from the Dionysos Temple IV (Bld-3d), from the earliest ca 580 BC at Iria, Naxos, and capital Ion-6 of the famous monumental Naxian sphinx column (Col-7) at Delphi, of ca 570-60 BC. Proportionally, the capitals are related to the preceding Naxian capital Ion-4 in terms of G:A [Gesamt Höhe Volute: Gesamt Länge Kapitell], D:E [or V:Va] and L:B [Gesamt Höhe Kapitell - von oberem Kanalis zu unterem Auflager : Tiefe Polster insg.], and whilst the two are proportionally fairly similar, there are differences. Morphologically these two capitals are closely related, almost facsimiles but not quite, and with both retaining the by now achieved, integrated capital form. Through the different articulation of the echinus element, very different results are attained. Both capitals use the leaf pattern introduced in Aegina (Ion-22), but here in the Cyclades for the first time in the disk-like cyma format and with the (flat- and round-ended) leaves plastically expressed through rounded beading. In the next section below there is an expression of an idea that the leaf cyma capital type may have found its first concretisation in eastern Ionia (following the accepted chronology), thus being the source form, or if the roughness of dating is accepted, that the types occur simultaneously, as parallel stone inventions or as import from Naxos. In the sphinx capital Ion-7 the cyma leaves overhang the column top, and the column top diameter is much smaller, resulting in the leaves being read as a column crown. In the Iria example Ion-6, the leaf bottoms line up with the column top, and the column diameter is greater, resulting in an echinus which is visually much more a part of both, and in other words a separating element between canalis and column shaft. The canalis bottom beading flows into the echinus top, and the concave volute channel stops at the volute-canalisis junction, creating the impression that the canalis is a block with two added volutes (In capital Ion-10, of another Parian votive column, the example is followed, but the canalis separated with the volute channels having rounded ends, increasing the idea of a column with leaf crown, sprouting to horizontally fixed volute elements). Due to the loss of the canalis element of the Naxian sphinx column capital, the same detail as the Iria capital cannot be proven, but is suspected.

Both capitals show the, by now achieved, integration of volute, flat echinus and canalis, with all the elements mentioned being clearly articulated. However, the sphinx column capital's bearing surface shows small angle pieces to create a longer bearing surface for the sphinx statue as required, but slightly different than in the Naxian capital from Delos (Ion-9). The sphinx capital had concave volutes with double rounded beading on both sides, and the volutes were geometrically ordered around a gridded square ordering device. The Dionysos IV capital (Ion-7) has far simpler decoration, in the form of flat flutes without borders which are

divided by single round beads (misleadingly indicating older age for the Dionysos capital). The capitals show a very shallow, almost cylindrical polster form, those of the sphinx capital subdivided (for the first time) by five concave flutes which are rounded on two sides like the volute channel from Capital Ion-9, and divided by double round beads, the whole looking very much like metalwork appliqué, but the flatness and closeness to the block outlines derives from the use of local emery for the moulding and incising work. The Dionysos capital polster has six similar flutes. The bolster of the outer Dionysos capital has a deeper curve, on the face of it showing progression from the flatter curve of capital Ion-6 in terms of known progression in sculpting technique (a misleading conclusion in terms of the known chronology). Both capitals had well-defined, bordered round leaves on the echinus, but with those of the sphinx capital being more rounded. The Volute width : Distance between volutes (D:E [or $V:Va$]) ratio of the sphinx capital is 1:2, indicating in part its extreme slenderness on the façade. The same ratio for the Dionysos temple capital is 1 : 2,15, even more stretched out. If this is related to the trend in capital design in the Archaic era (App.1, Table 1.1; Chapter 3 Table 3.1; Fig 3.1) and in the First Generation Cycladic group (App.1.Table 1.3; Chapter 3, Table 3.2; Fig 3.2), the Dionysos IV capital should be the older of the two. (This shows again how the typological trendlines can be misleading). The most startling difference between the *Oikos* capital and the sphinx column and Dionysos temple capitals is this particular aspect of their frontal proportion. For the sphinx capital the length is easily explainable from the functional aspect, but the proportion can only be understood from viewing the sphinx column as a total aesthetic entity, and realising the importance of the visual effects of the base in the sphinx-and-base typology. It is put that this capital is deemed to be the maturation of the idea imbedded in the earlier example from Delos (Ion-4), and whilst it cannot really be identified as a regional canonic type, it had a lot of influence in later capital design in other regions.

Because the Naxian sphinx column as a whole exhibits almost all the traits of the Ionic Order of the Dionysos IV Temple (which is closer to the canonic Ionic form than that of the Naxian *Oikos* with its postulated conical *spirae* for the portico columns and no known leaf cyma on the echinus), it has been an issue to establish if the column preceded or postdated the Dionysos IV temple (See Gruben, 1989, p.172; Ohnesorg, 1996, p.43), showing whether architecture or the arts lead the way towards the Order. Whilst the chronology shows the architecture in this case leading the arts, some further anomalies in style development between the two capitals, over and above those mentioned above, should be pointed out: Whilst the typological analysis shows that the volute of both the above capitals were ordered in the same manner, and both show the use of metrication and modular co-ordination of elements, that of the Dionysos temple is more intense. Furthermore, the back sides of the Dionysos outer capitals show an abstracted, shorthand volute spandrel palmette. This diminishing of detail is interpreted by the author as parsimonious design in an architectural situation where repetition and speed, as well as the vantage point from which the capital is read, may discourage greater detail. The sphinx column, being a single artistic monument, demands a far greater amount of detail attention and a more sculptural approach. The sphinx capital has an angle addition for creating a longer bearing surface for the sphinx statue, a necessity up till now, whereas the Dionysos capital shows for the first time a capital

without such additions: The capital bearing surface gracefully falls away into the volute arc. (This detail appears later in Naxian and Thasian capitals, and at Didyma). Another detail which is deemed important, is the deep *cavetto* below the sphinx column capital's leaf cyma, and its far overhang over the column top, in contrast to the shallow *cavetto* of the Dionysos capital, and the correspondence of the capital's cyma bottom to the column top. Although it is difficult to see a time progression from the greater overhang to the lesser, in part possibly due to the different heights and viewing requirements of the two capitals, it may be probable to see the Dionysos capital as the younger due to it showing stronger design control in the relationship between elements of the capital (for example the 18 ordered echinus leaves against the unordered 17 of the sphinx column capital). The column shafts and bases of the two capitals also provide useful insight. The bottom of the column shaft and base of the Naxian sphinx column seem to be closer to the design of the earlier Aeginetan column from Kolonna (Col-8). The Dionysos IV temple shows the introduction of a new element, namely a torus (attached to the spira base for the interior columns) between the shaft and cylindrical spira base. The Naxian sphinx column would possibly have utilised this detail if it had been erected after the Dionysos IV Temple. The fact remains, Gruben (1996, p.67) provides a start date of 580 [-75] BC, earlier than but roughly contemporaneous with that accepted for the sphinx column of 570-60 BC. When Gruben also (1993, p.104) mentions a manufacture date of *ca* 570 BC for the Dionysos temple capital, one might start working with the time lapse it took to reach the upper phase of the building, but with the building still preceding the sphinx column. That being the case, and in the awareness of the inadequacies of his method, the author would like to indicate the above stated chronology as an hypothesis to be more rigorously tested through further archaeological inquiry.

The more important question to answer here is, why does the Dionysos IV temple capital have roughly the same proportional schema as that of the Naxian sphinx column capital, rather than its architectural predecessor the Naxian *Oikos* capital? Because the Naxian *Oikos* proved irrevocably that short capitals were structurally adequate for an epistyle, it remains unclear exactly why the capitals of the Dionysos temple did not follow their form, but initiated a new architectural direction following the artistic example of the Delian sphinx column?

The above analysis clearly shows the dialectic relationship between the Naxian capitals, allowing one to think of a recursive feedback system existing in the design process, which is extremely inventive in nature. The capitals discussed above all came about, as will be shown, before a single stone Ionic capital existed in eastern Ionia. Before the first known east Ionian standard Ionic capital, that of the Artemision 'D' of *ca* 560 BC, quite a few other Ionic capitals were manufactured, each with its own addition to the achievement thus far. (See Chapter 3.2.2.1-2 and Tables 3.2-3). These are from Paros (Ion-10) and Delos (Ion-11, 20, 18, 19, and the capitals (Ion-5) of the *prostōon* of the Naxian *Oikos* (Bld-12c, of 550 BC), which were done at more or less the same time as the Artemision 'D' (Bld-2d, building start and design *ca* 560 BC, the capital manufacture slightly later). Proportionally there is no indication yet of a real canonic Cycladic regional form, but morphologically there are definite regional traits indicating a regional style.

At a slightly later time within the Parian artistic system, *ca* 550 BC, there is more diverse experimentation. In the Parian Aeolicising example dedicated at Delos (Iver-2) the well-known Aeolic capital form with rising volute channels is re-interpreted with concave volutes and with the addition of a smooth torus echinus, similar to the evolving Aeolic form but with the volute stems not descending to the volute bottoms. This detail occurs simultaneously with the move towards the torus connection in Aeolic Neandria (Aeol-2). A lesser form of experimentation is seen in Iver-2 in pairing what was deemed to be an abacus with the bolster palmette, but in this case exaggerating the "abacus" size, most probably due to its functional requirement as column base for the upturned column-water stand. A more important addition to the form composition is the deeply concave volute channel, paired with a round volute bead, as well as a huge, raised but flat volute eye. The deep, smooth double trumpet bolster form is now retained in the repertoire.

As a postscript to the above Ionic capitals it must be highlighted that none had a geometrically, rectangular block-like form - like the mentioned Aeolicising capital from Delos (Iver-3)) or a block form with U-shaped appendages like post-550 BC Aeolicising examples from Athens (For example capitals Iver-8/9). This means it was neither a rectangular timber-like block - the deep rectangular block form or the much sought after stretched out rectangular block form, which as a timber bracket capital would have been adorned with an incised, painted or applique Ionic capital form - nor a block form with half-cylinders at the bottom of the block, which would in timber form have been a pre-form of the Ionic capital. Other than the early Aeolicising capitals which had such geometrically pure forms, but which post-date the Ionic, the form of the earliest Ionic capitals are more complex than forms would be had those forms been dictated by the logic of timber construction and timber detailing only, and therefore do not appear to be xylolithic skeuomorphs. However, due to fact that the canalis and volutes of the early Aphaia (and possibly a [hypothetical] Kolonna) sphinx column capital (Ion-22) exist within a block shape, the possibility of the design concept springing from the idea of expressing a horizontal block element resting on an echinus element should be kept in mind.

Next, the author poses a distinct evolutionary movement in Eastern Ionia.

4.1.1.10 The east Ionian achievement: A new regionalism

a) The east Ionian non-standard capital experiments

After the early small experiments with timber and stone architecture there are a few novel expressions in terms of capital form: is an astonishingly bold event on Samos around 575 BC: Whilst the Artemision 'C' could have had composite capitals with metal applique, their actual existence (as is the case for stone capitals) is improbable, most possibly due to the incompleteness of the specific stage of building shown by the material record, as well as the absence of evidence of any influence such capitals would undoubtedly have had elsewhere. The first real innovative event in the region was the building of the first of the super-scaled

temples, namely the first dipteral temple at Samos. The capitals of this temple (Tor-1) were turned stone disks, hypothesised to have been topped by timber brackets. Because the Ionic capital at this point had achieved a first canonic form in terms of morphology and in this sense was not directly influenced by the Samian experiment, and also because it suits the argument to deal with these Samian capitals in the section concerned with the corner capital, the reader first taken to some other capitals.

After 575 BC the first known Ionic stone leaf cyma capitals Cym-2, and Cym-3, with flat, rounded leaves similar to those of the Naxian capitals from the Dionysos IV temple at Iria (Ion-7) and the sphinx column of Delphi (Ion-6), appear as elements in votive columns from Didyma. We also know of the introduction of the leaf cyma capital in the cella of the Aeolic temple of Neandria a bit later. If we accept the chronology as is, we must come to the conclusion that the leaf cyma capital type could have been the origin for the introduction of the leaf cyma for the echinus of the Ionic standard capital, but from our insight into the intense experimentation in Naxos and from a rougher grained chronological view it may well have been the other way round, or otherwise they may have been parallel form inventions in stone. Importantly though, both types exist before the use of the leaf cyma in the design of the Artemision 'D' capital (Ion-16), where it appears in east Ionia in the standard Ionic capital for the first time.

b) The early east Ionian standard Ionic capitals

The first known stone standard Ionic capital in east Ionia, after the early experiment at Didyma (Preion-2) and possible experiment at the Old Athena Temple at Miletos, is Ion-16 of the colossal Artemision 'D' at Ephesos. This is a good time to remind the reader, who did not pick it up in the description of Ion-16 in the catalogue, that this capital, the first of the super-scaled Ionic capitals, was a sculptural work of more than three metres long and one metre high, in itself an enormously staggering achievement, with not little thanks to the Samian achievement before. A study of an artistic context will show up the existence of artistic links between Naxos and Samos, Naxos and Miletos, between Samos and Ephesos, and Ephesos and Lydia. The Ephesian capital shows various details pre-existing in Cycladic forms, like the still flattish, rounded leaf cyma, the volute channel offset and accompanying straight canalis, the shallow curve of the bolster's double trumpet shape, the volute spandrel palmette (here with many more leaves), the inclined capital façade (achieved in the Aphaia capital) and the undefined volute centre. The capital however projects another image than most of the Naxian forebears. It is shorter and higher, more compact than most, and in terms of its main façade proportion $G:A$ [*Gesamt Höhe Volute: Gesamt Länge Kapitell*] only it is most closely related to Ion-1 and -24. Importantly, from a morphological perspective a new simpler vision for the volute façade is stated, namely a volute channel bead ending without an eye, like before, but now being a single bead with a pointed end. The detail further serves to make the façade less busy and complicated, and serves to draw attention to the thinnest volute spiral line, now a sinuous curving form rather than the attention grabbing volute channel of the Naxian precursors. The bolster flutes are reminiscent of the Naxian type on the Naxian sphinx column capital, but are deeper and

sharply defined with a rectangular edge, and there are only four, like at the preceding capital Ion-10 from Paros, in stead of six. The sharpness of detail of the volute bead and the bolster beads, so evocative of the edges and connections of Phrygian metal work, as well as the deepness of the bolster flutes (foreshadowing the later, deeply concave and edged canalis form) suggest input from a highly developed artistic system working in hard stone, like that suggested by the *finesse* achieved in glyptic art in east Ionia from 570 BC - but which in itself was connected to the Cycladic and Samian systems - and also as a result of the introduction of the claw chisel slightly earlier. The other truly new additions to the form *repertoire* are the convex canalis and volute channels and the outwardly curving abacus (although the abacus had already achieved at the Naxian *Oikos*, the reconstructed form of it remains speculative. In any case Gruben (1960, p.88) finds the Ephesian abacus a developed one with a local heritage), with ovolo pattern more pointed than those on the echinus, but not yet sharp. The interesting part of the abacus is that it starts at exactly the point where the volute starts its descent. The capital form at this point is very reminiscent of the smooth transition from bearing surface to volute arc at the capital of the Dionysos Temple IV at Iria (this same form is later often used in Ephesian capitals, with abacus present), at Milesian Didyma (with bolster palmettes), or at Myus (without the abacus). Naxos's strong leadership in the evolution of sculpture technique, and the strong sculptural relationship between Naxos, Samos and Miletos, may lead us to suspect the transfer of Naxian skill and predilections to these quarters also). Other detail which appears for the first time is the bead-and-real moulding below the echinus, but which is part of the column shaft rather than the capital. There is a slight convex half-moulding on top of the bead-and-real, a detail which does not appear in later capitals, but which very clearly defines the separation of echinus and column top. Even though the study indicates no existence of corner capitals with diagonal volutes in this building, mainly because they have not been found in the archaeological record, these capitals are postulated to have been a reality, for many reasons mentioned in preceding discussions, as well as in that to follow.

What was responsible for the introduction of the very slim abacus element, the single round volute beading as well as the sudden change in canalis section from concave to convex? Also, how could the achievement of the corner capital have come about? In terms of the abacus, it is put that the specific choice of capital shape suggested its introduction. The author indicates the capital of the Demeter Temple IV at Iria, Naxos, as the main inspiration for the form outline of the Ephesian capital shape (as well as the later one from the Lower Temple at Myus). They express the same treatment of smooth transition from bearing to volute. The addition of a highly decorated abacus on the Ephesian capital actually serves to accentuate this smooth and graceful descending volute even more, exactly because of its contrasting nature, but also because it introduces a division between the two bearing surfaces of capital and epistyle, as well as a tension. (One must remember that the Iria example was there for inspection of its results). In this case then, design criteria are seen to be decisive factors. Another factor is regional differentiation, meaning that the Ephesians wanted to have their own distinctive capital type (including a distinctive abacus type). This is also later seen in Samos, and in many other instances, and the idea is underscored by a similar regional differentiation in column bases in the Archaic

period. The specific heritage of the abacus element may be debated - the options are discussed above - but the author would like to propose that, apart from suggested copying of the first example of use at the Naxian *Oikos*, the prevalent Syrian and Cypriot use of this element in capitals - either from the Cretan architects' own experience, or the Ephesians' own knowledge of it - provided the next main stimulus.

In terms of the convex canalis and volute spirals (together with the well formed single round bead) it is put that, apart from examples with flat volutes, the Near Eastern capital types used the convex section exclusively (together with the similarly well formed round bead), and in the same Ephesian design process of creating a distinctive regional type, this form reference and the practical skill was conveniently available for this early Ephesian example. The choice of this type over possibly the deeply concave canalis which needs a claw chisel, cannot be explained by a lack of availability of sculpting techniques and tools, because these were available at the time, and had actually been used in the deeply grooved spira of the column of the Artemision 'D'. The graceful and visually riveting effect of the use of the single bead is also a result of artistic design judgement, of realising a potential previously hidden. The volute channel offset (ie the sharp connection between volute and canalis) refers directly to the early Naxian example from Sangri, Ion-1. The author comes to the conclusion that this capital form has a lot in common with the mature Naxian type, but differentiates itself through proportion, detail and additions. The author feels justified in advancing mainly reasons of a design nature for the choices given above, especially in the light of the fact that the analysis of this capital included in Chapter 3 has brought to light the extremely sophisticated design input in this capital. This input includes intense use of metrication and modular co-ordination, sophistication of capital base layout, as well as extremely precise workmanship in marble. This Ephesian capital is deemed to be the next interim canonical example (But here in terms of both proportion and morphology) to be followed by another distinct early group of capitals. The question of the corner version of this capital is dealt with later below (See Chapter 4.1.1.11).

Capital Ion-15 from Myus takes up morphological detail achieved in of Ephesos. There is the use of similar proportions for the canalis and volute parts, but the totality appears more compact due to echinus being much higher, and the bead-and-real being much more pronounced. No abacus is used as for Naxian types. The polster (from the reconstruction) is tripartite, a detail repeated in the Ephesian sphere to be seen in capital Ion-29 below. However, it is difficult to stand by all these interpretations because the capital is a plaster reconstruction from very few fragments. Capital Ion-45 from a temple (?) in Miletos is very close to the Ephesian capital in both proportion [except proportion B:A] and detail, but is distinguished by its very formalised symmetrical volute angle palmette detail. There is no detail regarding the polster elevation, but Koenigs (1979, Beil.3) speculates the possible use of polster palmettes. The abacus is not used as for Naxian capitals. The echinus detail, for the first time, shows the egg-and-dart elements rather than the simple rounded leaf. One could state that the capital essentially follows that from Ephesos but with slight variation in detail. Following this capital there is a new architectural experiment at Ephesos in the form of capital Ion-29 from an unidentified temple from Ephesos. There is a proportional resemblance to capital Ion-16. In terms

of its morphological resemblance to Ion-16, the abacus is retained, but the sharp volute channel canalis offset of the Artemision is replaced with a gracefully curving hanging cord shape, a shape achieved in a very stretched out format the Aphaian sphinx column bracket element (Ion-22) and the Naxian capital Ion-4 (later attempted in more triangular fashion in a votive column capital (Ion-20) at Delos from *ca* 560 BC), and now perfected in the standard Ionic shape. The echinus again shows the egg-and-dart elements. Due to severe mutilation of the capital nothing can be said about the bolster elevation apart from it seemingly being tripartite. A fragment from capital Ion-82 from a very small votive column from Didyma, which Gruben would like to see as remaining chronologically before the Didymeion (Ion-28), shows the by now accepted convex volute channel and single bead of the Ephesian architectural examples being accepted into artistic capitals at Didyma, but in a much less rigid and precise way. The capitals of the Archaic Didymeion (Ion-28) are proportionally very similar to that of Ion-29 from Ephesos. In terms of its morphology, it shows the same volutes as the Ephesian Artemision (Ion-16) and similar detail, but not the half-round bead between echinus and column beading. Whilst it has a less busy volute-angle spandrel palmette, it shows the same bolster details but with deeper contraction. Importantly it contains a bolster palmette in stead of an abacus, a detail reminiscent of the early Naxian votive column capital Ion-9 but smaller, retaining the effect of smoothly descending volute edge (It is important to note that in the earlier limestone phase for the Artemision temple there was an experiment with torus capitals - namely Tor-2, similar to those from the First Dipteral Heraion at Samos - supposedly for the inner capitals. The role of these capitals in the subsequent marblification of the temple has not been sufficiently defined as yet).

4.1.1.11 An evolution from standard Ionic to diagonally voluted corner capital?

The form of the early stone corner capital (for example Dinsmoor, 1927, p.131) has been addressed from various opinions, amongst others Bakalakis (1946), Gruben (1960, p.89-91; 1963, p.159-177), Bammer (1968-71, p.11 flw), Koenigs (1979, p.192-4) and also Kirchhoff (EIV, p.209-12). Gruben (1960, p.90) correctly identifies the main (aesthetic) design problem of the corner capital as the resolution of the formal conflict of two perpendicularly joined capital façades, this being the only reasonable solution for a building with a surrounding peristyle in which the bolster sides of the capitals were not to be shown on any façade. The question will be addressed from examples from stone architecture, after which earlier timber architecture will be analysed from this perspective.

What was for some time deemed to have been a very early corner capital (Ion-32) (previously dated by Gruben as being made anywhere from 546 BC [Late Archaic] onwards, and to him at the time therefore made before the Didymeion) of an unknown building from Delos (often previously thought to have been the *Porinos Naos*), has recently been identified by Gruben (1997, p.368) as belonging to the prostyle façade of the Propylon II next to the *Oikos*, and belonging to between 520-500 BC. This capital with the upward flaring echinus quarter-section in the inner corner and incomplete inner volutes is therefore is now of less importance in the

chronology of the evolution of the early corner capital overall, except for difficulty to explain the tentative inner solution which initially lead Gruben to his early date. Gruben (1997, p.369) rightly indicates that this capital with its experimental corner volute was probably the first corner attempt in the Cyclades. (Whilst it is known that the upper portions of the *Hekatompedon* at Palati were never finished, Gruben does not reflect on the [lost] capitals of the contemporaneous amphi-prostyle Temple 'A' at Paros. The attempt at Delos was possibly contemporary to it). For Gruben the attempt was a sculptor's work (related to other detail in the building), with nothing of the theoretical background included in the first east Ionian examples.

The improbability of the existence of a corner capital at the Naxian *Oikos* is implied by the temple's in-antis typology, which designation is widely supported, most recently by both Courbin's (1980) and Gruben's (1997) archaeological interpretations. Gruben *et al* (1978) have shown from the archaeological remains of the side epistyle of the prostyle that the Dionysos IV temple at Iria, Naxos, also did not have corner capitals. From some fragments which clearly can only belong to a corner capital (See Gruben, 1963, Fig.22 [From Fragments 18-9]), together with arguments, drawings and a structural model, Gruben (1963, p.164, Fig.41-2) removed previous archaeological, form-related and structural concerns against the possibility of the existence of the corner capital (Ion-28b) for the Archaic Didymeion. This is the oldest existing stone corner capital and, from the reconstruction (Gruben, 1963, Fig.43a-b), also the first known example of a stone corner capital with complete inner volutes. A corner capital is deemed to have been possible for the peristyle of the Lower Temple at Myus and the *Hekatompedos* at Palati, but both temples were never completed. These capitals were followed by various possible capitals from Late Archaic buildings (including the Delian Propylon II), and only at the end of the Archaic period, by that of the Heraion IV. The only stone corner capital which may therefore be older than that of the Didymeion is a corner capital for Artemision 'D'. Although its corner capitals have never been found, over the years researchers have had little doubt that some formal provision was made for the corner problem: Hogarth's (1908a) elevation and plan shows a 'suggested' capital with complete inner volutes (!), Dinsmoor (1927) talks of a hypothetical cross-plan version and Krischen (1938, Table 33) shows cross-shaped capitals for the inner peristasis. (The elevation does not include the corner column). Gruben (1960, p.89) acknowledges its canonic diagonal form, and sees it as igniting the design question of the corner. Bammer (1984, Fig.112) lately offered a revised version of Krischen's side elevation, at the same time providing his vision for a standard corner capital. In the vein of Gruben's (1960) thinking, if the Artemision 'D' did not have corner capitals with diagonal volutes, one would be very hard pressed to come up with an alternative form for it. Here one thinks of the formal and structural improbability of the cruciform capital form - and the T-shape shown in Gruben (1963, Fig.41) - which Gruben (1960, p.90) calls an "*Unform*". The matter of the structural eccentricity of the canonic form of the Artemision corner capital will be dealt with later.

Whilst we cannot know exact detail, the important question is whether we should see the hypothesised stone, diagonally voluted, corner capital as an *ex novo* design, being done for the first time in stone and being the

fount of the type, or as being a first xylicification of other, preceding capitals of material other than stone? In the first position there was no predecessor, only sheer invention. The second position clearly supposes that the capitals of the Artemision 'D' appeared as actors in a specific form tradition, ie that of peripteral application of the Ionic capital, which may be seen as being quite separate from the evolution process unfolding in the Cyclades, ie the tradition of frontal architecture. From this scenario, experiments with the corner detail in composite materials could be a necessary part of the evolutionary process, which in turn would have been directly influenced by previous experiments in timber corner brackets, scenarios which will be inquired into in more detail further along. Either way the Artemision 'D' should be seen as a vehicle for experimentation in and resolution of the formal design conflict on the corner of the outside peristyle, in stone. The scenario for a stone, *ex novo* corner capital for the Artemision 'D' would look like this: It seems to be quite in the realm of the possible that, in the hands of a master designer working within a sophisticated design framework that has been shown to have been achieved in the standard capital of the Artemision 'D', he may have achieved the diagonal volute form in a workshop, in stone. It is deemed that, with or without possible prior knowledge of the existence of a stone corner volute in Aeolic artifacts (like the Cadiz capital mentioned by Gruben (1963, p.160), which is inferred to be from before 610 BC, but which can also be seen as a parallel experiment, unknown to the east Ionian designers), the process of setting out the standard Ionic capital on the stone block, and the act of delineating the sharp divisions and round beadings of the bolster, as well as the round volute channel bead, give ample visual design clues which could make possible to a good designer the abstract, visual separation of the capital façade from the capital block at its corner, and 'bending' it into the diagonal plane, in order to create the diagonal volute. It goes without saying that this conceptual achievement should have been made simultaneously with the decision to apply the Ionic motif on the peristyle, therefore far before the execution stage of the building where *paradeigmata* are used more for achieving conformity in multiple replicas of the model. It means that in the conceptual design of the building the architects may have been making models to experiment with and test the design outcome. The boldness of conceptualising this novel design idea in stone for the first time seems almost too staggering for it to be acceptable, although theoretically it may have been possible and characteristic of the nature of the architect of the Archaic Hellenic period (The heroic scale of the design conceptualisation is also echoed in the glyptic arts of the time, especially in the achievements relating to the monumental *kouros* figure, but also in terms of other architectural sculptural decoration, the column and base of the Artemision 'D' as one example, and the expertise in creating a new architectural language and bold, innovative forms for the emerging Achaemenid empire at Pasargadae by these same Ephesian (Nylander, 1970, p.146) being another. Gruben (1963, p.164) and Koenigs (1980 p.62) show that, in the Milesian sphere at the altar of Myus (The oldest altar corner volute of just before 550 BC) and of Monodendri (*Ca* 540-30 BC), both soon after the Artemision 'D', the basic problem of the corner volute was sophisticatedly solved, supporting an earlier conception in temple architecture. Importantly however, in both cases the corner volutes were conceived in a rectangular rather than diagonal format. (Later altar examples show that the design achievement of the rectangular volute connection stayed the chosen norm for altar design). One should therefore rather not use the altar volute in the argument regarding the development of the

architectural corner volute. It is clearer from Gruben's (1963) work on the Archaic Didymeion II, as building following hard on the Artemision 'D', there is a good indication of the existence of a preceding example in which the extreme sophistication of the solution for the corner capital could have been achieved. Whilst these arguments argue strongly in favour of the existence of a canonic stone corner capital at Ephesos - which in all seriousness cannot be described as a 'missing link' but a matter of necessity - they really still cannot prove that the slender, curved diagonal volute was an element that was originally conceived in stone.

If we follow the line of thought that the stone capital had predecessors in composite materials, we must identify the buildings. The improbability of stone Ionic capitals for the peristyle of the Artemision 'C' may be argued from the incompleteness of the specific stage of building shown by the material record, as well as the absence of evidence of any influence such stone capitals would have had elsewhere. A similar argument may hold for the occurrence of stone-timber composite capitals for this phase ['C'] of the temple (only leaving the possibility of the intention for use of such capitals). This implies that the only earlier, completed experimentation in composite capital forms, which would have been available as design inspiration, would have occurred in the peristasis of the First Dipteral Heraion at Samos. (Here the narrative picks up the thread of the First Dipteral Heraion capitals, earlier touched upon).

The First Dipteral Heraion at Samos preceded the Artemision 'D' by some 15 years. After long speculation by Gruben and Kienast, there is the now well developed argument (See Hendrich (1997) and Kienast (1999, p. 141 and Note 6)) for the use of grooved torus capitals topped with timber brackets (The capital surfaces definitely indicate the use of timber at the top, either a bracket or an epistyle). Would the evolution of the Ionic capital on this site be feasible in these capitals, seen in the light of all the other buildings on the site having had torus capitals, and with the Ionic capital only appearing in the Heraion IV and the Monopteros II, buildings whose top structures were only completed after 500 BC? Importantly, we have seen the (very sophisticated) triple volute altar decoration starting and evolving from this sanctuary before construction of the First Dipteral Heraion (Kienast, 1989, Note 2-5), here specifically with obtuse connection between volute edge and altar top (Kienast, 1989, Fig. 2), possibly the originating form for the distinct Samian capital type. There is also the sarcophagus with Ionic peristyle temple motif from after 575 BC (Item No. 267, Pythagorieion Museum, Samos; Akurgal (1961, p. 129, Fig. 20 and *Samos*, Band XI, 1974, p. 183, Plate 76). This, together with the possibility of the First Dipteral Heraion having had voluted anta capitals, shows the early introduction of the volute into Samian architectural vocabulary. These arguments, seen together with the common usage of metal appliqué in architecture at the time, poses the possibility that the main temple was somehow differentiated from the rest, specifically in the form of volutes. Rather than speculating if the First Dipteral Heraion had voluted timber brackets, it appears as if the question of how the stone-timber composite capitals would have resolved the corners that an argument appears for this temple to have had voluted appliqué decoration, and thus being a pre-form for the Ionic capital: Kienast's (1999, Fig. 3-4) sketches clearly show the superiority of the specialised timber bracket corner solution *vis a vis* the other three possible solutions (90°

angle, cross, T). He further argues that the solution for the diagonal corner volute is improbable if made from only timber (against the grain, a big timber block carved away to get the form, breakage), so leaving the use of metal appliqué to explain the very flexible, thin, plate-like effect of the diagonal volute (Kienast (1999, Notes 23-5) supports this idea of metal appliqué with examples of and arguments around the use of appliqué work for capitals and columns). It is in realising that the metal decoration of the timber bracket would be the most probable vehicle to solve the formal collision at the corner, that the most pervasive argument arises for the First Dipteral Heraion to have had timber brackets on the torus capitals. The composite capital (Tor-1) is now not merely speculative, but becomes a necessity. The author drew the capital solution (See Appendix 2, just after Tor-1), proposed to him verbally in 1997, then without having an indication of the width of the proposed timber canalis block (Also see this solution in Fig.4.1.23 and 24 below). The impact on the design of the position of the line found on the torus fragment (See Tor-1) should still be made active in this argument, specifically to determine the size of the block relative to volute and torus proportions).

In terms of Bakalakis's (1946, p.54, 56) and Gruben's (1960, p.90) idea that the Artemision 'D' corner capital [ie Hogarth's reconstruction] would from necessity be eccentric (due to the slender long form of the standard capital), and for Bakalakis would have been an impossibility (to be replaced with a frontal capital on the corner, as in Gruben (1963, Fig.41b)), and for Gruben in 1960 would still be required to be held in place by the epistyle in order not to fall off, one may take it that these structural lessons had been achieved with the experiment of timber corner brackets at the First Dipteral Heraion. (The eccentricity of a supposed corner capital of the Artemision, constructed from the dictates of the standard capital but with feedback from the Didymeion reconstruction, should ideally still be structurally tested in the manner that Gruben did for the Archaic Didymeion (See Gruben's (1963, p.159) comment on this). The above realisation strengthens the idea that the act of creation of an Ionic stone corner capital in the Artemision 'D' should be seen as transfer of ideas evolved from Samos - being the final realisation from the perturbative effect resulting from contemplating the idiosyncratic, explorative solution of the Samian composite corner capitals, a solution borne from the problems posed by creating suddenly new form in a monumental scale. The personages involved in the transfer are not known: Whilst Theodoros's work at the First Dipteral Heraion is now more acknowledged (Hendrich, 1997), proof of his involvement at the Artemision is unfortunately extant (Bammer, 1972b, p.37)).

Having defined a possible pre-form for the canonic corner capital, one should ask again: Was the existence of a timber-stone pre-form with metal appliqué and diagonal corner volutes a necessary prerequisite for conceptual speculation and resulting achievement of an Ionic corner capital in stone? The author would like to refer the reader back to the detail of the Didymeion capital, and request a re-reading of the elemental composition of the form which reads as separate canalis and echinus, and the specific form of bolster decoration and volute beading used in the standard capital façade as found at Artemision 'D', which can quite easily be read as reminiscent of plate metal decoration, both on façade and the volute edge. Analysis of the Ionic capital's design in Chapter 3 has shown that it is precisely about the addition and integration of various

well defined artistic conventions and tectonic forms, namely the flat disk, the canalis element with two volute bolsters added, and an abacus plate placed on top if needed. If one agrees with this, and remembers that the early Cycladic capitals also made the jump from inscribed to plastic volute decoration, the importance of metal decoration is underscored and the idea of a metal appliqué form of the Ionic capital's canalis and volute may in all seriousness be seen as the design tool used to experiment with proportion and visual effects of the canonic corner solution. The question of new or evolutionary design strategy may however be further enlightened by study of the corner capital solutions which may have existed in half-timber construction with surrounding colonnades, before the First Dipteral Heraion.

A solution for the jointing of the two conflicting corner brackets could have been the crossing of the brackets over the axis of the column, with two ends sticking out past the epistyle edge. The joinery connection for such a solution would have exposed the one bracket to seeping water and rot, quickly leading to the joint to disintegrate, providing another argument against its possible existence. If one sees the Ionic Order as a xylolythic conversion of timber, this detail would have survived, even more so if one looks at the Hellenic predilection for the retention of existing form types. We know that the 'cruciform' detail did not survive into the age of stone architecture (apart from the mentioned speculation by Dinsmoor (1927, p.131) that it might have been the solution in the stone corner capitals of the Artemision 'D'. (The round column with domed top and cruciform bracket detail also does not convince as a suitable corner detail, and certainly has never been taken up in any stone work. This in itself places a shadow over the preceding architectural employment of this type of domed column). The other corner solution, namely that of two timber half-brackets jointed at the corner and placed or fixed onto the column top with pegs, is also not a good structural solution. In contrast to the sense the bracket capital makes in the linear colonnade, showing a clear logic of construction process, one may easily see, due to their extreme eccentric nature, how difficult it would be to temporarily rest two perpendicularly joined half brackets on the corner column's top. Even though it is clear that such an arrangement on a slender column makes very little structural sense, it is probably the solution that was followed (but probably also leading to further design evolution due to its inefficiency) until the arrival of a more monumental scale timber architecture. The necessity for a structurally efficient bearing surface on the corner could, with the continued use of the timber bracket form, only have been solved by the use of either shorter brackets, or a bigger sectioned square or round column supplied with an echinus element, or as Gruben (1989) has speculated, by providing the top of the column with a bulge. The question of the timber bulge 'echinus' will be dealt with in more detail later, but it is interesting that the earliest stone capitals were elongated, excluding the shortening of the canalis in later Archaic capitals as resultant from corner capital design (Refer also to early speculation in this regard by Gruben (1960, p.91)). In this sense the experiment at the First Dipteral Heraion should be viewed as the earliest corner experiment required by a bigger scale architecture with round columns. The question remains whether half-timber architecture's corner bracket capital would have had a specialised corner detail. It is easy to see that a specialised, diagonal timber insert piece could not have been present, this argument relying on the small space allowed for such an intricate joint,

as well as the now even smaller space allowable for fixing the brackets to the column top. The only other way in which to have presented a more formal detail solution for the corner would have been metal appliqué work, in the manner shown for the First Dipteral Heraion.

With these arguments it is posed that the canonic Ionic corner capital, rather than being born from manipulating the standard Ionic capital form, is rather an evolutionary design which most probably evolved from timber architecture, and definitely through a phase involving both stone, timber and metal, towards its final resolution in stone. The experimentation with eccentricity in terms of weight were very early solved in the composite stage, but the formal resolution of the inner corner (full volute to segmented volute) and the bolster, cyma and abacus forms showed slow progress through the Archaic period. The process of inner volute design from completely separate (Artemision 'D'), touching (Archaic Didymeion) and then conflicting, will not be presented here, but it does direct one to think that the inner corner resolution could have been an issue in determining the length of the early capitals of buildings with peristyles. The proportions of capitals of early prostyle buildings like the Dionysos IV temple however argue to the contrary. As regards the abacus design it is important to note that, whilst in Archaic corner capitals the bolster is just as wide as the epistyle and the abacus is taken around the corner, in Late Classical examples the capital bolsters are smaller in relation to the epistyle width and the cyma's extremity is placed on the edge of the inside vertical plane of the epistyle, so that the abacus may be square and not have to be taken around the corner with the turn of the epistyle (See Bammer, 1968-71, Fig 10). Any future analysis of the evolution of the proportion of the Volute height : Bolster width [G:B] in the Archaic period should be read with this in mind.

4.1.1.12 The east Ionian achievement: A second wave of pioneer generation standard Ionic capitals

From the knowledge gained from capital evolution thus far it is possible to view the earliest east Ionian achievements in a different light. From the argument above it has been seen that the existence of columns for the marble *Hekatompedos* in front of the Artemision 'C' can not be proven. The idea has been advanced that the peristyle of the Artemision 'C' (Later the inner peristyle of the dipteral version 'D') was probably never finished before the new edition of the building was started. The author would like to propose that, just as for the postulated Ephesian achievement of the corner solution for the Artemision 'D' capital, the composite capital type with stone torus, timber bracket and metal appliqué was not necessarily a prerequisite for achieving the standard, stone Ionic capital form in architecture, but only the corner solution. The Cycladic examples provided all the answers for the achievement of the standard type, but it was enhanced by the critical eye of designers who had a certain pre-disposition for making believable tectonic form. This type was an evolution of a long process of tectonic interpretation of form in the minor arts, and which process of interpretation will still emerge more clearly in future work.

With the First Dipteral Heraion [III] at Samos we tread different ground, because here the material record

indicates the existence (at least the high probability of the existence) of a composite (Ionic) torus capital. The form was most possibly discarded in the following architecture on the site, the North Building and the South Building, in part possibly due to the fact that these buildings employed stone epistyles rather than the timber epistyle of the First Dipteral Heraion, which material would have made the existence of a timber bracket not feasible. Despite this, the Heraion capital form may have had minor echoes in the artistic realm, if the two Sixth Century BC (hitherto not closely dated) Archaic hybrid votive capitals from the Milesian sacred road to Didyma (Ion-65), which are both standard Ionic capitals but which show the use of the ribbed torus, can be linked to the Heraion III experiment. The explanation for the non-use in the First Dipteral Heraion of the available, artistic (votive column) form of the Ionic standard capital, the stone bracket form of the non-standard Ionic capitals from Delos (Preion-1) and Didyma (Preion-2) and the architectural standard Ionic capitals of the Naxian *Oikos* - preceding the First Dipteral Heraion by *ca* a decade - must be laid at the door of the tremendous experiment that was being put in motion at the First Dipteral Heraion. Even though the Heraion and the *Oikos* were both experimental Ionic buildings, as concepts they were very different. Whilst the structural innovation of the *Oikos* must not be underestimated, the scale of the project was small. The material used, and the formal nature of the inner colonnade and the prostyle of the *Oikos* asked for the design formalisation of the hitherto timber portico and inner colonnade, but also for detail consideration for the sculpturally daring, stylistic 'signature' experiment of a marble 'Order' (ie the prostyle), executed in an environment with a long tradition of marble detail-making and tectonic problem solving on a small scale (ie the Dionysos III temple at Iria and others).

The First Dipteral Heraion was to be an enormous Ionic building in which the designer had to grapple with problems of momentous nature and scale, and executed with a softer material. If one had to place oneself in Theodoros's shoes for a moment one might just experience the enormity of his design problems: Extremely bad sub-soil conditions, three-dimensional proportioning on a scale not executed in Doric examples thus far and with a different vocabulary, the tremendous roof span, the design frontiers of finding the limits of poros stone, the weight, transportation and positioning of the building elements, the conception of the workings of a dipteral peristyle, innovative design in terms of new building elements like the turned bases and capitals, the formation of a new architectural style in stone which would translate the essence of the specifics of Samian religio-cultural context of the time - the list goes on and on. If confronted with the extent of detail resolution in the following east Ionian Ionic buildings of this scale, one may appreciate the amount of innovation at work here. From this perspective, and seeing that the our recent knowledge of the executed design now shows how the design fraternity at the Heraion was still grappling, in a building that may be seen as a transitional work, with the conversion from small scale timber to monumental stone and timber architecture, one might understand the difference in approach to capital design. The other major factor was that the formal resolution of the corner of the peristyle in terms of its capital, presented itself at the same time. This detail was, as postulated, worked out in a combination of known form (The torus) and material (Timber and appliqué).

From the above the existence of a second wave of standard Ionic pioneer generation architectural capitals may be shown for the east Ionian system, but in which only certain aspects of a later canonic Ionic standard capital appear.

4.1.1.13 The Attic achievement

Even though the design of the Ionic capital was carried to many outreaches and centres of the Ionian world, the next focus on capital design is Attica. The Athenian involvement with the Ionic architectural design sphere surfaces in many instances in the study of the capitals, but we know of Athens' claim to progenitorship of the Ionic heritage, Solon's involvement in Delos, Peisistratos's involvement there, the importation of east Ionian architects and artists to Athens for the *Enneakrounos*, the use of the Samian column base as first step to the Attic type, and so on. The important point is that Athens saw itself as heir of the achievement reached in Archaic Ionic architecture and capital design. After the Persian War she led the Delian League and proclaimed hegemony in the political sphere, but also in many others like art and architecture, where she led the field in both artistic innovativeness as well as accruing and spending of money on public works and religious artifacts. (This does not ignore the fact that cities in *Magna Graecia* built and sculpted on an equal footing, sometimes even surpassing Athens). It is in Attica where the most sublime architectural works of the Fifth Century BC originated, including the Ionic.

It is beyond the scope of the study to follow all the leads through to their final destination. From analysis of Ionic votive columns in Athens from *ca* 550 BC till the end of the Sixth century BC it emerges that there is a lessening of noetic control, almost a lack of *techne* (Also see Jacob-Felsch (1969) in terms of this trend in base design) and a very wide spectrum of experimentation with capital form. From the analysis in Chapter 3 however, it has become clear that the capitals of the *Enneakrounos* building - most likely an east Ionian endeavour, from bases through to capitals - in the Sixth Century BC not only brought the rigorous noetic approach inherent to the Ionic capital to the Athenians, but also revitalised the level of architectural sculptural expediency. Even though other capitals have been shown to be important, these capitals are identified as a specifically significant event regarding subsequent Attic capital design, in terms of morphology as well as syntax.

4.1.2 Dating of certain capitals from the typological analysis

Apropos the discussion around the approach to the dating of capitals in Chapter 2.3.2.5 it was stated that the reliability would be low if only qualitative or only quantitative criteria were used. The famous case is Kirchhoff's (EIV, p.30) apportioning of the *Oikos* inner capital [Ion-24] to *ca* 550 BC on grounds of

proportions only. However, whilst working through the capitals, the author has realised that most researchers are in a way forced to this method due to a lack of circumstantial evidence. It is true that good work has been done in this way, but which often relied heavily on experience from the researcher. Kirchhoff (EIV, p.18), when he qualitatively linked the capital of the Dionysos IV temple [Ion-7] to the Naxian sphinx column capital [Ion-6], came to a fair date, but he was hampered through his then lack of insight into the detail of the temple's history. In the case of the capitals of the Propylon II of Delos, [Ion-27, -32 and -48], whose linkage with each other were often suspected in the past, it was seen that they were only finally linked by Gruben through combining historical facts re the modern occupation of Delos and the subsequent history of the capitals, with a reconstruction of the gateway itself, a typological comparison of all three, together with arguments around the chronology of the existence of the corner capital on the island and in the region.

When looking at capitals that are suspected of belonging to the Archaic period, especially before 525 BC, and when they are known to have been manufactured outside of the main centres (east Ionia and the Cyclades), there is not a great sample of capitals to compare with and one often finds great difficulties in evaluating existing dates. The following capitals are examples of such cases. (Please also refer to their description in the catalogue):

Capital Ion-41 is part of a private collection, badly documented and not available for inspection. It was dated to the late Sixth Century BC by Kirchhoff (EIV, p.90), the origin identified as Gela, due to similarities with two similar contemporaneous Gelan capitals (Ion-40a-b). The similarity holds true for the round beading underneath the echinus as well as the volute windings and eye detail, but not for the canalis shape (angular in stead of cord shaped), the echinus form (not elongated in terms of height), the abacus form (Round bead on top of canalis bead in stead of vertical leaves) and the obtuse angle between volute and top surface, typical of so-called 'Samian' capitals, rather than a normal curve. The qualitative typological analysis shows the angular straight canalis line to be a Milesian/Ephesian/Naxian trait before 525 BC, although emulated elsewhere afterwards (eg Phanai, still connected to the eastern mainland). The small volute angle palmette is close to that of Ion-42 from Massilia and the inner bit of that of Ion-45 from Miletos and Ion-26 from Chios. The obtuse volute angle is similar to Ion-39 from Histria, Ion-61 from Syracuse and Ion-27/48 from Delos. The extended shaft piece is a very singular piece not echoed in this form in other Archaic capitals, but rather a much later example from Athens (Puchstein, 1887, No.7). From the qualitative viewpoint the capital is a very original compilation of elements not following that of one single regional group. From the above aspects one may say that another provenance may also be possible, most probably influence from the eastern Ionian centres or an artistic copy of these examples. The state of the dimensions makes a proportional analysis less reliable. Even though there is no quantity of regional samples to compare it with in terms of proportions (making such activity less fruitful), proportions may give clues as to its affinities (As shown for the Delian Propylon II). In this case more information in terms of exact size, material and workmanship must be collected - if possible, due to Sotheby's confidentiality clause - to advance knowledge further.

Capital Ion-57 from Cyzikos has been dated by others to after 500 BC. It exists as two small pieces, too small for any quantitative analysis. Apart from the smooth polster the only strong clues are the volute eyes in the form of a disc with raised centre-point, and the convex volute channels with single round bead. From the typological analysis it is shown that it is not like any other capital with similar eye detail, like Ion-12 from Smyrna, Ion-39 from Histria, Ion-38, -52 and 53 from Thasos and Ion-67 from Athens who have concave volute channels and edged beading, or Ion-32 from Delos which has a double round volute channel bead. The first profiled eye with centre bead occurs in Ion-12, dated by many researchers to anything from 550 BC to 520 BC. Whilst the date of Ion-12 was seemingly pinpointed to 520 BC due to the co-existence of the eye with a concave canalis, in actual fact the first known use of the bordered canalis beading is with Ion-74 of 550-25 BC, whilst it also has an eye. The possibility exists therefore that the Smyrna capital, and also the Cyzikos capital, may have been manufactured before 520 BC. Convex volutes with round beading, even if coupled with an eye, is in itself no guarantee of older age, as may clearly be seen from similar details (albeit a rosette eye) at Halicarnassus of 500-480 BC, and an Hellenistic Parian corner capital (Paros Museum without inv No) of the 2nd-1st Century BC (Interview Dr Skillardi, 1997). Whilst there is some further knowledge regarding the date parameters, in this case more circumstantial evidence is required to move forward, and more documentation work is required for the remaining echinus detail at the bottom of the capital.

Capital fragments Ion-61 from Syracuse were dated from before 530 BC to after 480 BC by others. Too little remains of the canalis and echinus fragments to say anything useful quantitatively. The echinus leaf shows parallel vertical beads, indicating round edges. Also the ovoli fragments' ends are not remaining, but they show no centre ridge, and could not be pointed. The first pointed ovoli date from the earliest 520 BC (Ion-27/48 and -35 [painted]), seemingly indicating older age for the Syracuse capital. Due to Pedersons (1983, p.111) evaluation the Heraion IV capitals are seen as model for Ion-61. The ovoli of the Heraion IV (Ion-58) are oval, which could be anything from 550 BC, but were only manufactured after 500-490 BC. One may see that the date rather needs to be sorted out by other evidence from building context, but even here there is controversy. Whilst we now know that the Heraion IV was started by 550 BC but the capitals only manufactured after 500, possibly after 490 BC, the early proposed building dates of 530 and 520 BC for Syracuse must be brought in question. Because we know, know due to identification of capitals of Propylon II at Delos (Ion-27, -32, -48) that the so-called 'Samian' capital shape was widely known from 520 BC onwards, the earliest date sounds wrong. Further contextual evidence will bring more certainty, but will have keep being mindful of the link to the Heraion IV and Propylon II.

The author has already speculated around the date of capital Ion-13 from Nasos in the text of the *corpus*, mainly based on qualitative aspects (especially the Athenian dome echinus, therefore after 520 BC). However, since the dating of Capital Ion-69 (ie 550 BC) the relationship between their dome echinus and straight canalis of Ion-69 becomes important. The capital from Nasos has a 'Samian' obtuse volute edge detail. Because the

first known capital to use this device (Ion-48) dates from the earliest 520 BC, a date of 550 BC for the Nasos capital seems too early, 520 BC therefore remaining the earliest possible. The use of a proportional analysis to get more certainty of the dating will not be possible because the dimensions (Reported by Kirchhoff (EIV, p.74)) rely on Wiegand's unscaled drawing. It seems as if this piece has 'disappeared', but a concerted effort should be made to trace it before more can be known. Also, more historical evidence of this enigmatic Ionic site is needed.

The only capital not yet dated is Ion-68 from Paros, still unpublished. This small marble piece is very slender and stretched out, just like the earliest Ionic capitals. It is monolithic with the shaft, like the first votive colonnette from Sangri. The bulging torus shaped echinus appears like the Sangri colonnette's torus, but the only 'foreign' shapes are lozenges around the column neck, a detail without parallel in the Archaic period. The capital façade has a 'Samian' obtuse volute, like the first example Ion-48 of the Propylon II Delos, itself at earliest from 520 BC. From a purely chronological perspective (See Table 3.1 and Fig.3.1, read with App.1, Table 1.1), the capital's specific proportions in terms of the relationships B:A, G:A, H:C and L:B do not allow for clear indications of age. From the relationships H:A one would place it before 550 BC, and from D:E between 570-50 BC. From a chronological and geographical perspective (See Table 3.2 and Fig.3.2 [only available for up to 525 BC though], read with App.1 Table 1.3), the proportions in terms of the relationship D:E show correspondence with Parian capital Ion-10 of 570-50 BC and Ion-17 of *ca* 550 BC, both indicating a possible date between 570-50 BC. In terms of H:A, the proportions are closest to Ion-17 but there is too much oscillation to be sure. It remains possible that this capital is a much later copy or singular piece, much like the two now famous Byzantine Parian capitals Cont-13, and -14 (See Chapter 2). As indicated, more detail re its founding area and circumstances are required for a more certain dating. The occurrence of lozenges on the column shaft must also be looked into. Additionally, the chronological ordering around geographical lines should be extended to include the capitals from 525-490 BC.

The last capital has shown that the system devised in the study may, in the case of a good regional sample, readily be employed for the dating of capitals. Previously, in Chapter 2, it was stated that capitals only dated within very broad time-spans, or only in terms of a single proportion or attribute, may be re-dated after the typological study. The author was fortunate that, during the course of this study, many such capitals provided in Kirchhoff (EIV) and Theodorescu (LCIG) were in the meantime re-evaluated from more current research and contextual evidence, and that these new dates could be incorporated in the *corpus*. Because of the recursive attitude kept alive during the course of the study, there are actually no other capitals in the present ordering, apart from the examples dealt with above, for which serious known doubts may be expressed about their current dating. Because the re-dated capitals were included in the chronological ordering, a solipsistic argument would arise if any of these were now re-tested within the system. Rather, it is recommended that more circumstantial evidence be gathered for those capitals which are only dated in relation to other capitals, in order to increase their reliability. Furthermore, the lack of chronological ordering of quantitative and

qualitative material along geographical lines for capitals from 525-490 BC, presently hampers the re-evaluation of those relationally dated. Such an exercise, together with the work done for the Classical capitals by Theodorescu, will provide a more representative and bigger sampling from which to work. If the more certain dates among them (emanating from the present study) could be indicated similar to the established dates, the interrelationships would also become more secure. These exercises are excluded from the present study, but are identified as fields of fruitful further research.

4.2 TOWARDS A PRE-HISTORY OF THE ARCHAIC IONIC STANDARD CAPITAL

In this section we are exclusively concerned with furthering the idea of the Ionic capital as a product from an evolutionary heritage, from which position commentary may also be given as regards the idea of the Ionic capital as invention, in part also as answer to the positions taken by Howe (IDO) for the Doric Order. In Chapter 2.5 the approach to this exercise was stated, as well as the guidelines from which an eventual, later formulation of a pre-history should be approached and completed. According to Wesenberg (1996, p.8) there is at present **no evidence** from which we may **factually** surmise the pre-form of Seventh Century BC Ionic columns and capital. Whilst there are bits and pieces, mostly we are working in the realm of speculation, albeit informed speculation. Nevertheless, the existing theories change unabatedly as archaeological effort continuously offers new material to work with. This section will deal critically with some of the most recent offerings regarding a heritage for the Ionic capital, and introduce new ideas forthcoming from the analysis of the Ionic capitals, which are meant to be pointers towards further, directed research. Figure 4.1 is included below to graphically assist the reader in the text to follow.

Wesenberg (1996, p.6) succinctly encapsulates the current positions regarding origins. Kirchhoff (IDO) sees the capital as a form which evolved in small terracotta votive columns. His theory will be dealt with in some detail. The capital for Kirchhoff is a petrified votive statue base, for Gruben a petrified architectural timber bracket capital - a view shared by Theodorescu (LCIG, p.95, Plate 3). Gruben (1989, p.161, 168; 1996, p.65, Fig.5) holds the opinion that pre-monumental architectural timber capitals were petrified in votive columns, then further developed for use in architecture. His theory will also be critically discussed in terms of form analysis as well as from an architectural referential view. Gruben's theory basically proposes that the separate canal and echinus sections came together as a capital over a period of time, whilst accepting that the echinus started as torus which only later receives a leaf decoration. (As an aside: Wesenberg refers to Bammer [*ÖJh* 49, 1968-71, p.4 Note 16-20, p.12, Fig.8], who not only poses the leaf cyma as origin for the Ionic, but also the Aeolic capitals). These ideas regarding the cyma have received proper attention in the previous section, but this study will further deal with the idea of the Aeolic capital as "proto-Ionic" form, and make comment from

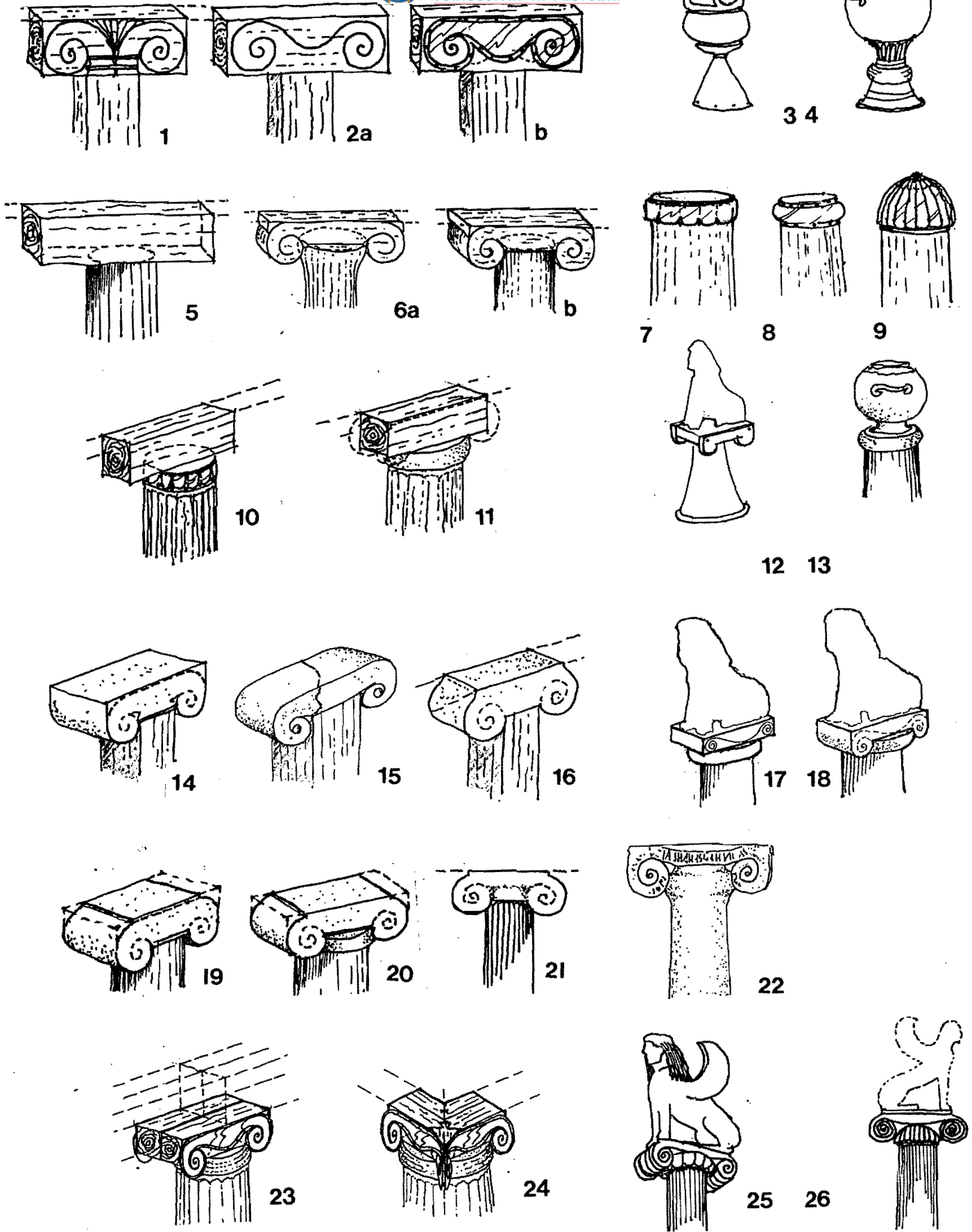


Fig.4.1 Illustrations of artifacts related to arguments around the evolution towards the standard Ionic capital.

recent research. The existence of torus capitals for the First Dipteral Heraion (tori with timber brackets), and their role in the design of the Ionic capitals, have received attention in the preceding section, hopefully providing some imperative for their existence.

Wesenberg rightly states that "Die Entstehung des ionischen Kapitells bleibt im Dunkeln, solange ungeklärt ist, in welcher Gestalt und in welchem Material Kymation und Volutenglied zueinandergefügt worden sind" (1996, p.9). This study will try to point the way towards reaching this explanation. Whilst this study does not set out to be deliver a history of the origin of the Ionic capital, it will set out to identify those theories which may be discarded or altered from insight flowing from the more representative analysis of the Ionic capital, as well as those who are more probable.

4.2.1 The use of the typological interpretation as guide for the identification of form-relatedness of preceding artifacts to that of the early Ionic capital and its elements

Taking into account the guidelines accepted in Chapter 2.5 for identifying and accepting form references for the Ionic capital, it is necessary that any identification and assessment of style correspondence be based on thorough typological understanding of the Ionic capital as type. The typological analysis of relevant Archaic capitals tries to be that understanding. For this exercise one refers particularly to the analysis of morphological trends, based on chronological ordering, in Chapter 3.2.1, the similar analysis based on chronological and geographic ordering in Chapter 3.2.2, the qualitative description of capital morphology and syntax in this Chapter, the analysis of tectonic qualities of the capital in Chapter 3.3.2.1 and Table 3.5, and the chronologising of the morphological innovations in capital design in Chapter 3.2.3, which helps in determining whether a suggested pre-form has more, or less, relevance as source, because it is chronologically isolated within the total evolutionary process. The typological analysis achieved in this study is put forward, amongst others, as tool in the formulation of the history of the origin of the Ionic capital.

4.2.2 Indications of an evolution from relevant minor arts

4.2.2.1 Kettle stands and votive columns

Analysis of the chronology and form of a relevant selection of the earliest examples of stone votive colonnettes indicate that stone statues and stone kettle, *kouros* and sphinx columns were emerging as new and preferred monumental votive offerings in sanctuaries *in lieu* of the bronze kettle wagons, conical stands and tripods, as well as monumental earthenware vessels, that there was experimentation with stone for use in votive columns in various parts of Hellas at the time (Arkades, Thebes, Samos) and that the torus moulding was emerging as a connecting shape between column shaft and statuary plinth or kettle. In focusing on the datum of the stone Ionic standard capital, namely the capital of the sphinx colonette of Sangri, Naxos (Ion-1;

Fig.4.1.22), together with its widely flaring conical, oval column (The sphinx is lost, and the existence of a lost base is only indicated from traces *in situ*), affinities with various artifacts were identified: Stone columns with torus necking carrying plinths, *terracotta* and metalwork (3- and 2-dimensional) voluted forms, as well as a memory of the timber bracket (as in Fig.4.1.5) with volutes added as discrete elements to the sides. The column shaft retains a memory of the conical kettle stand, and *terracotta* forms. The multivalent reading of this column and capital presents the researcher with quite a quandary, coupled with the fact that its size, function and execution makes it a difficult candidate to use for posing a relationship with a preceding architecture in another material.

We have no certainty that the Sangri capital is the first stone standard capital, and therefore cannot yet define it as an archetype. In tracing the history of an artefact one uses the evolution of the artefact from that form onwards, together with a backwards tracing of possible typological roots or origins. One has to look into the history of the votive column, and its historical connection with the kettle stand, in all the forms and materials in which they appeared. The most complete argument to date for an evolutionary history of the Ionic capital from the minor arts is that of Kirchhoff (EIV, p.137-90), and it is necessary to reply to his argument from realisations gained in this study. His exposition of the evolution of the Ionic votive column from *terracotta* kettle stands to non-monumental Ionic stone votive colonnettes, places the founding of the Ionic votive column and its capital in a radically new perspective than was previously accepted. Kirchhoff's (EIV, p.141) main argument evolved around two central aspects, namely the idea that the torus column with timber bracket as it appears in the First Dipteral Heraion - which he described as the first Ionic building dating from 600 BC - is a transitional form between the early colonnettes and the canonic Ionic capital form, and secondly around the correspondence of shape between the preceding kettle stands and the column shafts of the early Ionic colonnettes.

The inconsistencies in the main concept must be pointed out first: Whilst the First Dipteral Heraion is still deemed to have had torus capitals with timber brackets, and to have been involved with the evolution of the capital form, its position - and influence - in the chronology is now much later, namely *ca* 575 BC. Secondly, of all the early colonnettes so important in his form analysis, only the Sangri colonnette remains in its chronological position as datum. (Absent now are capitals Cont-13, -14 and -18 (ie Kirchhoff, EIV, No.B, C and 26). The remaining central element in his thesis, ie the Sangri colonnette with its downward flaring shaft and its torus shaped bulge, are indeed similar to the kettle stands' shafts with their torus shaped connection, occurring between shafts and the flaring kettle holders above (Fig.4.1.4). Kirchhoff (EIV, p.141, 146) mentions that one should accept the possibility that such column forms, as interim phase in the monumentalisation process, could have been executed in timber and decorated with bronze. According to Kirchhoff the metamorphosis of bronze kettle stand to votive column must have followed an evolution through an intermediary phase of *terracotta* colonnettes with cyma capitals similar to those of later stone kettle stand columns, some of which evolved into the votive column type with leaf cyma capital and some of which were

crowned with a (flat) clay tablet for statuary to rest on. Such a tablet would have been decorated with an applied rather than engraved volute capital decoration. To him this form variation is the pre-type for the Ionic votive column. The author must mention here that a depiction of a stander from 680 BC (Schefold, 1966, Fig.4) may have been a *terracotta* column, but it may just as well have been a bronze artefact. Whilst Kirchhoff's theory cannot be disproven, it also cannot be proven from the existing archaeological record.

The most probable decoration technique for the *terracotta* colonnette's flat tablet mentioned by Kirchhoff (EIV, p.177, 189) is a plate type decoration which would have hung over the bottom edge of the tablet shape on the cyma capital of the stander, mainly in order to give a directional front to the statue (Supposedly a sphinx) on such a column. A drawing by the author of his idea is included in Fig.4.1.12. One has to be critical about the examples Kirchhoff (EIV, p.173, Note 615) gives for such decoration. Firstly he uses the existence of *terracotta* appliqué in architectural contexts as reason for the probable existence of these appliqué capitals in this *scenario*. Furthermore, the mentioned fragments from Olbia are not dated and apart from their distance from the founding area, Kirchhoff's uncertainty regarding their functional application makes them less probable as candidates. He assumes a votive function for the other examples he mentions, namely the corner *acroteria* from Larisa, because they have been described by Boehlau *et al* (1940-2, p.141) as "möglichlicherweise sind es Weihgeschenkreste". These examples might just as well only have been architectural *acroteria* like the others of the find. In accepting the tablet with decorated front as capital pre-form, Kirchhoff stresses the necessity for such decoration to hang past the block form, in order to have a properly proportioned capital form. For the same reasons of proportional propriety he expresses doubt regarding the existence of a horizontal tablet with a capital decoration in *intaglio* or painted capital form on its side. Kirchhoff (EIV, p.171, 219, A9) however proposes the existence of an additional form of *terracotta* capital from this context, namely one with volutes appended as sub-form to the sides of a main cubic shaped tablet form, according to him much like the Aeolicising capital from Delos (Iver-12) which we know to be of 550 BC, 100 years younger than the stands he discusses, and one of the few such examples. No examples of such *terracotta* forms are present in the archaeological record. Kirchhoff (EIV, p.173, 189-91) proposed these form variations as the ones which were eventually petrified in the form of the first small colonnettes from Naxos and Paros mentioned above (and now disregarded). The reasons he advanced for the xylolithic conversion were that the kettle stands showed a tendency towards greater slenderness over time, showing a drive towards monumental form. To achieve this, another material was needed, namely stone. Whilst this conversion of *terracotta* kettle stands to a certain type of votive column seems feasible, there are a series of further criticisms regarding Kirchhoff's theory.

Firstly, Kirchhoff's theory regarding the evolution of the Ionic capital form from *terracotta* votive column pre-form to 'first' stone example, cannot stand the test of artistic skeuomorphic conversion. A comparison of the forms of the hypothetical *terracotta* voluted plates and solid capitals with the composite form of the Sangri capital (Ion-1) - the result of this evolution - quickly removes any doubt about this. Against a tablet with

hanging solid volutes on the side, it can be said that the firing technique of *terracotta* requires working in slabs of a relatively thin nature and hollow forms. This would preclude a deep canalis element for the capital, as well as a thick volute cylinder. The resulting form would rather be a tablet form with a small volutes of more or less the same depth of the tablet. In terms of the *terracotta* volutes applied as slab to the front of a tablet, the result is quite sound as regards to the possibilities inherent to the material. However, there is very little skeuomorphic correspondence with such a pre-form in the canalis-volute ensemble of the Sangri capital (Ion-1), which is very plastic and does not give the tiniest hint of an applied façade of any thickness, as many later capitals do [then thin]. The volutes do look as if they were 'attached' on the side, but as shown in Chapter 3 this is due to the volute channel offset, itself resultant from the position of the canalis strip in the composition.

Kirchhoff (EIV, p.148) connects the *terracotta* kettle stand's and interim *terracotta* colonnette's torus capitals to a previous timber tradition. There are excellent mid Seventh Century BC examples of *terracotta* kettle stands, some of which are mentioned by Kirchhoff (EIV, p.148) and some additional ones which were identified by the author (See Boardman (1970, p.94, Plate 4.1) and an example in Figure 4.1-4), but seeing the *terracotta* forms as flowing from a timber tradition is plainly negating the previous achievements and traditions inherent to clay artwork, and also negating the tremendous influence of the form elements of the bronze kettle stands which were the most important monumental religious artwork before the votive column and eventually the temple (One also thinks of the strong parallel tradition of leaf cyma capitals for stands as in Sixth Century BC limestone incense burner stands (eg Cyprus BC (1979, Fig.292-3; Karageorghis (1981a, Fig.115)) and torch holders from Cyprus (eg from the Heraion, Samos - Item B2532, Vathi Museum, Samos). There is knowledge of miniature timber kettle stands, like the Samian turned example (See Kyrielys (1980a, p.106, Table 27)) with base, horizontal flutes and capital topped with torus moulding (Incidentally pre-empting Ionic column-base and polster fluting details), but there is no proof for their existence in monumental timber form.

It rings true that the load-bearing, vertical form of the kettle stand, being the right shape for carrying and elevating an object, be chosen as readily available form to carry other objects like a sphinx statue as well, obviously with an intermediary horizontal object to receive the statue (the plinth). Kirchhoff's (EIV, p.148, Note 494) very apt observation (See his example, in Phillips (1970, Fig.5), but also in Boardman (1970, p.94, Fig.5)) that the torus shape of the *terracotta* stands in some cases is extremely close to the that of the later stone torus capitals from Samos (ie the kettle stand replicas), made his *terracotta* argument appear to hit the spot in terms of pinpointing the missing link between timber and stone columns. Whilst the use of potters technology in turning a soft sandstone torus capital has been demonstrated by Hendrich (1997, p.60, Fig.16), and the stone form is most probably directly reliant on that of the kettle stand's torus (of which examples were present in the Samian domain), our analysis shows that the torus was the linking element *per excellence* - from the bronze kettle with conical stand, through the *terracotta*, to the stone. However, no definite link between

timber and stone columns is constructed, only a preference for form. There is the additional fact that Hellenic monumentalised statuary (opposed to miniatures) progressed from timber to stone at *ca* the middle of the Sixth Century BC, and it is only in the Cypriot domain where there was really a *terracotta* sculpture tradition already from 750 BC (Reyes (1994, p.33, 149-50)), there focusing mainly on the human figure. For the *terracotta* sphinx column or *kouros* column to have been our transitional object from the strong tradition of kettle stand to stone votive, it would have been a similarly strong tradition. There is just no underpinning for the idea in the archaeological remains anywhere, and the form will have to remain hypothetical in the meanwhile.

Kirchhoff (EIV, p.211) also acknowledges the role of metal in his theory, in that he identifies the bendability of metal appliqué in his statement that the solving of the corner problem for a decorated statue plinth on a column must have acted as the predecessor for the diagonal volute of the Ionic capital. Whilst the use of appliqué on architectural *terracotta* is known, a more elegant argument for this architectural problem has been proposed in Chapter 4 above. There is the additional fact that Archaic glyptic art, and especially the *kouros* and the sphinx column, was a frontal art, not *per se* requiring a formal corner treatment. (The statue base from Naxos of 600 BC, with corner treatment in the form of a face (See Boardman, 1978, Fig.56), on the other hand does make another statement).

There is additional criticism to Kirchhoff's link. The advanced nature of stonework by *ca* 600 BC, for artifacts such as the late Seventh Century columns from Arkades and Thebes and the stone kettle stand from Samos, the column portion of the Kolonna column (at best contemporaneous with the Aphaia sphinx column), the Aphaia column, the Naxian *Oikos* (now being the architectural datum rather than Kirchhoff's First Dipteral Heraion [III]), the possible use of stone capitals similar to Preion-1 and -2 before the last decade of the Seventh Century BC (these two showing providing proof of an earlier tradition of the use of the stone voluted capital in architecture, a proof lacking for their existence in *terracotta* votives), together with the very early start of an articulated formality in stonework at the beginning of the Seventh Century BC (ie the Dionysos Temple III, Iria), all indicate that there may have been much more experimentation with stone in columns during the Seventh Century than was previously accepted.

This leads us to explore other pre-forms of the votive column in material like timber, and composite forms of timber and stone, and timber and metal. A strong case has been made out for metal appliqué as pre-form of the later strain of Aeolic capital (after Old-Smyrna). The possibility of a column-capital like the Aphaia capital having existed as a stable form in wood, with the bracket slotted into the dome, and the dome pegged to the column, can be argued, only with the dome rather being part of the column shaft than as a separate piece, for reasons of stability. Such a capital would have to be sheathed in bronze to protect the end grain from water induced rot. The volute/canalis decoration may have been a bronze appliqué. The repercussions of finds of Seventh Century BC bronze cymas (Hampe, 1939, Fig.3-5; Hampe *et al*, 1981, Fig.88-9; Daux,

1966, p.746, Fig.3; Wesenberg, 1971, p.52, Fig.92, Fig.93 [Pedersen (1983, p.118) reports this work as being of Cycladic Ionic origin]; Kyrieleis, 1988, p.279, 281, Fig.1-2 [the existence of which was long suspected by Drerup (1969, p.116)], bronze acroteria (Kyrieleis, 1988, p. p.285, Fig.3.4 [My thanks to Dr H. Kienast for the scarce document]), the use of bronze on capital Iver-10 and a Late Archaic bronze capital volute (Herrmann, 1996, p.124, Fig.1) have now been well integrated into the discussion around the Ionic corner capital above.

Where we may now accept the round timber column with bronze leaf cyma or dome (Fig.4.1.9), a round timber column with dome and bracket capital, as well as a round timber column with bracket capital (Fig.4.1.10) possibly with bronze volutes, in the discussion around the capital of the Naxian sphinx capital (Ion-22) the improbability of a totally timber column carrying a stone statue was argued. In any event, one should ask why a timber bracket would have been inserted into a timber dome capital, if nothing was to be carried. Wouldn't the imperative for sprouting leaves only, have lead to a different solution? Whilst one would also hardly expect a free-standing votive column without statue in the form of stone base, timber shaft, and then a stone capital, this form composition was used in architecture, as the capitals Preion-1 (Fig.4.1.15) and Preion-2 (Fig.4.1.16) show. Likewise, the Aeolicising capital Iver-4 of a votive column from Delos, may most probably have had a timber column. A certain amount of experimentation in composite forms may therefore be accepted for free-standing columns, most probably with the stone voluted bracket form wider than the column diameter. (Again, if the canalis-disk combination was achieved here, it would have been available as pre-form for the colonnette at Sangri).

4.2.2.2 Other Minor Arts available as source material for designing the standard capital form

The analysis above has shown that the evolution of the Ionic capital is one which occurs in the Hellenic sphere, and deals with problems of creating form within the Hellenic religious domain. The following section on possible architectural sources for the capital will show a similar scenario. There is nevertheless the possibility that the form may have existed in other cultural spheres, or in a prior guise in the Hellenic sphere. In looking for pre-forms or prototypes for the Ionic capital therefore, there are two parallel involvements: One is concerned with the idea of prototype, the other is rather a concern with ascertaining the transfer of specific detail traits, and establishing the transfer of elemental form over a long period of time and across cultural boundaries. From extensive searching for pre-forms for the Ionic capital it becomes clear that many forms for both the Ionic column and the Ionic capital, as well as for the separate elements of the capital can be put forward. These forms exist in the Aegean era, as well as in the Hellenic and non-Hellenic spheres before the founding of the standard capital form in stone. As argued in Chapter 2, these contenders have to be evaluated from both a chronological and typological viewpoint, and the certainty of historical or contemporary linkage between the capital designing system with those in which the pre-forms were found, is a prerequisite. A list of these forms, their dating, together with the type and instance of linkage, may be used to pinpoint those

examples deemed to be the most probable. Further research regarding the typological status of those forms may then proceed, in the absence of such typological interpretation. In the event of any such forms being regarded favourably, they will have to be brought into relation with the already ascertained aspects of the evolution within Hellenic architecture and in Hellenic votive columns.

4.2.3 Indications of an evolution from Hellenic architecture preceding the Ionic capital

4.2.3.1 Indications of an evolution from an Hellenic 'Ionic' timber architecture

In the beginning of this Chapter it was indicated that the extent of articulation and formalisation of the Seventh Century architectural column is fundamental for coming to a conclusion regarding the origins of the capital, and that knowledge of the type of connection between, and the materials used for the cyma and canalis, is vital. Knowledge of the event of introducing the cyma as element in a timber construction of column and bracket, is a key to the riddle. In the analysis of the torus of the earliest known Samian kettle-stand replica (Tor-3, Col-9), and later of the timber votive column, it was indicated that exploration of the possible occurrence of a stone disk torus on round timber architectural columns (Fig.4.1.20), or in timber votive columns (Fig.4.1.13) is necessary. It is necessary to start with the most pressing current theory arguing for a timber heritage for the Ionic capital form, that put by Gruben (1989, 1996). Therefore, in order to debate the theory one has to include arguments around the possibility of the existence of a timber Ionic architecture or Order, as well as arguments from the analysis of the Ionic capitals themselves.

4.2.3.2 A short critique of the timber Ionic Order

Evaluating the probability of the existence of timber Orders may shed light on the probability of the existence of a timber Ionic capital. Importantly, Vitruvius (Book I, 2, 6; Book IV, 2, 1 to 6) differentiated between the origin of the timber entablature and of the columns. To him the entablature referred to a timber tradition of architecture which evolved over a long period, and was only later apportioned to the column types which evolved in the Doric and Ionic spheres. Nevertheless the idea of fully fledged timber Orders preceding the stone Orders has remained one of the most pervasive and influential architectural canons over a very long period up to this day.

There are only very few eloquently put arguments for a timber Ionic Order. Due to previous Modernist functionalist readings of the Orders, this dearth may have been caused by the apparently more readily discernable 'tectonic' character of the Doric Order, but also due to the convenient existence of other similarly looking xylolithic skeumorphs like the Egyptian examples (eg in Badaway (1966, p.148-9, Fig.57; Plate 14), as well as the Lycian Group III rock cut tombs (For example Akurgal (1961, Plate IVb)) which, according to Akurgal (1955, p.88-93; 1961, p.127), date from from the Fifth to Fourth Century BC, postdating the

emergence of the Ionic Order in stone. The case for the timber Ionic Order reads that the timber bracket capital is seen as pre-form for the Ionic capital and gradually evolves into the Ionic form, that flat timber beams placed on top of each other (In some cases two, and in some three) are proposed as pre-form for the threebanded, rabbeted epistyle, and the projecting ends of small square rafters resting on the epistyle are seen as pre-form for the dentil moulding. Even though proponents of the timber Orders do not easily draw the timber Ionic Order, the elegant drawing of an eaves peristyle arrangement by Durm is shown in Fig.4.2 on the right.

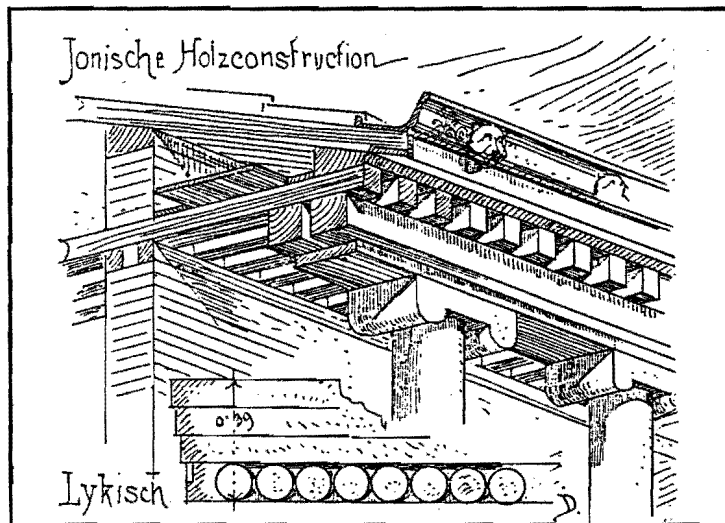


Figure 4.2 Timber Ionic Order by Durm (1910, Fig.315).

The drawing of the timber voluted capital on a column bulge by Gruben (1996, Fig.5.4) as shown in Fig.4.1.6a is a variant of this train of thought, but one which is contextually rooted.

Lambrinoudakis (1996, p.59, Fig.7) has shown for the reconstruction of the Dionysos Temple III at Iria that the timber prothesis, as composition of colonnade and entablature, is at the root of the evolution of the Cycladic Ionic form vocabulary. This form element is a strong argument in favour of the timber evolutionary Order, but one should look at the level of articulation: The use of timber does not *per se* indicate the use of articulate form. As mentioned earlier, the archaeological lack of stone capitals for this building phase, alone indicates that one should accept timber capitals. As Lambrinoudakis did for the prothesis, Gruben (1996, Fig. 6.III) argues for voluted timber capitals in the interior of the naos. The question remains to what extent of detail they were articulated? Lambrinoudakis (1996, p.59), working back from the typical Cycladic stone epistyle and frieze expression and starting with the Naxian *Oikos*, followed shortly thereafter by the Temple IV prothesis and then others, argues that the timber entablature for this building was a simple, unadorned affair, with the concept of a frieze zone extending around both front and sides of a building, resulting from the practicalities surrounding closing beam ends and sides above the simple flat epistyle of both sides of the prothesis. The important fact is that the Cycladic Ionic entablature now cannot be seen as 'invention in stone', as Howe did for the Doric. One more important aspect of the evolution of the Ionic Order is that we witness in the Iria example the composite use of articulated stone (Square stylobate stones and articulated column bases) and other timber elements (round columns, capitals and entablature).

The canonic Ionic entablature also includes the dentil moulding, which is one of the examples *per excellence* of those in favour of a timber origin for the Ionic Order. One realises the dentil does not appear in Ionic stone

architecture until the last quarter to the end of the Sixth Century (Late Archaic *Megaronbau* in Larisa (Mertens, 1979, p.134; Schefold in Boehlau *et al*, 1940-2, p.161, Item No.50, Table 24c, 42a.I; Wesenberg (1996, Fig.13)), at the *in antis* Carian temple at Labraynda between 520-500 BC (Thieme in Courtils *et al*, 1993, p.49), possibly the Hexagon Monument at Delos of the end of the Sixth Century BC (Hellmann *et al*, 1979, p.113 [He provides the date], Wesenberg, 1996, p.14, Fig.13 [who deems the origin of this element to be the Cyclades]) and between 500-490 BC at Temple 'D' at Metapontum (Mertens, 1979, p.127-8, 138-9, Fig.2). Gruben (1957) believes that the roof of the Seventh Century BC South Stoa at Samos was a flat timber-and-earth roof whose square rafters projected over the epistyle showing the 'dentil' moulding detail. One rather expects larger sized rafters in this direction, and with the smaller lattice work running perpendicular to these in the other direction. Also, Carpenter said aptly "...if Ionic dentils are to be seen as simulated beam-ends....they should (like the triglyphs) rest directly on the epistyle" (1962). In the Ionic Order there would be no excuse for introducing any other element in between the epistyle and the dentils. It is indeed uncommon for Archaic Ionic architecture to combine a dentil moulding with a frieze or 'second' epistyle. In Archaic Ionic architecture, the epistyle and dentil moulding are most often, rather non-structurally, separated by a leaf cyma. In terms of the structural sensibility of the projection of timber beam-ends in a peristyle arrangement the same formal collision as may be demonstrated for the Doric triglyph would apply in this arrangement, leading the author to surmise that any truly structural timber 'dentil' detail might initially only have existed in a *in-antis* roof formats where there is only a single rather than turning epistyle, or the lattice work of the gable. Apart from the lean-to or projecting portico, the linear stoa-like shrines shown in little Seventh Century BC *terracotta* models of Lemnos (See Pernier (1934, Plate 20a-b); Dunkley (1939, Plate 20A)) are precisely the application where the 'dentils' could have occurred. Gruben also comes to the conclusion that the initial occurrence of the dentil would have been in a frontal application (like the lean-to or projecting portico) only, and says in realising from Sixth Century BC Samian *naiskos* models - The well known ones from the Vathy Museum (See Wesenberg (1996, Fig.12) showing the dentil detail going around the corner - that in those corner dentils "wohnt kein konstruktiver Sinn mehr inne" (1957, p.61, Beil.84.1-2). Gruben therefore accepts the decorative application of the detail when occurring in peripteral form, in the sense that it merely copies the original structural intentions of the detail. Wesenberg (1996, p.14) also implies this contradiction. The dentil-like ornament on a frieze plaque from a temple from Piano del Tesoro in Tuscany of 575-55 BC also underlines the early purely decorative use of the dentil pattern. The house models specifically indicate that in the founding of the stone Ionic Order, details which earlier had a structural function may have been incorporated as a decorative scheme in the Order. In such a way a sense of structural credibility was achieved, even though the detail would not stand up to intense structural scrutiny. In terms of the Ionic stone capital, one may think that similar portions of elements which had structural functions, eg the timber bracket (Fig.4.1.2a-b, 4.1.5), were used as motif in the final execution.

The canonical Ionic epistyle, divided into three horizontal and rabbeted sections, is seen by some as a structural solution sprouting from a typically Ionic, lighter approach to timber structure, and by others as an

aesthetic solution. The reasoning behind the latter idea is that the Ionic Order, being proportionally more slender than the Doric, would look cumbersome with a deep beam. A subdivided beam is indeed more slender and 'graceful', and it remains a fictional expression skewed towards the aesthetic rather than the structural. Whilst we have witnessed the birth of the Ionic epistyle as a simple flat timber and then flat stone element before the introduction of the fascia, the origins of the later aesthetic solution for the epistyle holds no mysteries. The existence of the subdivided beam in the trilithon ensemble was common in Cyprus and the Levant - where the subdivisions may have referred to earlier traditions in timberwork before the founding of the Ionic Order - and was available as a reference form for a designer looking for a more fitting solution for the (supposedly 'cumbersome') epistyle design existing thus far. It is important that this reference to timber work was not used in the earliest Ionic stone examples (Just as the detail was not used at the early door surrounds in the Cyclades (See Gruben, 1991, p.64), underscoring the idea that the focus was not on copying a timber precursor. Just as the rabbeted fascia was a later introduction to a preliminary form, the Ionic capital design shows similar evolutionary design refinements to the preliminary achieved form..

From the elements discussed briefly one sees that the complete stone Ionic Order was no sudden invention, that it shows a definite evolution from timber, albeit a very slow one, that pre-existing timber form vocabularies were employed to express a convincing and balanced idea of construction, rather than being merely replicas of a presumed timber architecture, and that refinement and augmentation of existing form remained common in the Ionic Order ensemble. From the Iria III example (as well as many others, most notably the First Dipteral Heraion) one also sees that the Ionic architects were comfortable with mixing their construction media, as well as their decoration media.

The most important aspect to be learned from looking at the evolution from timber to stone architecture remains the specifics of the retention of a tectonic approach originated in timber. The nature of the morphology of the Ionic Order, clearly demonstrated in the abstract tectonic expression, serves as base for asserting that we are witnessing a purposeful act of expressing the *tektonike* present in timber architecture, not in the sense of a slavish replica of it but, through *techne*, as a mimetic, re-inventive act of revelation of a specific past experience. Just as articulation and the use of colour was used in Hellenic architecture to clearly indicate the morphology and syntax of the tectonic whole of the Orders, so the choice of elements and element-form played their part. It rings true when Porphyrrios says "...in any encounter with building it is not the particular exigencies of construction, but rather the ontological experience of tectonics that is brought to bear." (1981, p.37). It must be quite clear that there is no superficial application of snippets of details here and there, that it is not a case of art applied to base structure, but that these details are integrated within a structural semantic that hangs together as believable structural totality, expressing a certain and specific understanding of structural behaviour and sense. (The idea of the structurally honest use of material is very much an Arts and Crafts and Modernist concept). From the prevalence of use of polychromy on timber and stone architecture, and from the use of decorative schemes, we see that the Hellenic architect was comfortable with

the idea of adding to the medium of stone aspects which go beyond the utilitarianly mechanistic and that which solely expresses the mechanical qualities of the material, and also of functionally overlaying form or structure with colour and decorative schemes (just as prevalent in Levantine architecture). This was however done in the strictest of guidelines, and added to this one may expect, with the logical, common-sense use of material, even though there was prevalence in the mixed use of materials in Geometric and Archaic architecture.

Allow a short footnote on the existence of a timber Doric Order: Whilst there are many more Modern defined subscriptions for the existence of the Doric order (starting W. Chambers in his *Treatise on Civil Architecture* of 1795, Dörpfeld's (1935) fervent testimony to the existence of a timber Doric Order at the peripteral Olympian Heraion (subscribed to by Gruben (1961)), and many others, most notably Beyers (1972) who subscribes to a timber-framed-construction-type Order), there are many points of criticism against the existence of a timber Doric Order which are listed briefly: The existence of a timber Doric entablature does not follow *mutatis mutandis* from the existence of round timber columns; There would be an irreconcilable confrontation between the transverse beams and any *pronaos/opisthodomos* beams which lie perpendicular to the transverse beams (In a prostyle or in antis situation there would similarly have had to be short beams from the front epistyle up to a transverse beam situated somewhere in the area between the two gable ends and the naos or cella walls; The structural absurdity of an early Doric plate shaped capital turned from timber; Wesenberg's (1996, p.11, Fig.10) explanation from Vitruvius (Book IV, 2, 2) of the evolution of the triglyph and metope design on the wall where the beam ends passed through. This detail is mirrored in sorts by the continuous marble beam end capping at the Naxian *Oikos* as in Ohnesorg's (1993a, Tafel 3; See Gruben (1996, Fig.9)) reconstruction drawings. It seems possible to state that, in terms of the evolution of the Doric frieze, the structurally plausible pre-forms might have been used in a bigger decorative scheme, which may be called a place- and time-related tectonic fiction (In the words of Howe (IDO)), used exactly for their suggestive effect in creating an illusion of a specific structural plausibility and tectonic presence. One may deduct there was no imperative for the existence of a pre-monumental phase Doric entablature for the coming into being of the stone Doric Order, and that the Doric Order may indeed be a composite design, but as the Ionic, one that evolved over a period rather than of necessity being a sudden invention as Howe proposed, for various reasons not mentioned here.

If one accepts that the Orders were not xylolithic conversions of a total timber system, and that the process involved a degree of poetic license, it excludes the idea of the stone Orders purely expressing the 'logic' of timber construction. One rather agrees with Howe who states that the Doric Order "looks like structure because the formal vocabulary derives from the forms of structure, that is, that forms derived from practical considerations will also appeal to vision" (IDO, p.51), but that in practice the structural delusion is very thin and does not withstand close scrutiny. The details make the building appear as if it has tectonic presence, but are not applied according to the dictates of structural design. This implies the individual details are part of an 'iconically styled' decorative scheme rather than a skeuomorphic or replicating stylism (an exact copy of

a pre-existing model of other material) It is in this novel way then that Hellenic architects used imitation: Imitation of existing convention, of tradition, however inventively transformed and integrated within a new whole.

It seems more feasible to acknowledge that it might be correct to think in terms of Hellenic design solutions that would have been possible, logical, and sustainable over time: Rather than to have a fixated idea of the pre-form of the Orders having to be from timber completely, one must accept that aspects of structural work were concluded in differing architectural solutions (already shown up by the use of stone bases and stone capitals Preion-1 and -2, similar to the *scenario* at the Kition Kathari temple in Cyprus of *ca* 1200 BC), and get away from the idea that any employed preceding timber detailing should have been exactly like the eventual stone product, completely ignoring the demands posed by material on the act of design. In terms of this way of thinking, one may also see that the idea of round timber columns and timber entablatures could be two separate design entities not bound together through logical inevitability or predestination, and that the evolution of the Ionic column with capital may have had a complex history which includes experimentation in various materials as well as infusion of original ideas from the parallel tradition of votive stands.

To relate the above to the design of the Ionic capital, whilst the existence of voluted timber brackets on timber columns with bulging top are possible, one should not exclude the architectural role that was played by metal, ie as appliqué volutes (Fig.4.1.2b) that could have protruded past the bracket bottom (Fig.4.1.23), and as protection (*cum* decoration) of the column top (Fig.4.1.8, 4.1.10), as well as by stone, ie as possible loose disk element between bracket and column (Fig.4.1.11 and 4.1.13), the last mentioned as possible vehicle for rudimentary attainment of the integrated, but still separated, stone canalis-on-disk form (Fig.4.1.20) somewhat earlier than the votive colonnette from Sangri (Fig.4.1.22). This last aspect is addressed in the following section.

4.2.3.3 Architectural forebears of the oldest stone Ionic capitals?

If the idea of a fully formed timber Ionic Order is not so probable, and the idea of a fully formed Ionic capital with it, one must think of alternative architectural form which could have inspired the earliest stone standard Ionic capital from Sangri. The development, contemporaneous to the Sangri capital, of two different types of stone capitals for rectangular timber columns with volutes hanging past the bottom bearing plane, namely Preion-1 (Fig.4.1.16) from Delos and Preion-2 from Didyma (Fig.4.1.15), presupposes the hypothetical existence of similar architectural capitals for round timber columns (Fig.4.1.19). Such a capital form is present, only in slightly different clothing, in the Aeolicising capital Iver-3 from Delos. This capital could have existed similarly but with an 'Ionic' (ie horizontal) decoration, exactly like the decoration on the bracket part of the Aeginetan sphinx column capital (Ion-22; Fig.4.1.26). Such a stone capital would have been wider than the timber column, obviating the need for a stone echinus. Whilst one would argue that the specific shape

of such a capital shows that it most probably evolved as stone shape, one also realises that stone form of this era closely resembled that of timber form, and also that this shape could have existed as timber form with hanging volutes extending below the bearing surface of the bracket form similar to Gruben's timber model. Whilst such a timber capital would have been a very shortlived (with its U-shaped bottom sections falling splitting of) and unstructural (the volutes being unnecessary in practical timber construction) specimen, one should not force a Modernist, Brutalist or Functionalist approach on the event, and allow for the fact that it could have been made for its aesthetic appeal, a position also borne out in later capital design.

From the earlier analyses of capital form it is shown that in early capitals their width closely follow that of the column diameter. Because of this we may permit the addition of a more practical concern: The forming of a bulging top for a column would be wasting a great deal of a trunk's wood and be a very vulnerable part of the column (breakage and rot), and together argue against the capital being narrower than the column top, but rather of similar size or slightly larger, protecting the column top in a similar way as the stone capitals Preion-1 and -2 on rectangular columns. From the above analysis we may state that the idea of Gruben's (1996, Fig.5.4) voluted timber bracket capital remains, but more probably in slightly wider format which takes away the imperative for the big column bulge (See Fig.4.1.6b). Also from the early examples of stone capitals on rectangular timber columns (Preion-1 and -2) it is clear that this voluted, timber bracket capital's decoration and form would have been very rudimentary and searching, rather than being a very plastic timber pre-form.

If one argues that the Sangri capital (Ion-1) referred to an earlier timber architecture (namely Gruben's (1996) argument for the Dionysos III temple), such reference would imply a strong tradition of doing which would definitely have been applied in the soon following Naxian *Oikos*. This 'tradition' of course refers to the echinus being a physical part of the column. We earlier (Chapter 4.1.1.6-7) saw that in all the capitals following Ion-1, the echinus is actually part of the capital and is expressed strongly as a separate disk form, therefore not following such a 'tradition'. This alone must lead one to think that the Sangri colonnette may have had another type-model. One could argue that, if the single, monolithically combined shape of canalis and disk in standard form had been reached by now, it would surely have been utilised at Sangri. The only way such a monolithically combined capital form could have existed before the Sangri colonnette, would be if last did not refer to such a form, but to another. The shape of the Sangri colonnette's column shaft may be seen as referring to a column with torus capital. This column form was a well-known emerging form of the time, but one which may just as soon have referred to a separate stone torus element rather than a timber column bulge (Fig.4.1.11; Fig.4.1.20). The shape of the Sangri colonnette's capital, read as statue plinth with volute decoration on a column with torus, could just as well have referred to the type of architectural stone capitals for rectangular columns which were in existence at that time (Preion-1 and -2 [Fig.4.1.16; 4.1.15]), which through widening was transformed into the voluted statue plinth form-type and placed on the torus column form. This stone plinth/capital-column ensemble (Fig.4.1.18), a slight variation from the Kirchhoff *scenario* which focussed on the clay pre-forms, is a separate form proposal not necessarily dependant on the by now

a century old Dionysos III's timber architectural capital and column argued above, or on a previously existing, but improbable, monolithically combined stone canalis-disk shape. Its existence is also not precluded by the non-use in the Sangri colonnette of its separated form.

The hypothetical capital form argued here, namely the loose stone bracket capital with 'Ionic' decoration, placed on a separate cylindrical stone disk on top of a round timber column (Fig.4.1.20) does not exist in the archaeological record before the coming into being of the Sangri capital. The closest analogy we have to the loose disk of this hypothetical type are the torus shaped resting places on top of the round beading of the Samian kettle stand replicas (eg Col-9) which were carefully articulated as being separate, the stone canalis of the capital (Ion-22) of the Naxian sphinx column (Fig.4.1.26), placed (in effect visually slotted but physically monolithically fixed) as separate element on top of a domed echinus, as well as the timber bracket loosely placed on the stone torus 'capital' [cyma] of the First Dipteral Heraion (Fig.4.1.23). Whilst one must concede that the canalis-disk ensemble's first physical combination may have been with capitals Ion-4, -24 and -9, it is proposed that the interim bi-partite capital type (Fig.4.1.20) and the composite decorated canalis-disk type (Fig.4.1.23) be considered in the realm of possibilities, and that further research be directed to this possibility.

There are a few anomalies to be dealt with regarding the various arguments related to the history of the capital's evolution.

The first is that one cannot help but wonder what the imperative could have been to introduce a separate disk form as formal connection between the timber column and a stone canalis capital of the same width than the column (Fig.4.1.19)? We must remember that the metal cyma decorations (Fig.4.1.7) and torus shaped column necking bands (Fig.4.1.8) were available as form reference at an early stage, and when used together with the stone capital would have stuck past the capital sides, providing a visual clue as to a new form possibility. Whilst a design imperative is a possibility, one should keep in mind that, even though the very first stone Ionic capitals were not narrower than their column diameters, there is a degree of possibility that such narrow stone canalis forms existed, which would have required some protection for the column top, either in metal or stone.

A second anomaly that is still not resolved, is the relatively late evolution of the Ionic capital decoration which would refer to 3-dimensional metalwork applique. All the earliest capitals (Preion-1 and -2, Ion-1, Ion-4, Ion-24, Iver-3 and -4) are flat and have inscribed decorations only, where the ability to create more 3-dimensional decoration did exist. In geometric and Early Archaic architecture the metal applique canalis and volute would be fixed to the side of the timber canalis. In the absence of real examples, one refers to the Archaic (Apparently before 500-475 BC) example from Olympia by Herrmann (1996, p.124, and his Note 7) where he also refers to Kienast's theory for the First Dipteral Heraion), the later Classical examples, Kienast's

(1999, p.145, Note 24) three examples and, obliquely, to the metalwork on column neckings, echini and acroteria. One of the examples stressed in this study would be the corner volute situation for the timber corner brackets mentioned before. However, if this tradition was so prevalent, wouldn't it have dominated detailing of the first stone capital types?

The third anomaly is the existence of plastic, 3-dimensional volute detailing on Levantine-Aeolic capitals before the earliest stone Ionic examples. Whilst we expect that the *intaglio* decoration on timber capitals was also the form initiator there, further research will have to show why this type dominated as form reference for the earliest stone Ionic and Aeolicising capitals in the face of other, more sophisticated solutions?

The fourth anomaly to be resolved is the late use of the leaf cyma decoration for the stone echinus, in the light of its existence as bronze applique in Early Archaic timber votive columns at Samos and Olympia mentioned before, as well as in the Cypriot lamp holders found in the *temenos* at Samos Gruben's (1993, p.102; 1996, p.65) argument, that the Seventh Century BC movement towards finding the Ionic capital shape was driven by decorative need rather than tectonic necessity, a movement in which there was still no linear direction, cannot explain the lack of leaf cyma decoration of the echinus up till *ca* 575-70 BC, roughly 30 years after the first standard Ionic stone capital (even though Gruben uses this lack of linearity to explain the many variations in design solutions in the Sixth Cent BC). If the Seventh Century BC bronze leaf decoration cyma was an archaistic re-employment of Mycenaean motif (Similar to Wesenberg's (1996, p.6-7) argument for Doric capital being re-employment of Mycenaean-Minoan standard capital form in the Doric pre-monumental types, before their monumentalisation and formalisation in stone), surely the first stone Ionic capitals would have followed this trend. More research on the stated anomaly is required.

In the following section we account for the 'Aeolic' timber tradition, which poses the possibility of the existence of an 'Aeolic' prototype for the Ionic standard capital.

4.2.3.4 The Hellenic-Aeolic form-type as pre-form for elements of the Ionic capital?

The idea that the Aeolic capital is a proto-Ionic capital (and therefore also named as such) has been held by many, for example Braun-Vogelstein (1920), Dinsmoor (1973[1927]), Fletcher (1975[1896]), Lehmann-Haupt (1913), Puchstein (1887), Von Luschan (1912), Boardman *et al* (In The art and architecture of Ancient Greece, 1967 [1966], p.16), Scully (1979, p.52) Theodorescu (LCIG, Plate 3) and Akurgal (1985 [1969], p.17), amongst others. Wesenberg (1996, p.9) rejects the idea. Even though the non-Hellenic Aeolic capital - this term is used *in lieu* of "proto-Aeolic" - has a long history before the existence of the Ionic, it has been stated by Betancourt (TES) that neither the pre-Ionic, Levantine-Aeolic capital type (the *Timorah*), nor its Hellenic-Aeolic derivative [His identification] can be seen as a prototype of the Ionic standard capital in its total form. In terms of the stone Hellenic-Aeolic capital, this last assertion is borne out by the author's

chronological ordering of the Ionic and Hellenic-Aeolic capitals in Chapter 2, but does not necessarily hold true for any timber or metal pre-forms of the Hellenic-Aeolic capital, and does not say anything of any transference of ideas in consecutive evolutionary stages of the Aeolic and Ionic capital, especially in terms of the evolution of the Aeolicising-Ionic capitals. In terms of volute design, there were certain similarities between the types as regards line/beading detail and volute section type. In the early Parian Aeolicising experiments the bolster palmette and abacus is included into the Ionic repertoire, and in some Delian examples the Ionic volute form is slowly Aeolicised. This influencing occurs sooner than that described by Betancourt (TES, p.131, 213). Also, the now closer dating of the Aeolicising capitals have facilitated pinpointing those capitals that have in the past often been seen as pre-forms for the Ionic capital due to their 'timber-like' appearance and a presumed earlier date of manufacture (See discussion in Chapter 4.1.1.9 above).

Nevertheless, to Betancourt (TES, p.130) it was a cut and dried case that the Ionic and Aeolic styles developed concurrently and in close relationship, and with the similarities occurring in the Hellenic era, rather than them having a similar, preceding foreign prototype. He (TES, p.126, 130) sees the design link between the two as the leaf crown, acting as connector between volutes and column. Bammer (1968-71, Fig.8) even showed how both types can be seen as two leaf crowns placed on top of each other. Both these stated relationships, which would make it appear as if the designers of both spheres were initially working with the same theme in coming to a form solution but had to go in diverging directions in terms of these solutions due to the differing formal content of the design problems inherent to the two systems, are now under threat.

Analysis of the earliest Hellenic-Aeolic capitals, and as may be deduced from the latest interpretations of by Kuhn (1986) and Wiegartz (1994) - both confirming earlier ideas put by Wesenberg (1971) - show that the leaf crown does not feature at all as connector between capital and column, but rather as column base. There is one example of the use of the leaf crown cyma (alone) as interior capital, and a still unresolved case of a possible - and late - leaf echinus at Aegae. There is still the bronze plaque with Aeolic leaf cyma capital from Samos (Akurgal, 1962, Plate 102.27) to connect with these, but on the whole the connection evolved from a rectangular connection to a cylindrical piece, and then finally into a torus band, with the initial volute binding element - as Old Smyrna - shifting downwards towards the capital bottom. Kuhn (1986, p.51) also lucidly shows how the double-volute (also named double-cup) motif, bound back to back, explains the underlying structure of the vertically ascending Aeolic volute motif, as against the single, horizontal double-volute motif of the Ionic capital. This origin for the Aeolic volute form may be clearly seen in the bottom separation of the volute channels of the Old Smyrna capital, a type which was made redundant by the next which became the *marquee* of the type, namely that with purely vertically rising volute stems, but which type that was reclaimed in later Athenian Aeolicising capitals (like Iver-9).

Apart from these important realisations, it is now also clear that the Aeolic capital has a relationship with timber architecture, specifically regarding rectangular columns or pilasters, as the connection of the earliest

and later round capitals show (already earlier realised by Wesenberg (1971, p.83)). Although it is easily thought that the (stone) Levantine-Aeolic capital must be the predecessor, Kuhn (1986, p.56) argues rightly that the splaying bottom volute stems of the Old Smyrna capital (coupled with the use of the anthemion between the diverging volutes), and the lack of the typical triangle which is the hallmark of the foreign capitals, show that there was definitely a separate type development in Hellas. In earlier timber architecture the capital shape would have been a 2-dimensional metalwork adornment, fixed to the column, a shape copied by the later Aeolic stone type with torus moulding. Whilst Clarke (1886, Fig.4) at a very early stage showed a drawing of Geometric architecture with a bracket capital with vertically splayed volutes and anthemion palmette carved into the timber (Fig.4.1.1), a form which is very conceivable, Kuhn (1986, p.58) realises that the Old Smyrna capital alone must have had a different source, namely a more fully formed timber predecessor in Seventh Century Hellenic architecture. Whilst such an assertion has far-reaching implications for our parallel search for the antecedents of the Ionic capital, one must mention that from the chronology it appears as if the so-called Aeolicising capital Iver-4 from Delos, as votive column capital, points to the possibility of an Aeolic stone and timber hybrid architecture before the monumentalisation process in stone at Old Smyrna. It may be stated that, from the present evidence, the Hellenic-Aeolic stone capital was not a prototype for the Ionic capital (Likewise all the "proto-Aeolic" or rather Levantine-Aeolic examples as total capital forms), that some form components of the Levantine-Aeolic capital may be traced to both Aeolic and Ionic capitals, that the use of the leaf cyma in Ionic design was not dependant on the Aeolic development, and that only a limited amount of cross-lending took place during both the Aeolic and Ionic capital's parallel process of development.

From these conclusions there is less of a case to look for antecedents for the Ionic capital in preceding non-Hellenic architecture, but any search for the sources and/or stimulation and of transference of singular details should of necessity follow the same approach as stipulated earlier.

4.3 CHAPTER CONCLUSION

From the first portion of this chapter there has emerged a rich description of the process of form design during the founding process of the Ionic capital, and in particular its early stage. Analysis of the earliest stone non-standard Ionic capitals on rectangular columns shows the emergence of two capital types and also introduces the possibility of an interim capital form between the earlier supposed voluted timber bracket type and the earliest stone standard Ionic capitals. A new reading of the datum for the Ionic standard capital, the Sangri colonnette, provides new insight into its tectonic make-up which, apart from its possible architectural heritage, indicates a design influence deriving from the dictates of votive column design. The Naxian achievement of coming to the clearly articulated standard capital form is explored, and greater clarity is brought to the early relationship between Ionic and Aeolic capital design from current knowledge. The regional design traits of the Cycladic and east Ionian capitals are traced over time, and the

analysis of the design problem of the corner capital brings us closer to an answer regarding the evolution of the type, including the design of the capitals of the First Dipteral Heraion of Samos, as well as the possible evolution towards the corner solution in stone in east Ionia and Delos. The achieved typological analysis is employed in the dating of capitals, from which there is an indication of a date for the previously undated Ion-68 from Paros. The second portion of the chapter provides a clear framework within which a founding history of the Ionic capital can be constructed, and in which certain previous ideas are eliminated and others put forward for further exploration and verification. The possibility of the occurrence of interim experiments, executed in combinations of timber, stone and metal, in an evolution from the timber capital of the Dionysos temple III at Iria towards the Ionic standard capital form at Sangri, Naxos, is suggested for further corroboration. The idea of the Aeolic stone capital as prototype for the Ionic standard form is refuted by the chronology and the analysis of form, but there is greater insight in those instances of cross-pollination that did exist.

The representativeness of the data ensures that the description adds to our current understanding and that a solid foundation is laid for further interpretation, whilst the explicit exposure of the problematic areas and deficiencies, in either data or method, works congruently within the stated goal to provide a *corpus* which is open ended rather than finite, and which is meant to be a tool for exploration. In isolating those remaining aspects necessary for the construction of a probable founding narrative for the early Ionic capital, there is more clarity to add to and take from the seminal works before.

CHAPTER 5 - RECAPITULATION, CONCLUSIONS AND RECOMMENDATIONS

5.1 RECAPITULATION

The problem posed was to construct a *corpus* of early Ionic capitals in which there is typological definition of the form, evolution and integration into built artifacts in its standard format in a 'first generation' period, but which would take cognisance of the preceding pioneering efforts towards reaching a standard Ionic capital form, and evolutions from the 'first generation' capitals in the Archaic period. From existing *lacunae* in the knowledge regarding the Ionic capital the author defined a problem that would, in a response thereto, not only lead to an increase in understanding of a specific artefact, but would lead to a revelation of the complexities and fullness of the act of artistic and architectural creation involved in the capital and its integration in the built context within which it is situated. The endeavour to provide a *corpus* of early Ionic capitals within which the complexities involved in the early evolution of the artefact may be understood, had as a resulting aim the provision of the necessary framework required to construct a probable founding history. Both the construction of a suitable corpus and the necessary framework have been achieved. The work is structured such that in future there may be a seamless integration with other existing work regarding chronologically following capitals, in order to be able to come to a more definitive conclusion regarding the nature of the Ionic capital as the most complex element in the Ionic Order and its parallel achievement, the monumental Ionic votive column. Simultaneously, the structure allows for continuous feedback through the possibility of inserting newly emerging data and conclusions into the *corpus* provided.

In Chapter One the current state of knowledge was defined, the need for and scope of further research identified, and the approach, delineation and terminology circumscribed.

In Chapter Two the identification, preliminary description, chronological and geographical ordering of the Archaic Ionic capital and artifacts closely related, namely Ionic buildings, columns and related non-Ionic capitals, was brought to fruition. As part of this process existing ordering models for related artifacts (Those of Betancourt (TES), Kirchoff (EIV) and Theodorescu (LCIG)) were integrated and made relevant to the artefact at hand. The integrated model for the description, chronological, geographical ordering and subsequent typological interpretation of the Archaic Ionic capital, augments existing methodology regarding such manipulations of the artefact and may also find application in other architectural historical endeavours of this kind. Apart from being applicable in this study, the ordered data base emanating from application of this model increases existing knowledge in the field that will find application as a research tool in the disciplines of archaeology, art and architecture. Apart from being a reference guide and catalogue, specific fields of application are the dating of artifacts and the definition of chronologically and geographically bound stylistic enclaves. Due to the open-ended nature of the data base and ordering model, feed-back from subsequent archaeological interpretations may be integrated in order to determine the effect of those

interpretations. Together with this, the changing relationships with other aspects of the founding context may also be evaluated.

In Chapter Three there was a typological definition of the design achievement contained in the Archaic Ionic capital, and of evolutionary patterns present in the total Archaic period. There was detailed identification of design trends present in the capitals up to 525 BC, and a realisation of the experimental nature of capital design within this period. The study leaves the opportunity for further implementation of the ordering model so that typological phases may be discerned and defined, in order that artifacts may be stylistically classified. The Ionic capital was brought into relation with the artistic and architectural systems within which it functions, and an understanding of a typological relationship between the capital and votive column and architecture was achieved, making further levels of interpretation possible. Insight into a perceived form and structural performance related relationship between the Ionic and Aeolic capital was made more specific.

In Chapter Five there was a disclosure of the design process involved in coming towards the Ionic standard capital, which disclosure augments but also challenges existing descriptions of the process, and which provides an increase in knowledge regarding the process. There was an exposure of a continuous transfer of design insight and achievement in the early Archaic evolution of the capital, the innovations achieved and of the extent and nature of canonic content of design in the period. The postulated existence of early regional typologies of the capital were confirmed, and the evolutionary relationship between the Ionic, Aeolicising and Aeolic capitals was exposed from a typological and chronological perspective. A contextual framework for future construction of a founding history of the early Ionic capital - which also reacts critically towards existing frameworks - was formulated.

5.3 CONCLUSION

The description and interpretation achieved in this study, including its critical stance towards existing interpretations of the artefact, not only provides a suitable base for future construction of a founding history but precipitates as further artefactual residue which may be seen as adding to the present understanding of the Ionic capital and its role as an element in art and architecture. At the same time the achieved architectural interpretation may in future be related to a series of contexts accessible to other disciplines to fill in detail which, due to the specialist and mono-perspective nature of previous architectural interpretation, does not allow such intervention, insertion or addition. It is in this co-constructive spirit that this study is offered.

This study should provide great amount of detail for further study within a coherent framework, within which researchers from various disciplines may interconnect to increase the depth of interpretation from their various perspectives. There is a great need for material which may be used in future research which has as

its aim insight into the complexities included in the formative stages of Hellenic monumental architecture relationship between culture and style, to critically view the dominant vision of the nature and origin of Hellenic architecture, new understanding of the evolution of the Classical heritage, relevant knowledge for a reassessment of current knowledge regarding the formative stage of what has been shown to be the foundations of what is held as Western architecture, revitalisation of current architectural theory and an enhancement of design pedagogy which values a traditive perspective.

The most definite *lacuna* in this study is the use of secondary sources regarding description of the artifacts, and the exclusion of capitals between 525-489 BC from the detailed typological analyses, due to the limitations put on the scope of the study and due to the restrictions of research rights existing within the specific field of study. The re-documentation of all capitals where an increase in accuracy may be achieved (including those Classical capitals contained in other studies) will, due to the structural nature and ease of use of the *corpus* provided here, bring about a much needed improvement in accuracy of the synthesising conclusions reached in this study and be of immense value in further research.

5.3 RECOMMENDATIONS

- 5.3.1 This study has identified various critical instances where an intensified focus of archaeological and interpretative endeavour may deliver fruitful results. These include:
- * a redocumentation of capitals Ion-12, 13, 56, 65, 67b, 68, 69 and 76;
 - * future contextual corroboration of possible base dimensions used in capital design, as identified in the process (Identified and evaluated in Table 3.11, and shown as experimental values in App. 1 Table 1.1. See 3.3.4.3);
 - * the conversion of all proportional relationships inherent in Archaic Ionic capitals from the decimal system to one employing fractions (taking into account the insight into the use of base dimensions gained in the study);
 - * the interpretation as well as the graphic representation of identified modular design;
 - * finding the plan-ordering system of undersides of Archaic capitals for which this information is outstanding and identifying those having significant proportions;
 - * finding the geometries underlying the volute construction of Ionic capitals between 525 and 480 BC;
 - * finding instances of design co-ordination between volute centre and echinus bottom bearing surface and echinus side in late Archaic and Classical capitals (See 3.3.4.2.4);
 - * scrutiny of Archaic Ionic capitals before 525 BC for the existence of rebates and bosses used in the construction process;
 - * geographical ordering of Archaic Ionic capitals from 525-625 BC included in this study according to the proposed guidelines in order to more accurately assess the results of the study by Kirchhoff

(EVI), as well as for purposes of further dating (See 4.1.3), classification and analysis of geographical trends in Archaic capital typology, inquiry into the context surrounding the introduction of Ionic architecture at Samos during the reign of Polycratos on Samos, efforts at more closely dating the Kolonna sphinx column (Col-8) and of finding further information regarding the lost capital;

- * directing research towards establishing the probability of the existence of composite Ionic capital types preceding the datum of the Ionic standard capital and the anomalies surrounding this possibility (See 4.2.33);
- * the construction of a diagram of relationships which graphically explains the complexities of the system of proportional relationships inherent to the Archaic Ionic Order;
- * the reconstruction of façades of certain identified Archaic Ionic temples and the representation and analysis of the geometrical ordering devices inherent to the façades;
- * lastly, contextual evidence around those capitals that were shown to have been significant (See 3.2.4; 3.3.4.2.4; 4.1.1.13) in the Archaic evolutionary process (as well as regarding later development in the Classical period) should be garnered so that the role and meaning of these capitals may be further elucidated.

- 5.3.2 The demarcation of capitals from the total Archaic period into regional, interim types (See 3.2.4) from detail gained from the analysis of the geographical and chronological ordering, enhanced from analysis of the metrological and geometrical content of the capitals, together with detail scrutiny of sculpture style and method and correlation with external contextual evidence.
- 5.3.3 The comprehensive, integrated, representative and ordered data base of Archaic Ionic capitals and first generation Archaic Ionic buildings that was compiled in this study may be used as reference work in further archaeological and art- and architectural historical research.
- 5.3.4 The achieved typological interpretation of Archaic Ionic capitals, if augmented with post 525 BC capitals, may be utilised for classification of artifacts from typological and stylistic criteria as well as in determining further instances of resonance between design phases in Archaic Hellenic architecture and glyptic art.
- 5.3.5 The achieved typological interpretation of the Archaic Ionic capital may be specifically applied to achieve a typological understanding of the early Archaic Ionic Order, to come to a founding history of the Ionic Order. This may also be used to critically review and enhance the content of current theory and parallel theories for the Doric Order, and to critically reread the epistemology of existing architectural systems that implicitly use the presumed tenets on which Hellenic architecture is founded as etymological base for promoting those systems.
- 5.3.12 The study may serve to review existing architectural historical knowledge around the design process involved in Archaic Ionic architecture.



6 REFERENCE LIST

6.1 Abbreviations

6.1.1 Journals

AA	Archäologischer Anzeiger
AAA	'Αρχαιολογικὰ ἀναλεκτα ἐξ 'Αθηνῶν
ADelt	'Αρχαιολογικὸν Δελτίον
AEphem	'Αρχαιολογικὴ Ἐφημερίς
AJA	American Journal of Archaeology
AM	Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung
AntJ	Antiquaries Journal
AntK	Antike Kunst
ArchHom	Archaeologica Homericæ
ASAtene	Annuario della Scuola archaeologica di Atene e della Missioni Italiane in Oriente
AW	Antike Welt
BASOR	Bulletin of the American Schools of Oriental Research
BCH	Bulletin de correspondance hellénique
BICS	Bulletin of the Institute of Classical Studies
BiOr	Bibliotheca Orientalis
Bjb	Bonner Jahrbücher des Rheinischen Landesmuseums in Bonn und des Vereins von Altertumsfreunden im Rheinlande
BSA	The Annual of the British School at Athens
BSR	Papers of the British School at Rome
Bull. Bulgare	Bulletin d'Analyses de la Litterature Scientifique Bulgare Histoire Archeologique
CIJ	The Classical Journal
CVA	Corpus Vasorum Antiquorum
DAA	Denkmäler Antiker Architektur
Ergon	Τὸ Ἔργον τῆς Ἀρχαιολογικῆς Ἐταιρίας
Gno	Gnomon
HarvSt	Harvard Studies in Classical Philology
IstMitt	Istanbuler Mitteilungen
JdI	Jahrbuch des Deutschen Archäologischen Instituts
JHS	Journal of Hellenic Studies
JRIBA	Journal of the Royal Institute of British Architects
MdI	Mitteilungen des Deutschen Archäologischen Instituts
NSc	Atti della Accademia D'Italia. Notizie degli Scavi Antichità
ÖJh	Jahreshefte des Österreichischen Archäologischen Instituts in Wien
PBF	Prähistorische Bronzenfunde
Prakt	Πρακτικὰ τῆς ἐν Ἀθήναις Ἀρχαιολογικῆς Ἐταιρίας
Qedem	Monographs of the Institute of Archaeology. The Hebrew University of Jerusalem
RA	Revue archéologique
REA	Revue des études anciennes
RM	Mitteilungen des Deutschen Archäologischen Instituts, Römische Abteilung
SAAR	The South African Architectural Record
SSAAG	Saarbrücker Studien zur Archäologie und Alten Geschichte
ZGdA	Zeitschrift für die Geschichte der Architektur

6.1.2 Books

EIV	KIRCHHOFF, W. 1988. <u>Die Entwicklung des Ionischen Voluten-Kapitells im 6. und 5. Jhd. und seine Entstehung.</u> Bonn: Habelt.
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APPENDIX 1 - TYPOLOGICAL ASPECTS OF ARCHAIC IONIC CAPITALS AND ARCHAIC IONIC BUILDINGS (UP TO 525 BC)

- * Table 1.1 Chronologically put spreadsheet of quantitatively described Archaic Ionic standard capitals up to 489 BC
- * Table 1.2 Chronologically put spreadsheet of qualitatively described Archaic Ionic standard capitals up to 489 BC
- * Table 1.3 Chronologically and geographically put spreadsheet of quantitatively described first-generation Archaic Ionic standard capitals (up to 525 BC)
- * Table 1.4 Chronologically and geographically put spreadsheet of qualitatively described first-generation Archaic Ionic standard capitals (up to 525 BC)
- * Table 1.5 Chronologically put quantitative description of façade elements of Ionic buildings up to 525 BC.
- * Table 1.6 Effect of Gruben (1991; 1996, Fig17; 1997, Fig40) on discernable proportional relationships in the façades of pre-525 BC Archaic Ionic buildings.*
(*See Chapter 3, Table 3.13)

The spreadsheet tables are included on 1,44" computer disk in Excel® 5.0a for MS Windows® 3.11 (See the sachet on the front cover of the library copy of the dissertation). Copyright for the spreadsheets resides with the author.

TABLE 1.5 Quantitative description of relevant facade elements of Ionic buildings up to 525 BC											
	Bld No.	Bld 1d	[Included for comparison]	Bld 12b		Bld 12b		Bld 3d		Bld 12c	
	Capital	[Tor-1 + bracket]		[Ion-24]		[As Ion-24]		[Ion - 7a]		[Ion - 5]	
I O N I C B U I L D I N G S	Building	1sr Dipt Heraion [Zone E - corners]		Naxian Oikos interior, Delos		Naxian Oikos exter. west prodomos		Dionysos Temple IV, Iria, Naxos [Outer]		Prostáon, Naxian <i>Oikos</i> , Delos	
	Z	5250 [E]	Hendrich, 1997, Beil2 [Kienast]	2074	Gruben, 1972, p.323	ca 2460	Gruben, 1997, Fig.40	4080	Gruben, 1987, p.595	2921	Courbin, 1980, p.102
	T	3640	Resultant	1700	Resultant	ca 2173	Resultant	3310	Resultant	2278	Resultant
	O	535	Wesenberg, 1971, p.125	465	Ohnesorg, 1993, Plate 3	ca 650 [664 courbin?]		450	Gruben, 1987, p.596	362	Ohnesorg, 1993a, Plate 3
	S	9693	Hypoth. Resultant	4500	Ohnesorg, 1993, Plate 3	ca 4028	Resultant	7250	Resultant: Gruben, 1987, p.596	3168	Hypoth: Ohnesorg, 1993a
	R	1600-20	Hendrich, 1997, p.52 [Kienast]	376	Gruben, 1963, p.148	367	Courbin, 1980, Plate 5	770	Gruben, 1987, p.596	ca 480	Ohnesorg, 1993a, Plate 3
	Y	1320-70	Hendrich, 1997, p.52 [Kienast]	264	Gruben, 1963, p.148	264	[as inner - same capital]	660	Gruben, 1987, p.596	ca 420	Ohnesorg, 1993a, Plate 3
	U	3260	Between cymas	1414	Resultant	1800	Resultant	2295	Resultant	2063	Resultant
	OSLM	10480	Hypoth. Buschor, 1930, p.87	5135	Ohnesorg, 1993, Plate 3	4870	Gruben, 1997, p.348	8070	Hypoth: Gruben, 1987, p.596	3740	Ohnesorg, 1993a, Plate 3
	Q U A N T I T A T I V E C R I T E R I A	Bld No.	Bld 2d		Bld 21		Bld 22	Also Ohnesorg, 1993a	Bld 23		Bld 26
Capital		[Ion - 16a]	[OSLM includes plinth]	[Ion - 15]		[Ion - 25a]		No capitals		[Ion -26]	
Building		Artemision 'D', Ephesos [min col cent]		Lower Temple, Myus		Naxian Stoa, Delos [S.flank;aver cent]		Apollonion, Palati, Naxos		Apollonion, Phanai, Chios	
Z		5230	Bammer, 1972b, Fig.5	3141	Weber, 1967, Fig.2	2320 aver	Hellmann et al, 1979, p.99	4385	Gruben, 1972, Fig.13	lost	
T		3660	Resultant	2402	Resultant	1915 aver	Resultant	2764	Resultant	lost	
O		1320	Murray, 1889, Fig.5	486	Wesenberg, 1971, p.120	187	Hellmann et al, 1979, p.112	lost		470	Boardman, 1959, Fig.1a-b
S		lost		7829	Deduce	2735	Hellmann et al, 1979, p.99	lost		10048	Resultant
R		1575	Gruben, 1963, p.148	739	Weber, 1967, p.137	348	Vallois, 1966a, p.101	1621	Hypoth: Gruben, 1972, Note 4	920	BSA 1934/5, p.142
Y		1200	Gruben, 1963, p.148	614	Weber, 1967, p.137	255	Vallois, 1966a, p.101	lost		800	Hypoth: Capital bottom H]
U		2150	Resultant	1241	Resultant	1626	Resultant	not measrb		1400	Resultant
OSLM	18900	Gruben, 1966, p.158	ca 8868	Weber, 1967, p.138	3107	Hellmann et al, 1979, p.112	not measrb		11040	Hypoth*: Kirchhoff, 1988, p.275	
Q U A N T I T A T I V E C R I T E R I A	Bld No.	Bld 6d		Bld 1e		Bld 27		Bld 28			
	Capital	[Ion - 28a]		[Ion - 58a]		[Ion - 74a]		[No capitals]			
	Building	Archaic Didymeion, Didyma		Heraion IV (Polycratos), Samos		Enneakrounos, Athens		Temple 'A', Paros			
	Z	4188	Gruben, 1963, p.89, Fig.1	4730	Kienast, 1992, note 20	ca 2400	Thompson, 1972, Fig.50	2992	Gruben, 1982a, Fig.15		
	T	2879	Resultant	2840	Resultant	1874	Resultant	2032	Resultant		
	O	548	Knackfuss-Wiegand, 1941a, Tab82	730	Boardman, 1959, p.175, Fig.2b	110 [108-12]	Merrit, 1982, Fig.3-5	unknown			
	S	14248	Deduce	18411	Deduce: hypoth col height	lost		unknown			
	R	1309	Gruben, 1963, p.108	1890	Gruben, 1963, p.155	526 Bottom	Merrit, 1982, p.89, Fig.3	960	Gruben, 1982a, p.215 note 39a		
	Y	1038	Gruben, 1963, p.127	1500	Gruben, 1960, Fig.49	454	Merrit, 1982, p.89, Fig.1	775	Gruben, 1982a, p.214		
	U	1571	Resultant	1670	Resultant	1610	Resultant	not measrb			
OSLM	15450	Hypoth Gruben, 1963, 158	19930	Hypoth: Gruben, 1963, p.155	not measrb		8860	Hypoth: Gruben, 1982a, p.215			



TABLE 1.6

	Bld No.	Bld 1d	Bld 12b	12b	Bld 3d	Bld 12c	Bld 2d	Bld 21	Bld 6d	Bld 22	Bld 23	Bld 1e	Bld 26	Bld 27	Bld 28
	Date	ca 575 BC	ca 575BC	ca 575BC	570BC	<550BC	<550BC	550BC	ca 550 BC	550-40BC	550-24BC	540/500>BC	550-25BC	540-30BC	530-20BC
		Chronologically put first generation Ionic	1st Dipt Heraion, Samos [Col. type 'E' + Tor-1; Dims excl bracket]	Naxian Oikos interior, Delos [Ion-24] + Gruben, 1996, Fig.17	Naxian Oikos [Ext W]As Ion-24] + Gruben, 1997, Fig.40	Dionysos Temple IV ext, Iria + Gruben, 1991; 1996, Fig.17	Prostoon Naxian Oikos, Delos [Ion - 5] + Gruben, 1997, Fig.40	Artemision 'D', Ephesos [Ion - 16a] Gruben, 1996, Fig.17	Lower Temple, Myus [Ion - 15]	Archaic Didymeion, Didyma [Ion - 28a] + Gruben, 1996, Fig.17	Naxian Stoa [S, av cent], Delos [Ion - 25a] + Gruben, 1996, Fig.17	Apollonion, Palati, Naxos [No capitals]	Heraion Polycrates, Samos [Ion - 58a] Gruben, 1996, Fig.17	Apollonion, Phanaï, Chios [Ion - 26]	Enneakrounos, Athens [Ion - 74a]
EFFECT OF GRUBEN ON PROPORTIONS OF PRE-525 BC ARCHAIC IONIC FACADES	Z	5250	2074	2460	4070	2921	5230	3141	4188	2320	4385	4730	3400	2400	2992
	T	3640	1700	2173	3310	2278	3660	2402	2879	1915	2764	2840	2480	1874	2032
	O	535	x	650	x	x	x	486	548	187	lost	x	470	110	unknown
	S	9693	x	4028	x	lost	x	7829	14248	2735	lost	x	10048	lost	unknown
	R	1610	376	367	760	480	1575	739	1309	350	1621	1890	920	526	960
	Y	1345	264	264	660	420	1200	614	1038	255	lost	1500	800	454	775
	OSLM	10480	5000	4870	6860	3610	12600	8868	15450	3110	not measrb	19930	11040	not measrb	8980
	spira diam	x	439,5	x	x	x	2020	x	x	x	x	x	x	x	x
	L	252	170	170	370	210	885	553	654	181	lost	789	522	199	lost
	A	1520 [cyma]	660	660	1785	858	3080	1900	2617	694	lost	3060	2000	790	lost
	C or C ¹	1420 [top]	474	474	1275	572	2060	1400	2190	442	lost	2510	1360	534	lost
	U	3830	1414	1800	2295	2063	2150	1241	1571	1626	not measrb	1670	1400	1610	not measrb
	X	3360	1600	1986	2805	2349	3170	1741	1998	1878	not measrb	2220	2040	1866	not measrb
	Y/R	0,84	0,70	0,72	0,87	0,88	0,76	0,83	0,79	0,73	not measrb	0,79	0,87	0,86	0,81
	OSLM/R	6,51	13,30	13,27	9,03	7,52	8,00	12,00	11,80	8,89	not measrb	10,54	12,00	not measrb	9,35
	Z/R	3,26	5,52	6,70	5,36	6,09	3,32	4,25	3,20	6,63	2,71	2,50	3,70	4,56	3,12
T/R	2,26	4,52	5,92	4,36	4,75	2,32	3,25	2,20	5,47	1,71	1,50	2,70	3,56	2,12	
Z/OSLM	0,50	0,41	0,45	0,48	0,63	0,29	0,27	0,19	0,62	not measrb	0,14	0,22	not measrb	0,23	
X/OSLM	0,32	0,32	0,41	0,41	0,65	0,25	0,20	0,13	0,60	not measrb	0,11	0,18	not measrb	not measrb	
U/A	Not App	2,14	2,73	1,29	2,40	0,70	0,65	0,60	2,34	not measrb	0,55	0,70	not measrb	2,04	
X/C	Not App	3,38	4,19	2,20	4,11	1,54	1,24	0,91	4,25	not measrb	0,88	1,50	3,49	not measrb	
Z/A	Not App	3,14	3,73	2,28	3,40	1,70	1,65	1,60	3,34	not measrb	1,55	1,70	3,04	not measrb	
Z/C	Not App	4,38	5,19	3,19	5,11	2,54	2,24	1,91	5,25	not measrb	1,88	2,50	4,49	not measrb	



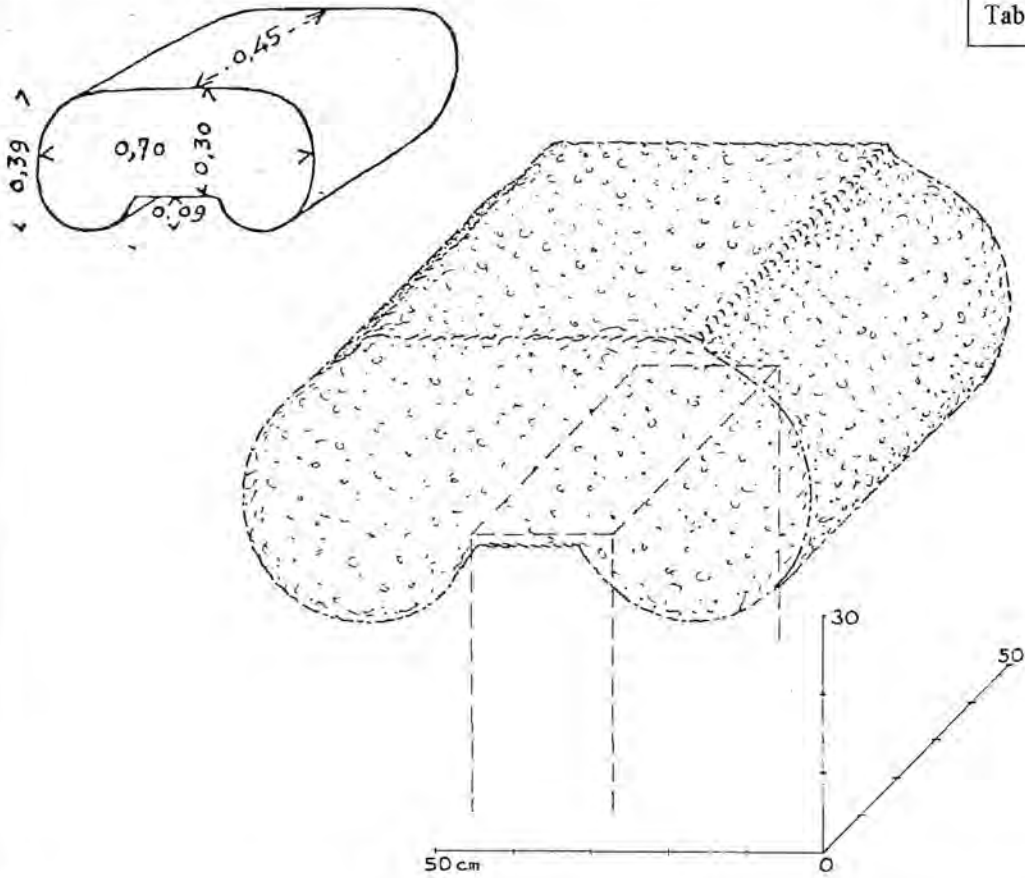
APPENDIX 2 DRAWINGS OF RELEVANT ARCHAIC PRE-IONIC, AEOLIC, AEOLICISING, CYMA , IONIC AND TORUS CAPITALS (625 up to 489 BC)

Index

- A Stone non-standard Ionic capitals (Preion-) and Ionic standard capitals (Ion-).
There are no capitals Ion-2, -3, -8, -33, -47, -49, -70, -71 and -79.
- B Aeolicising capitals (Iver-)
There is no capital Iver-1.
- C Cyma capitals (Cym-)
- D Aeolic capitals (Aeol-)
- E Torus capitals (Tor-)
- F Visual lexicon of the Archaic Ionic Order and capital.

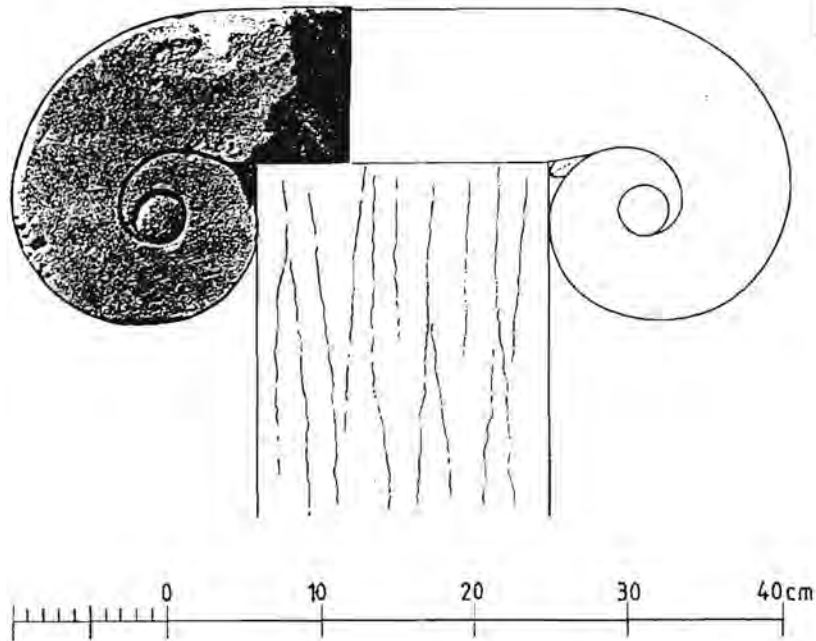
A Stone non-standard Ionic capitals (Preion-) and Ionic standard capitals (Ion-).
There are no capitals Ion-2, -3, -8, -33, -47, -49, -70, -71 and -79.

Table Preion-1



Drwg/photo reference: Courby, 1921, Fig.5; Gruben, 1996, Fig.4.

Table Preion-2



Drwg/photo reference: Gruben, 1969, Fig.3 [His collage drawing, using the photograph of fragment 29 in Wiegand, 1941a, Plate 213 - F662A].



Table 1.

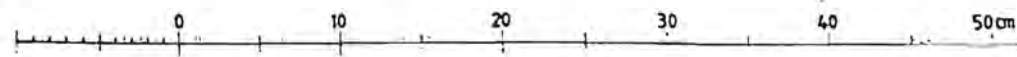
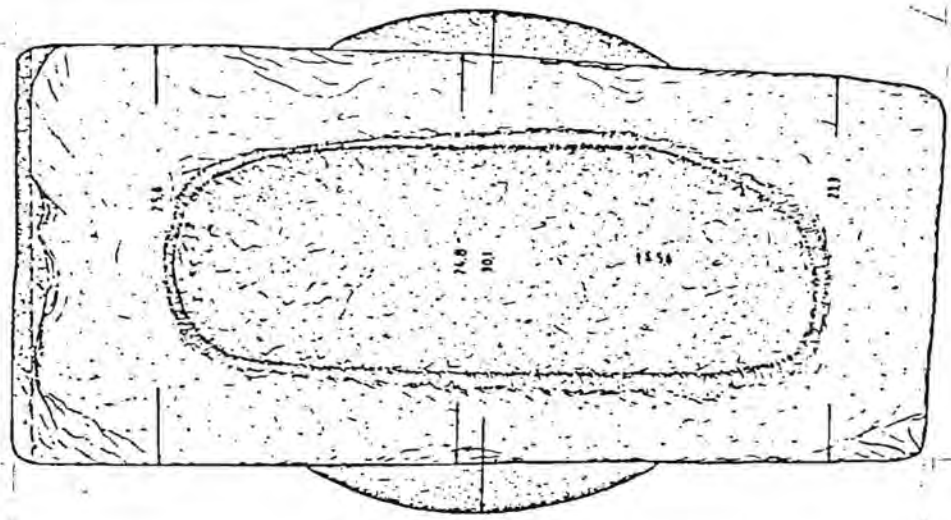
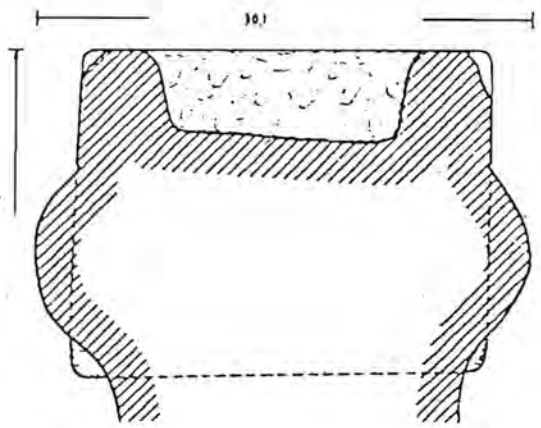
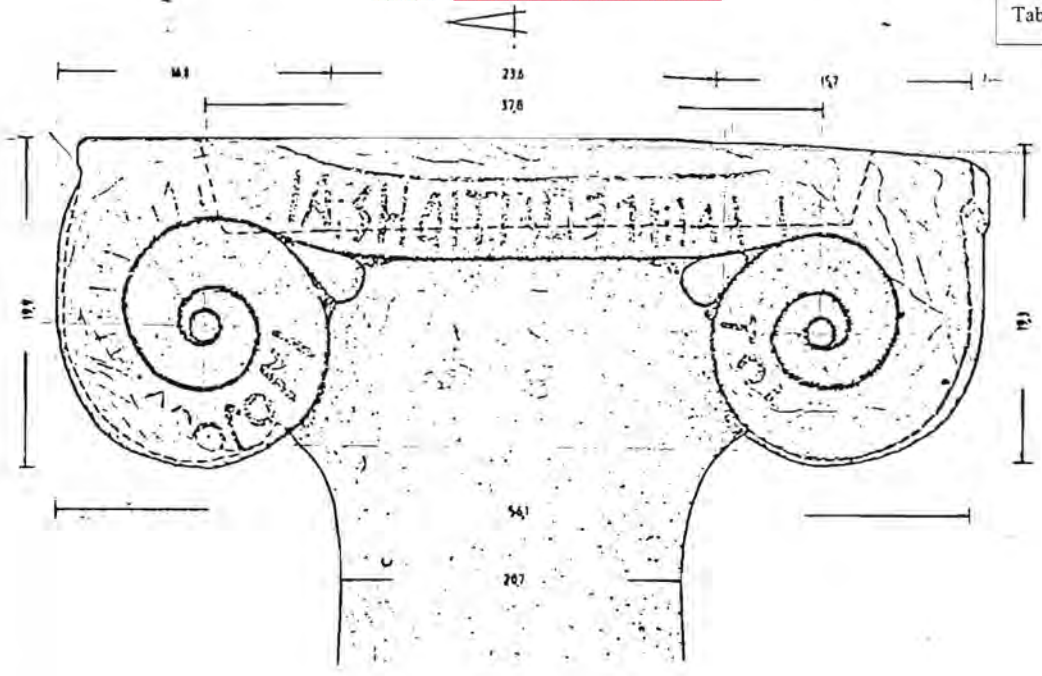




Table 4

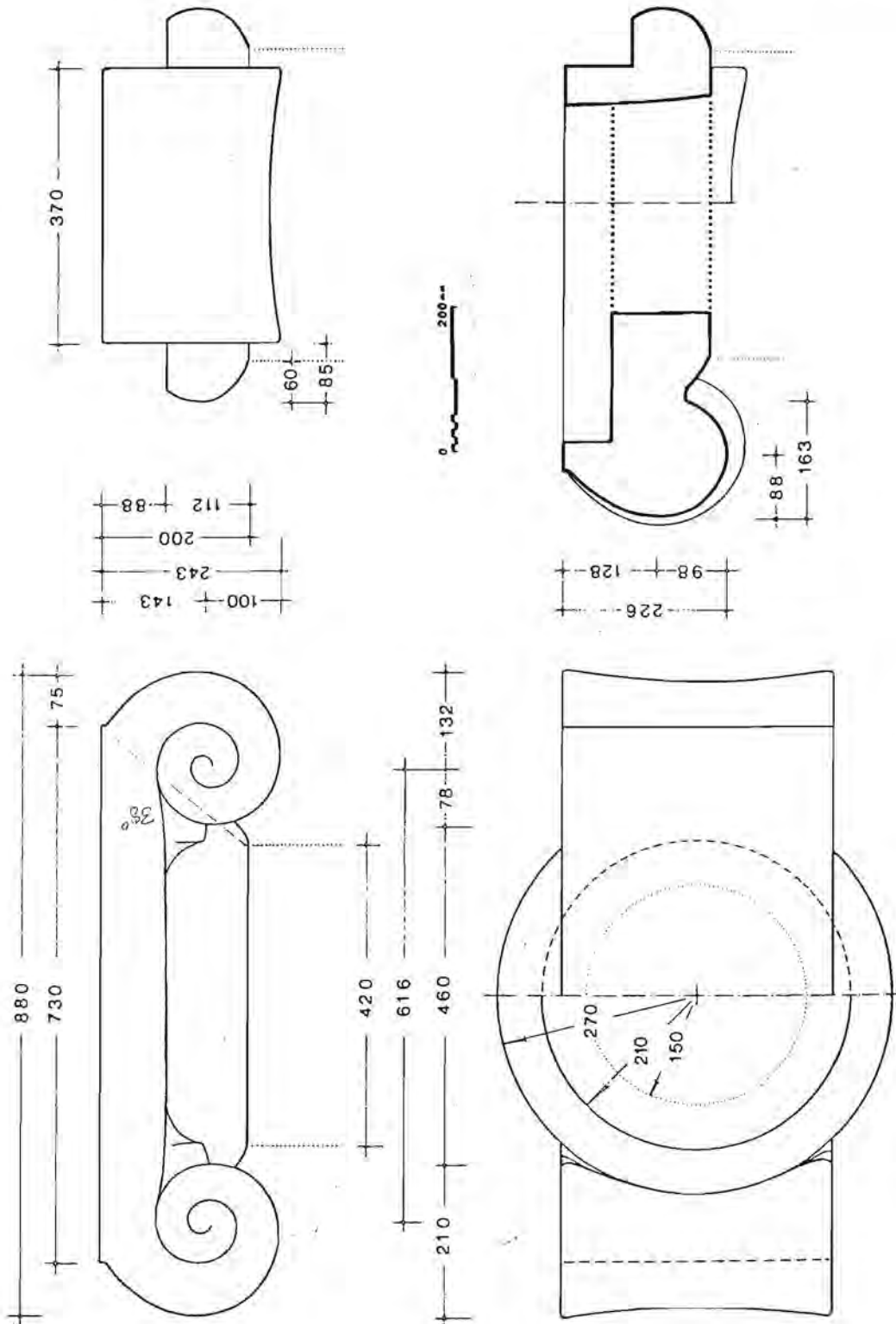




Table 5

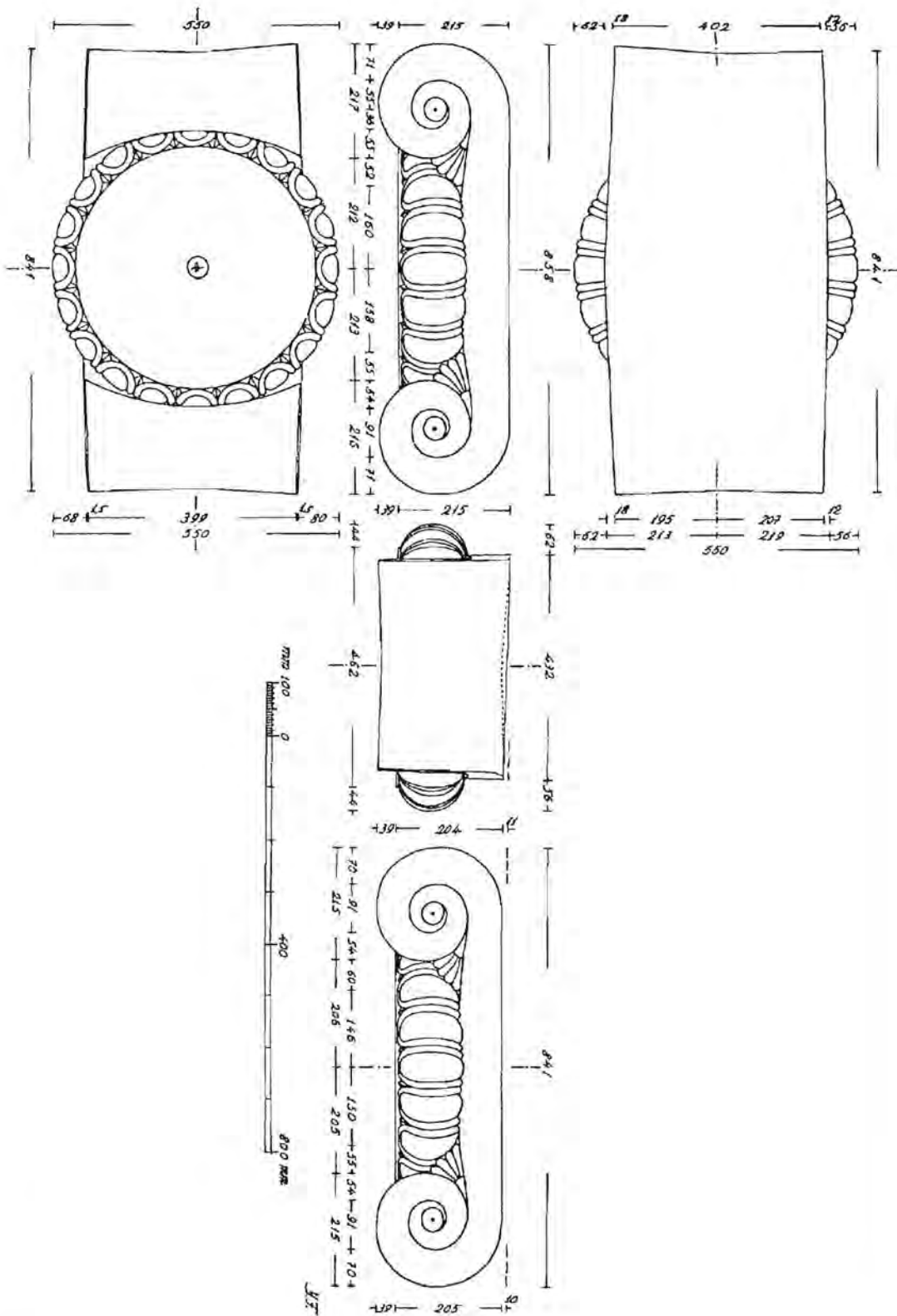




Table 6

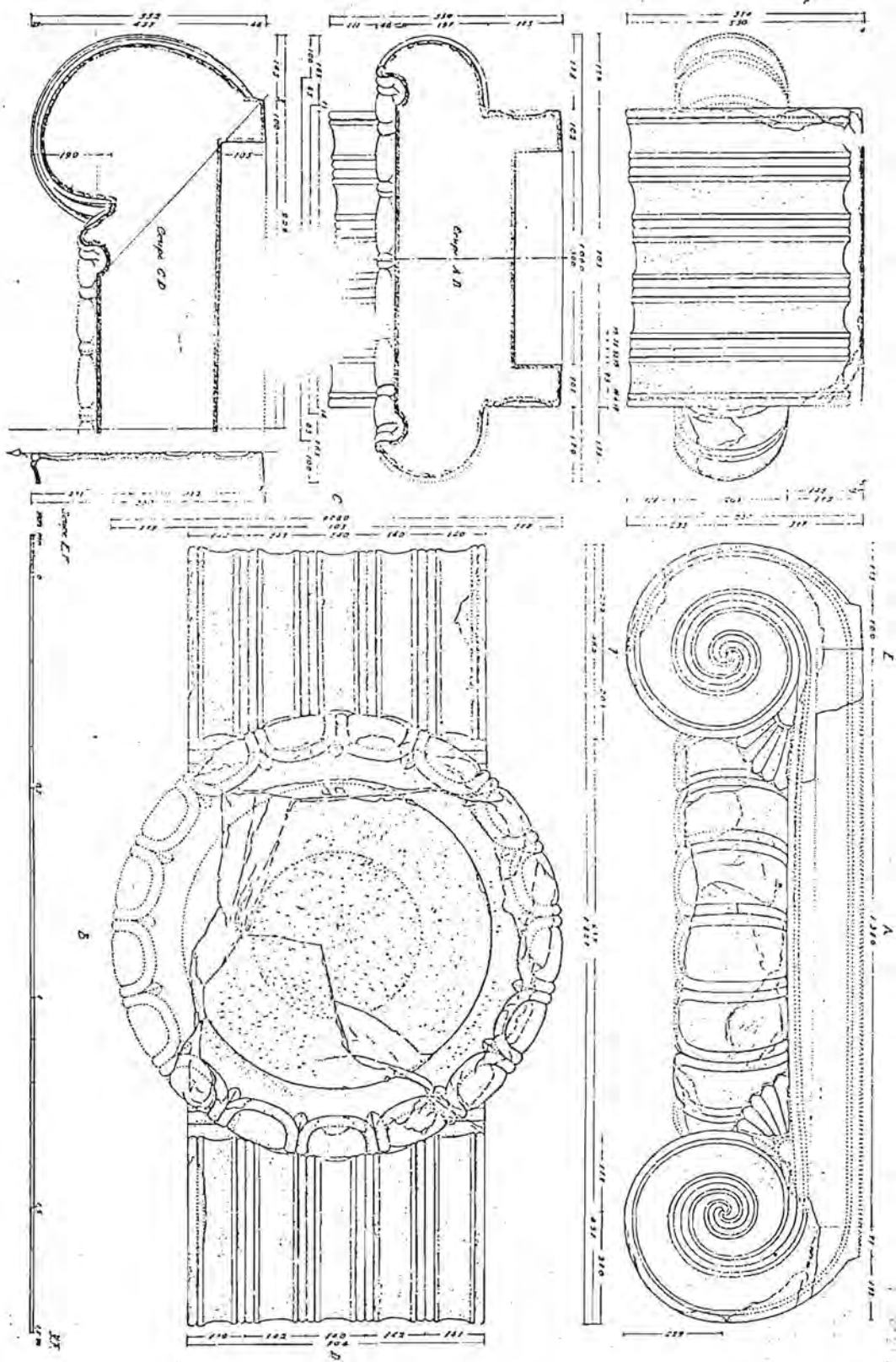
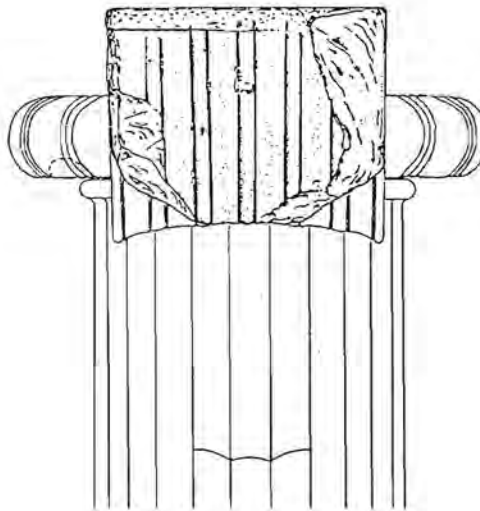
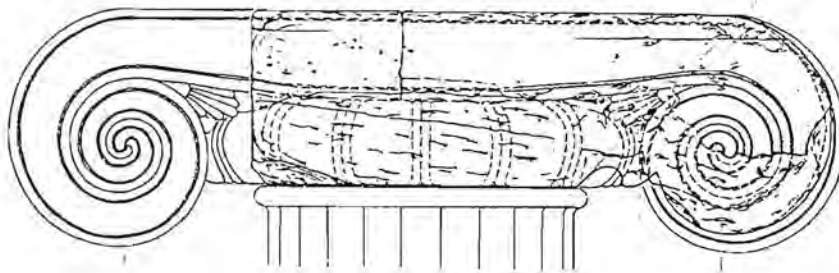
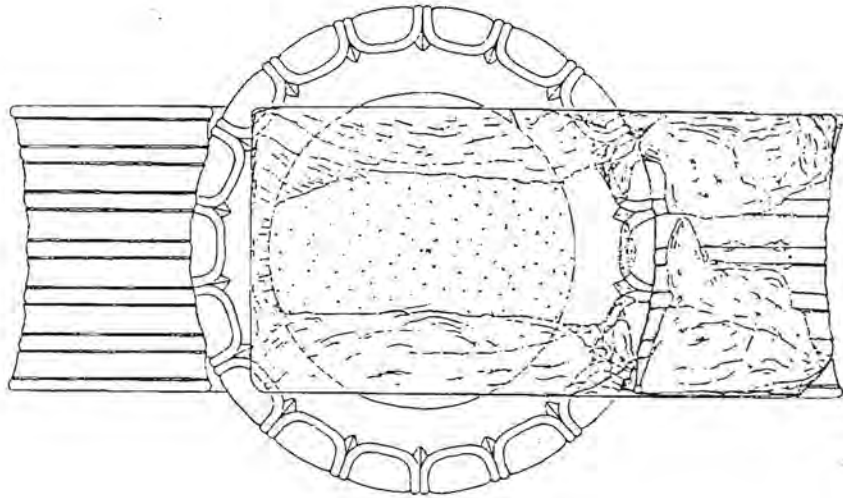




Table 7a



DRAWING REF: Gruben, 1987, Fig.41 [Also see Gruben, 1989, Fig.4 for back elevation].



Table Ion-9

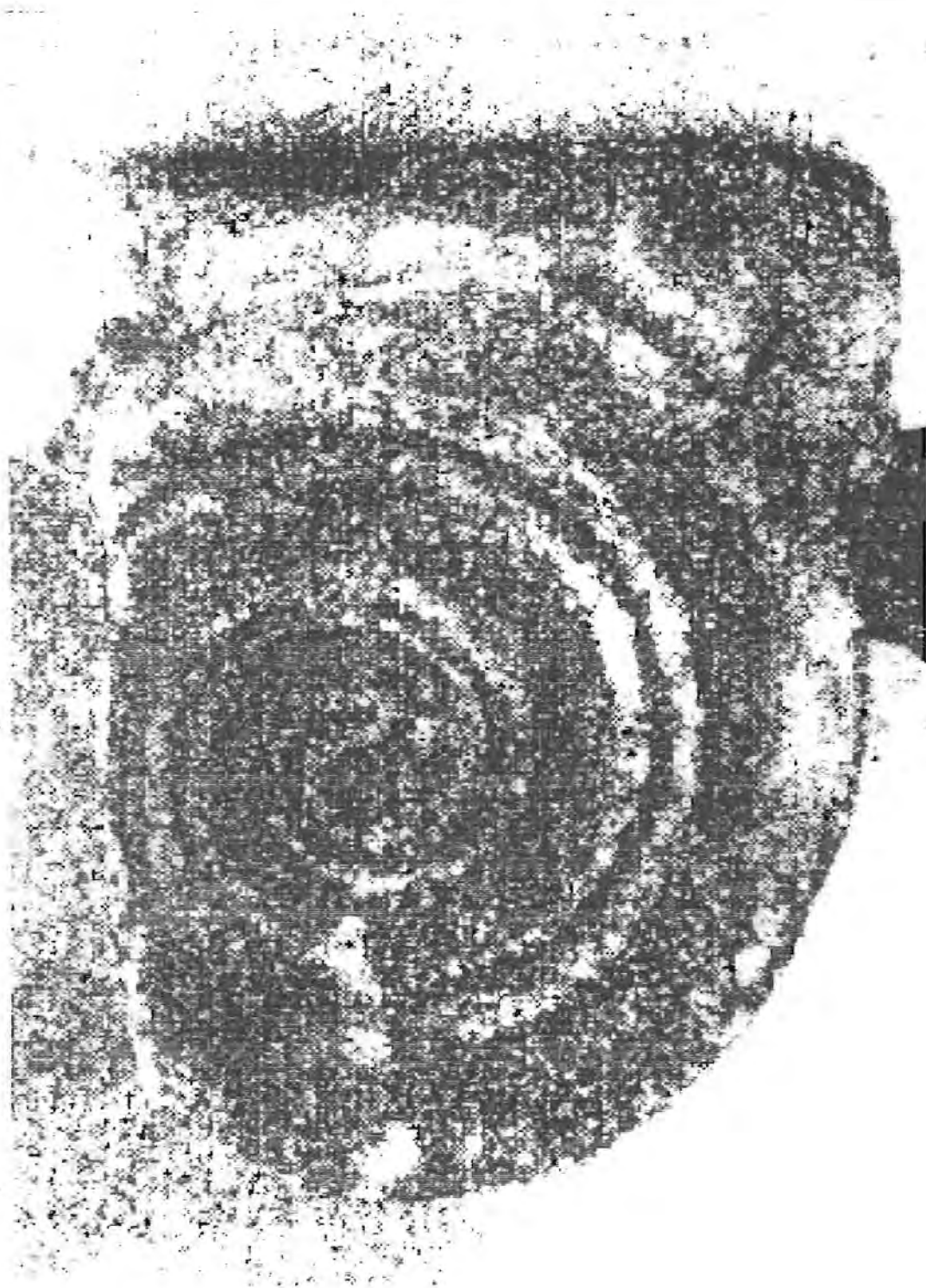


Table Ion-10

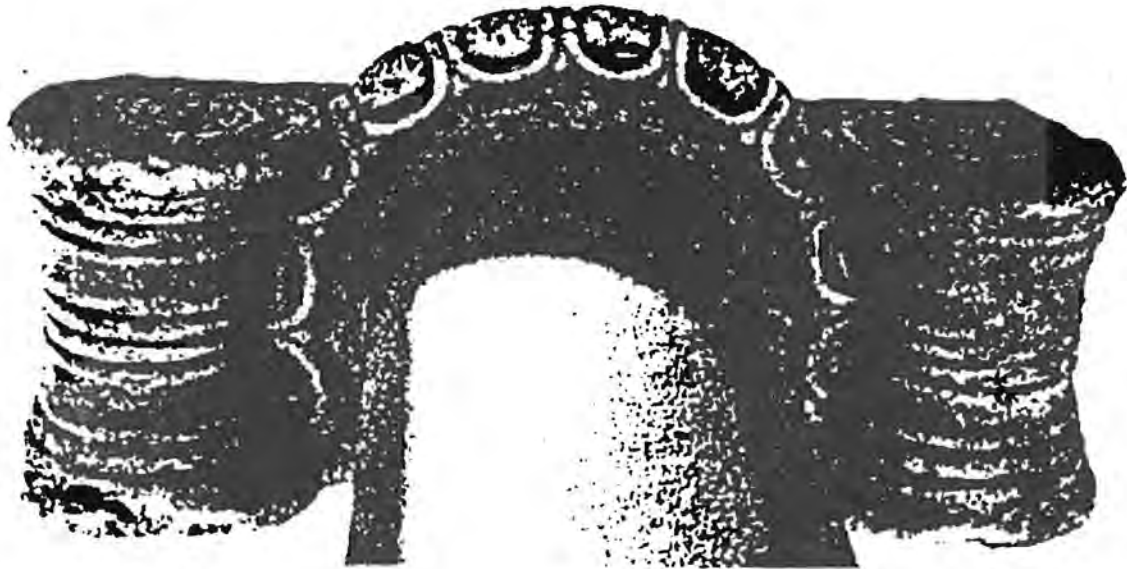
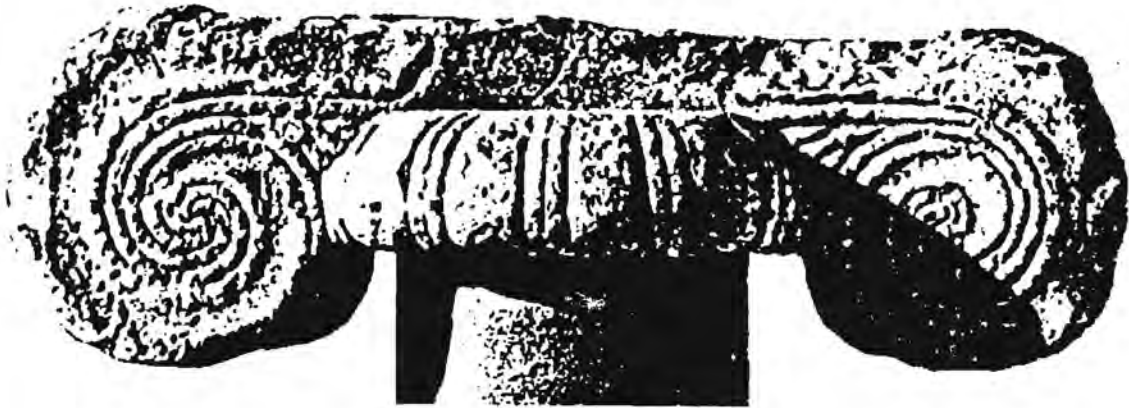


Table Ion-11

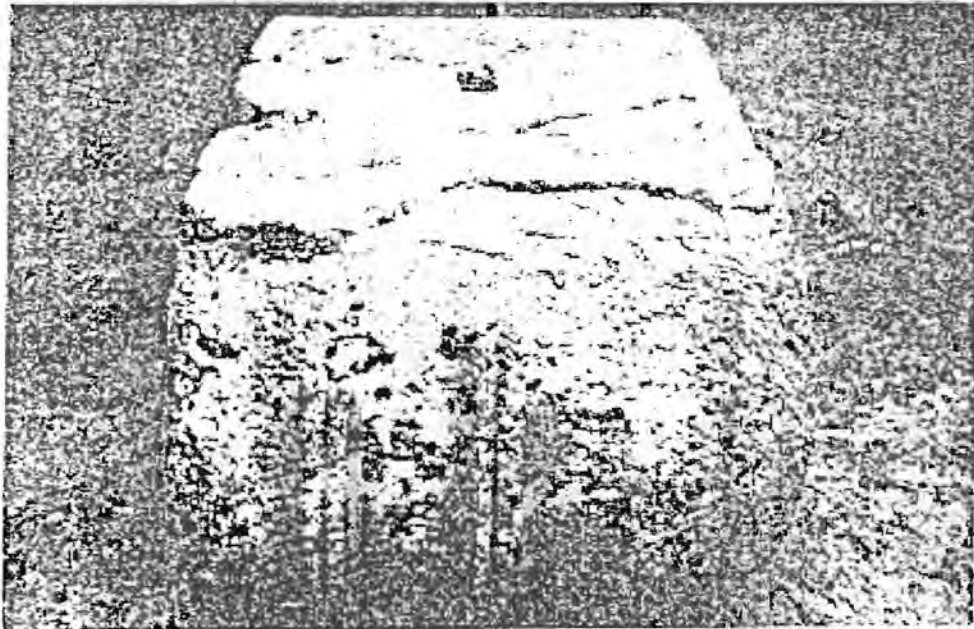
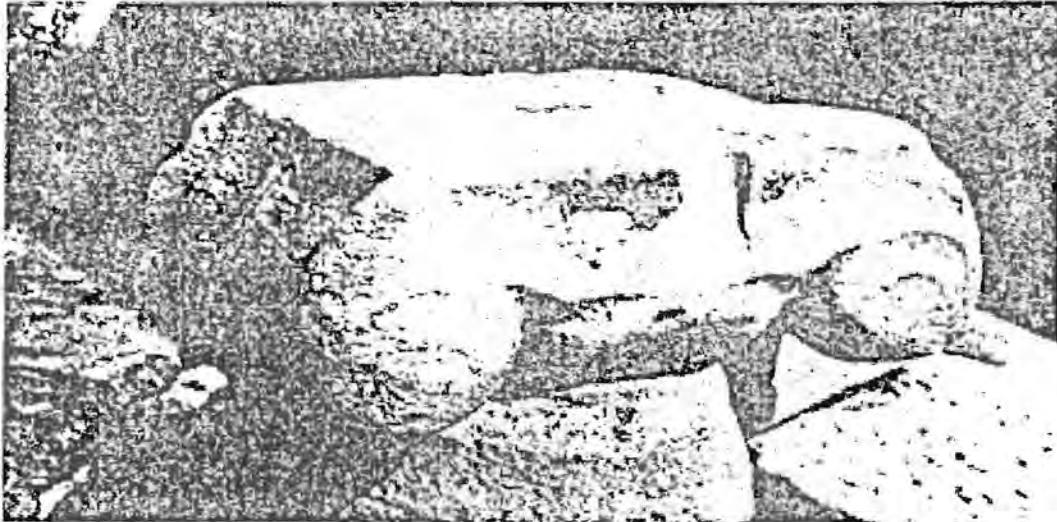
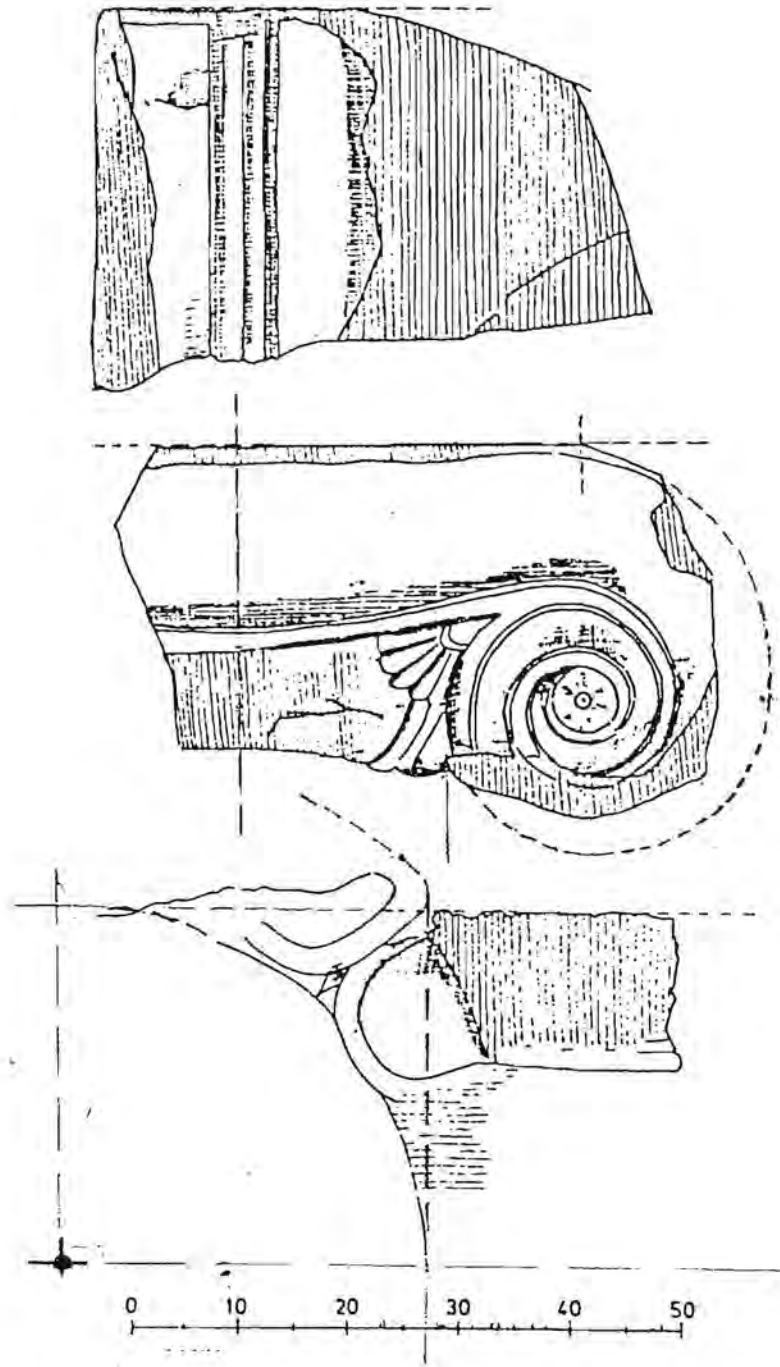




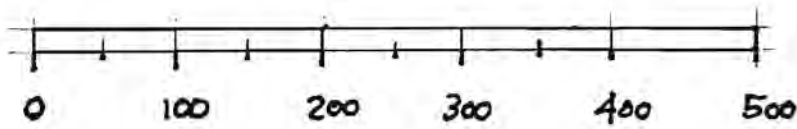
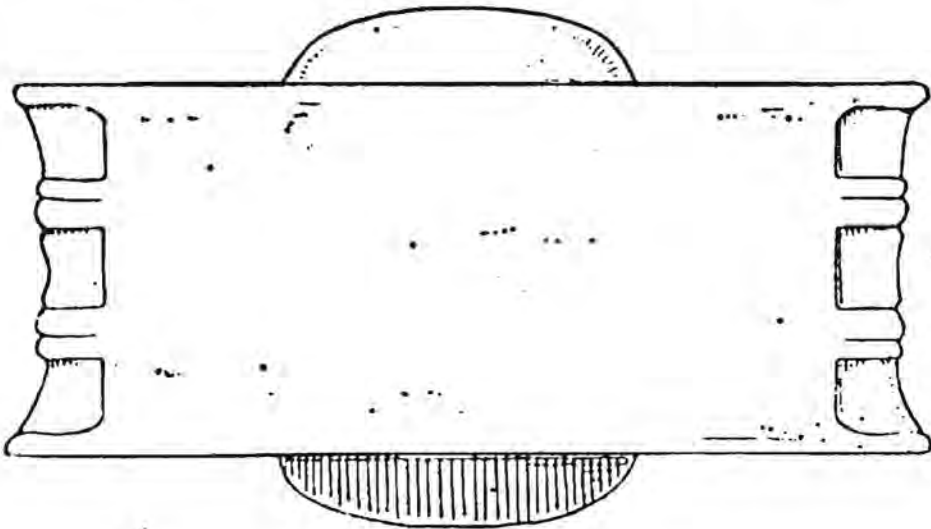
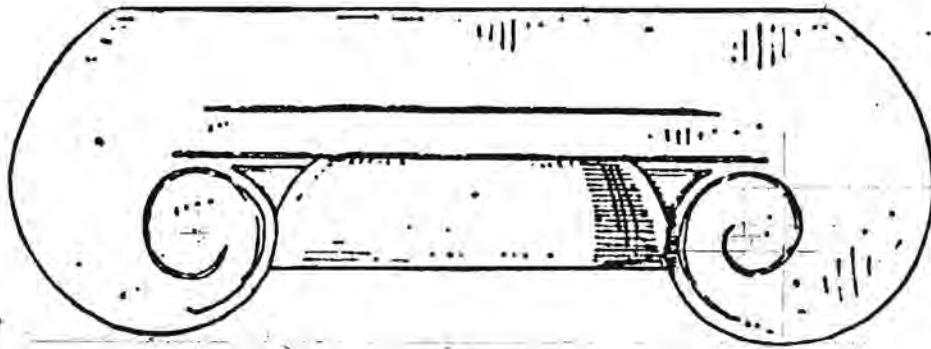
Table 12



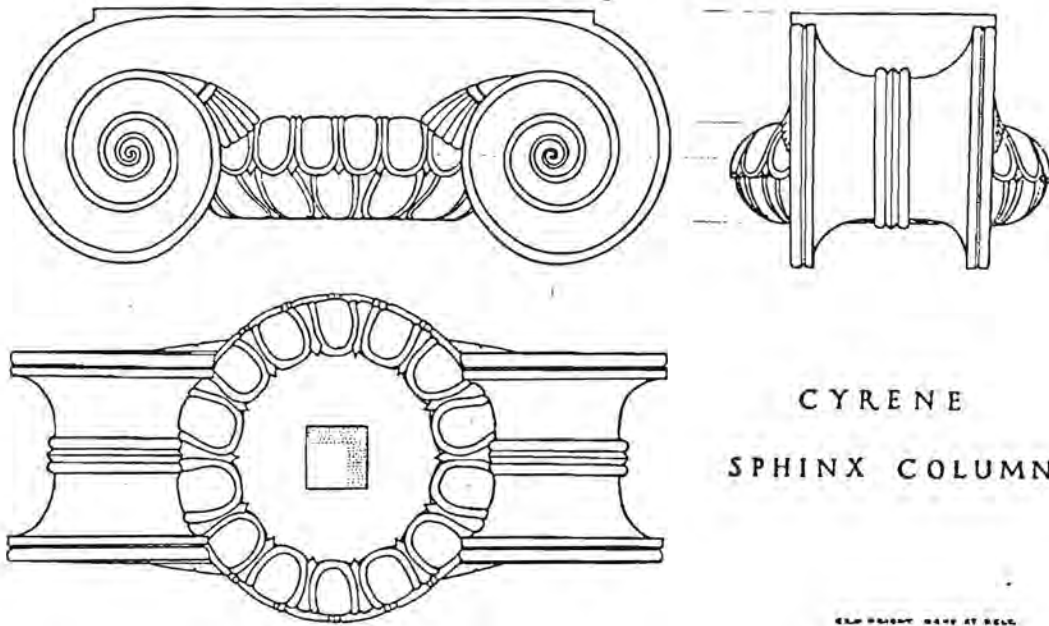
DRAWING REF: Alzinger, 1972/3, Fig.13 [with notes and comments by author].



Table 13



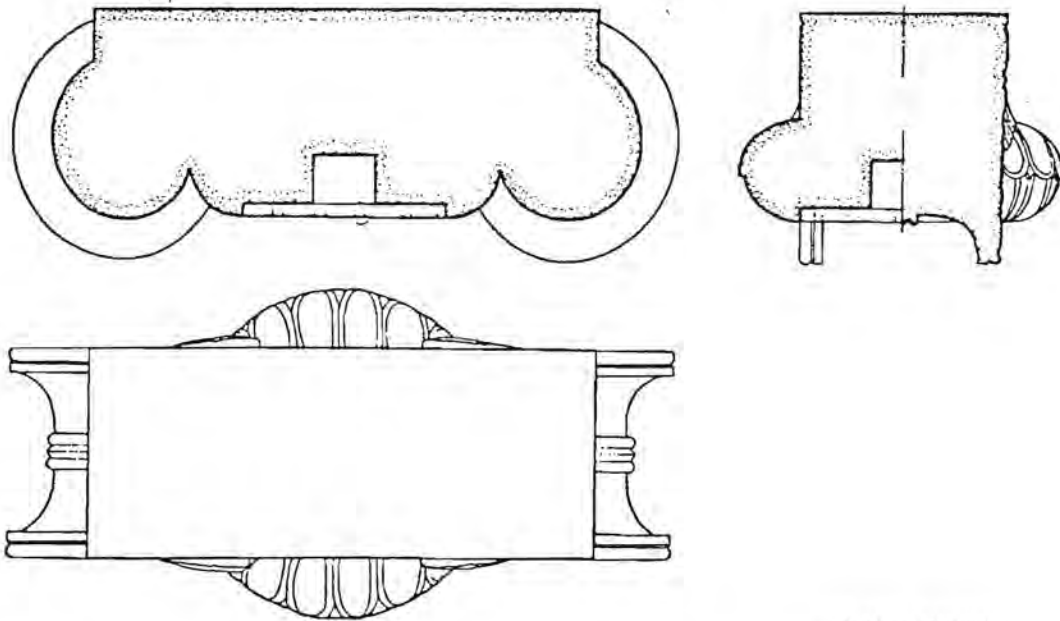
DRAWING REF: Wiegand, 1904, Fig.1 [with notation and scale by the author].



ELM HONEY WOOD BY GELF
CYRENE - GREEK 19



ILL. 1
Drawings by G. R. H. Wright



ELM HONEY WOOD BY GELF
CYRENE - GREEK 19





Table Ion-15

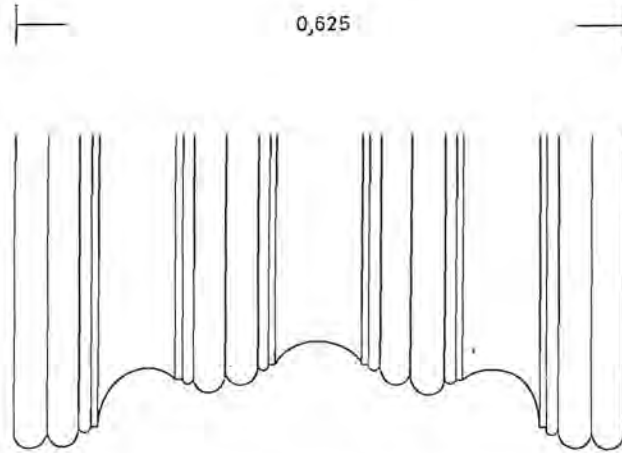


Abb. 5. Kapitell, Polster. Rekonstruktion

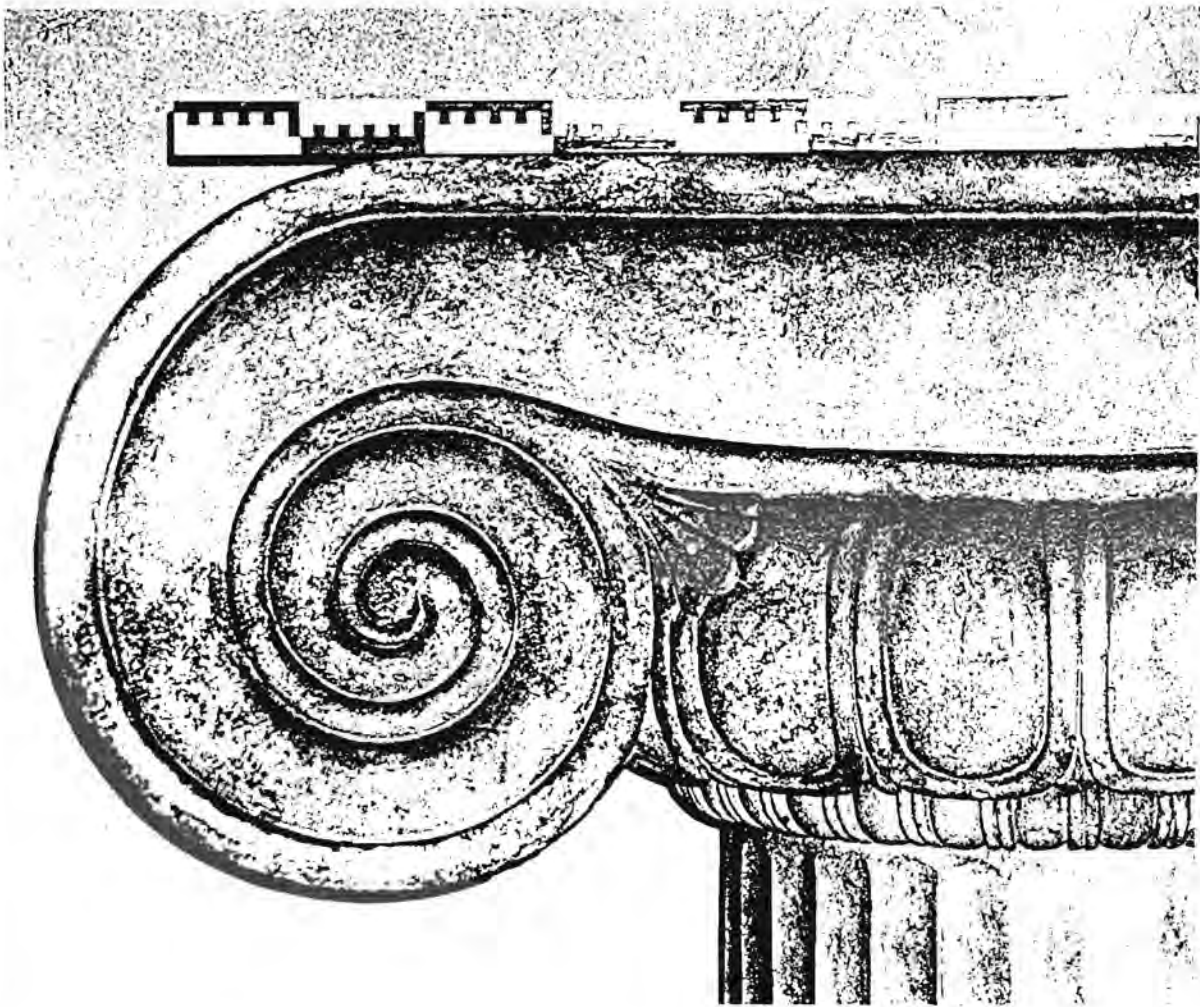




Table 16a

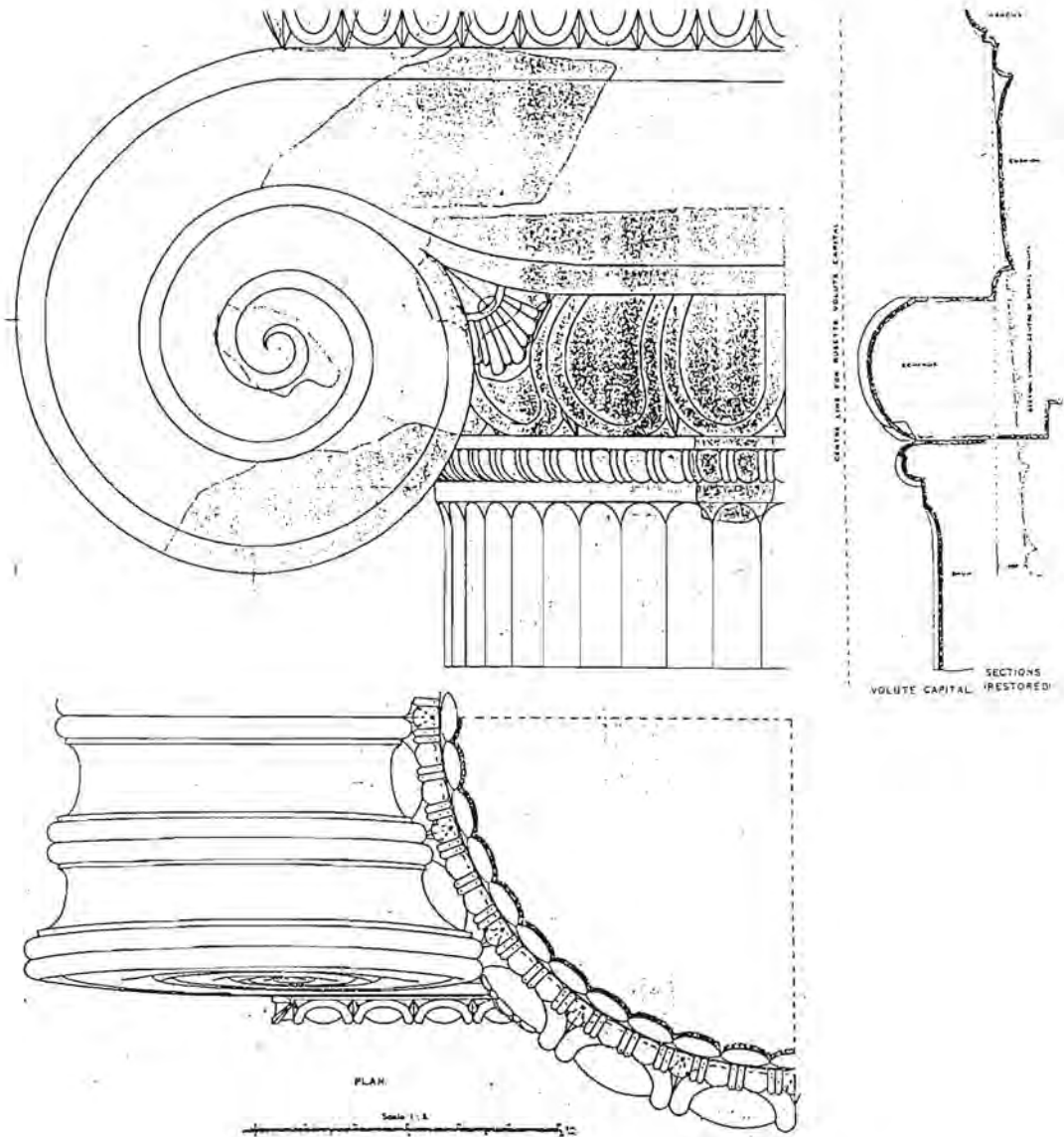
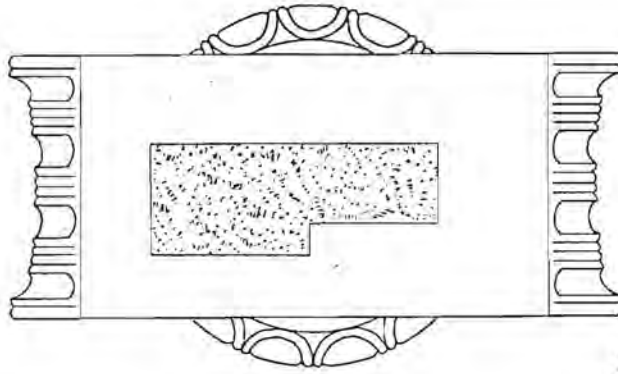
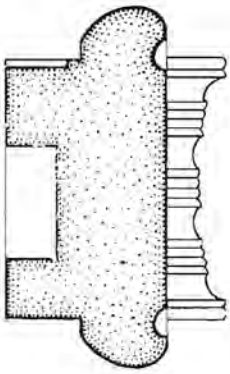
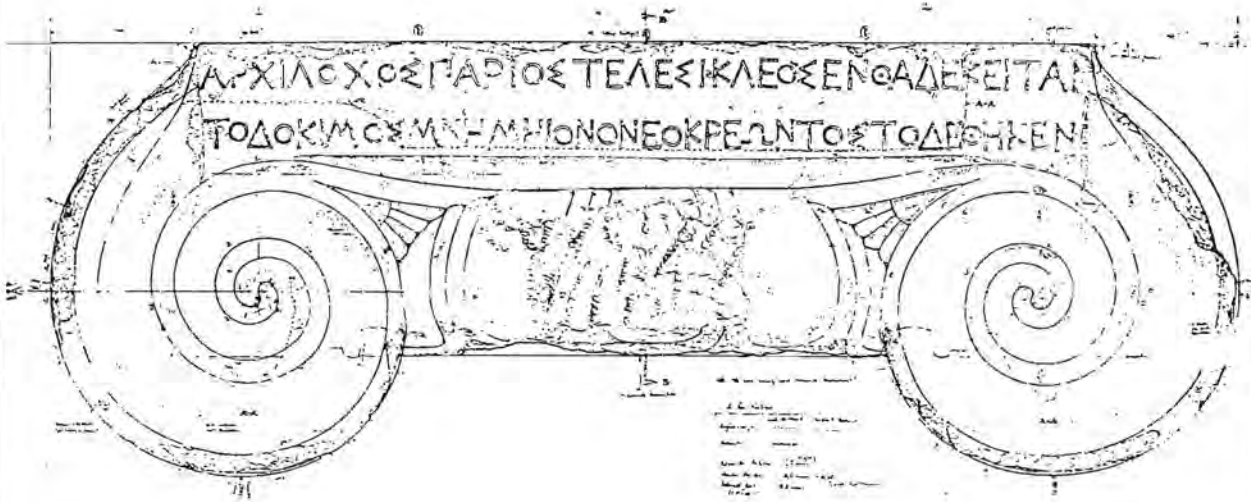
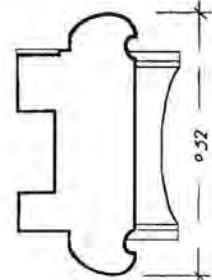




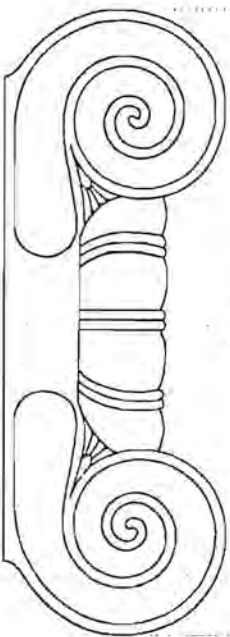
Table Ion-17



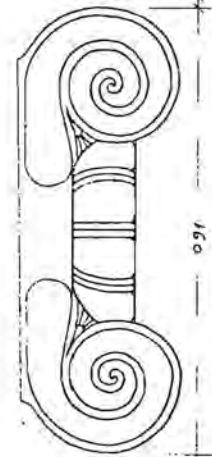
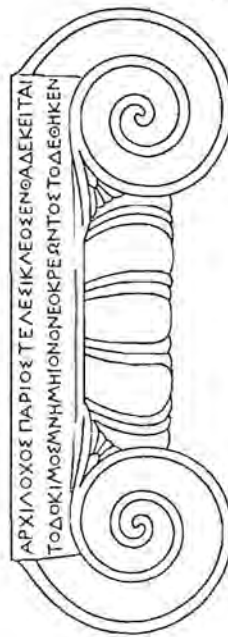
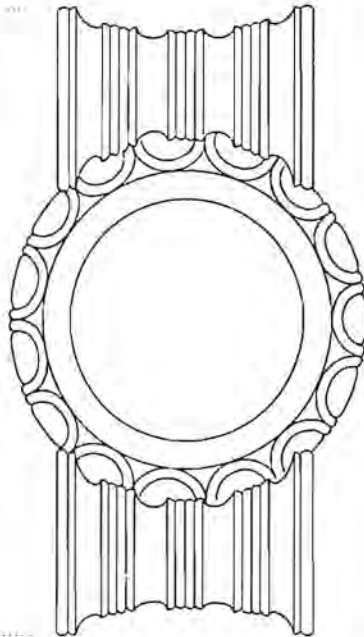
Α. Ορλ.



0.52



0.92



0.91



Table 18

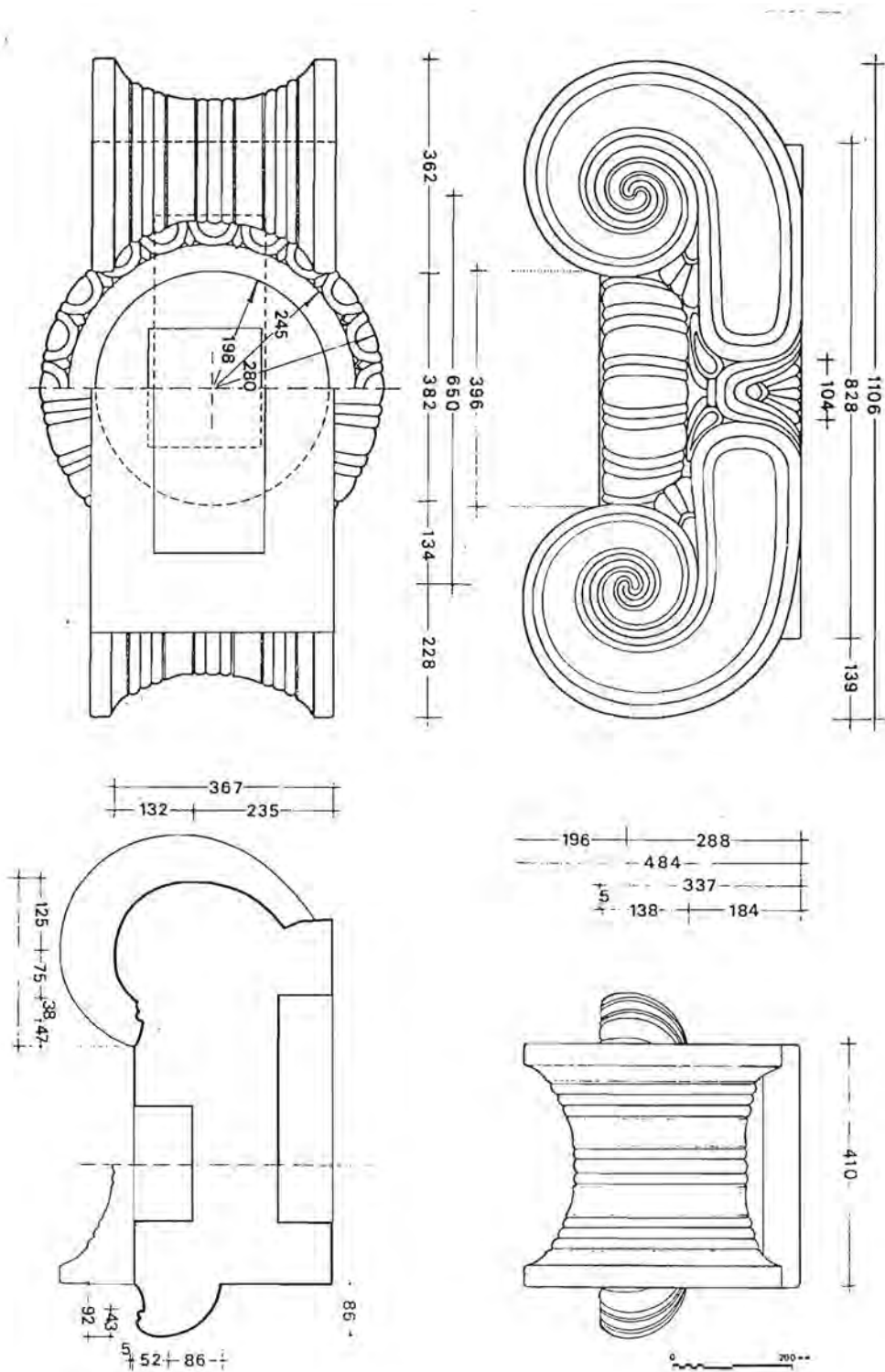




Table Ion-19

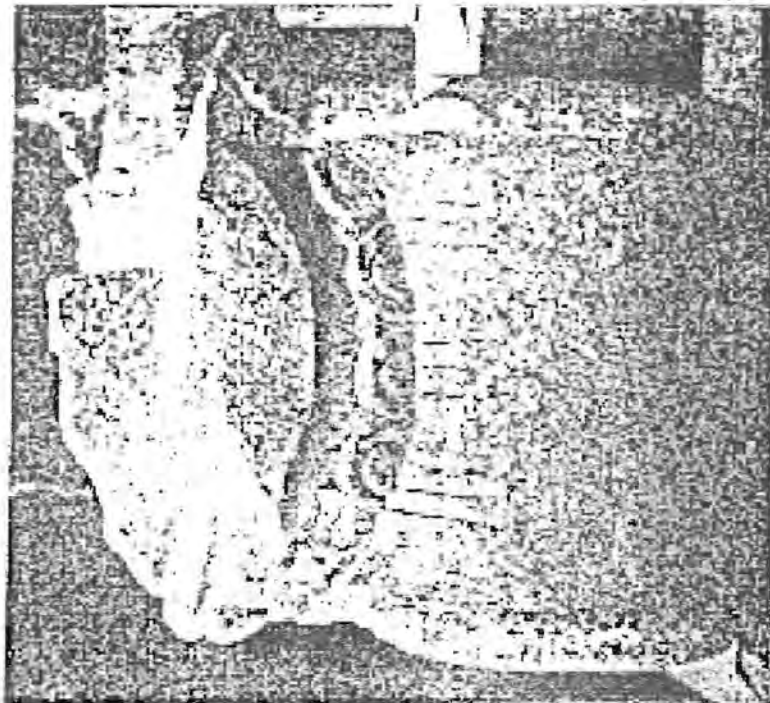




Table 20

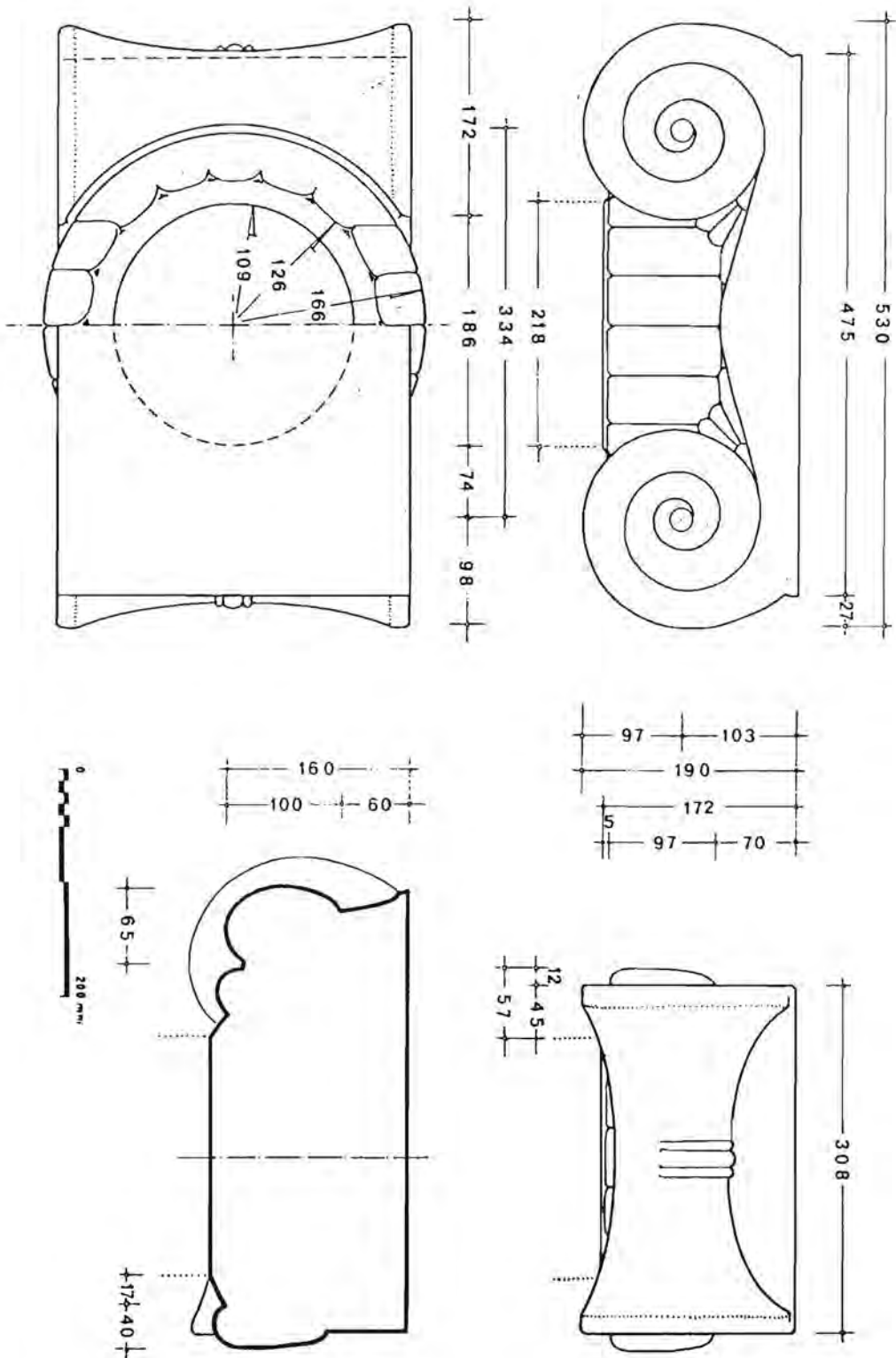


Table 21

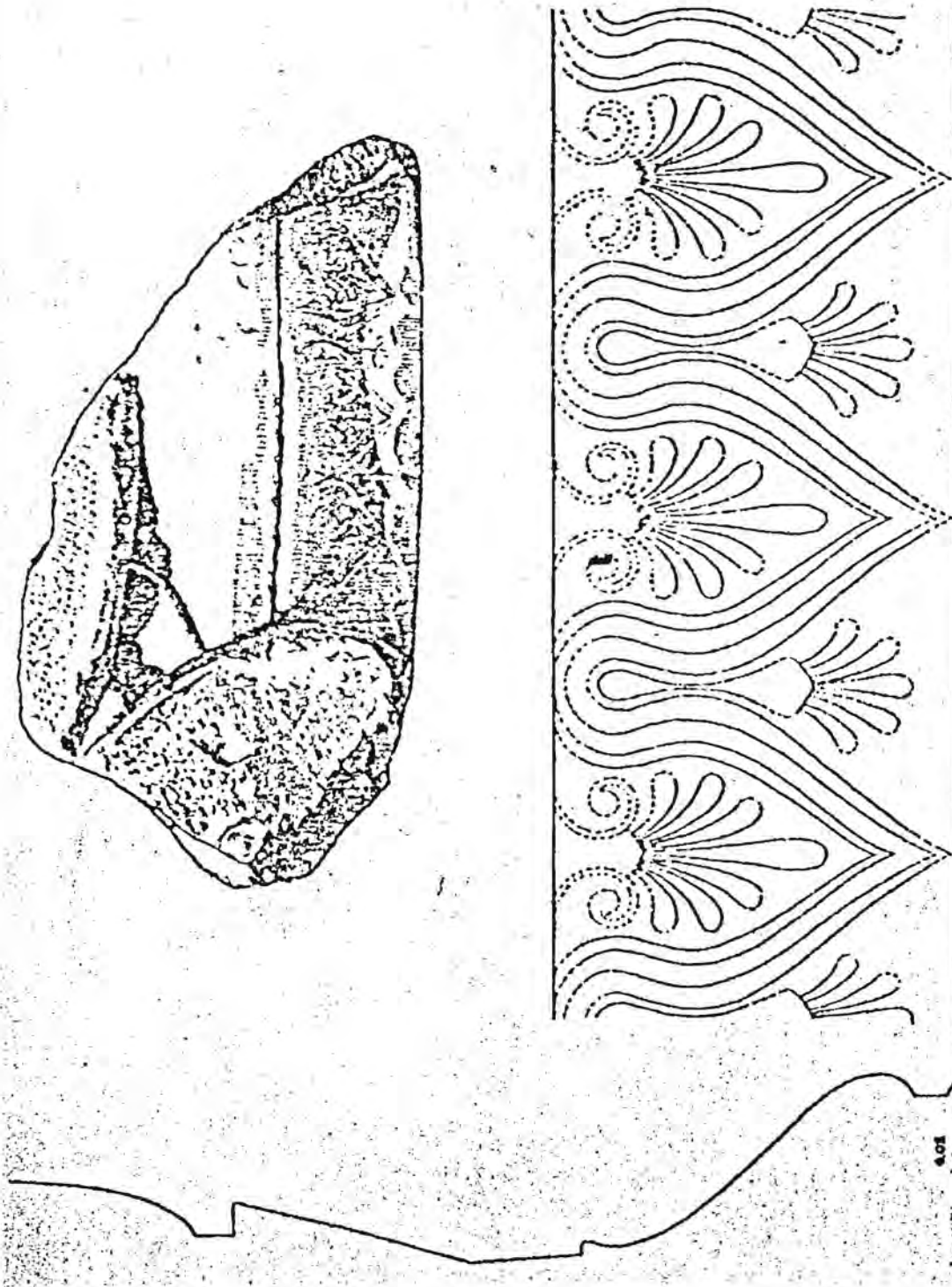




Table 22

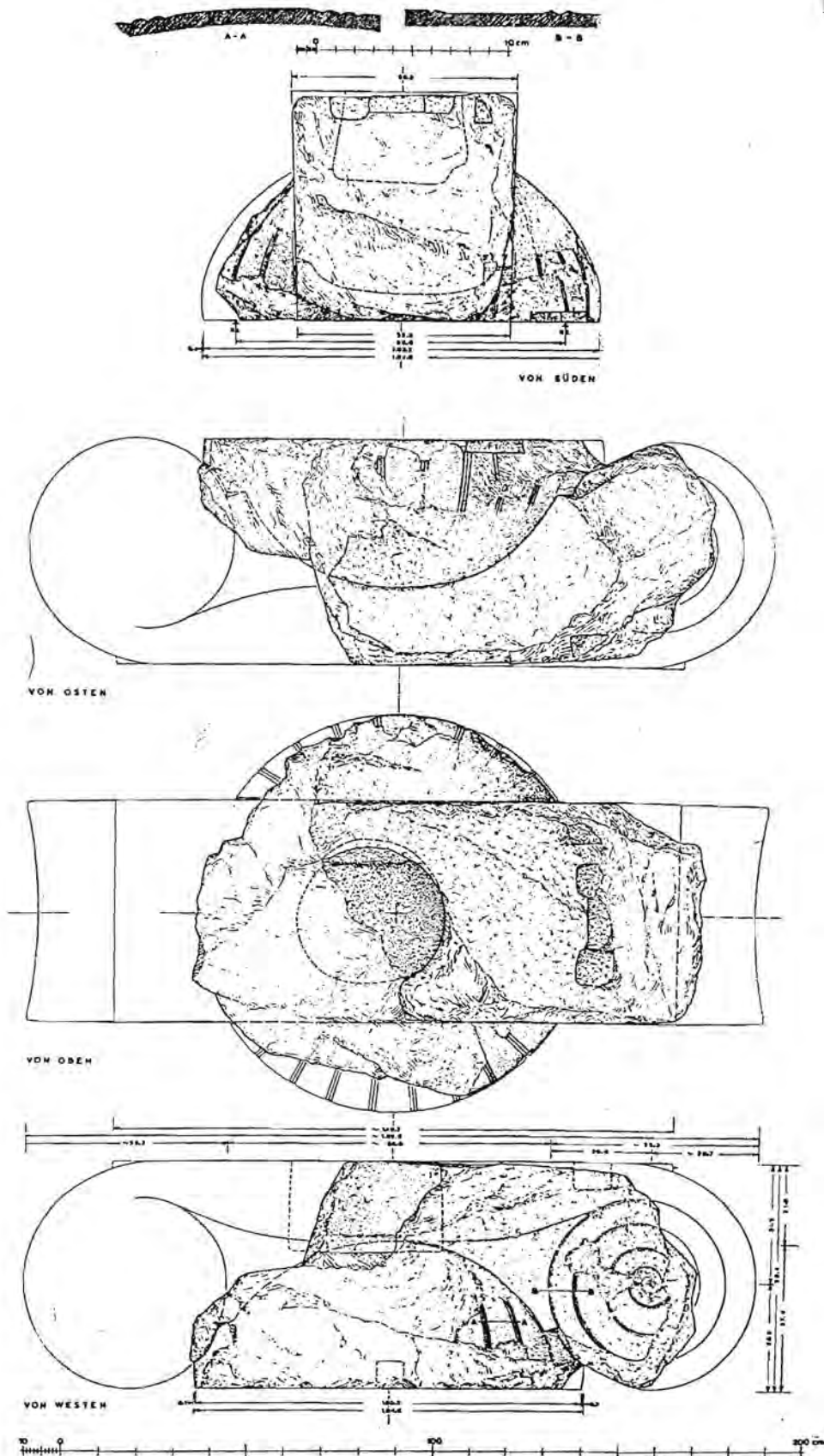




Table .23

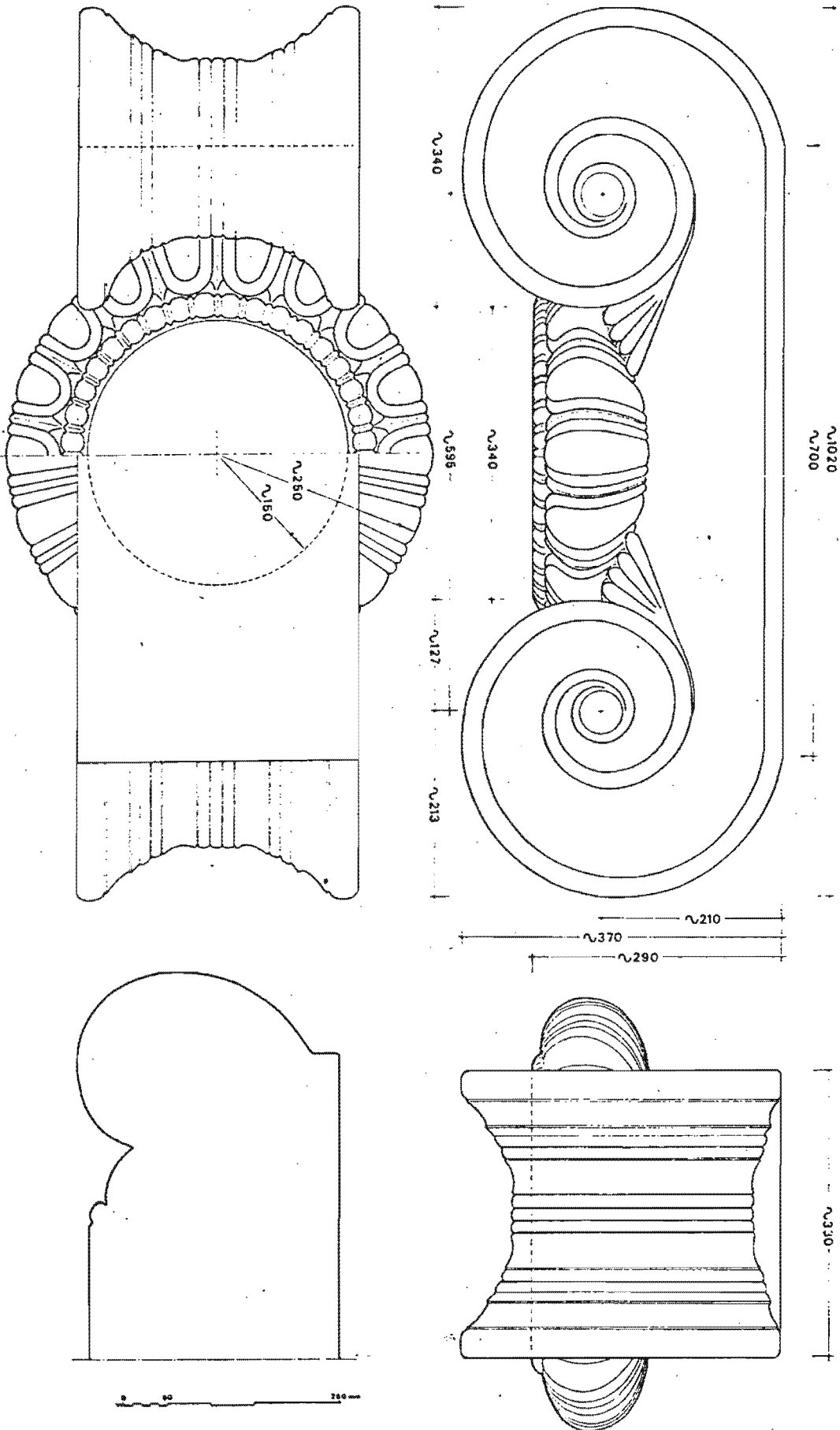




Table Ion-24

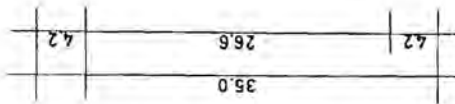
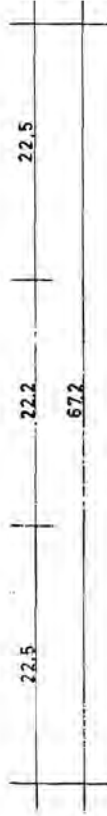
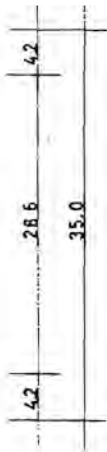
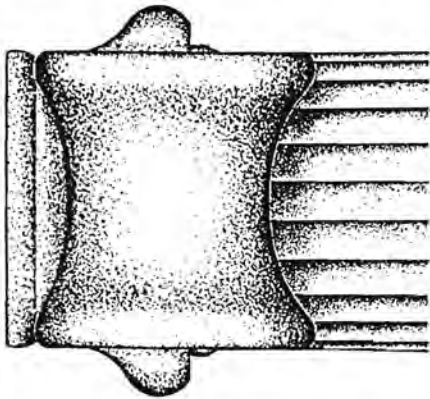
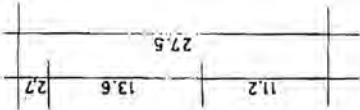
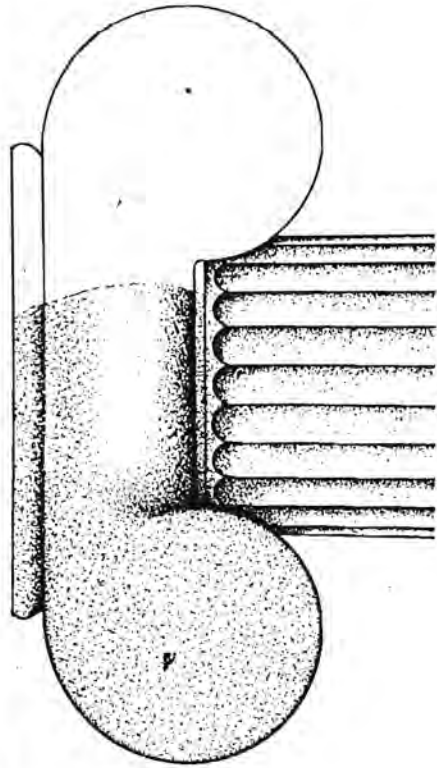




Table 25a

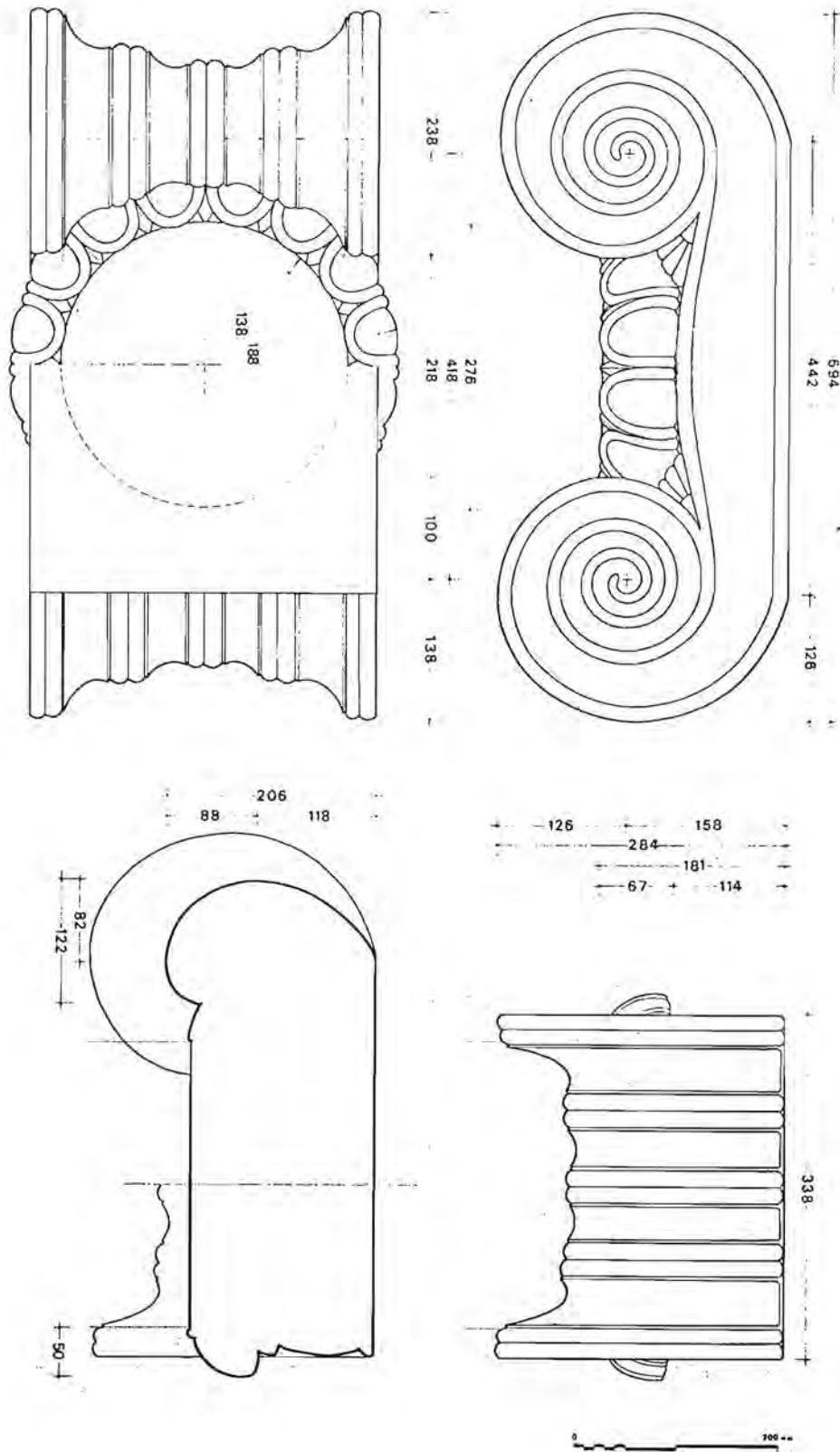




Table Ion-25g

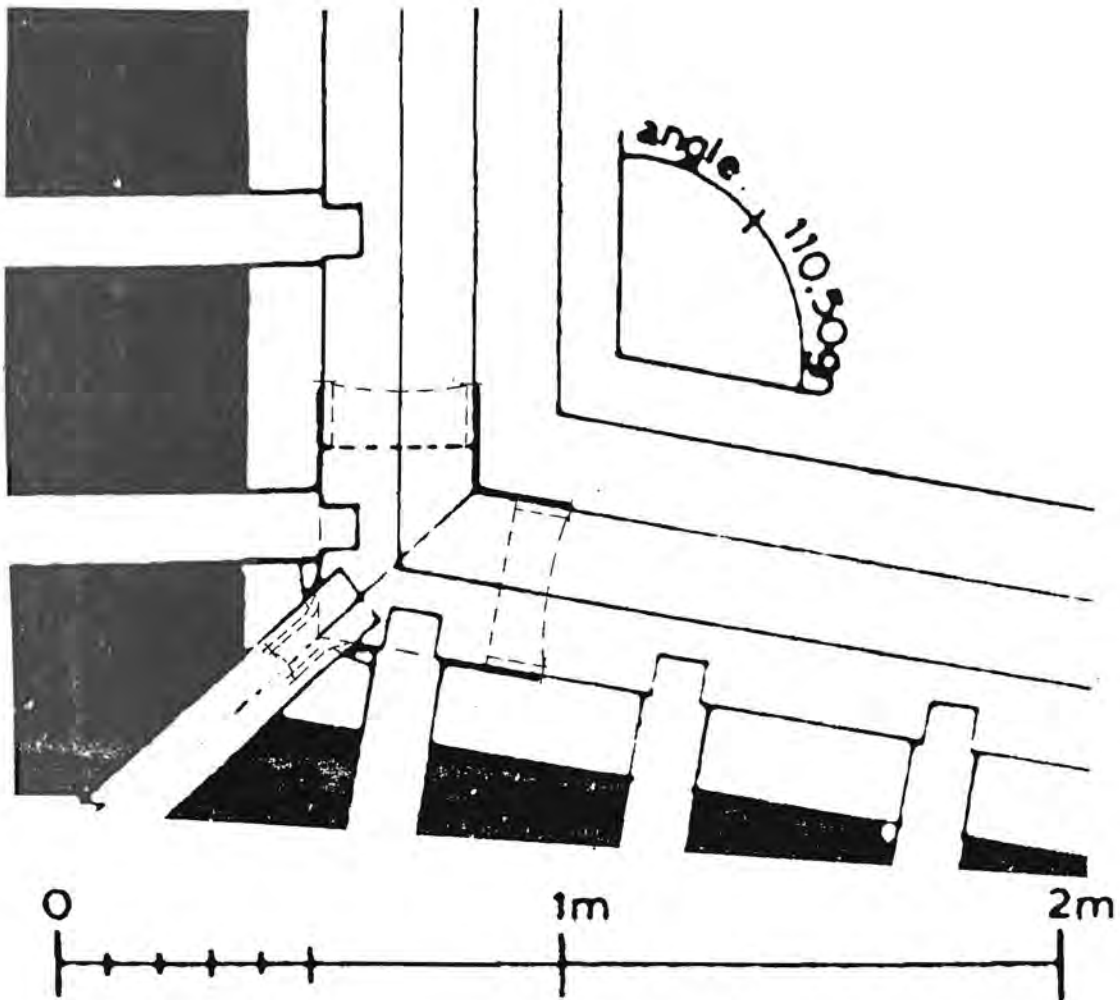
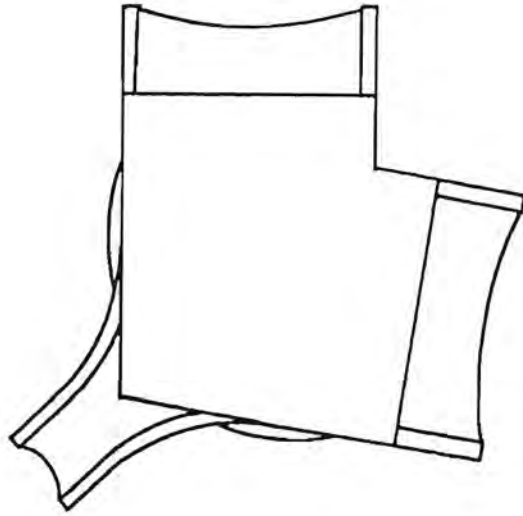
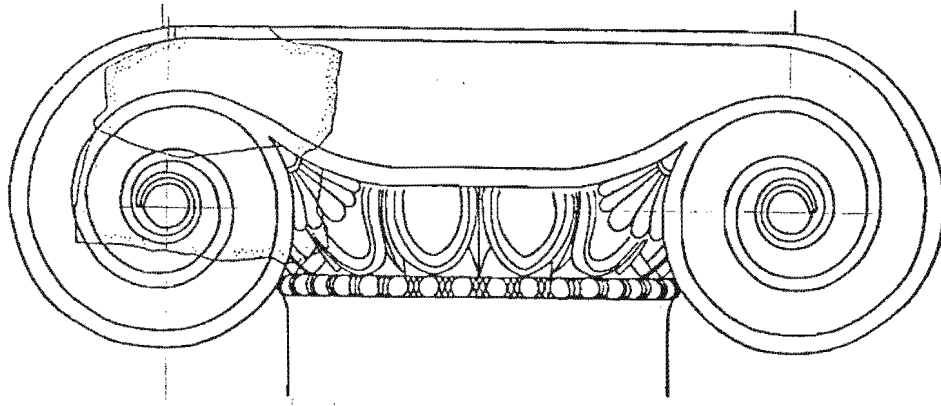
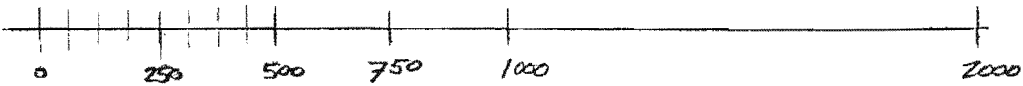
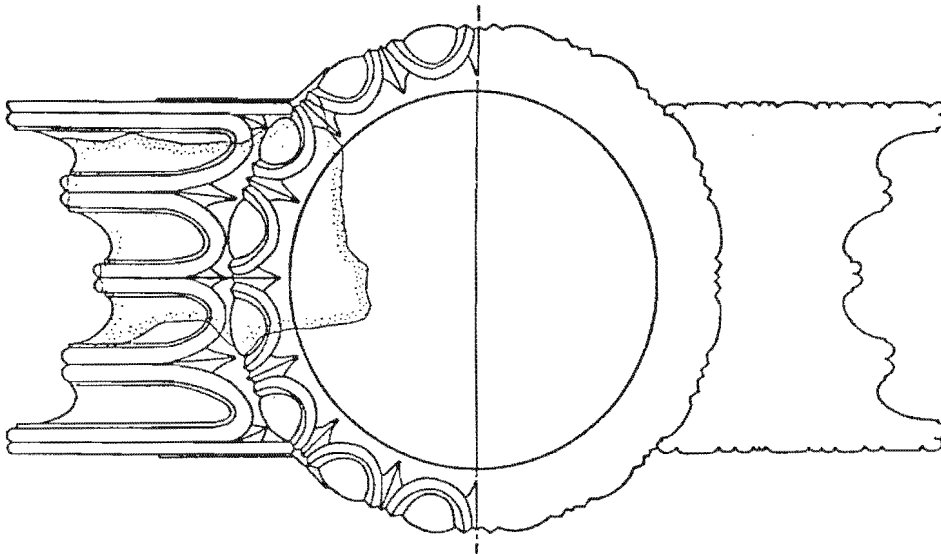




Table 26



V ca.2.0 V



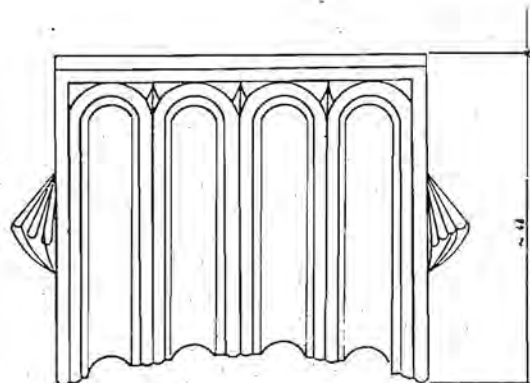
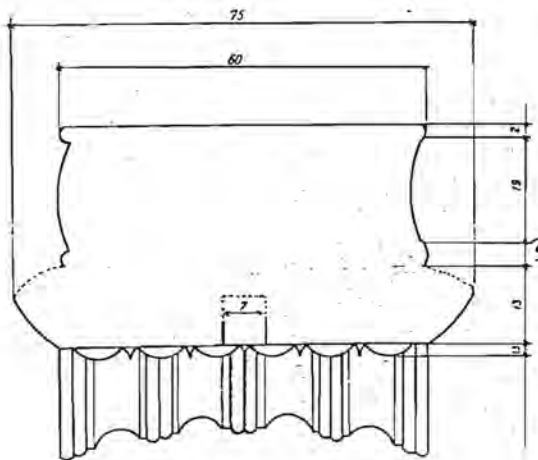
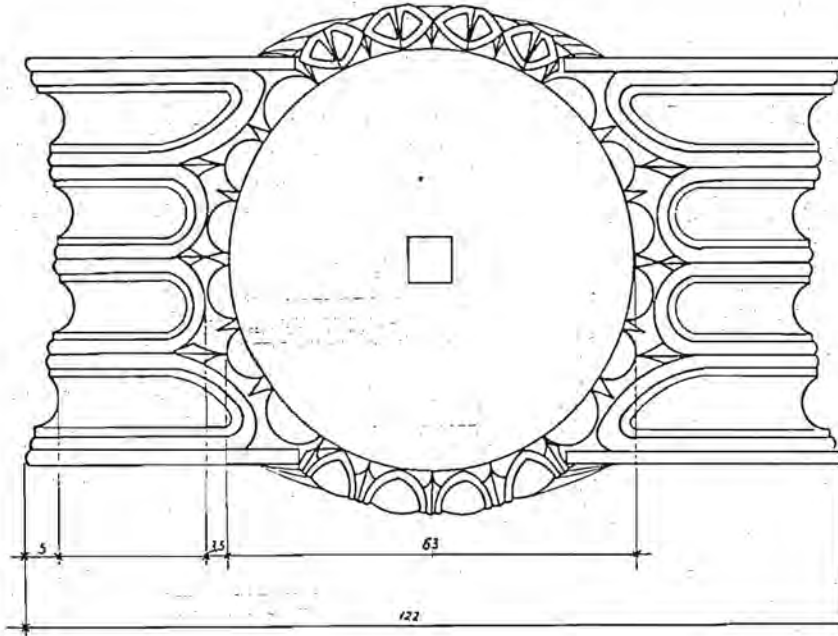
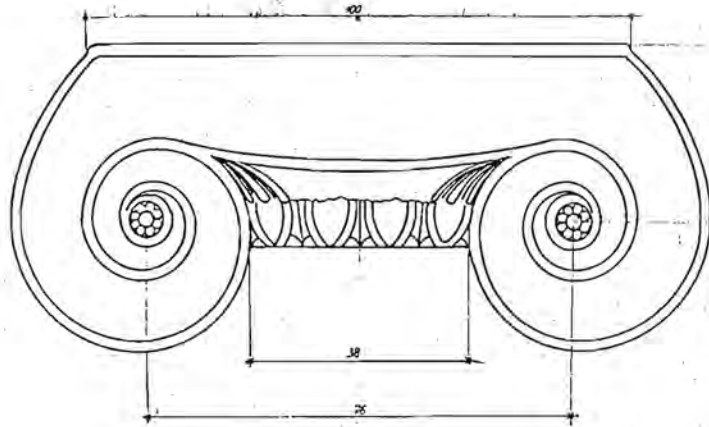




Table 28a-

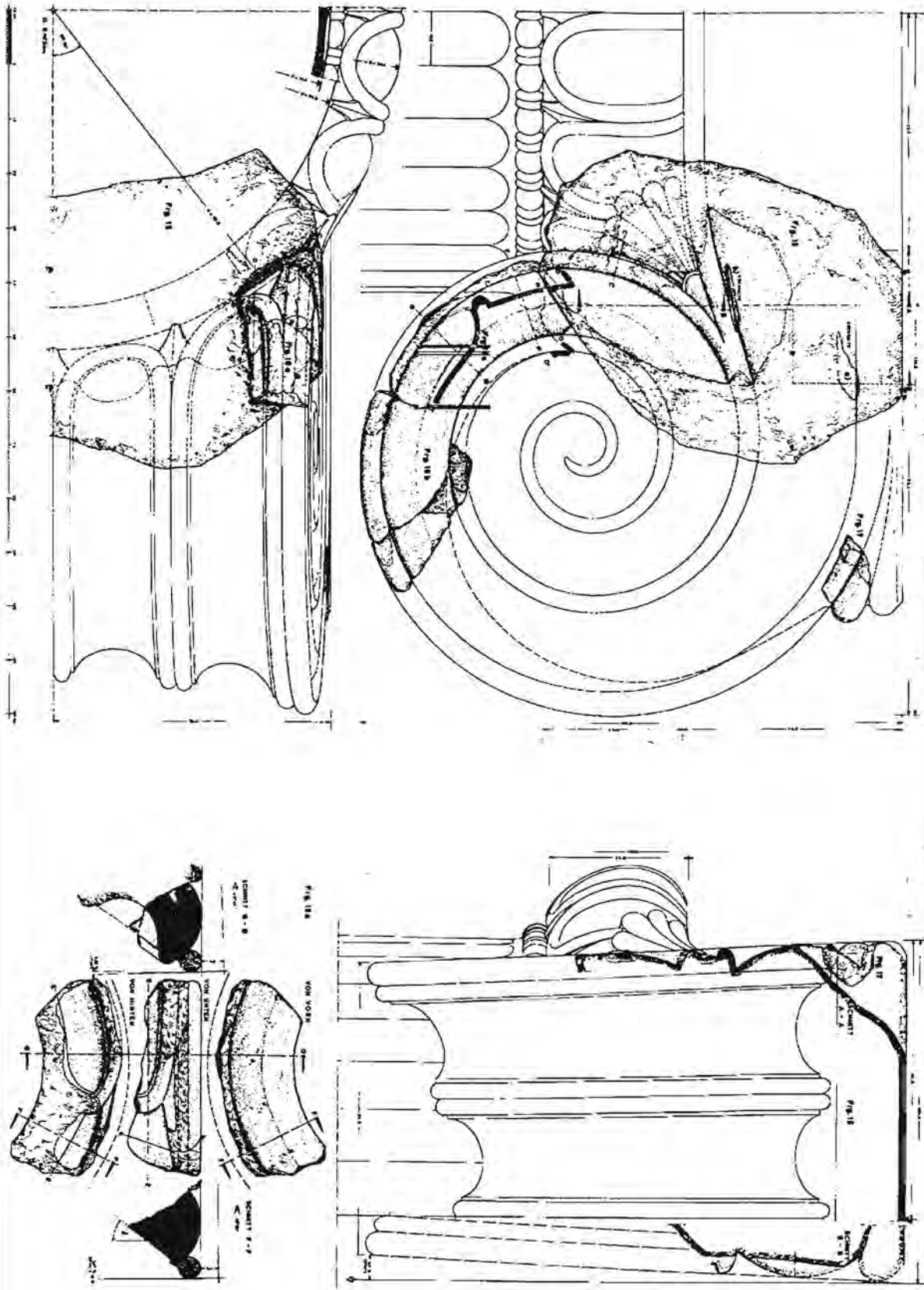




Table Ion-28b

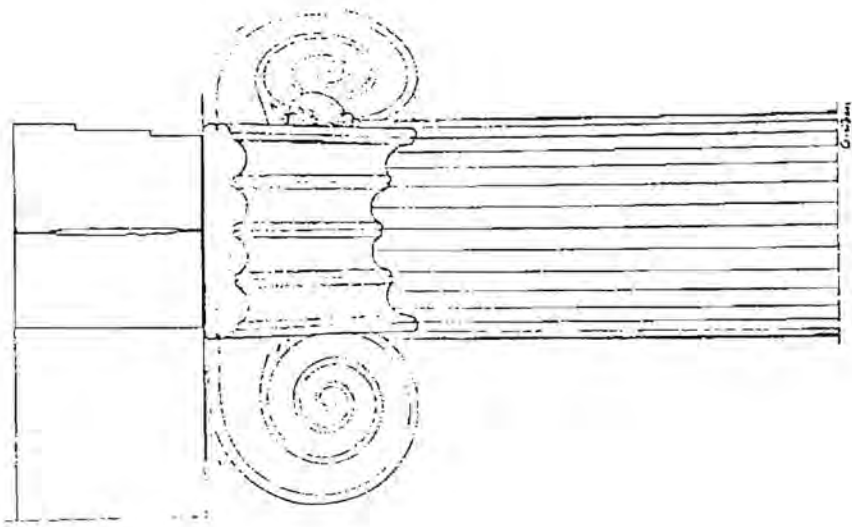
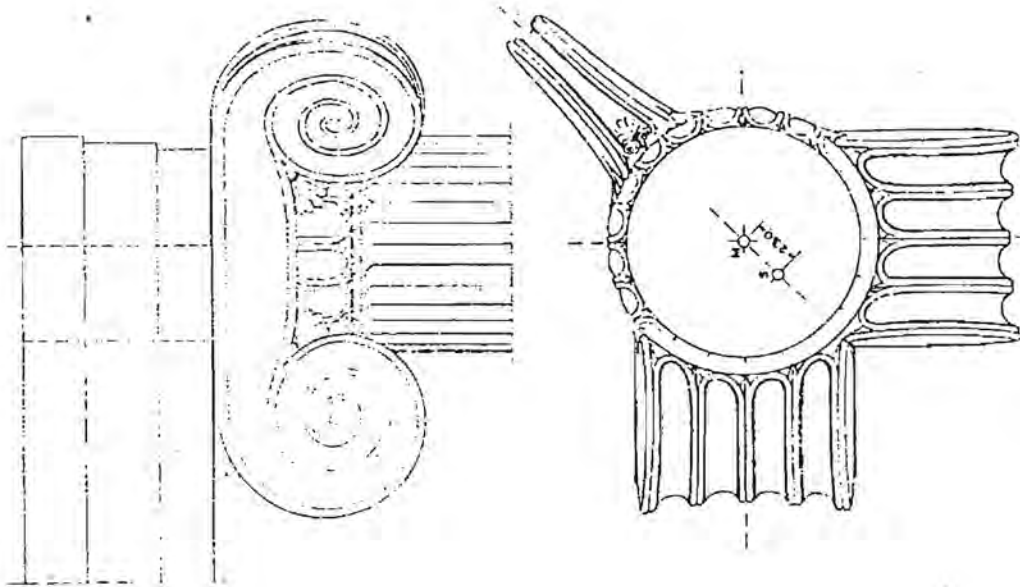




Table 29

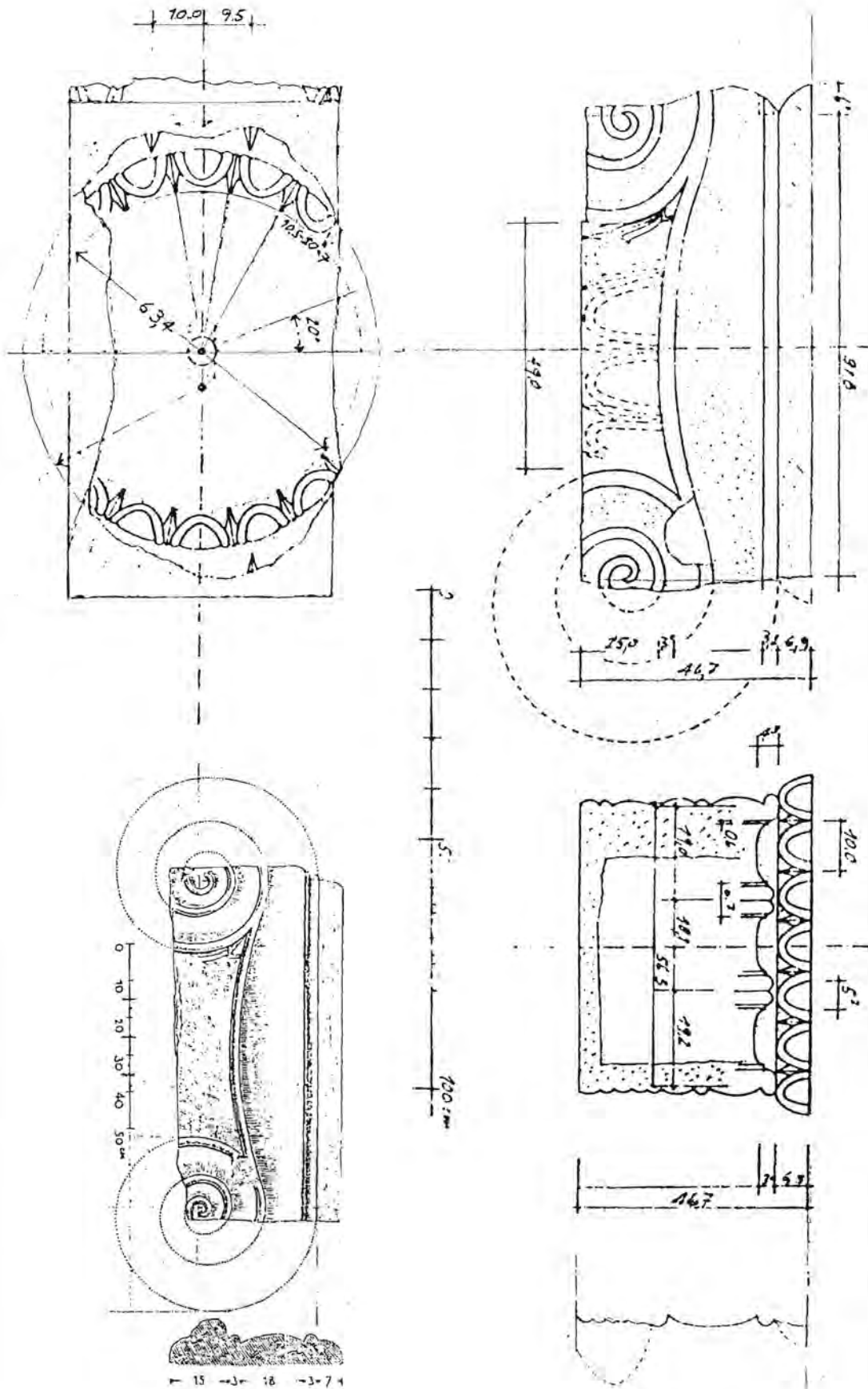
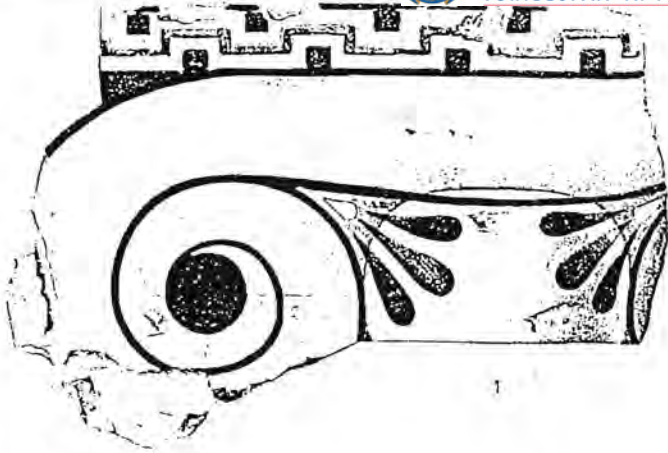
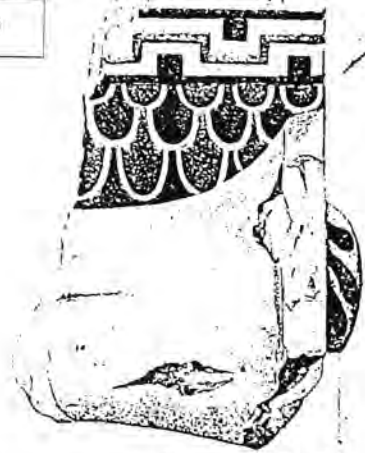




Table 30

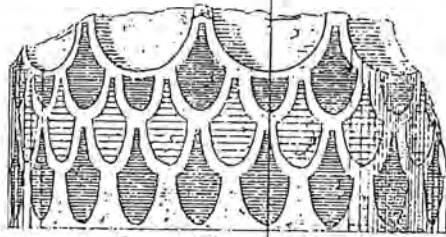


1

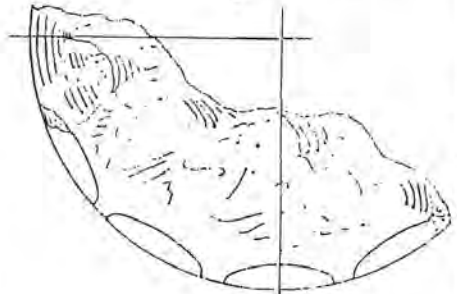


2

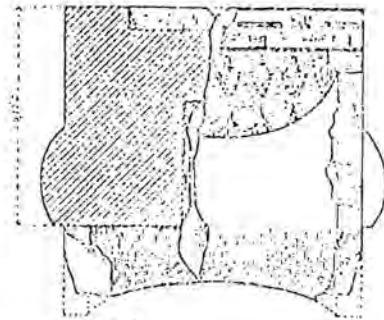
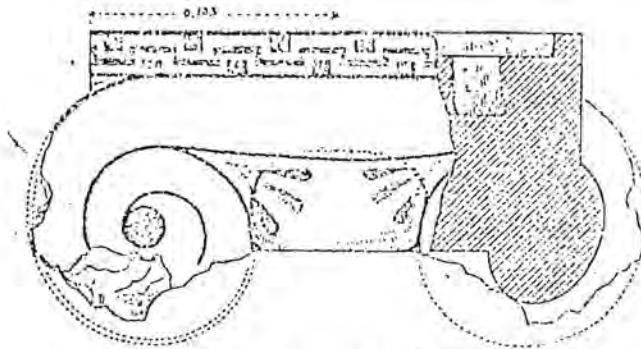
10 cm.



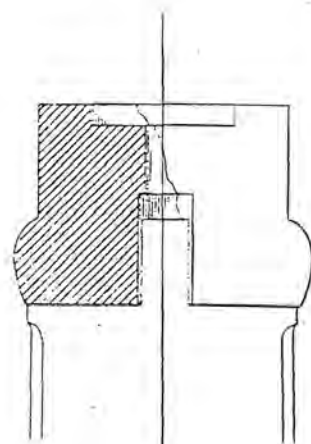
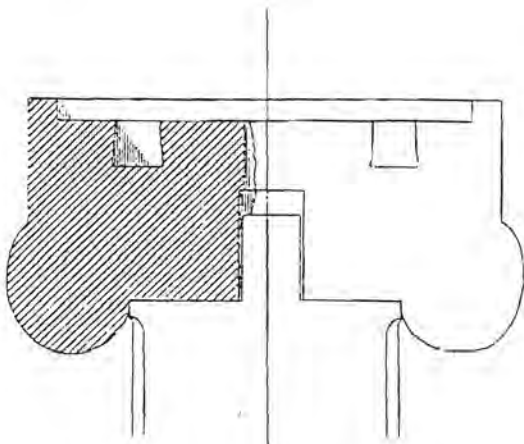
3



4



0 10 20 30 cm.



0 10 20 30 cm.



Table 31

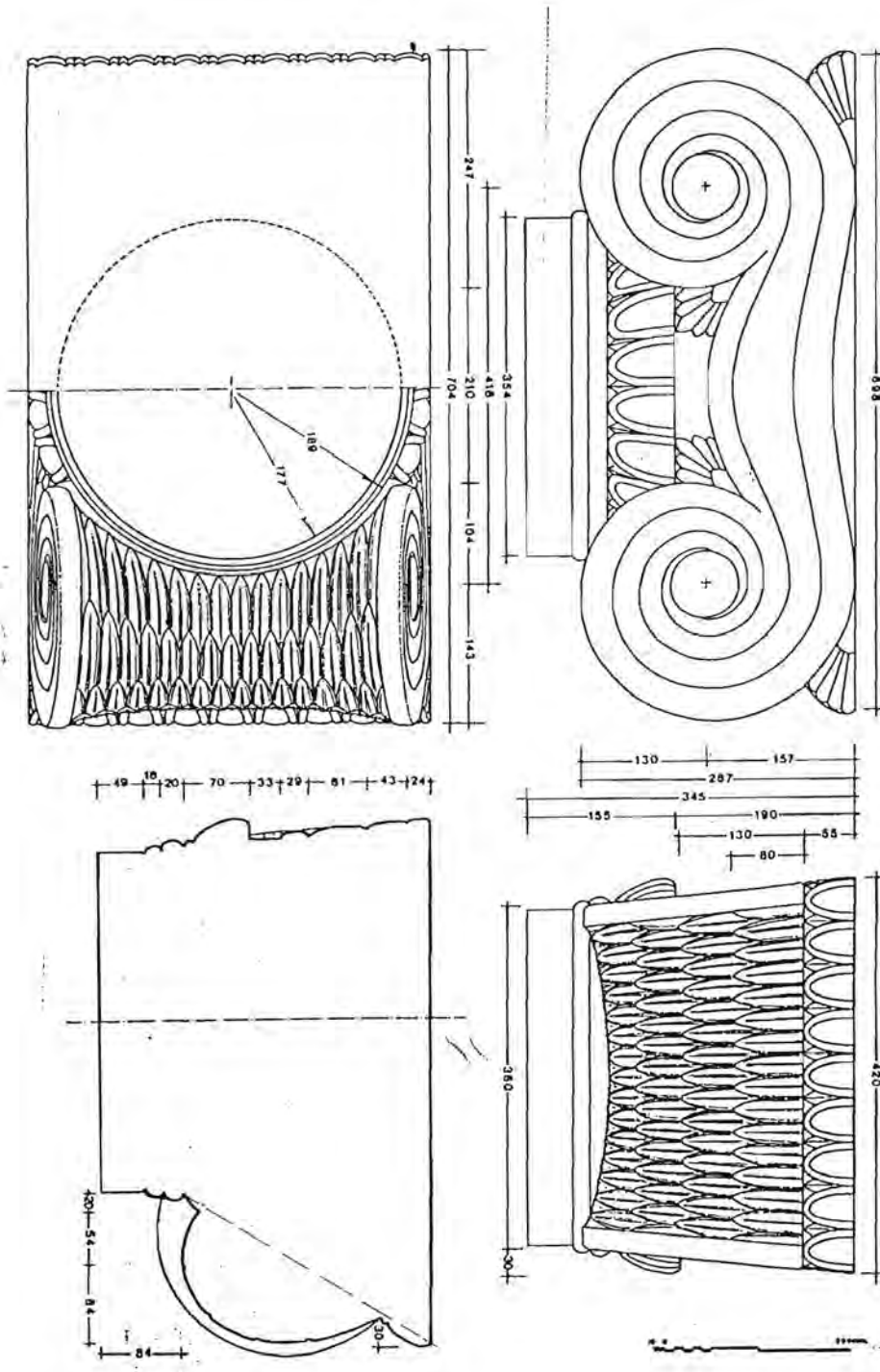




Table Ion-32

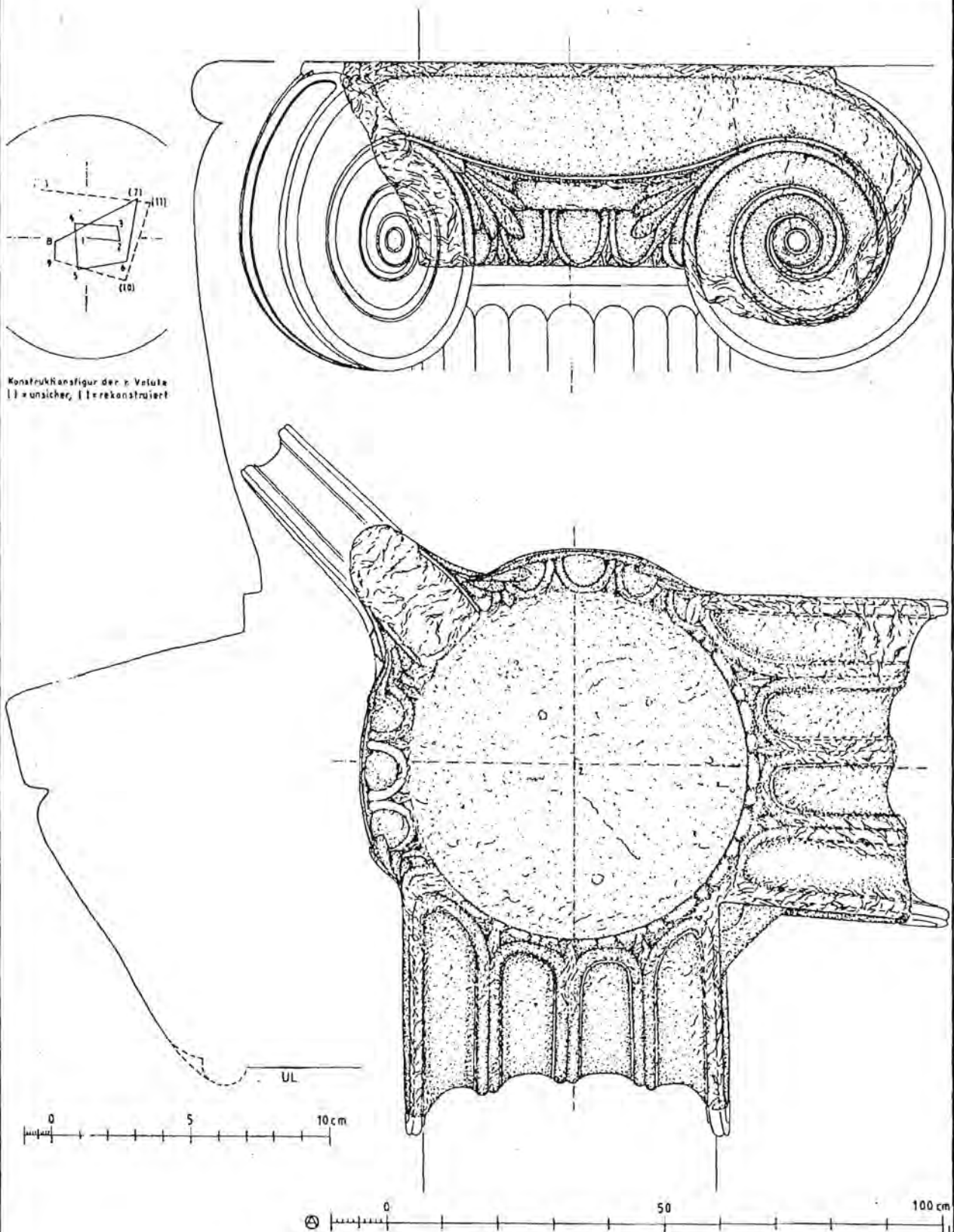
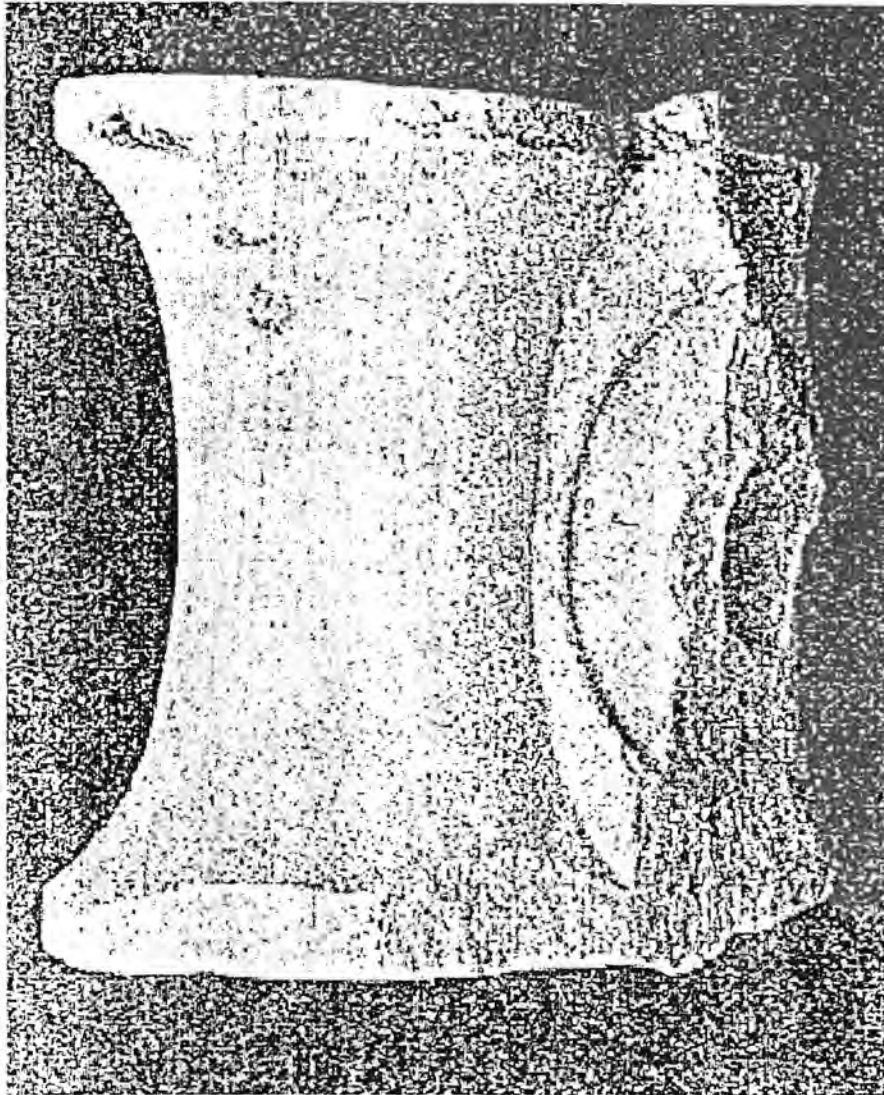




Table Ion-34



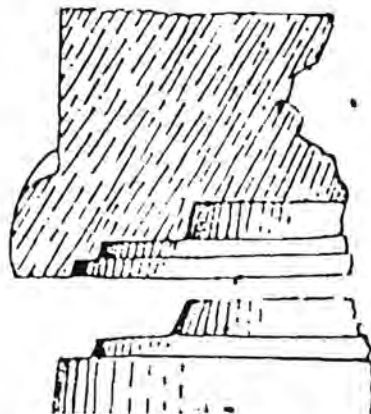
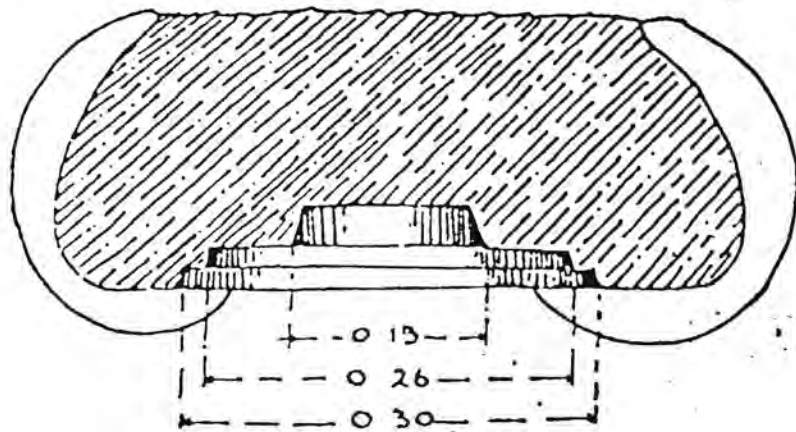
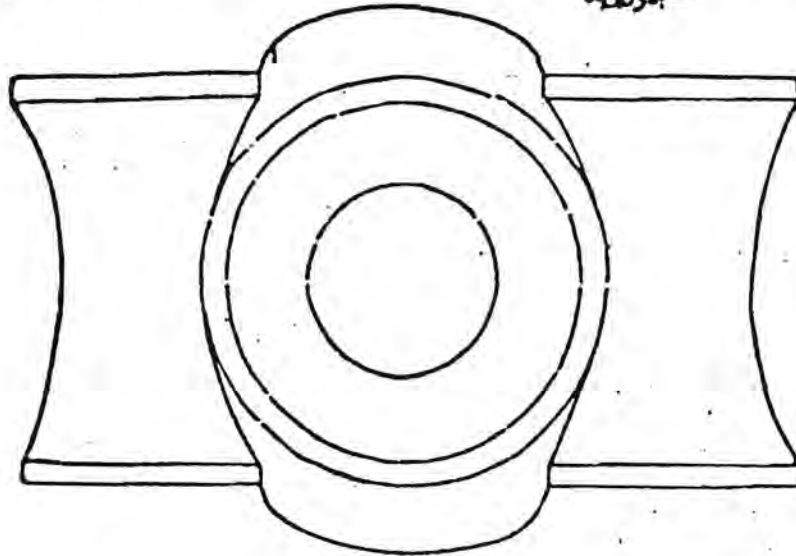




Table 36

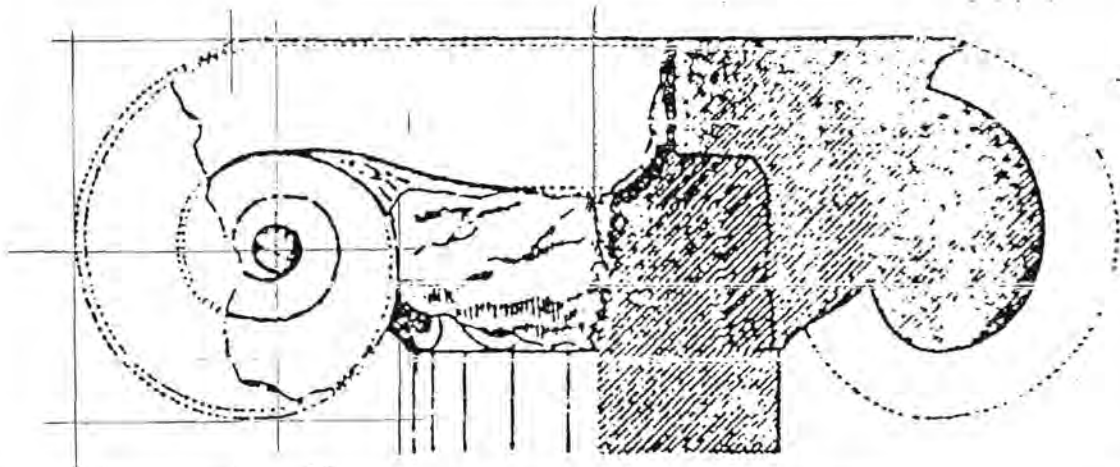
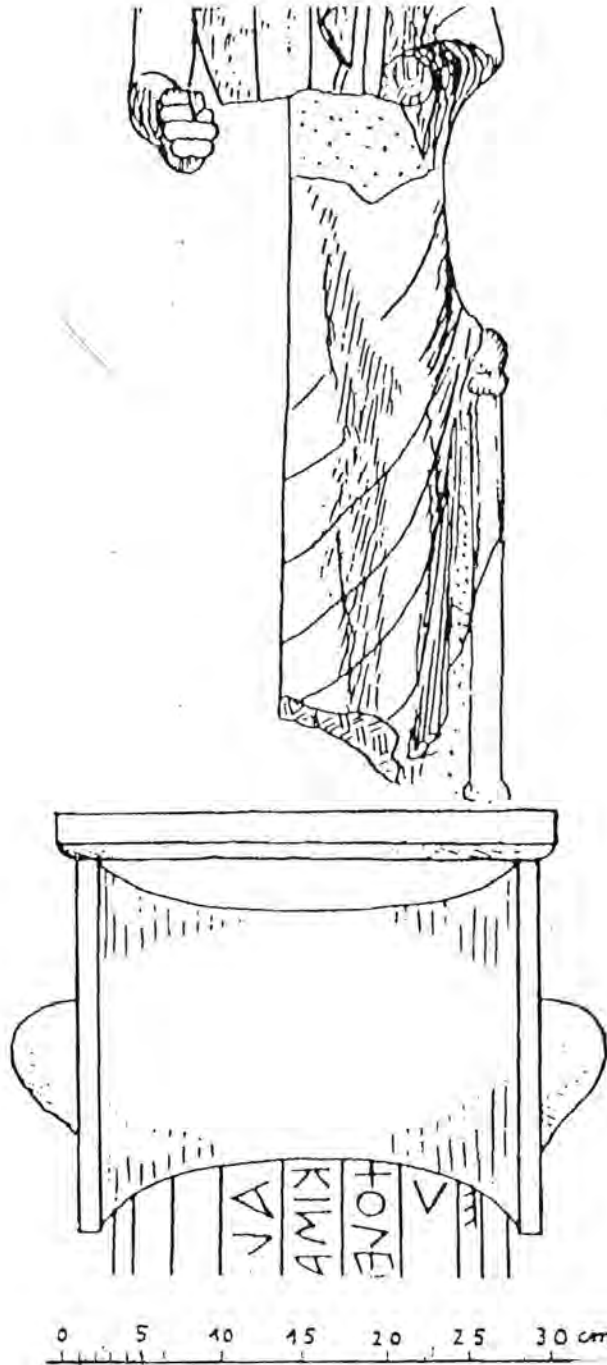




Table 37a

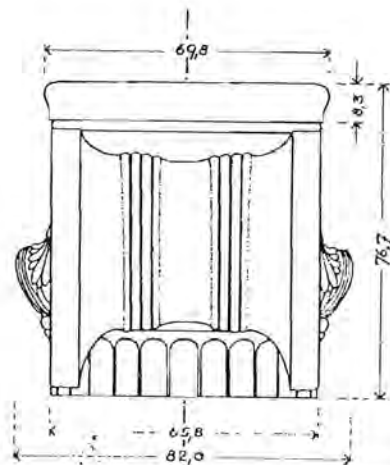
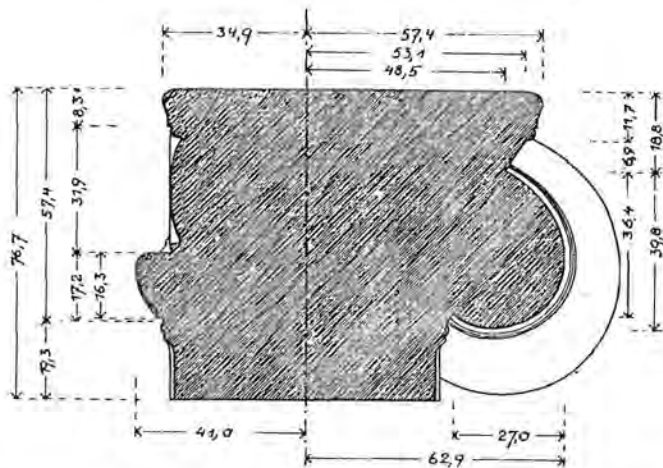
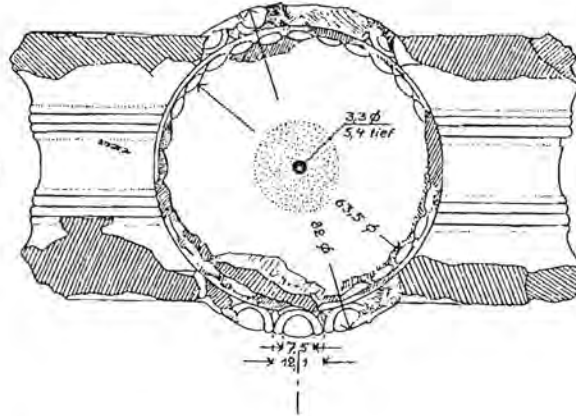
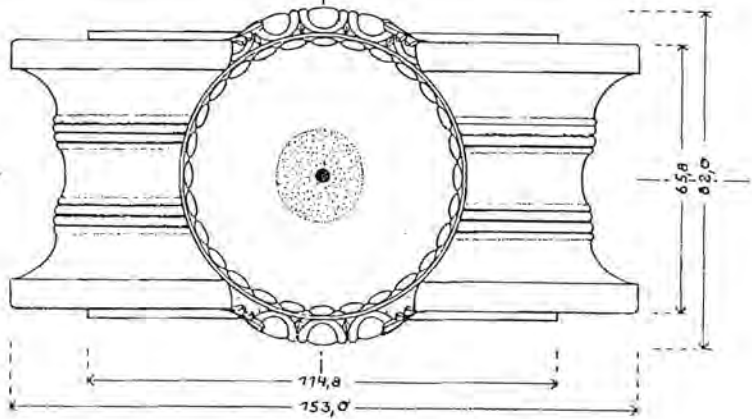
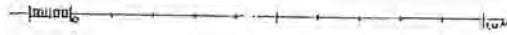
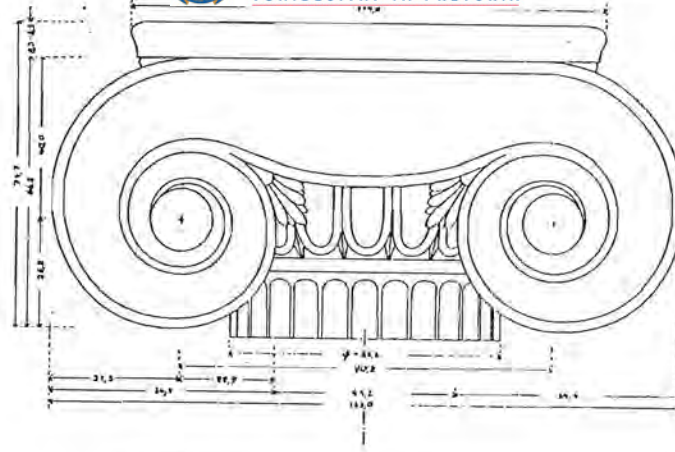




Table 38

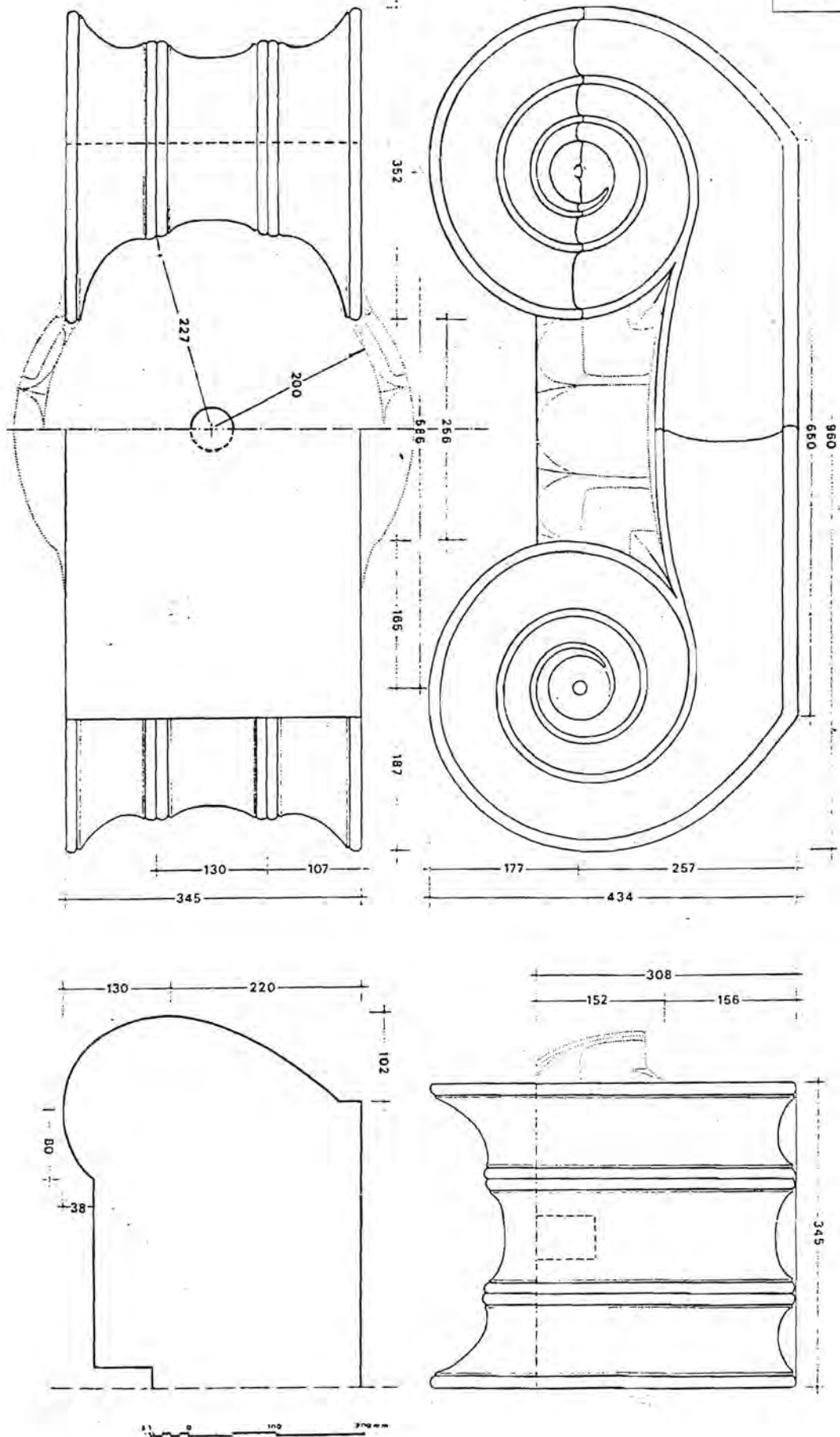




Table 39a

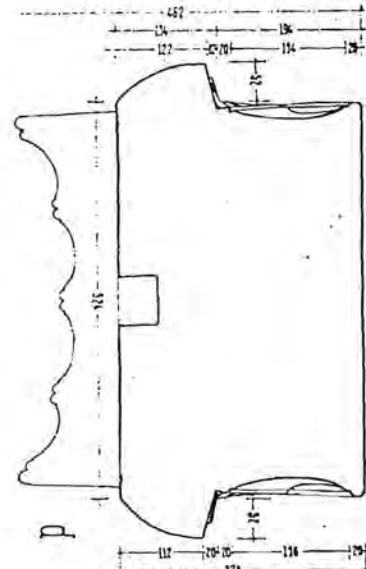
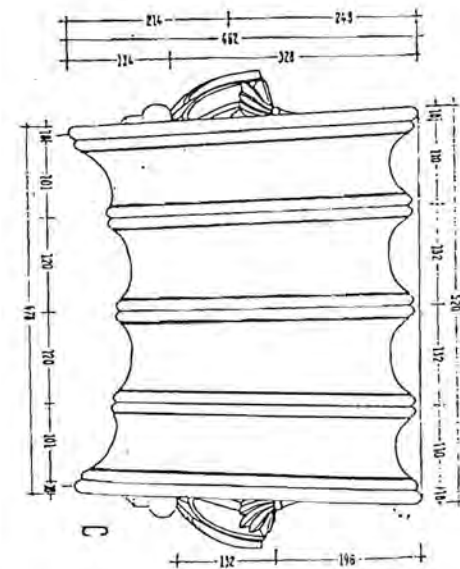
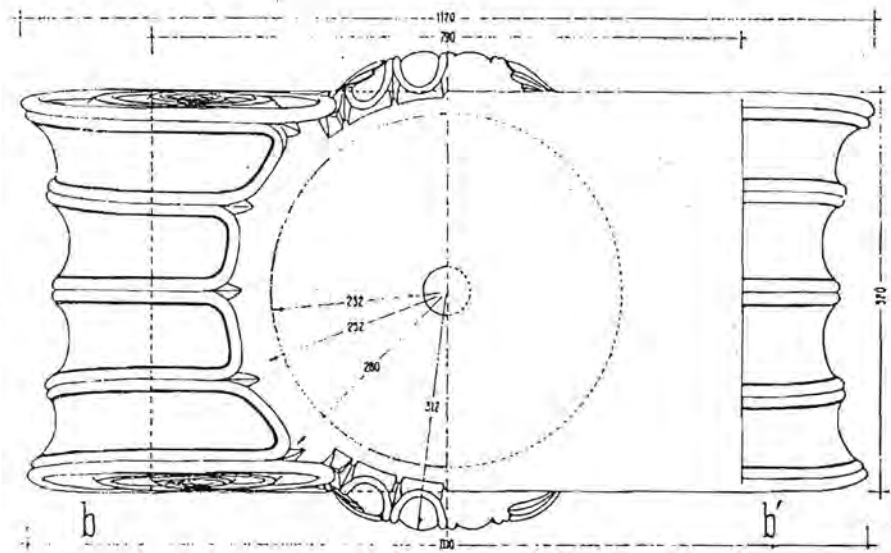
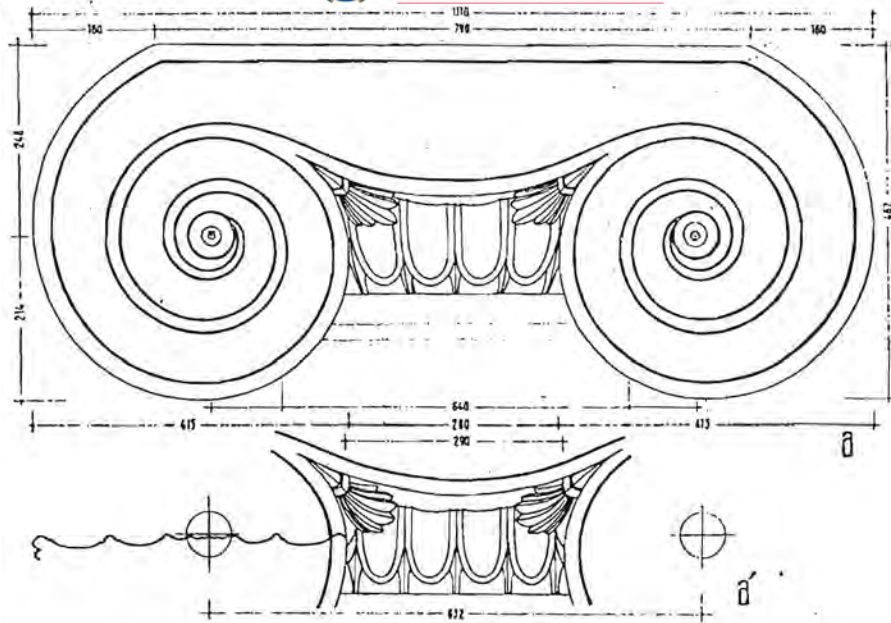
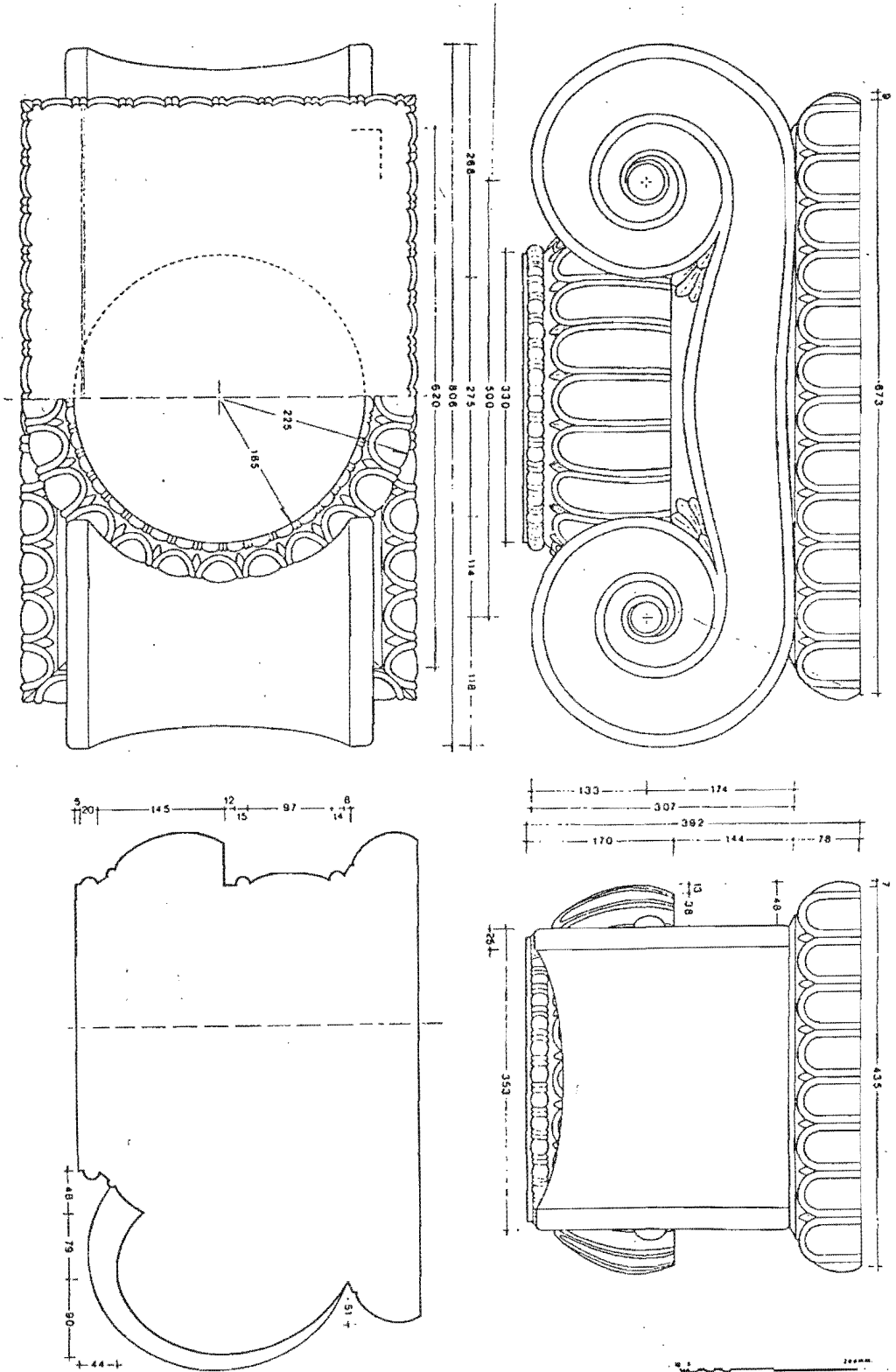




Table 40a



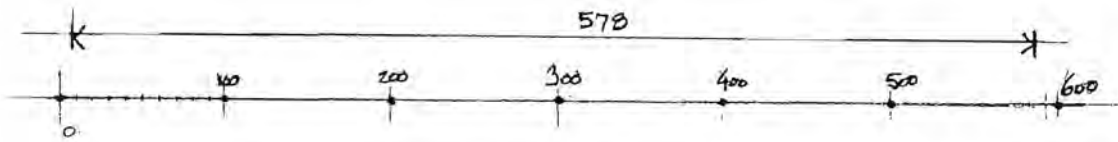
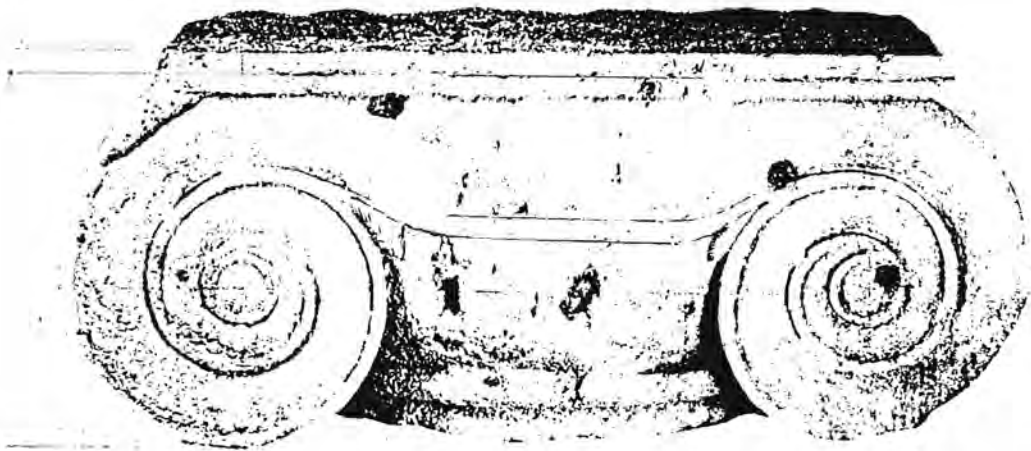
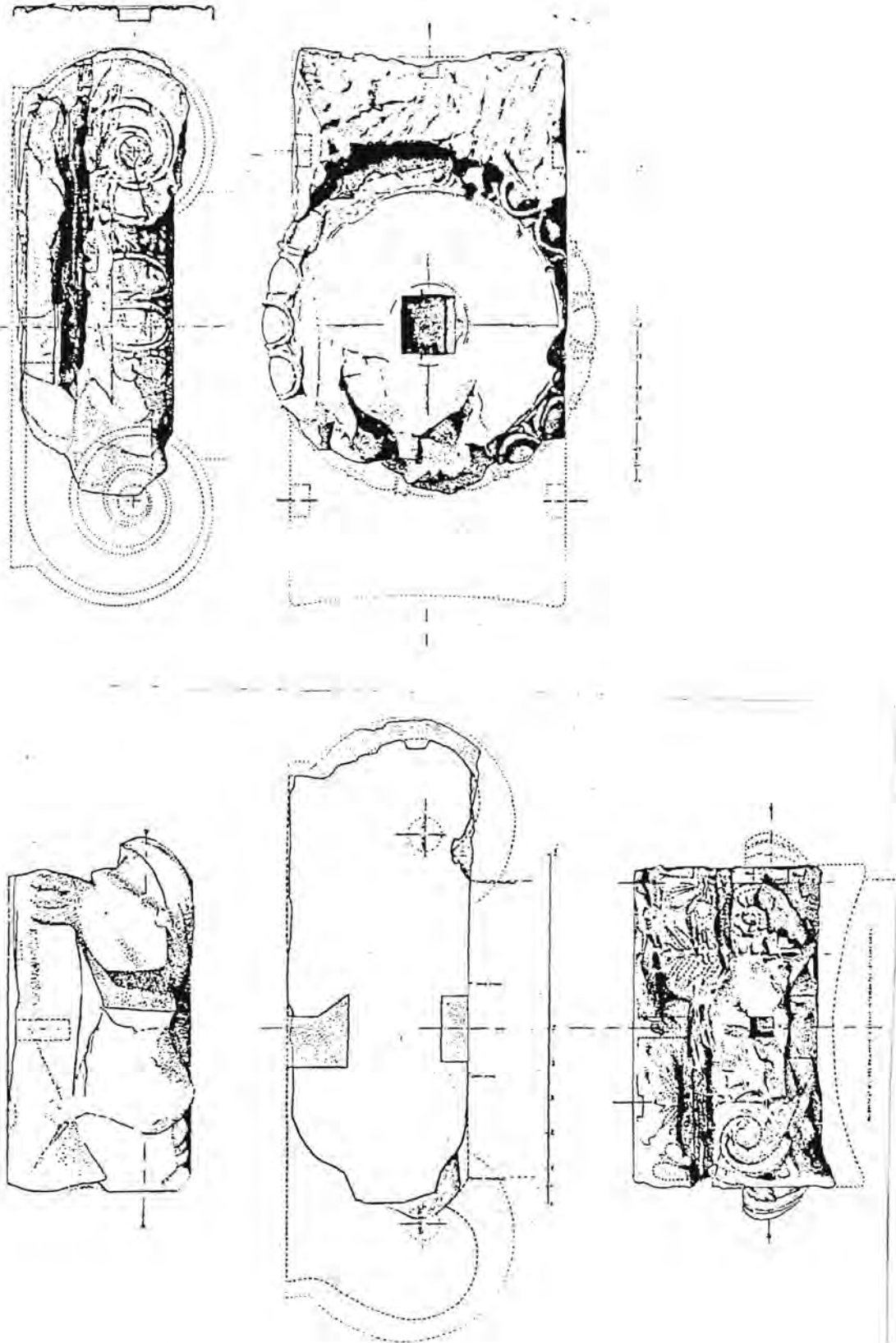


Table 42



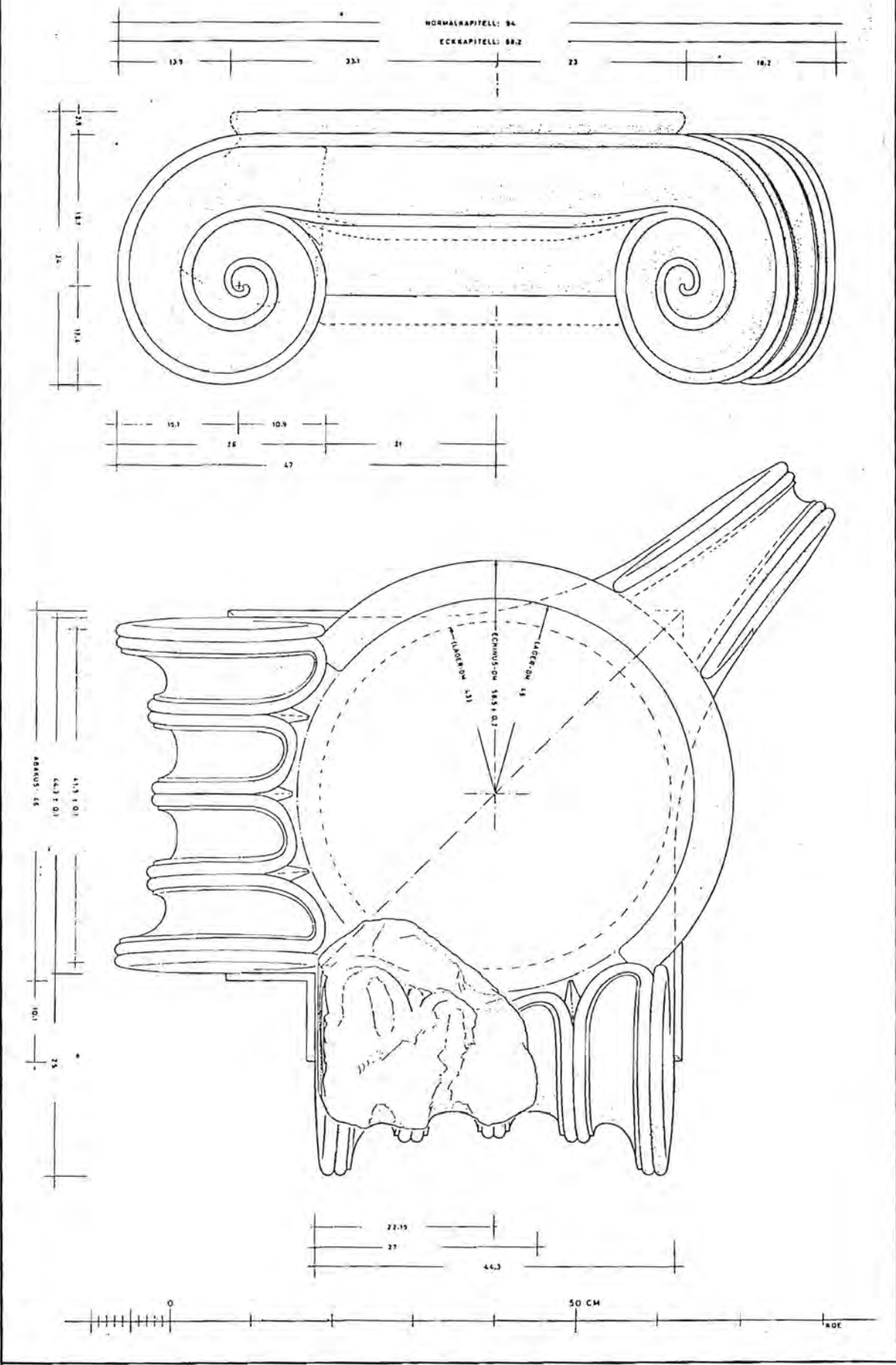


Table 44a

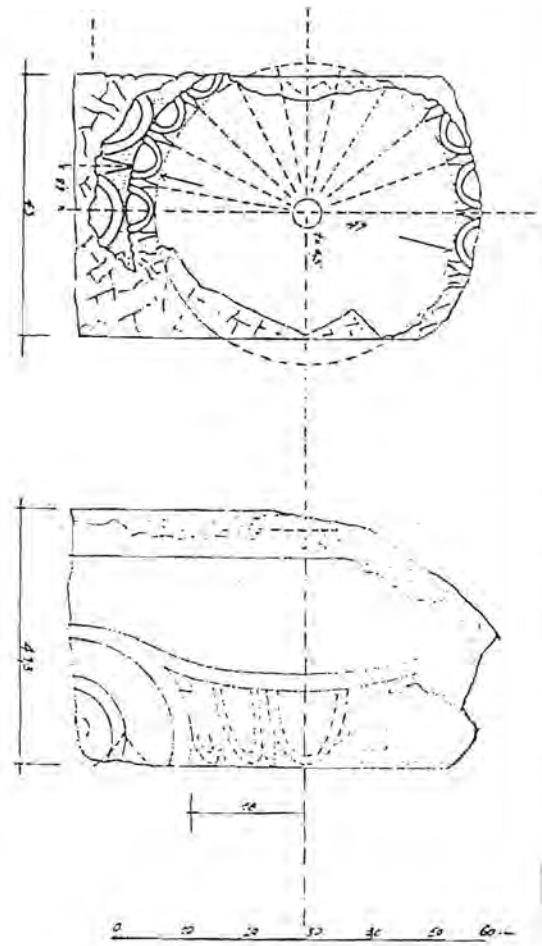
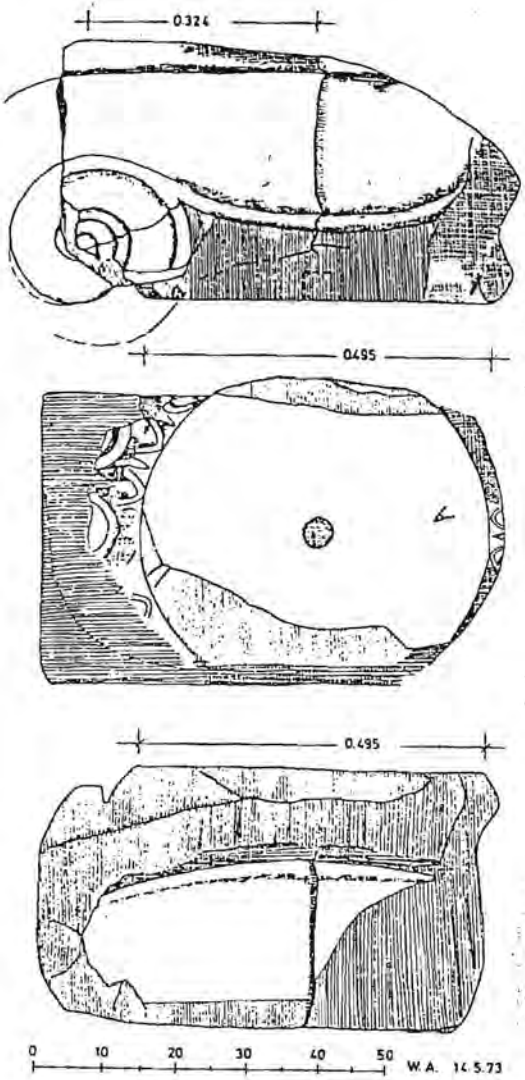




Table 45-

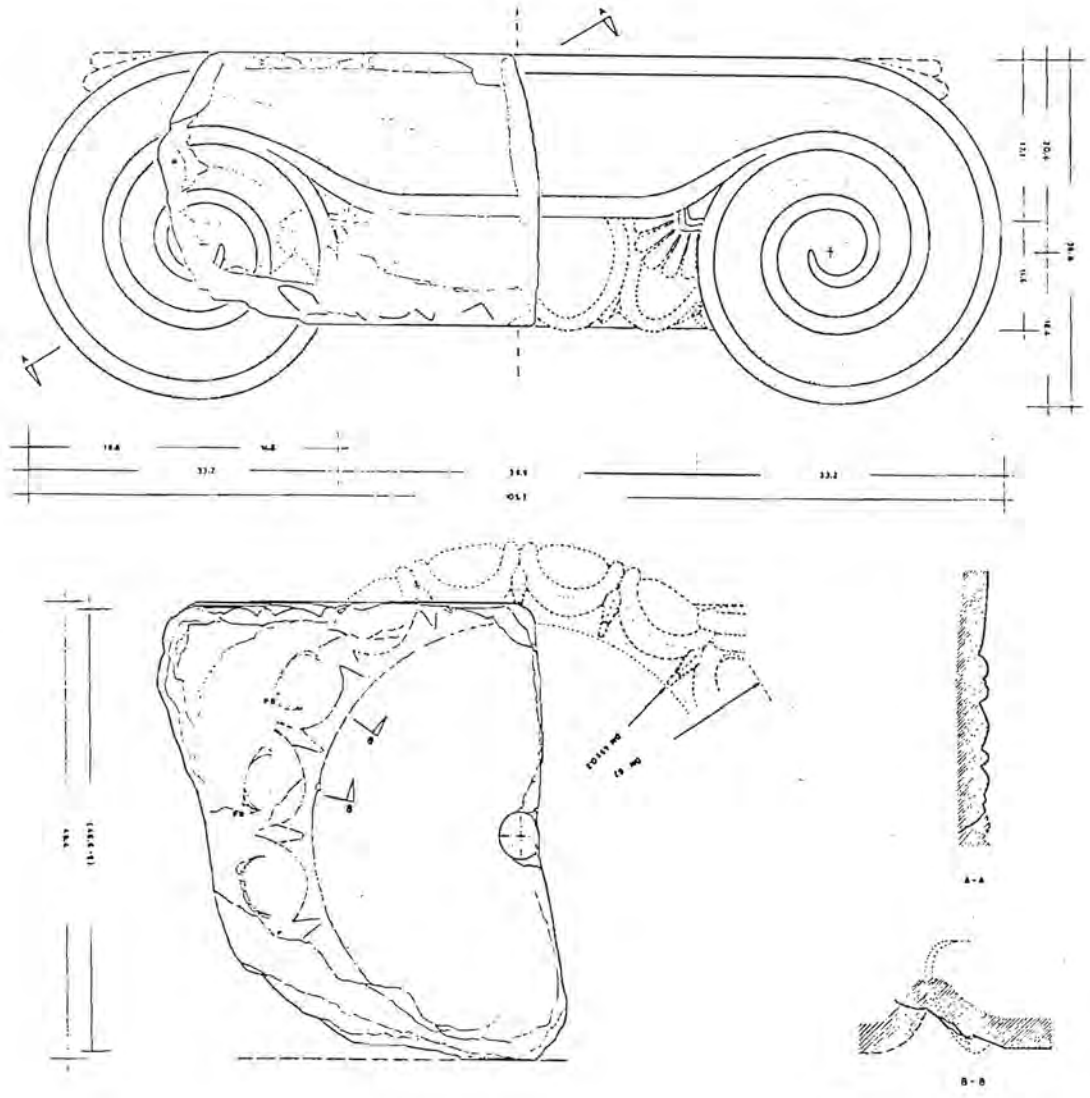




Table 48-

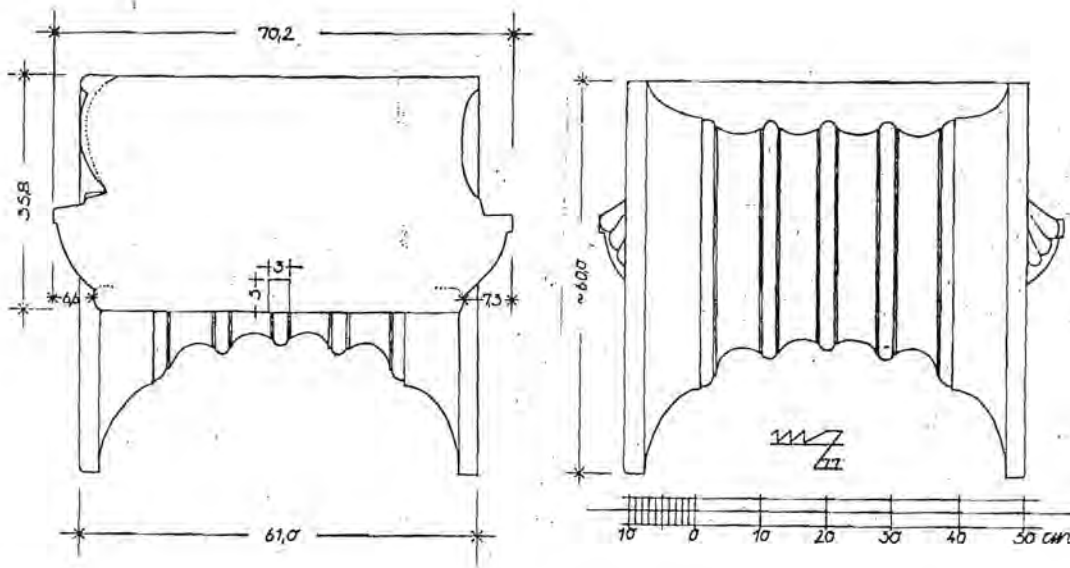
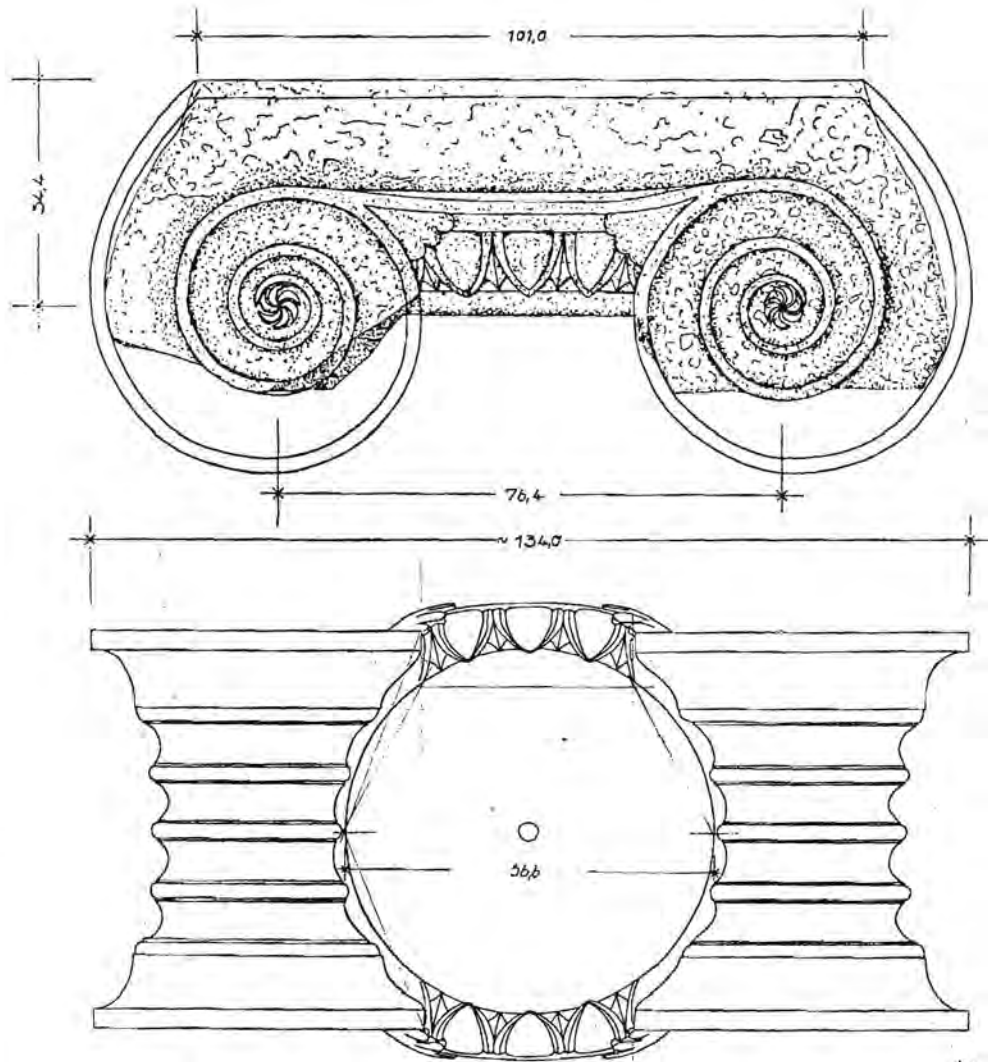
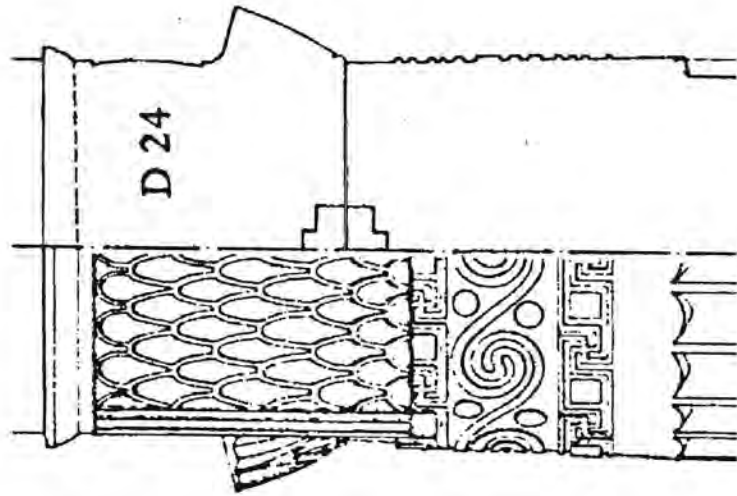




Table Ion-46



44,4

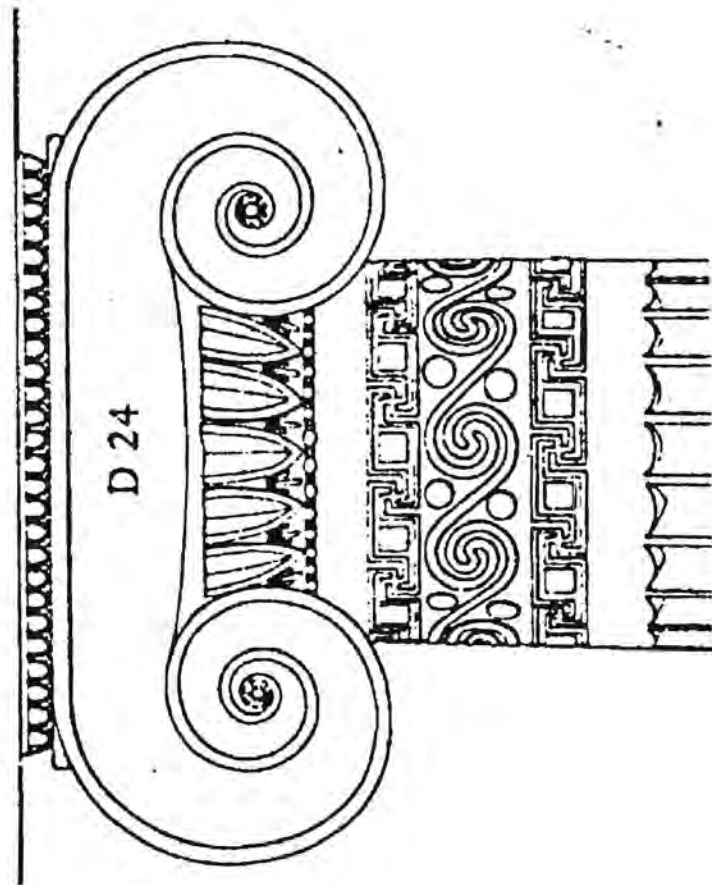




Table 50a

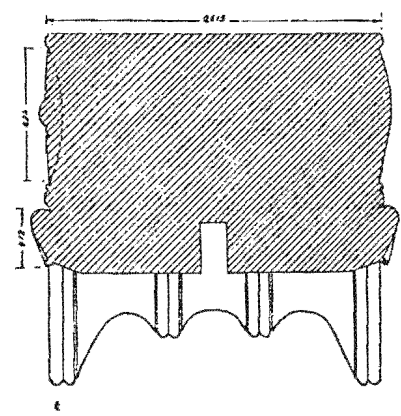
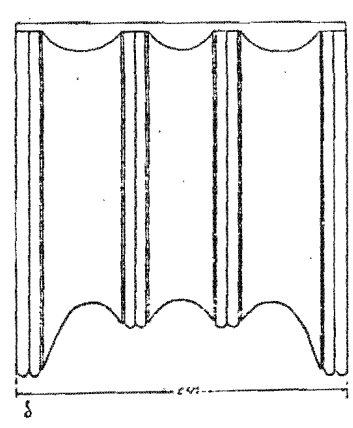
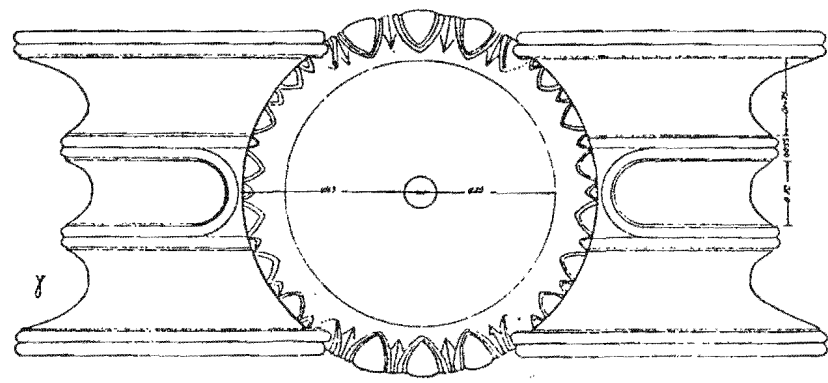
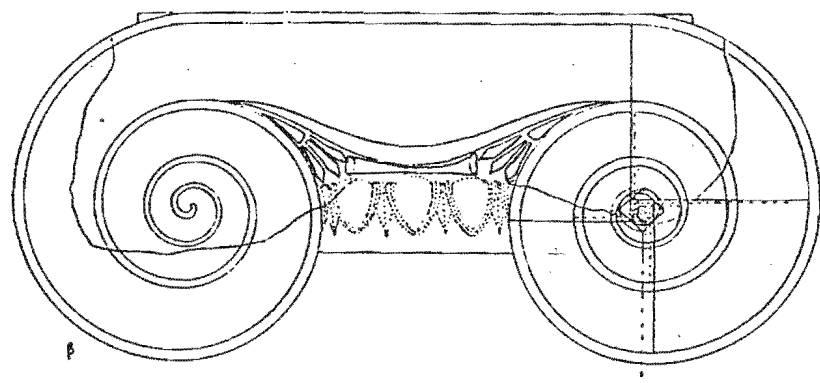
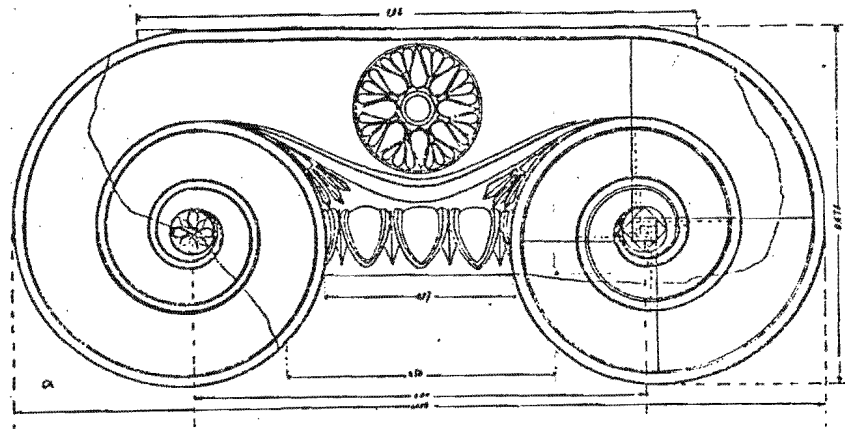




Table Ion-51a

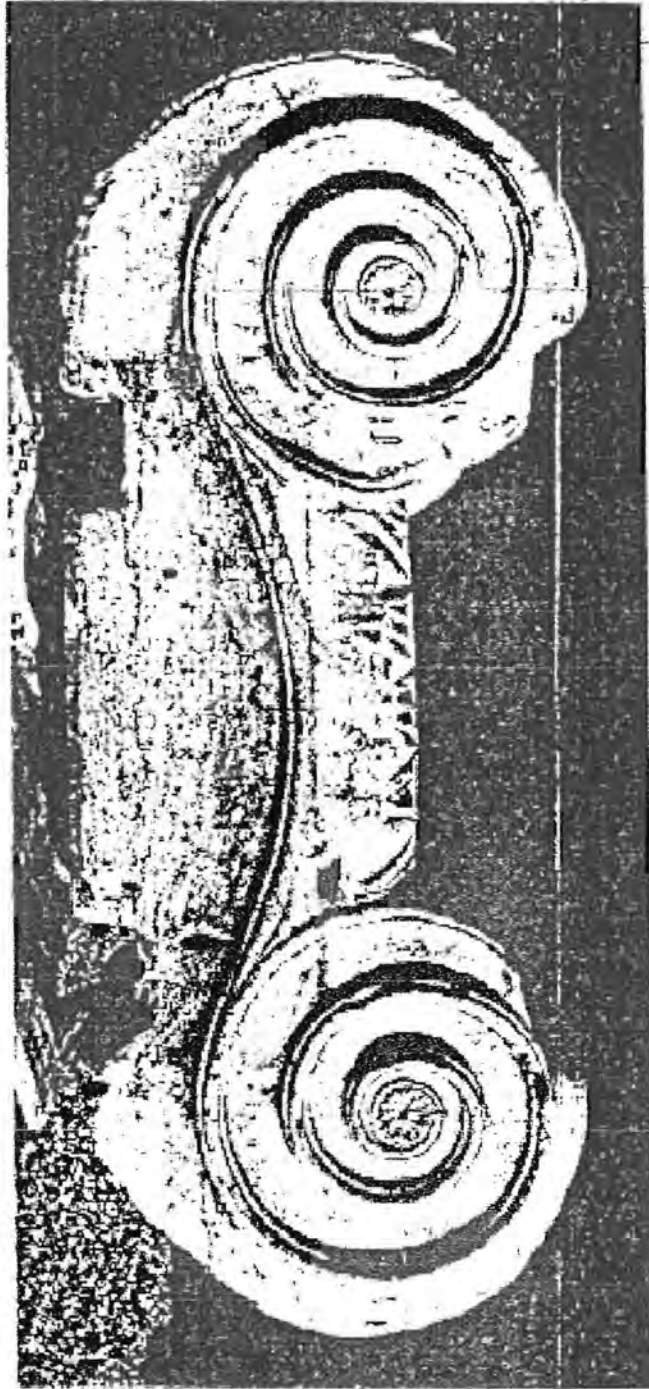


PHOTO REFERENCE: Bakalakis, 1963, Plate 17.1.



Table 52

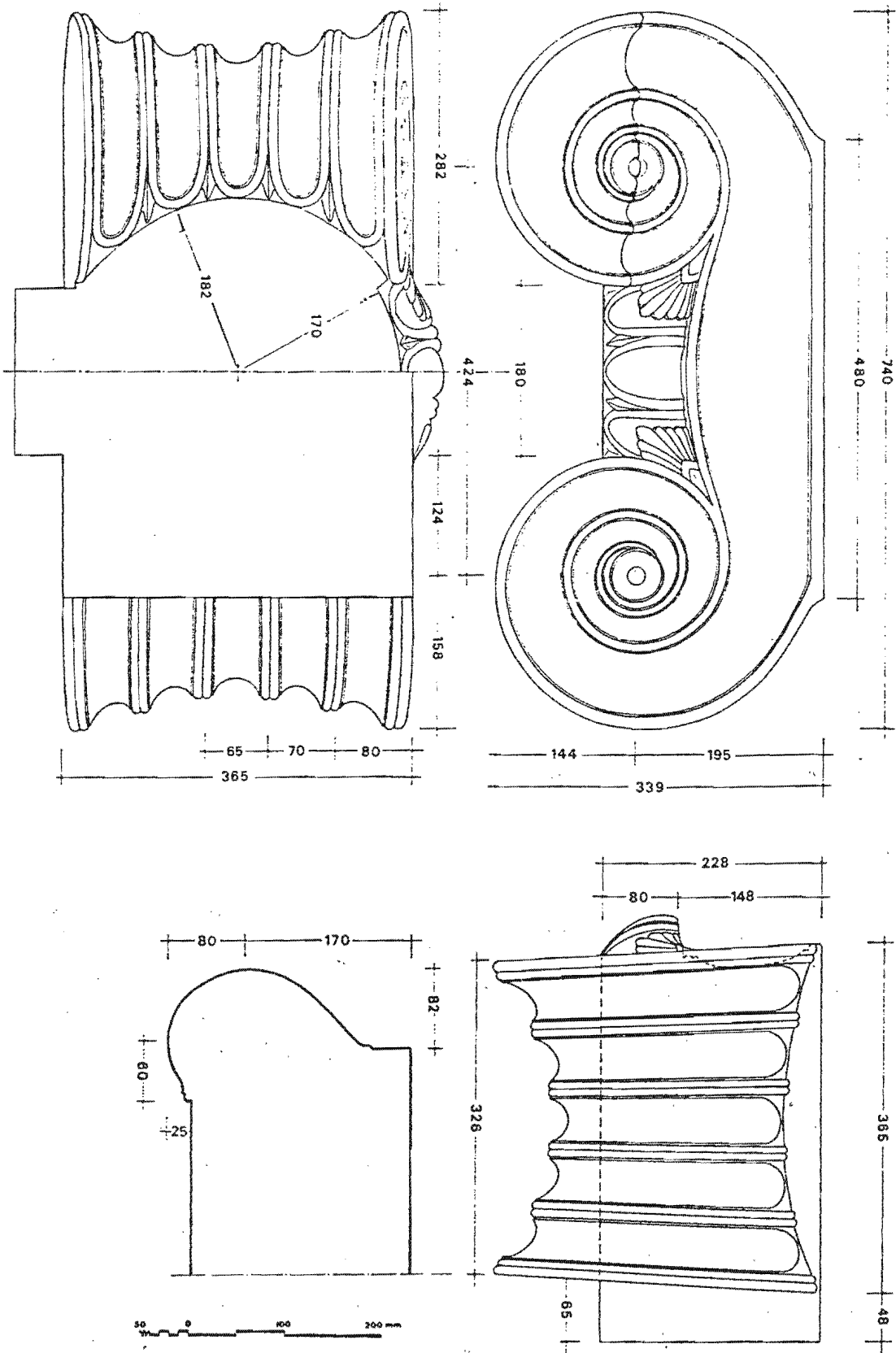
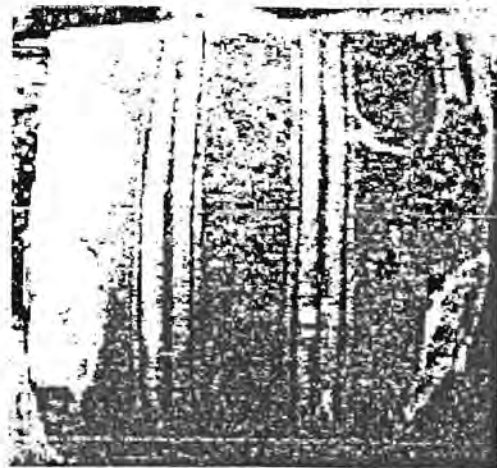
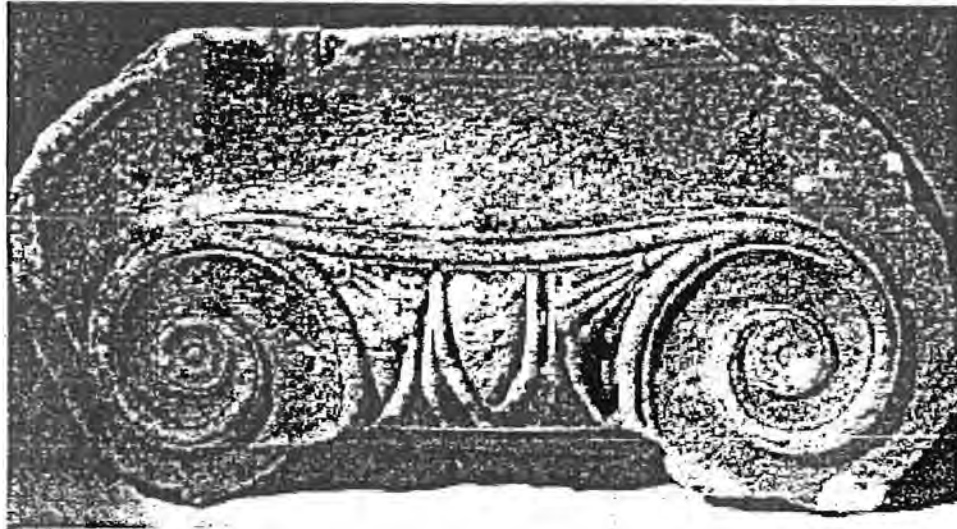
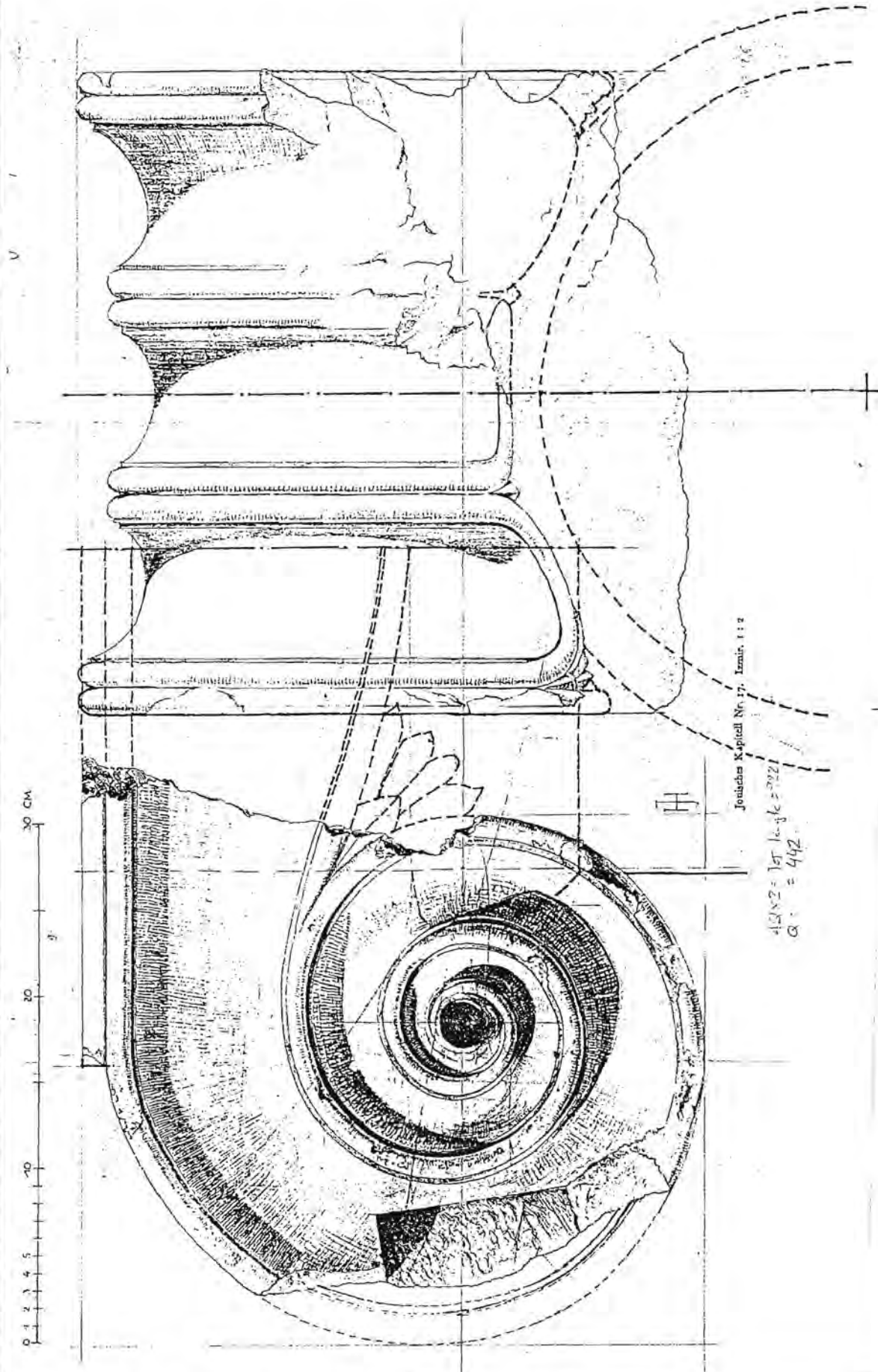
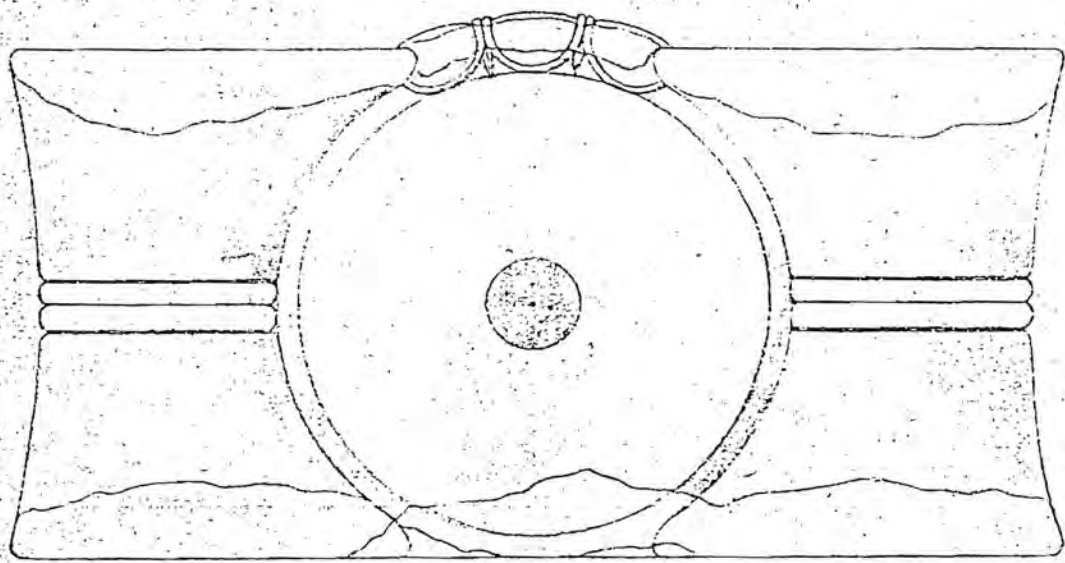
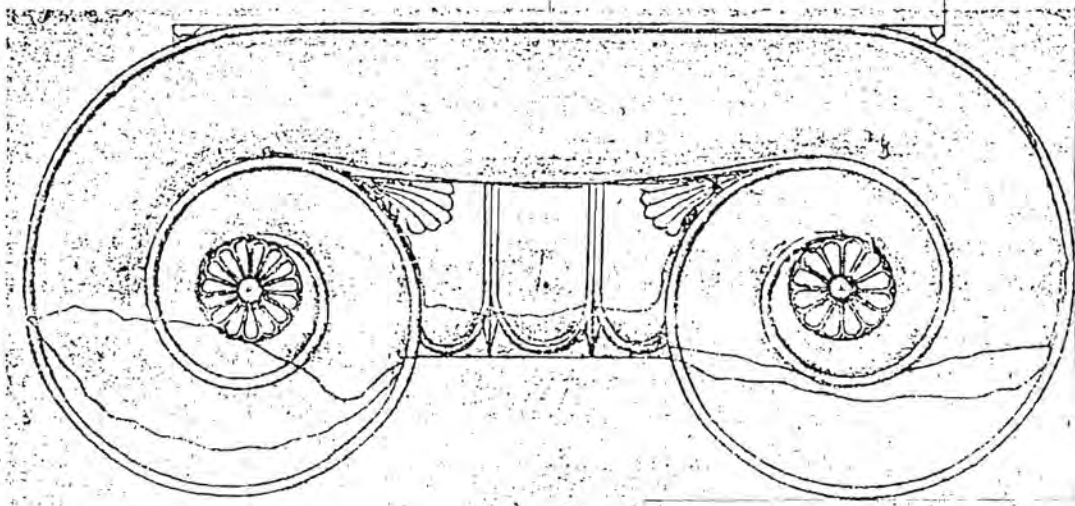




Table Ion-53







0 50 CMS.



Table Ion-56

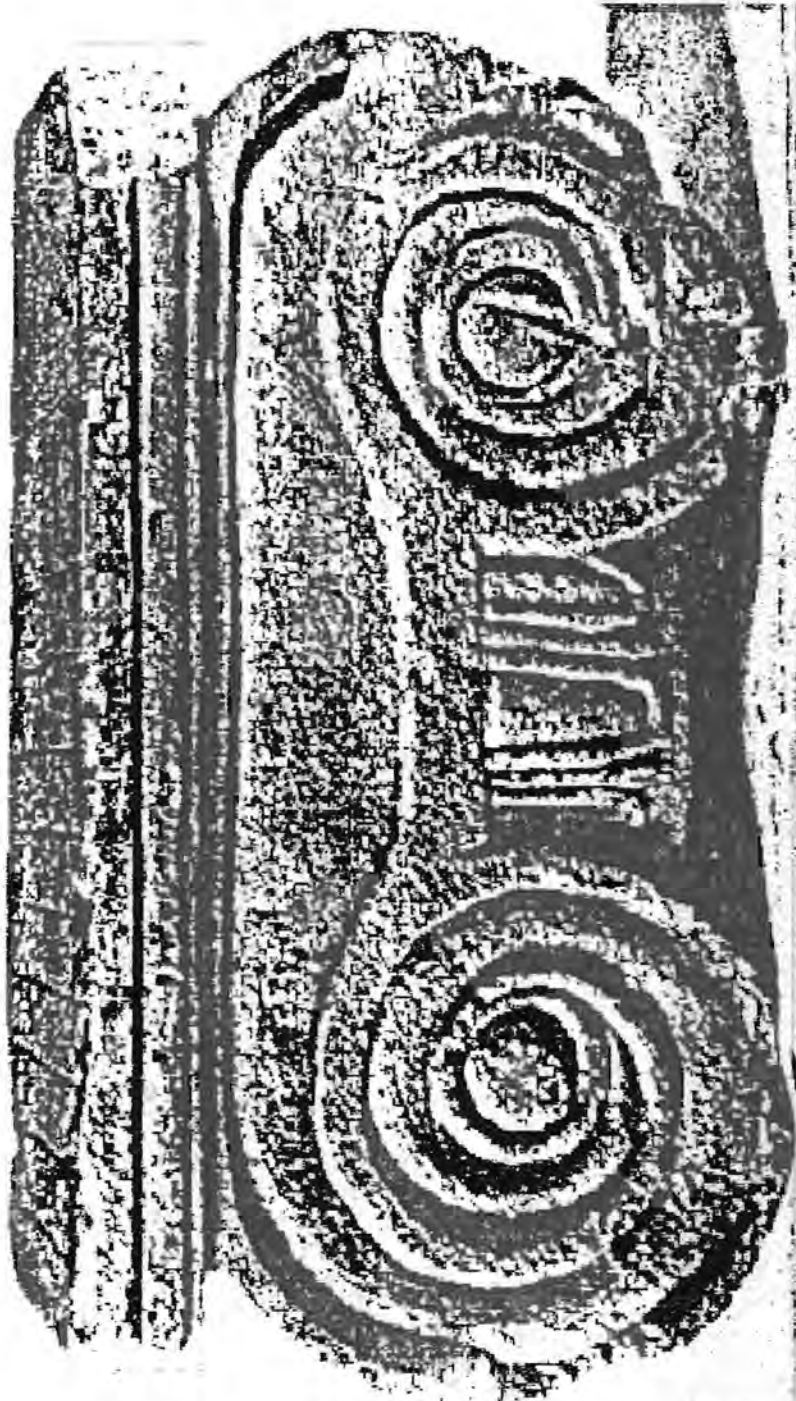


Table Ion-57



PHOTO REFERENCE: Hasluck, 1901-2, Plate VI.6.



Table 58a-

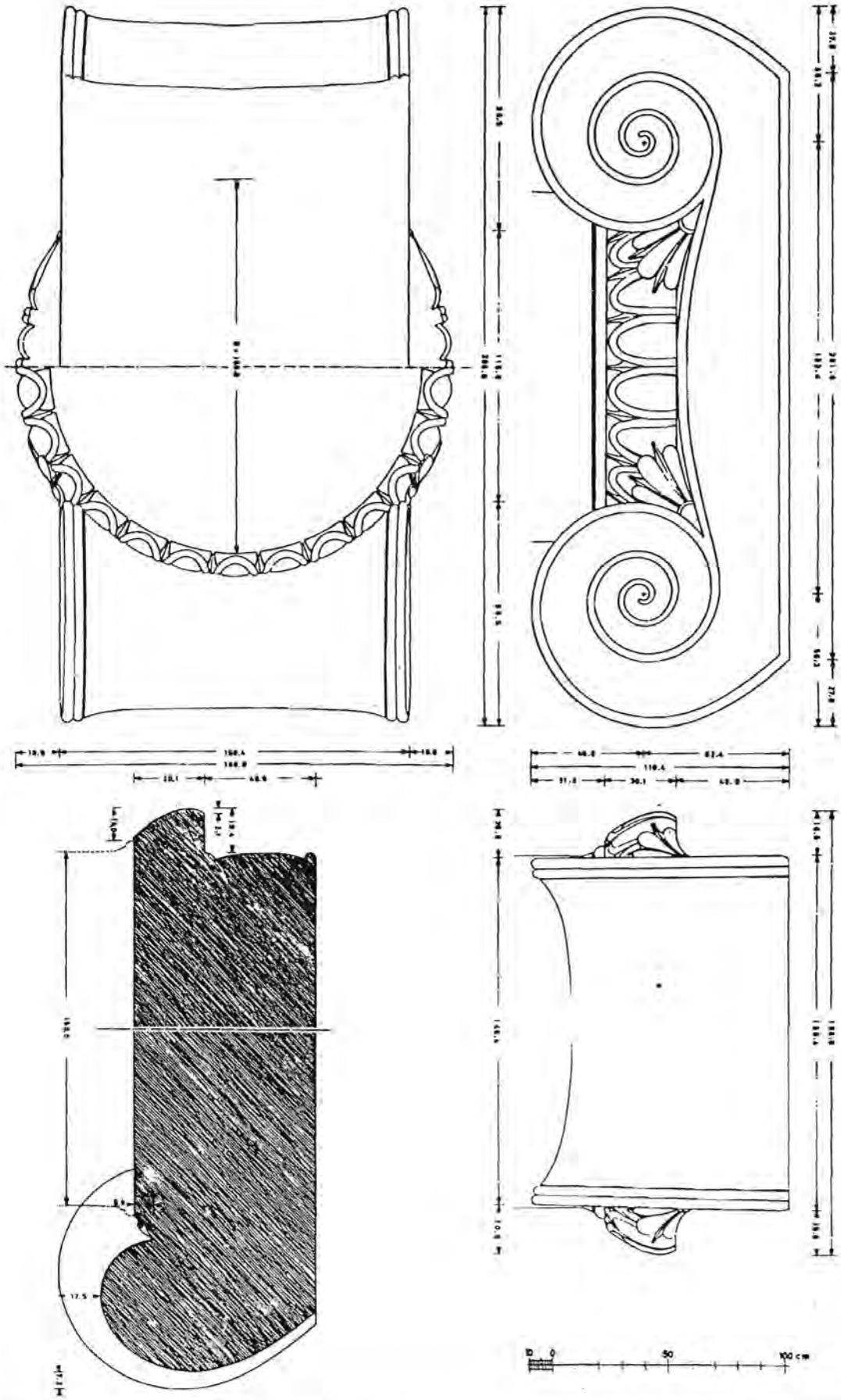
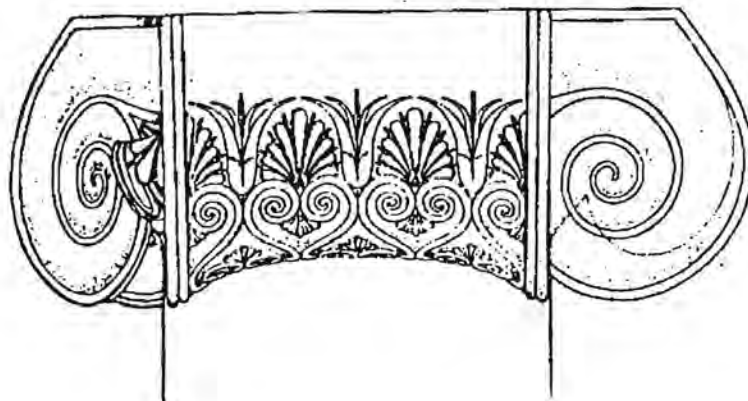
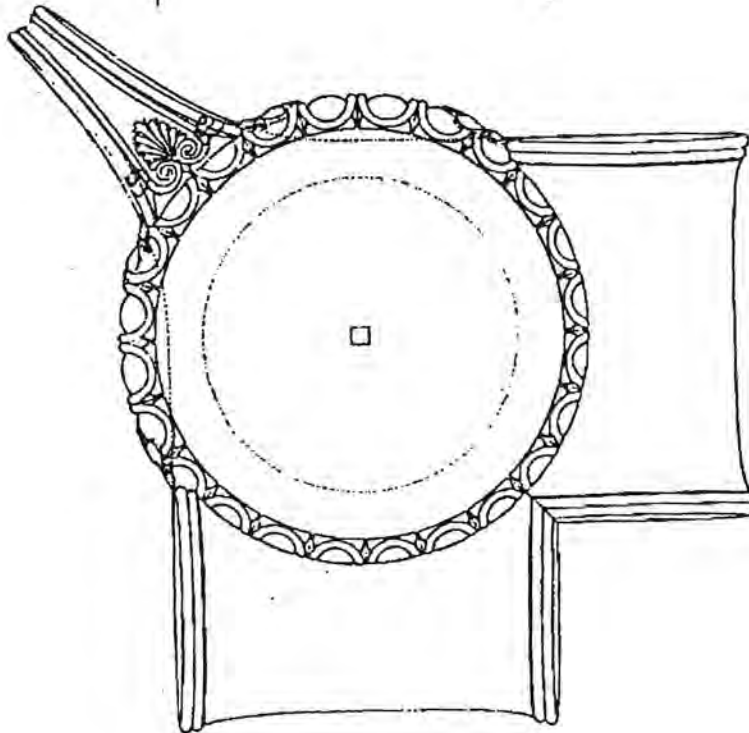
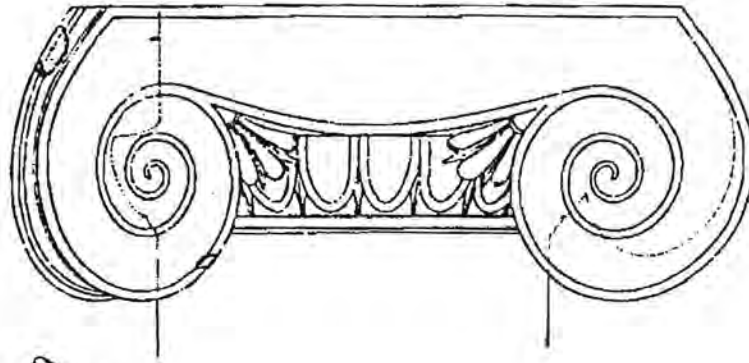




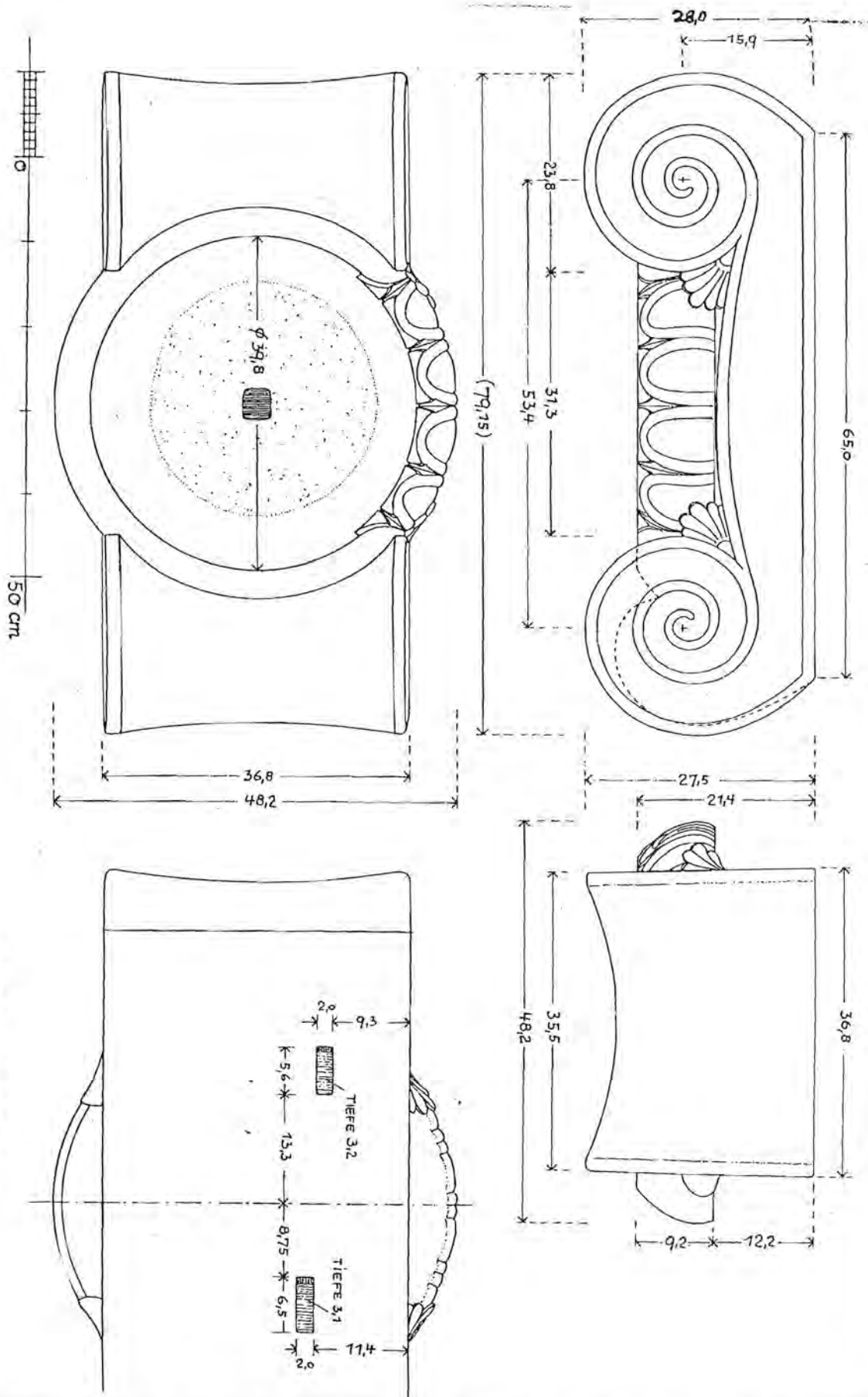
Table Ion-58b



DWG REFERENCE: Top and middle: Gruben, 1960, Dwg.46; Bottom: Author's new side elevation on a collage of Gruben's Dwg.42-7



Table 59a



Taf. XV. Tempel B, jonische Kapitelle



Table Ion-60

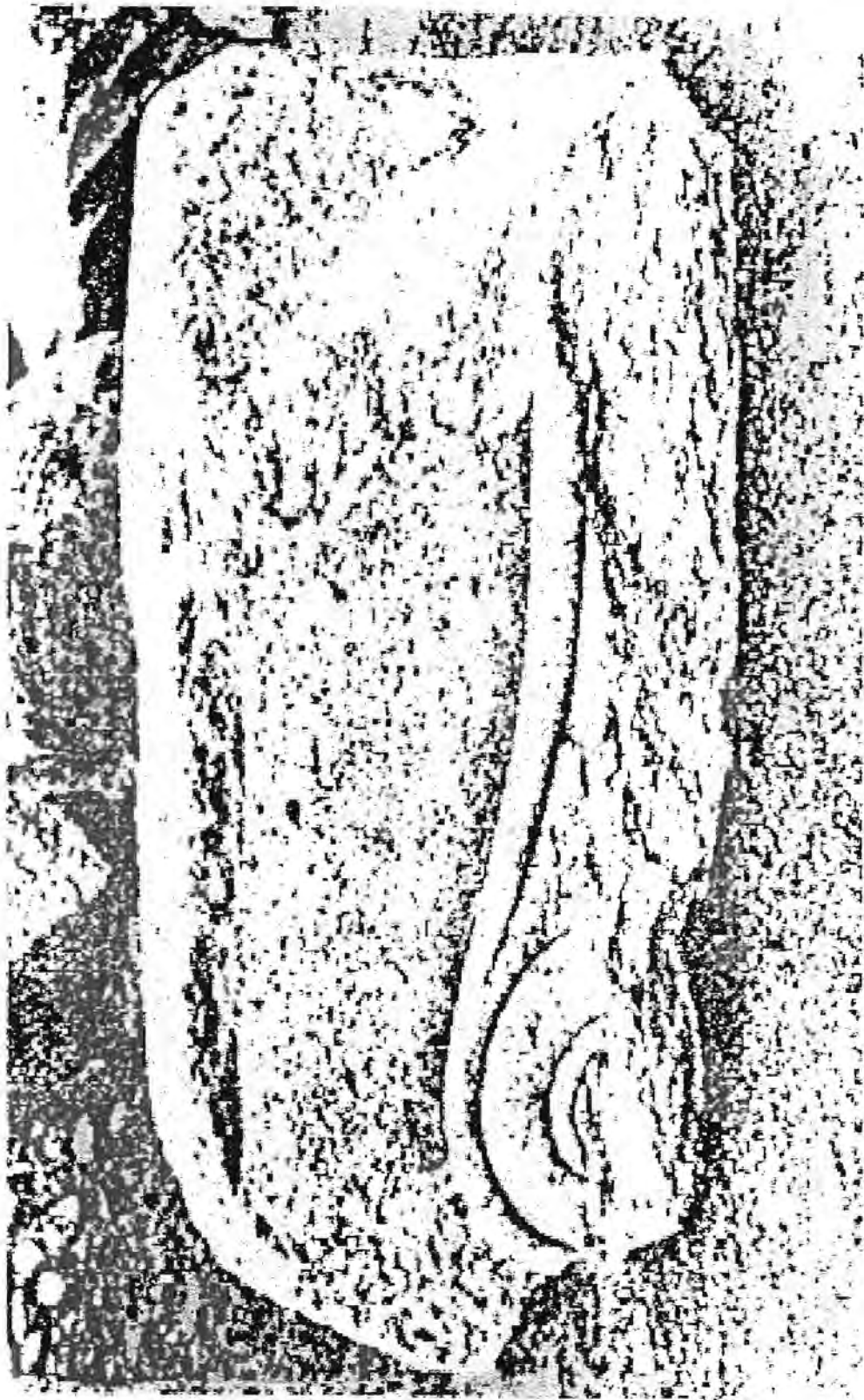
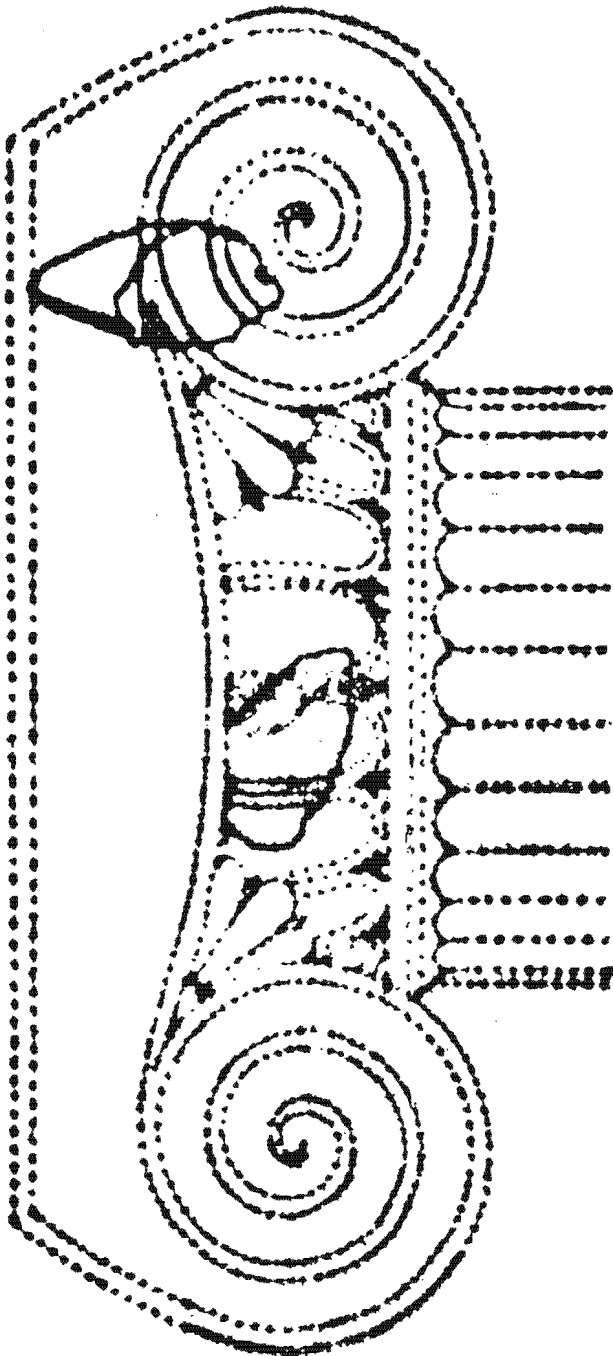
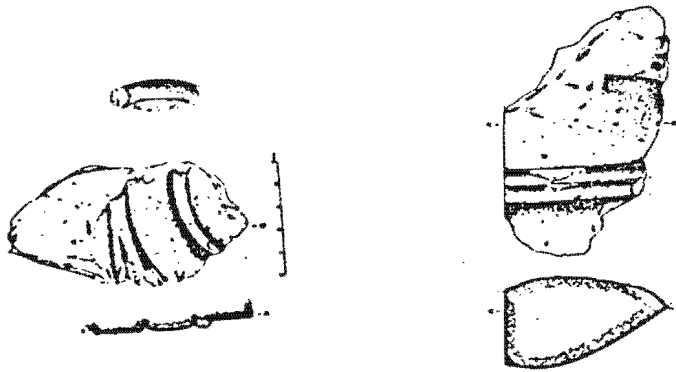


PHOTO REFERENCE: Alzinger, 1972, Fig.15.

Table 61



ΜΝΗΜΕΙΟΝ ΚΑΛΛΙΜΑΧΟΥ

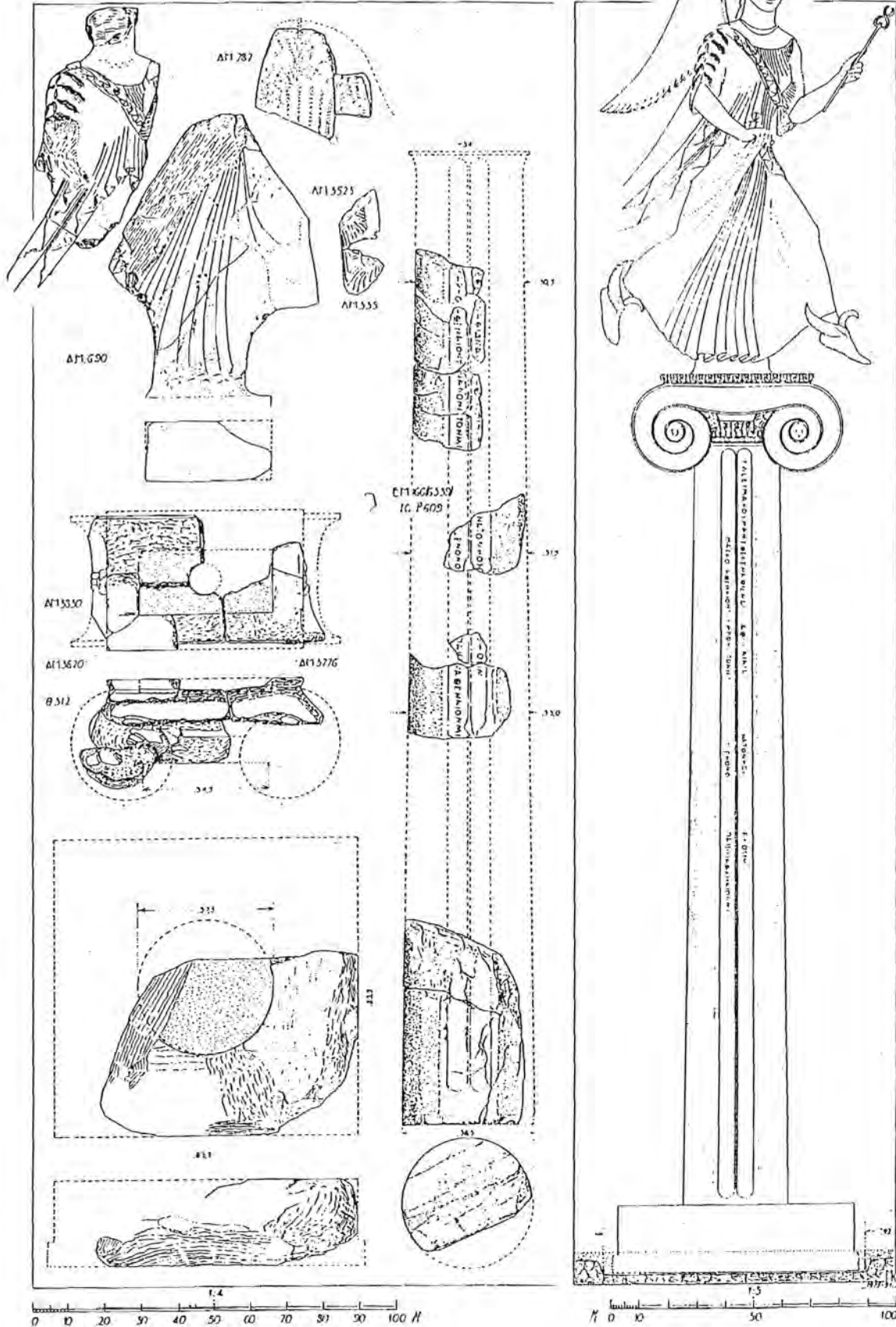




Table Icon-63

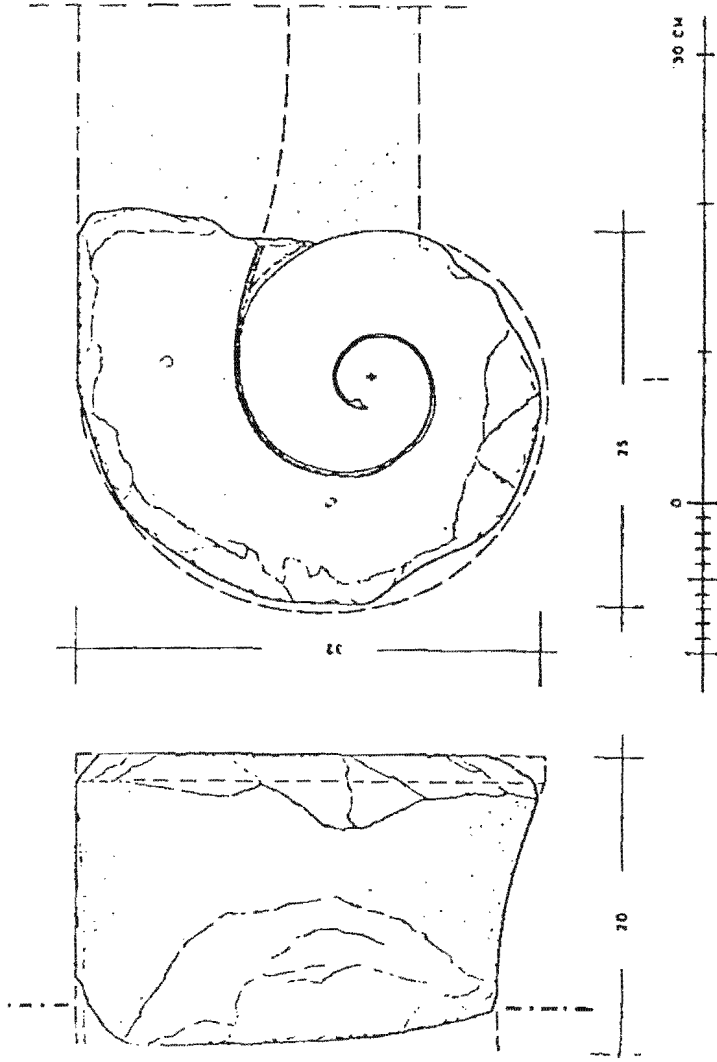




Table 64

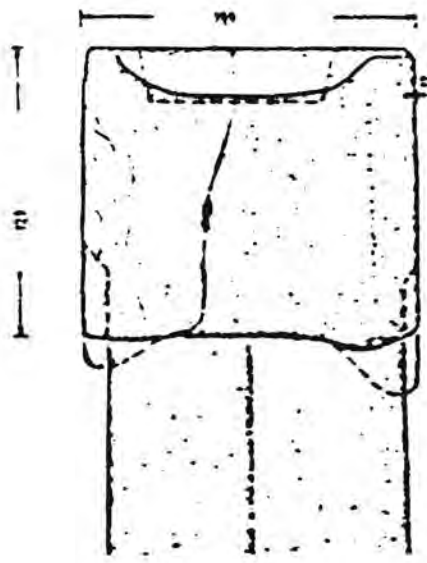
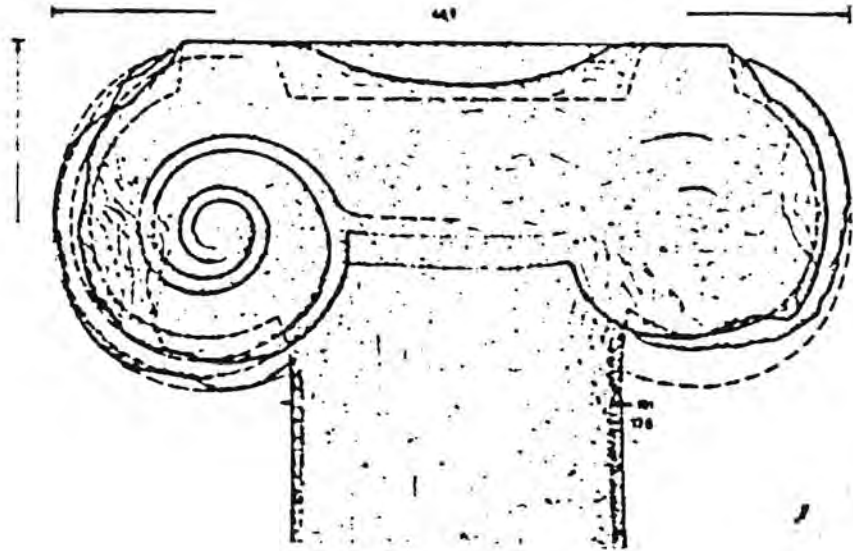
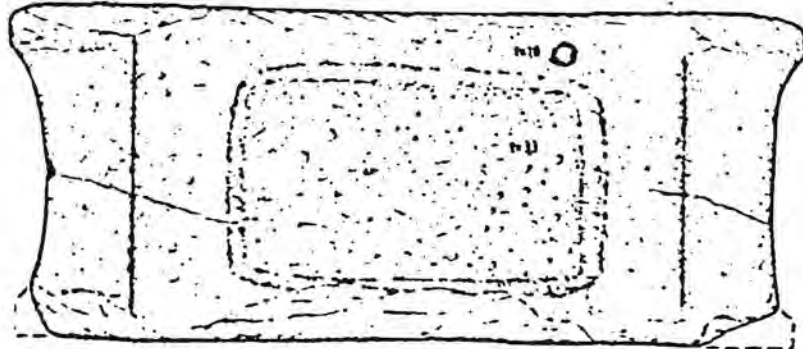




Table Ion-65

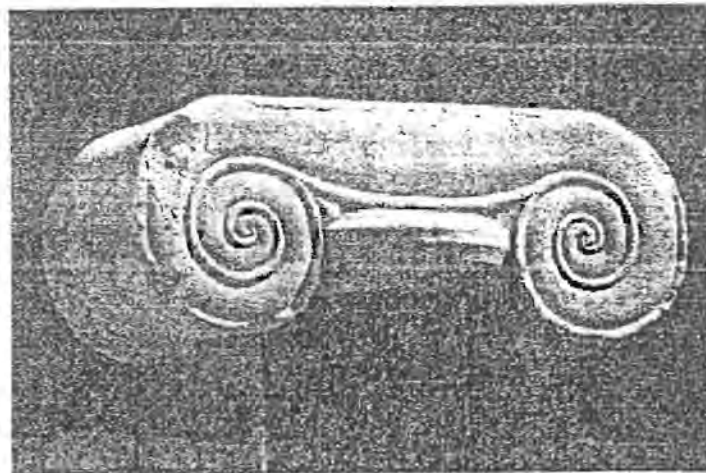
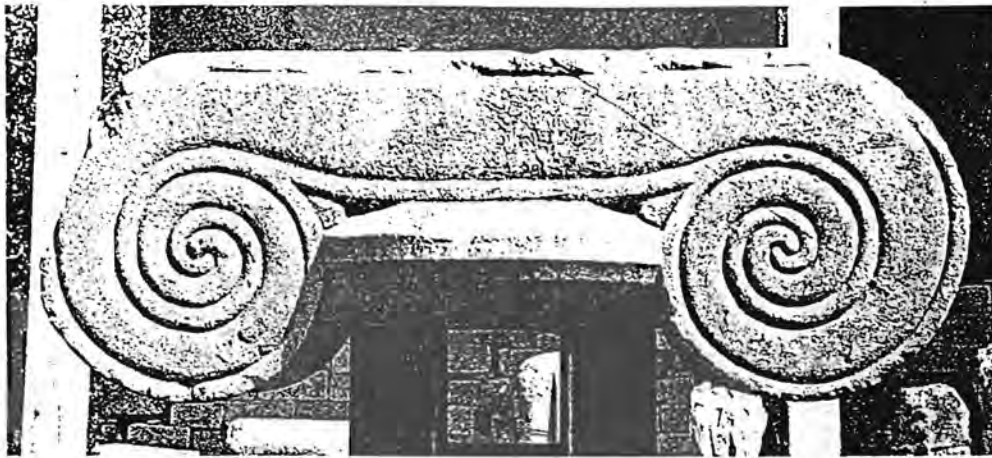




Table Ion-66



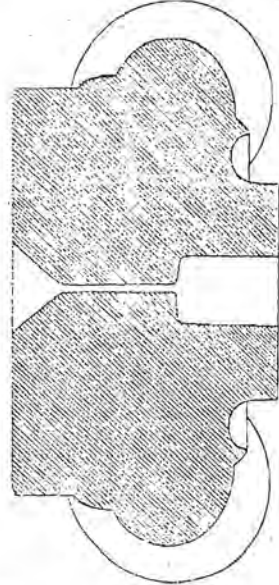
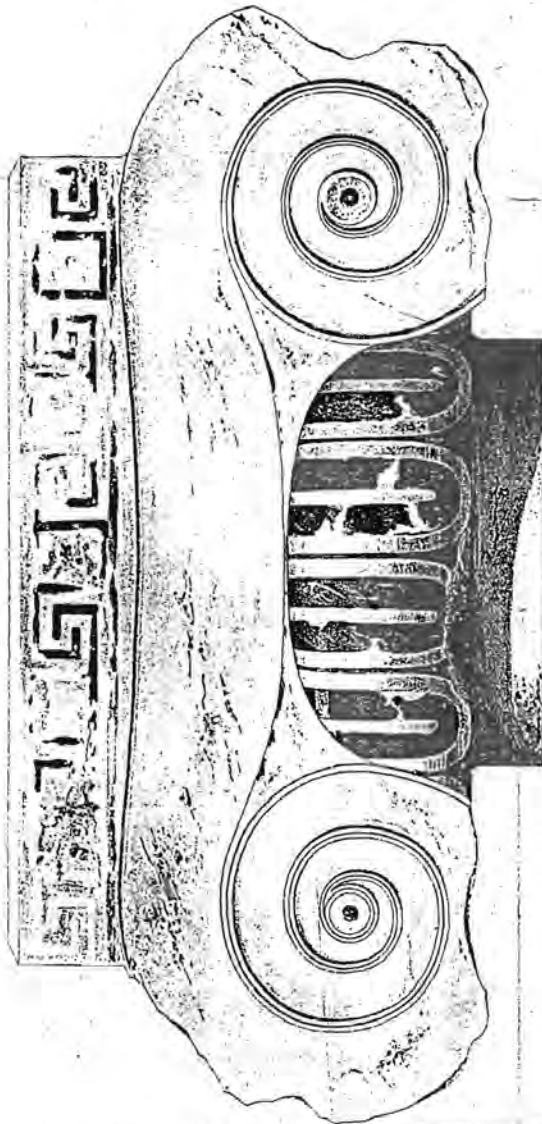
PHOTO REFERENCE: De la Coste-Messeliere, 1957, Fig.17.



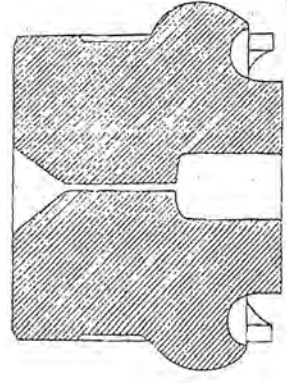
lon-67a

Maafstafek van 1:10 (1/10)

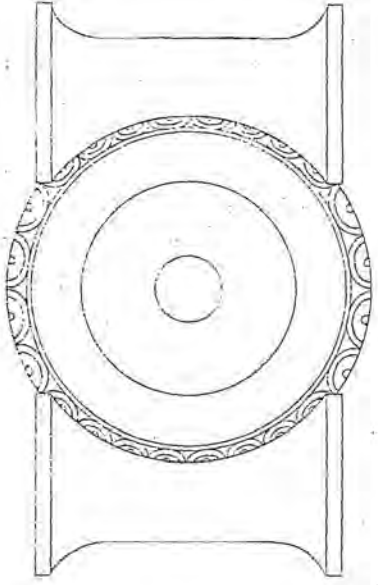
Maafstafek van 1:2 (1/2)



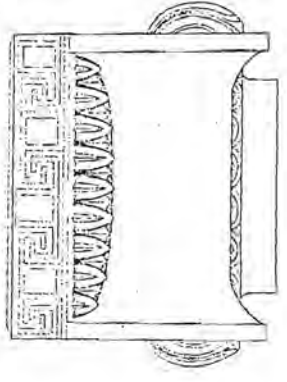
2^a



2^b



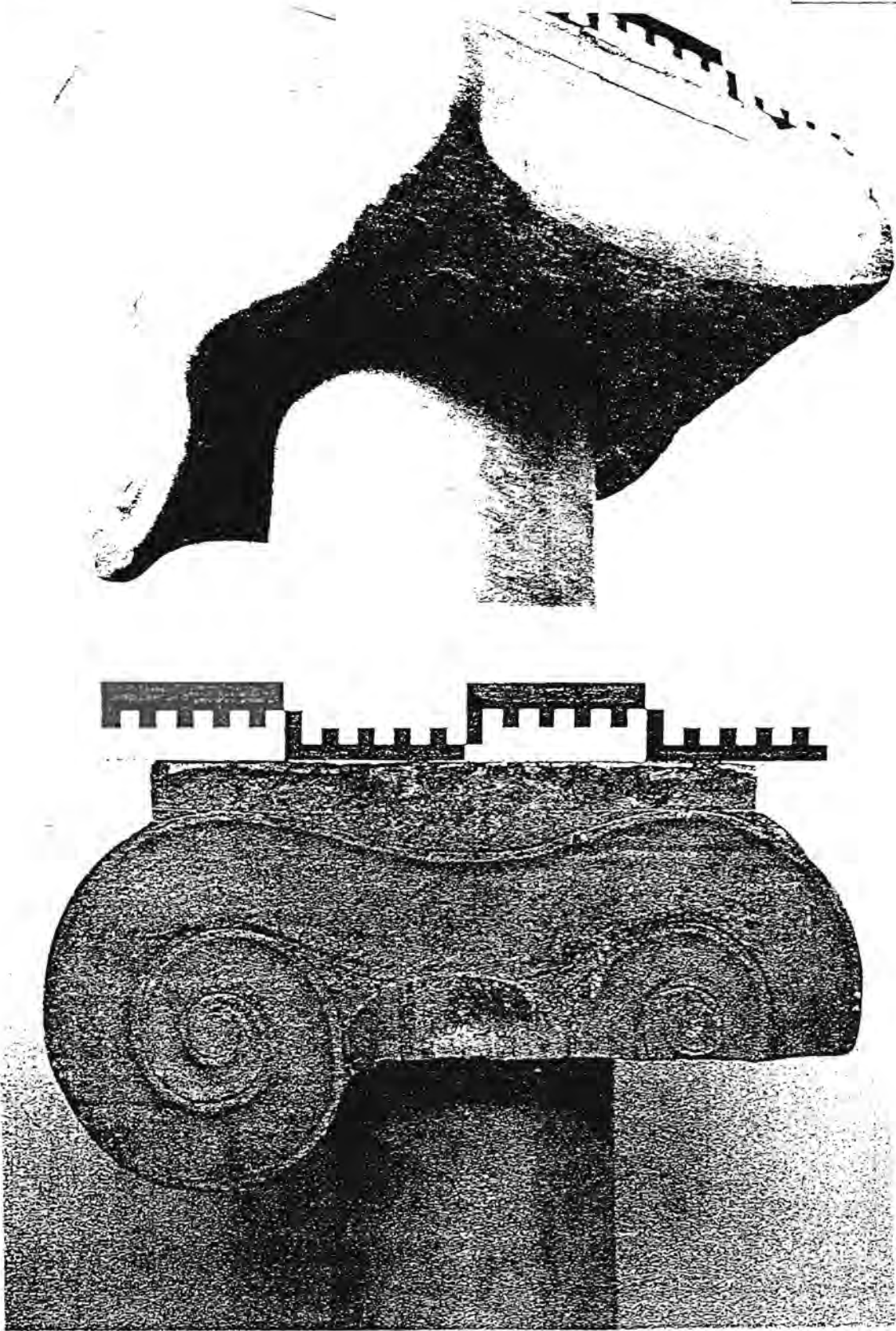
2^c



2^d



Table Ion-67b



DWG. PHOTO REFERENCE: Top and bottom: Author's own photographs.



Table 68

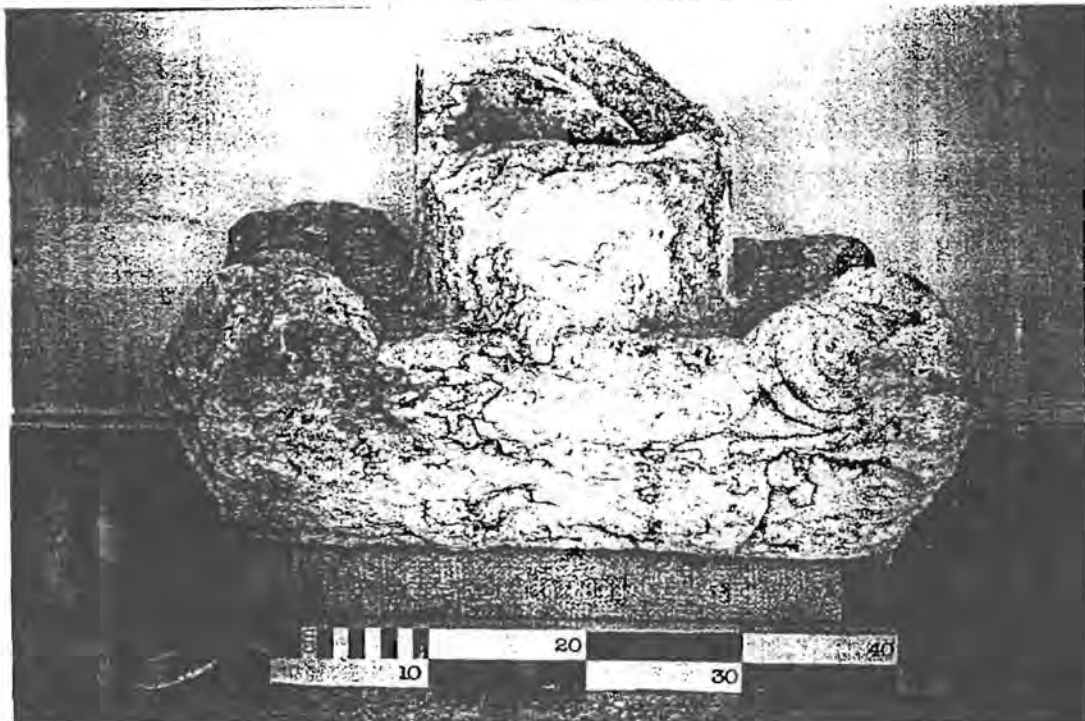
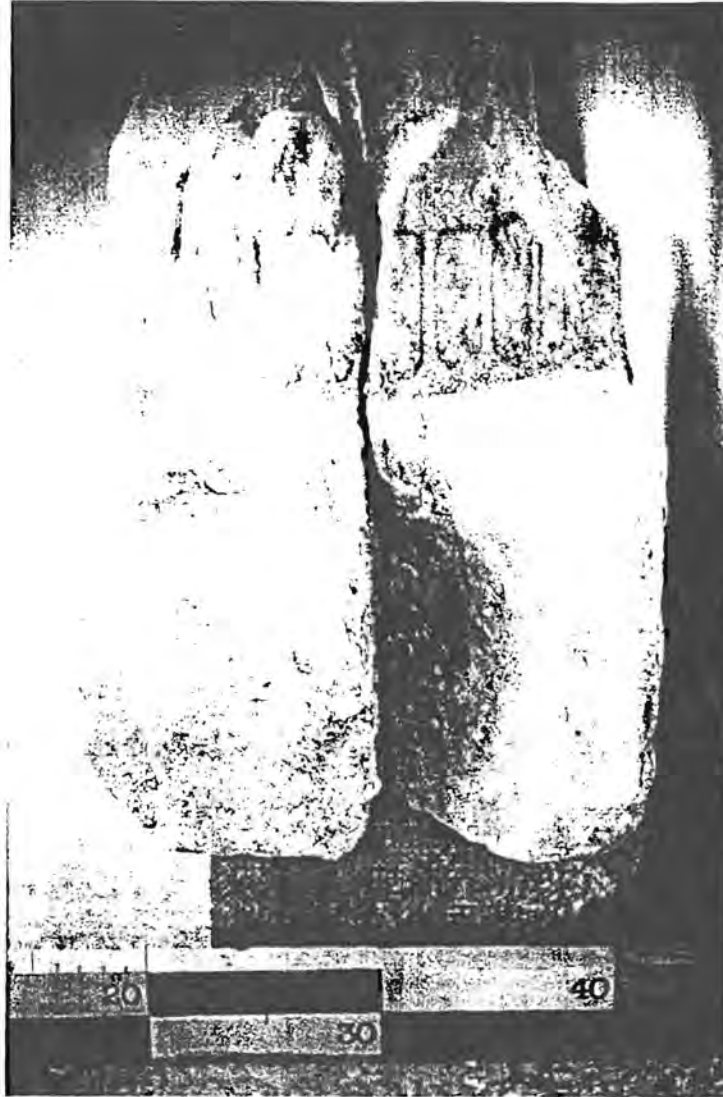




Table 69

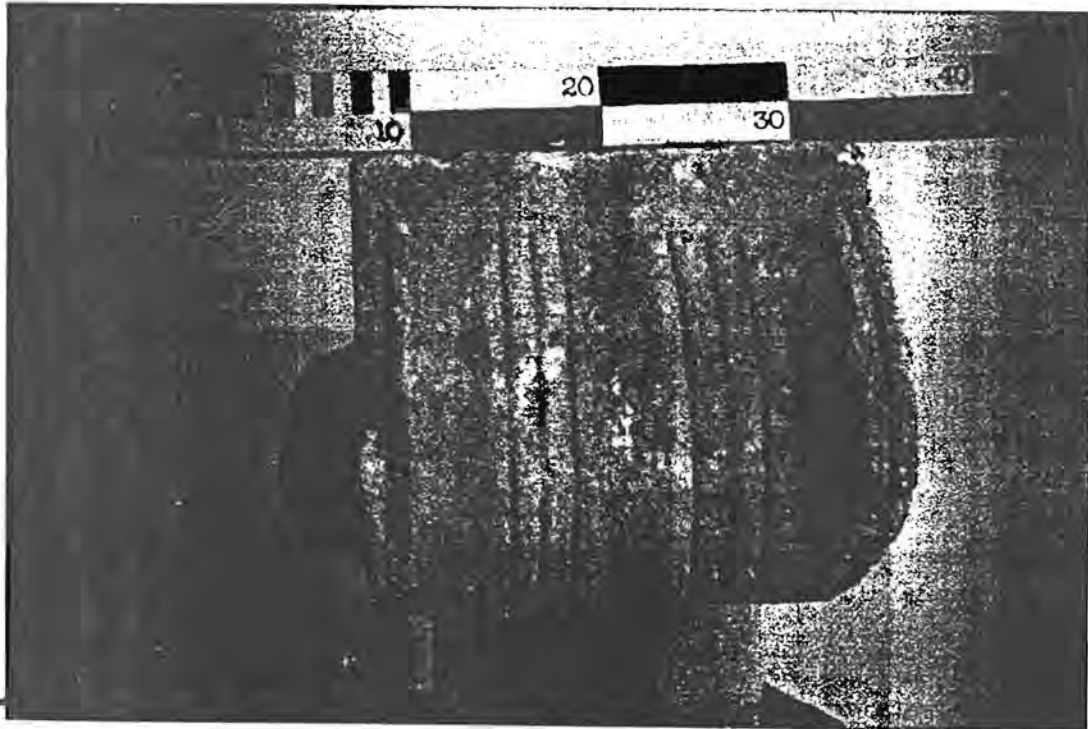
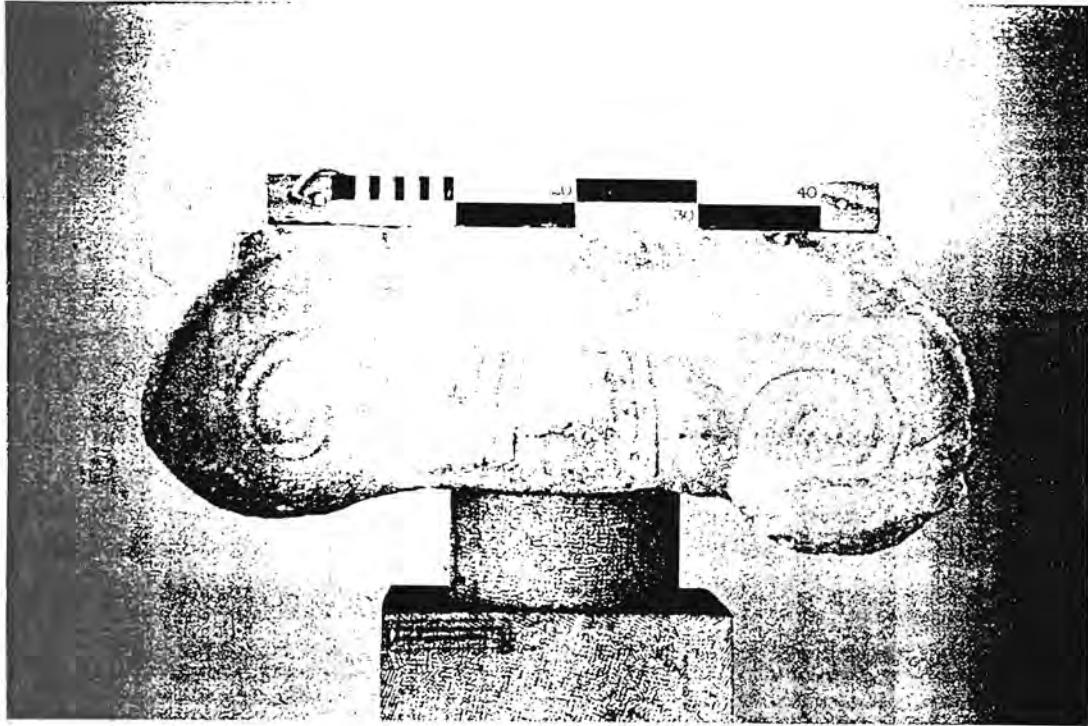
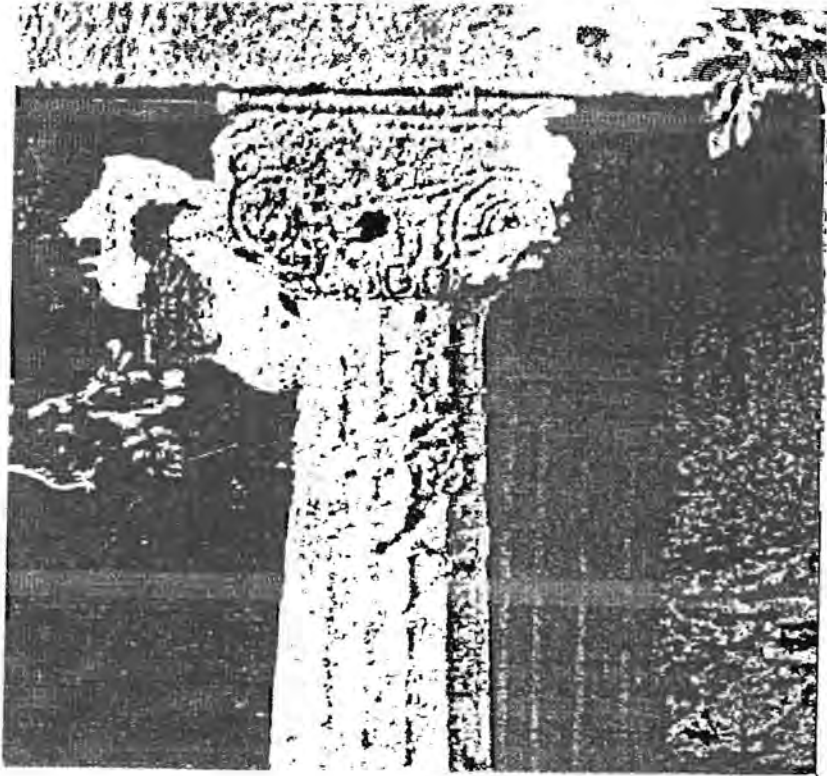


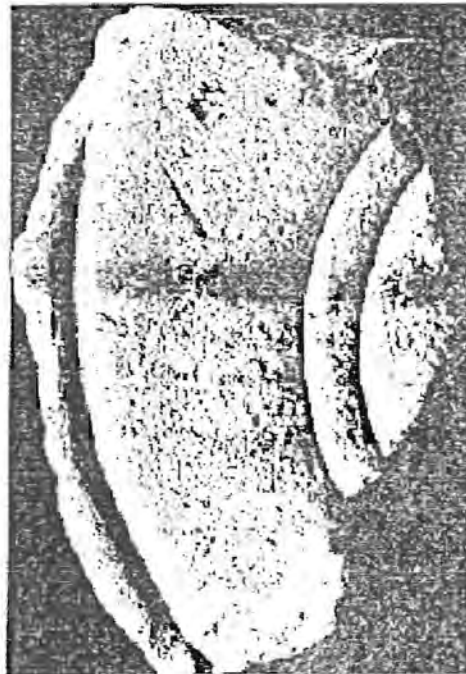


Table Ion-72

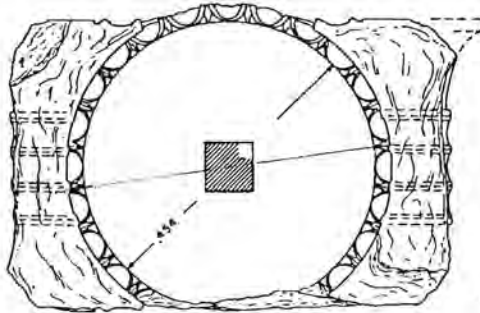
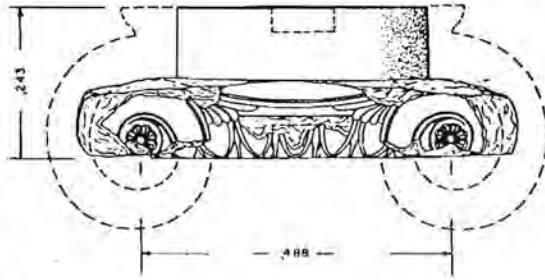
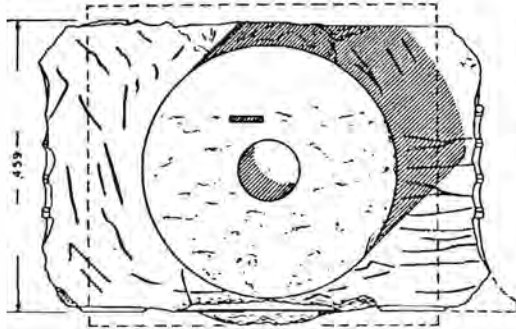


Drwg/photo reference: White, 1971, Fig.7

Table Ion-73



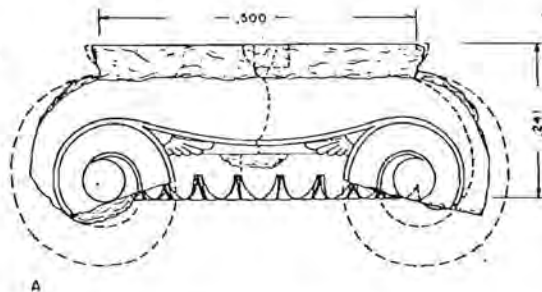
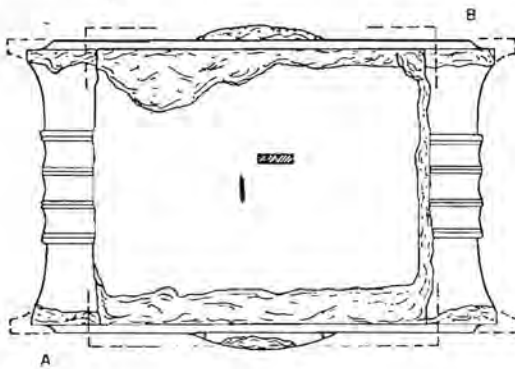
Drwg/photo reference: Ziegenaus, 1957, Plate 14.2.



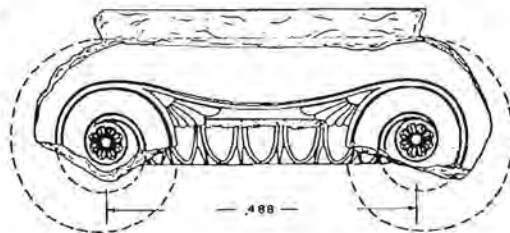
A 616



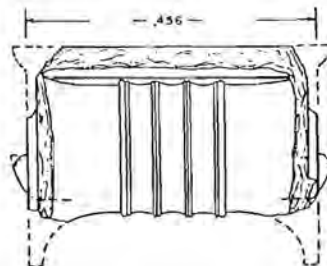
W.B.D., JR. - 1976



A



B



ON ACROPOLIS BELOW NIKE BASTION

W.B.D., JR. - 1976



Table Ion-75

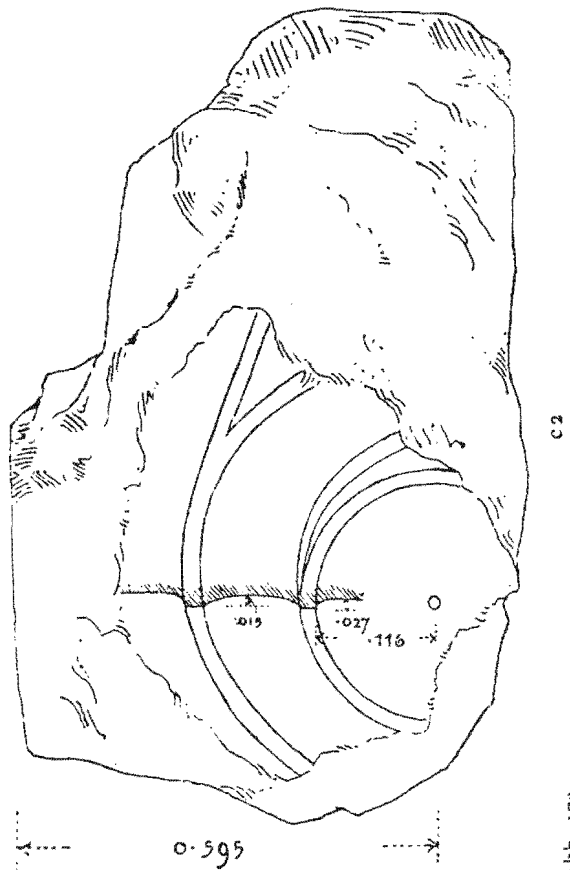


Abb. 172.

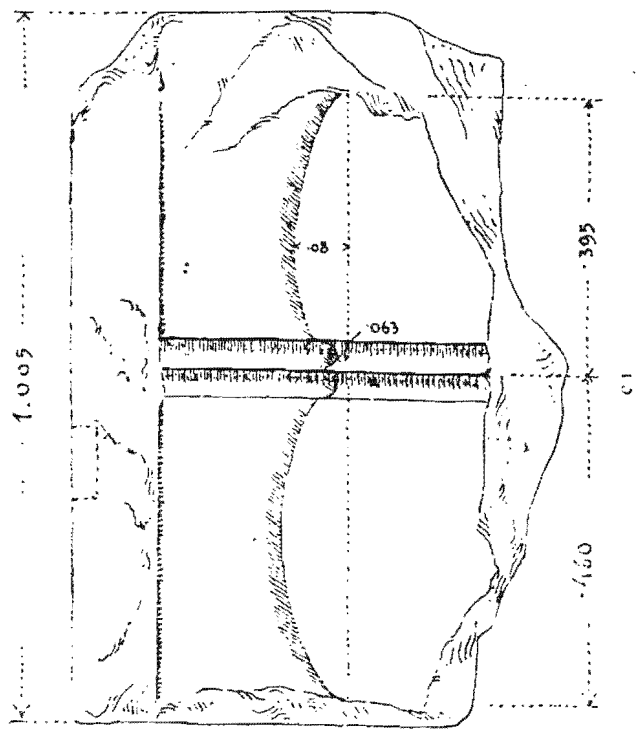




Table Ion-76

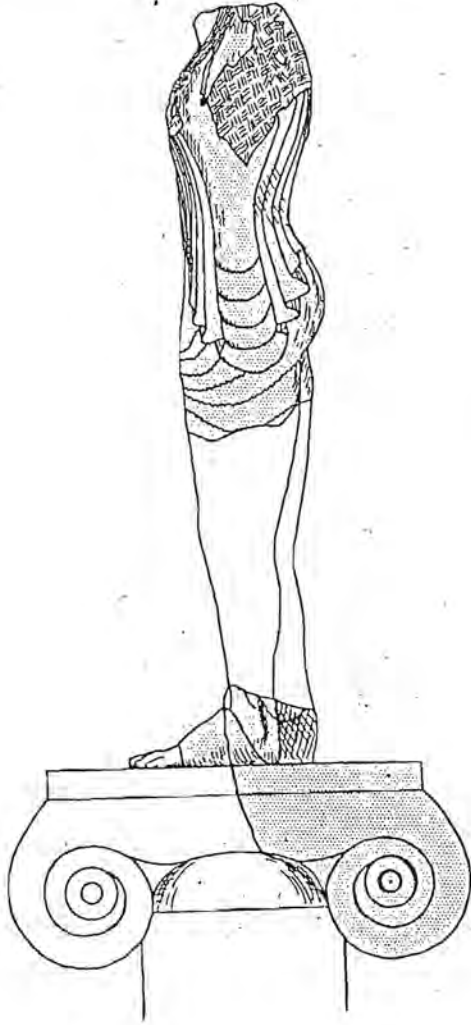




Table Ion-77

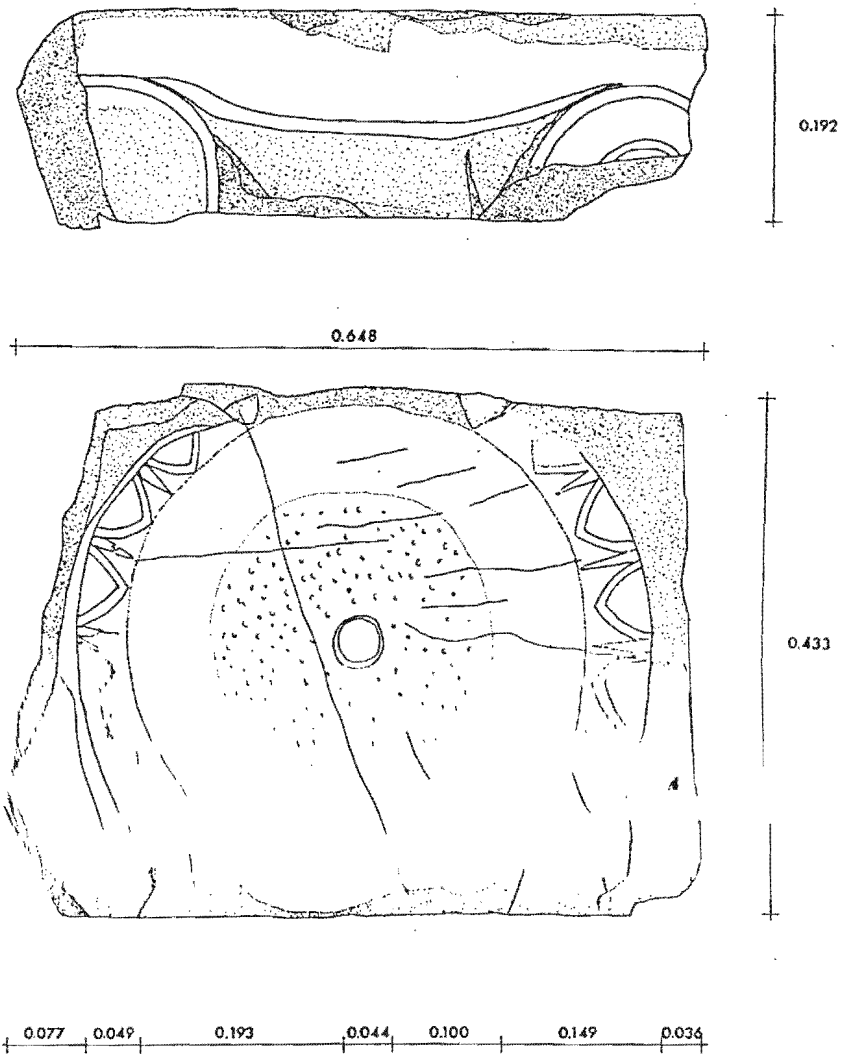


Fig. 1 : The archaic capital, front and bottom.

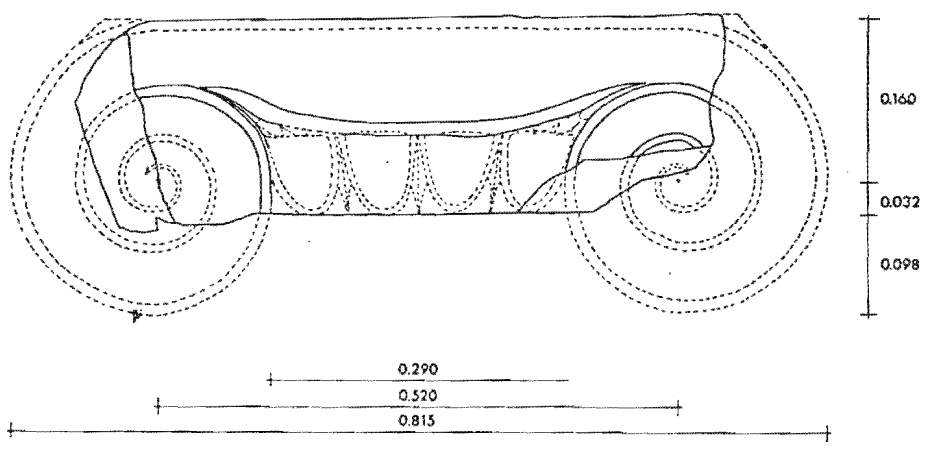
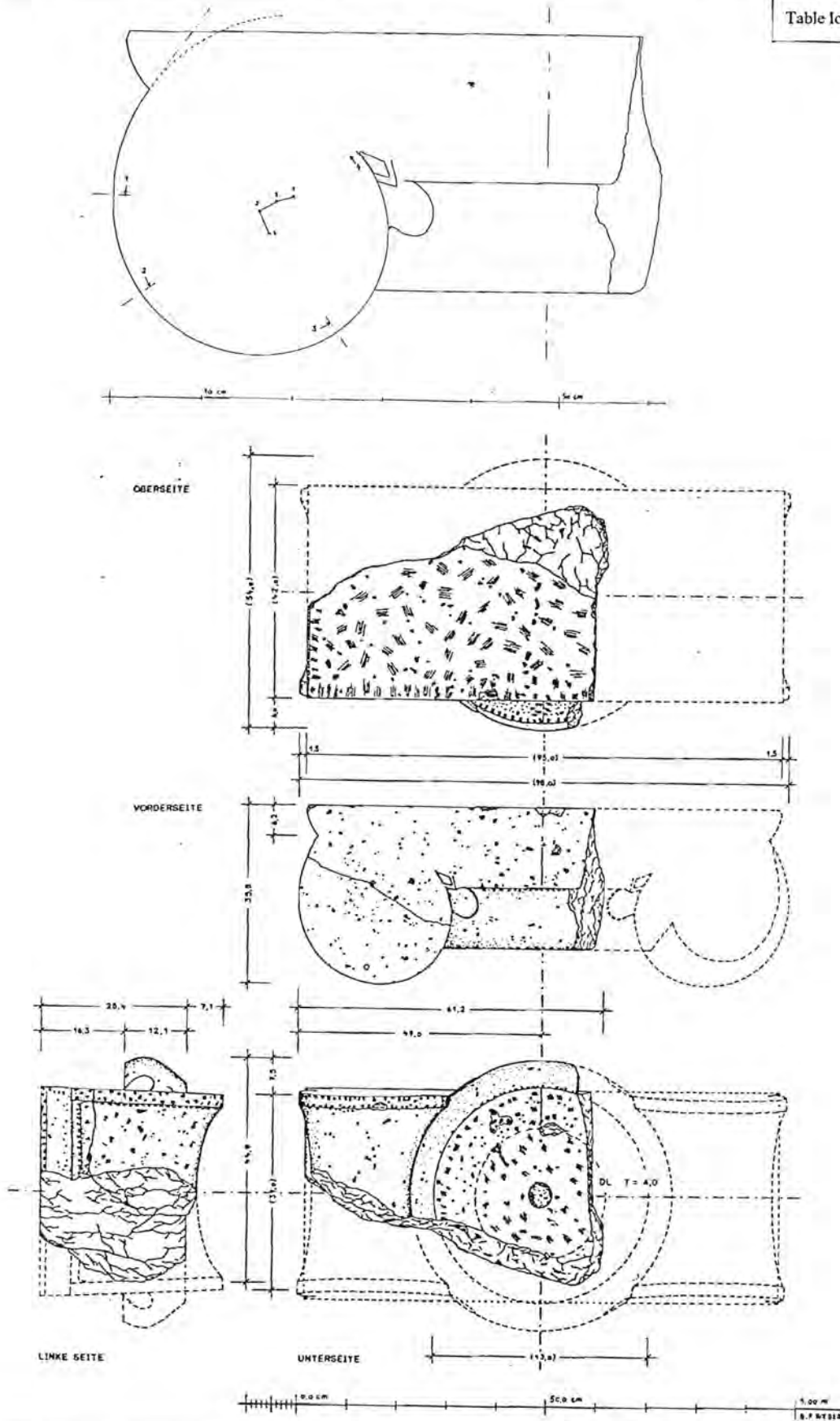


Fig. 2 : The archaic capital, restored front.



Table Icon-78



DWG REFERENCE: Top: Weber, 1996, Fig.6; Bottom: Weber, 1995, Fig.33.



Table Ion-81

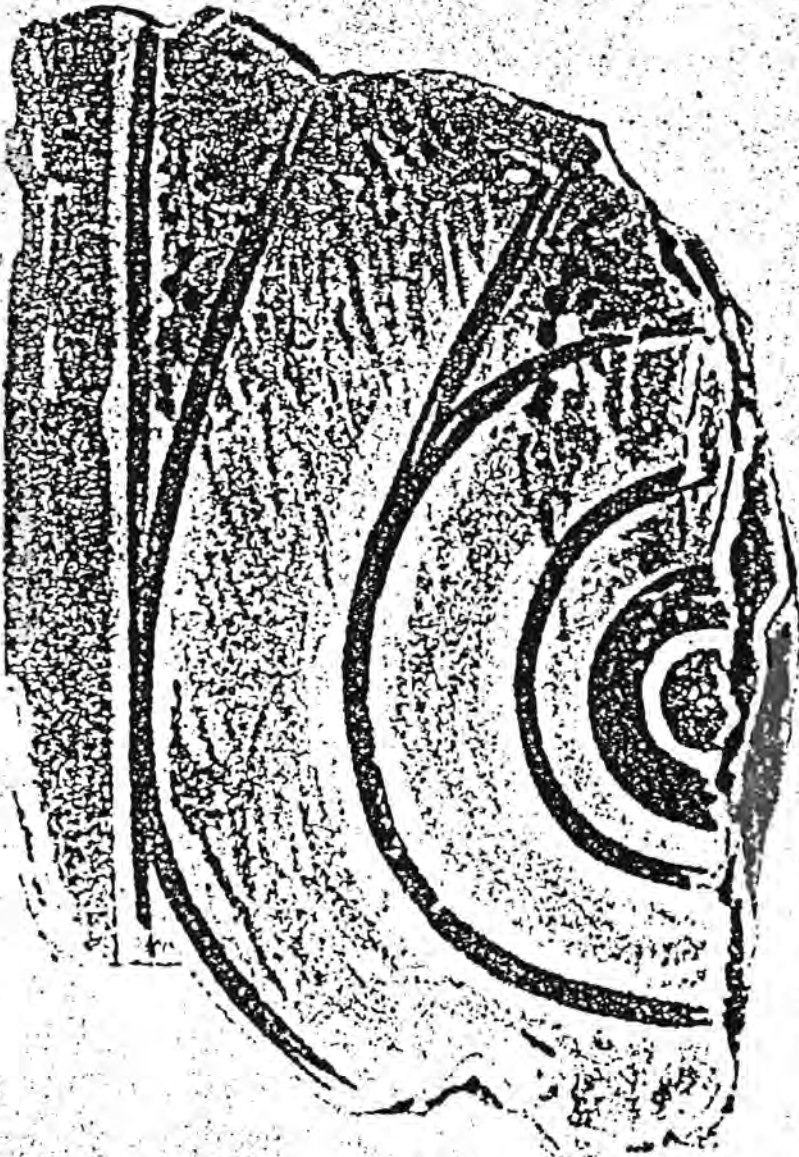
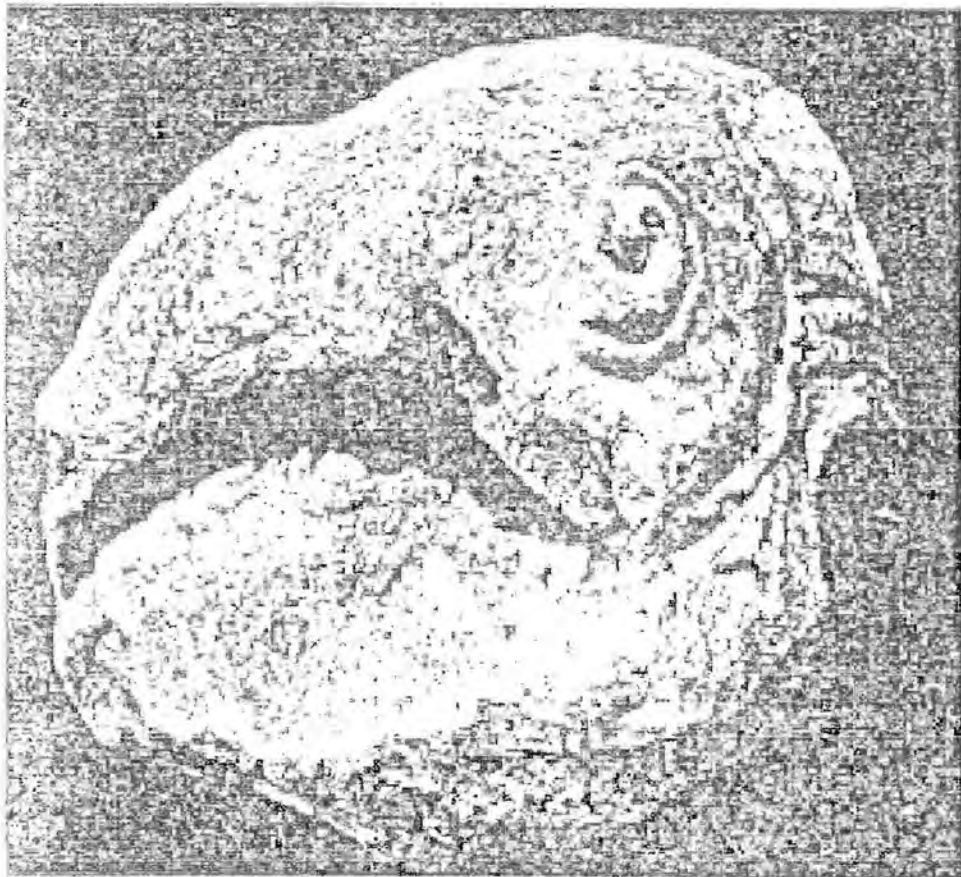
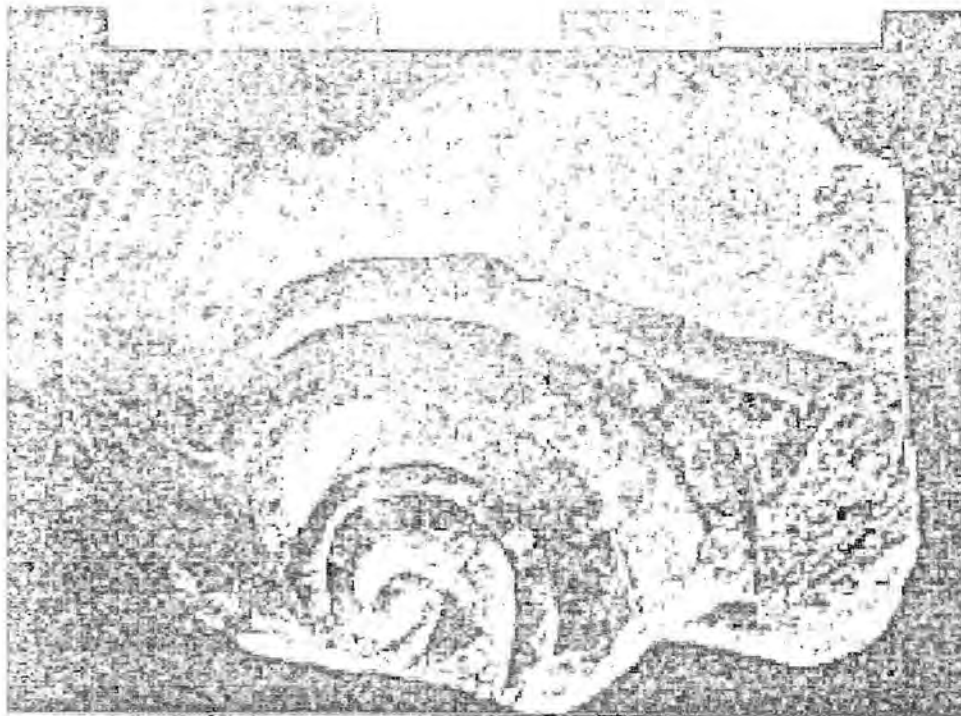


Table Ion-82



DWG REFERENCE: Gruben, 1963, Fig.32-33.

B Aeolicising capitals (Iver-) There is no capital Iver-1.

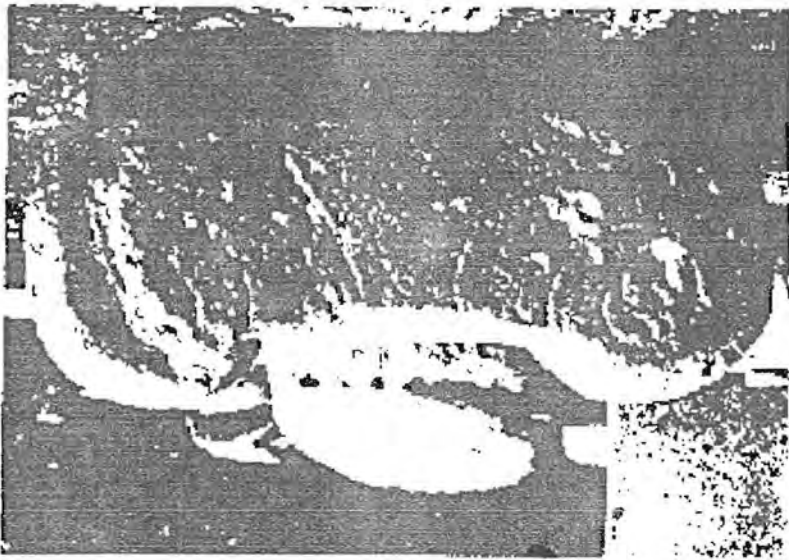


Table Iver-2



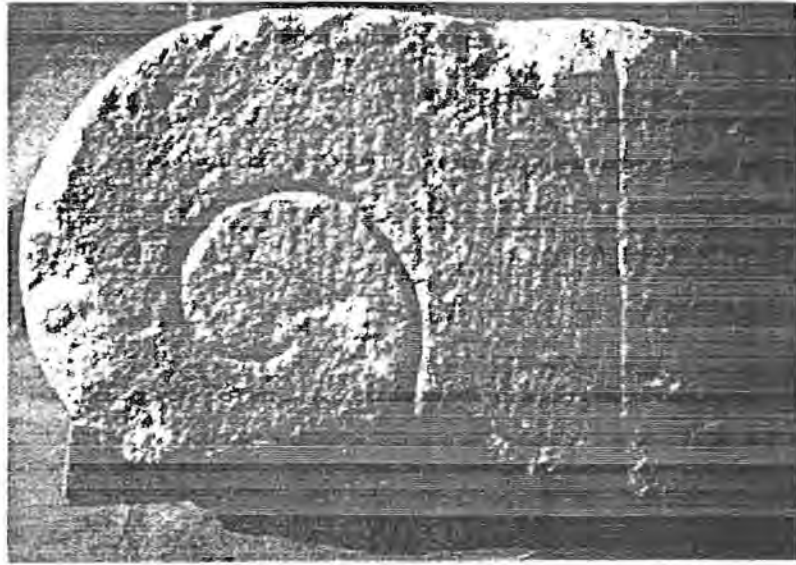
Drwg/photo reference: By author [Also see Ohnesorg, 1993, Plate XXII.4 for backside].

Table Iver-3



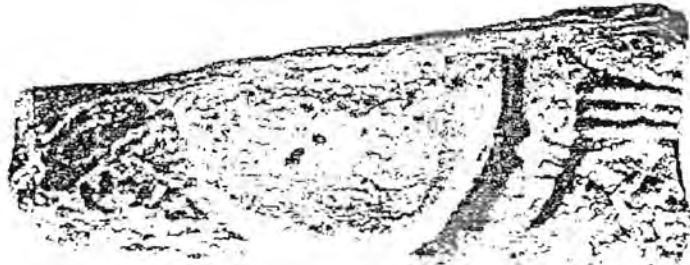
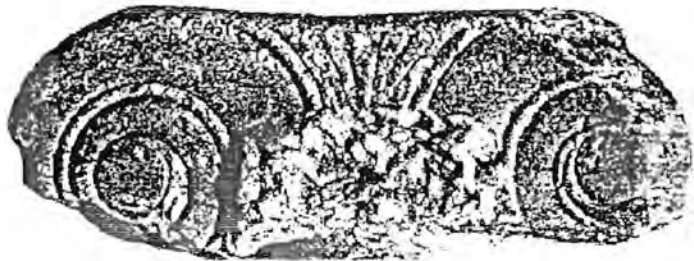
Drwg/photo reference: Martin, 1973, Fig 1

Table Iver-4



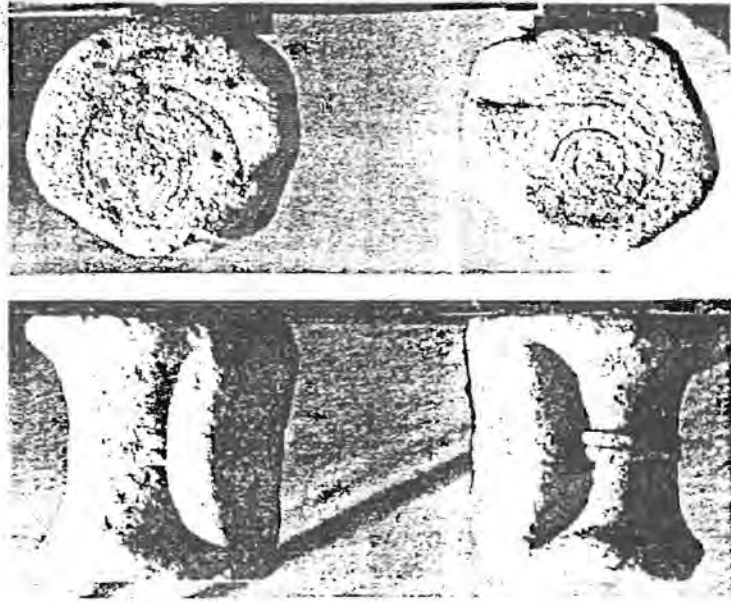
Drwg/photo reference: Martin, 1973, Fig.3.

Table Iver-5



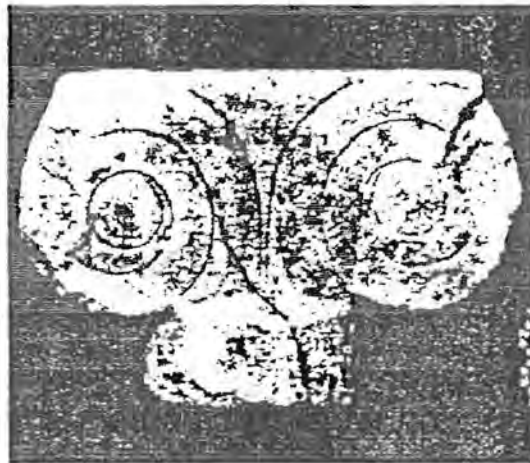
Drwg/photo reference: Gruben, 1972, Fig.35a,b [Top as Ohnesorg, 1993, Plate XXI.7].

Table Iver-6



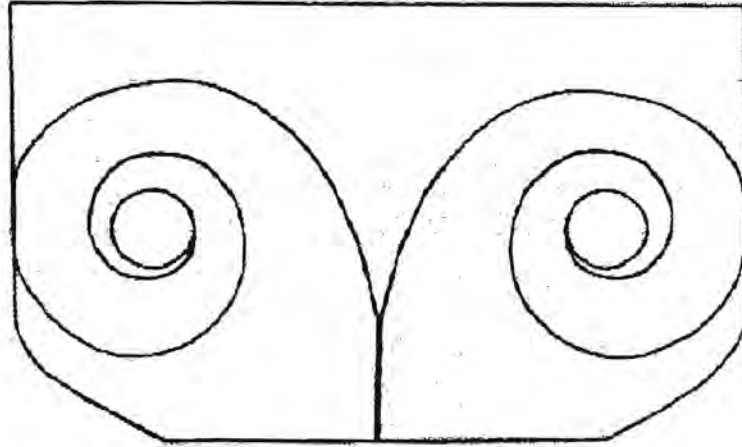
Drwg/photo reference: Gruben, 1982c, Fig 37 [As Ohnesorg, 1993, Plate XXII.1-2].

Table Iver-7



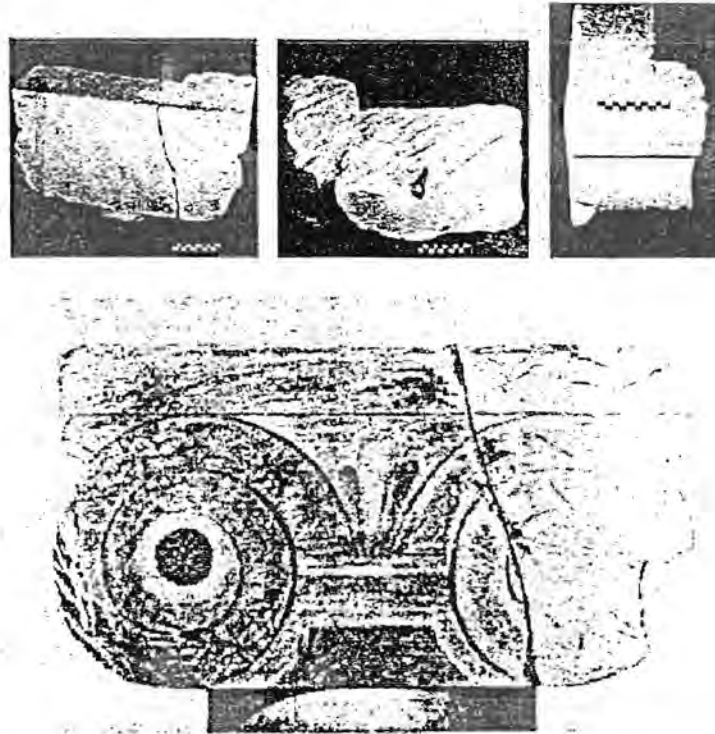
Drwg/photo reference: Betancourt, 1977, Plate 53-5.

Table Iver-8



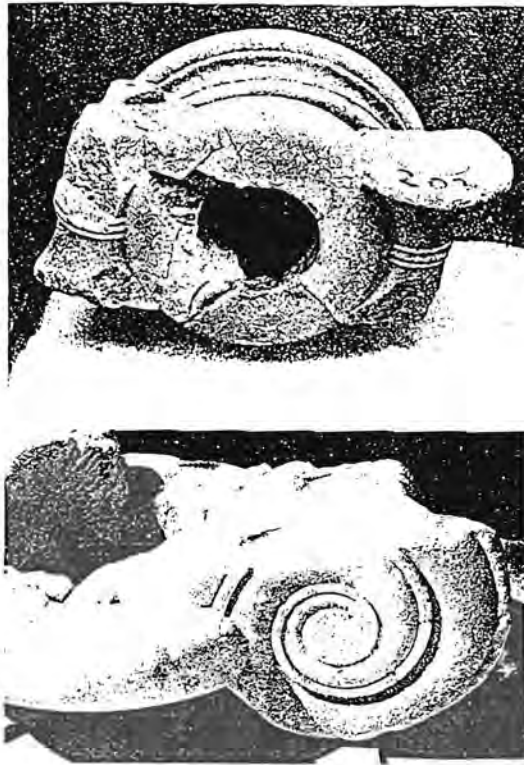
Drwg/photo reference: Betancourt, 1977, Fig 49 [From Raubitschek, *Technik und Form*, Fig.20].

Table Iver-9



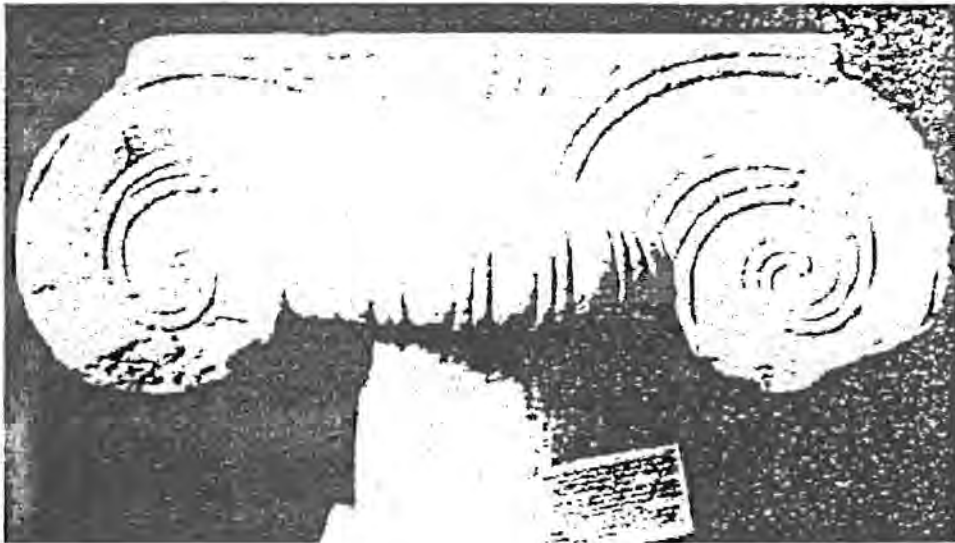
Drwg/photo reference: Top: Betancourt, 1977, Plate 56-8; Bottom: Borrmann, 1887, Plate 18.3.

Table Iver-10



Drwg/photo reference: Ohnesorg, 1996, Fig.4a,b.

Table Iver-11



Drwg/photo reference: Betancourt, 1977, Plate 67 [As Ohnesorg, 1993, Plate XXI.8 [By Korrés]].

Table Iver-12

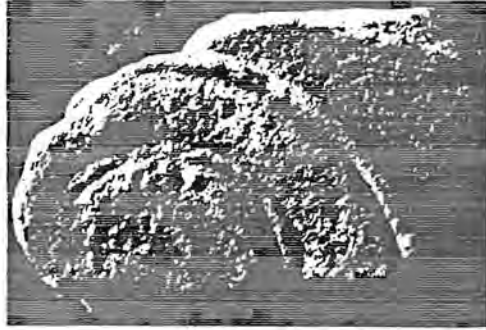


Fig. 4. - Chapiteau 3, Face.

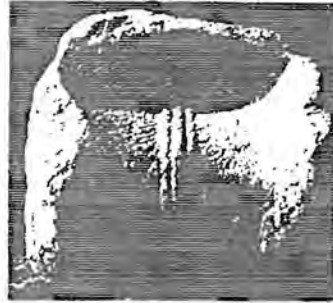
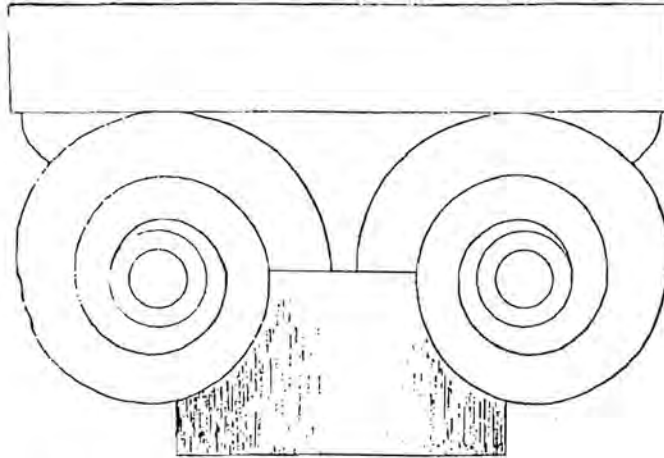


Fig. 5. - Chapiteau 3, Abacuse.

Drwg/photo reference: Martin, 1973, Fig.4-5.

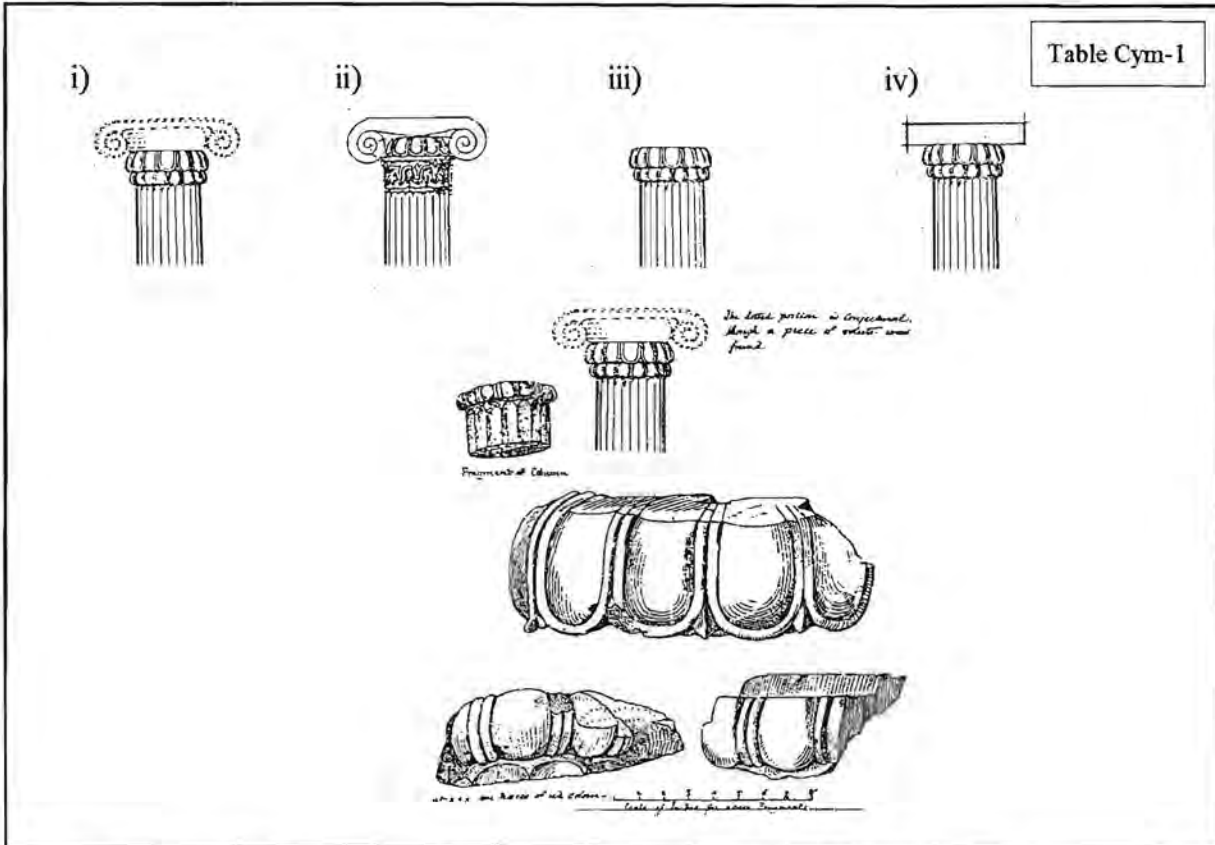
Table Iver-13



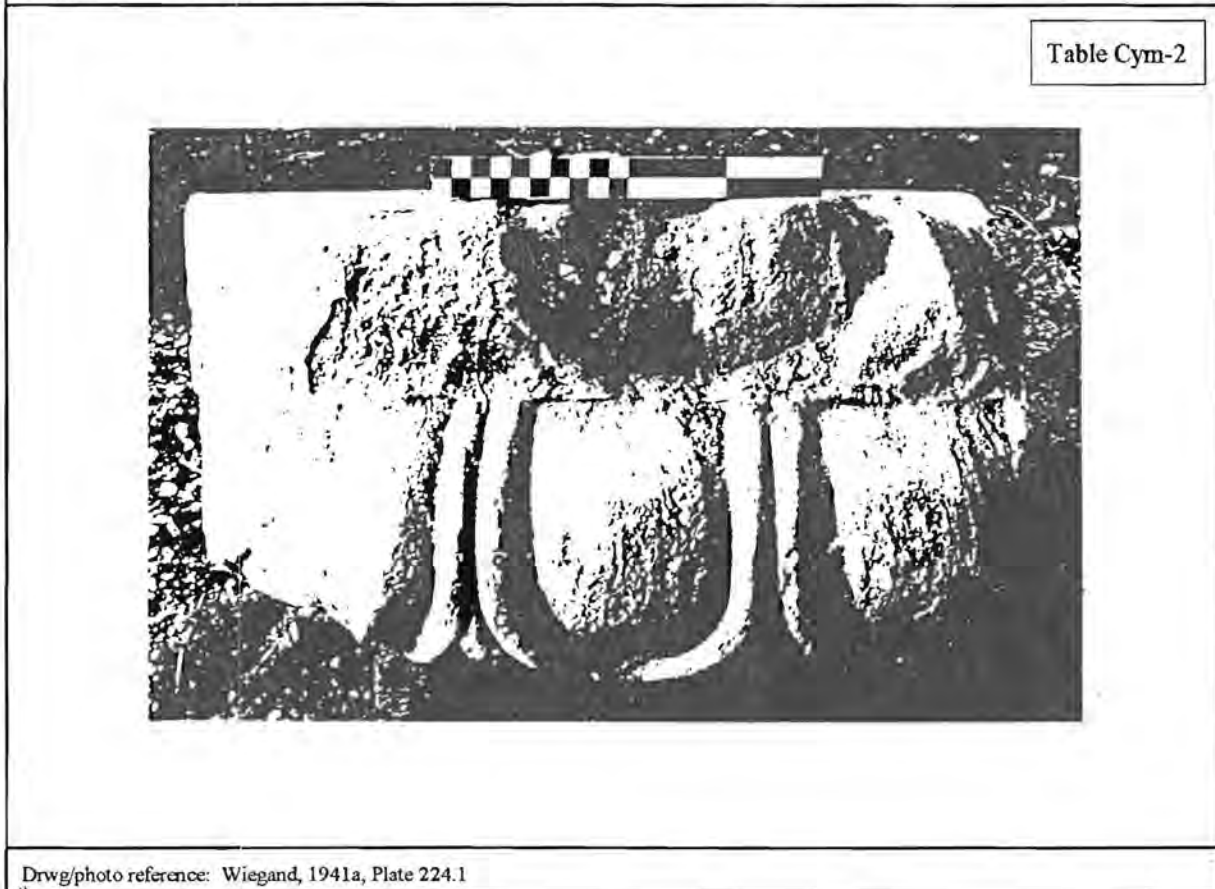
Drwg/photo reference: Raubitschek, 1938, Fig.22.



C Cyma capitals (Cym-)

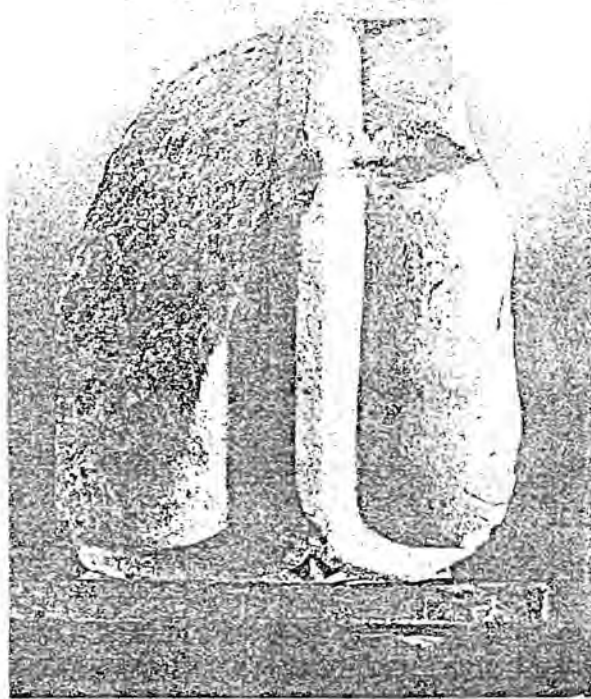


Drwg/photo reference: Top: Four reconstructions (See Cym-1); Bottom: Sections of Flinders-Petrie et al, 1886, Plate III.



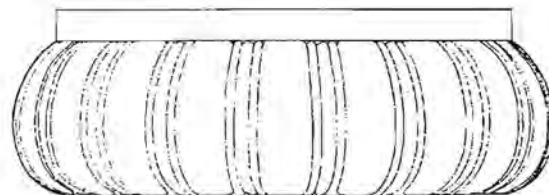
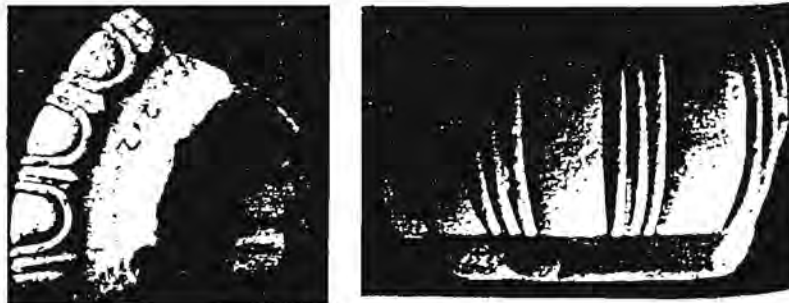
Drwg/photo reference: Wiegand, 1941a, Plate 224.1

Table Cym-3



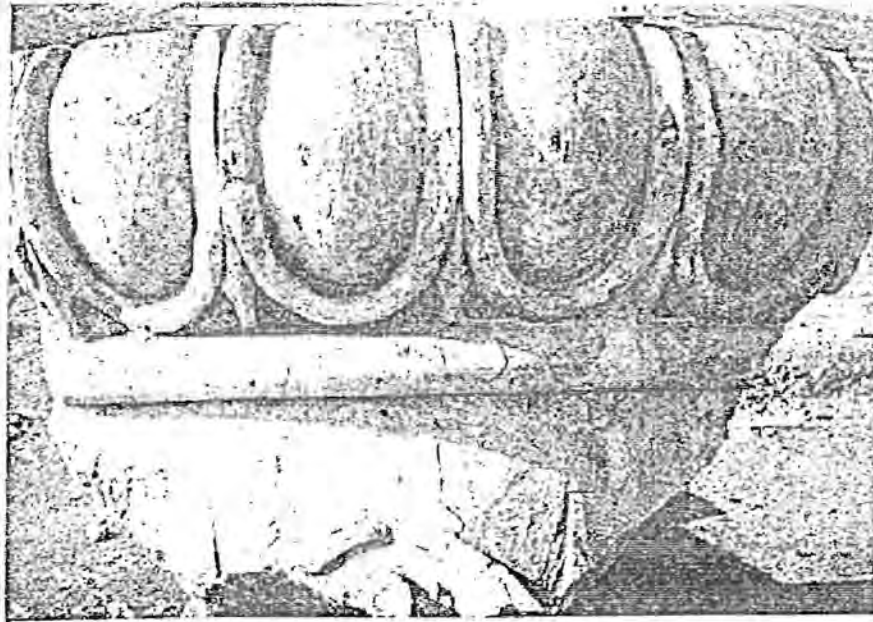
Drwg/photo reference: Wiegand, 1941a, Plate 220.

Table Cym-4



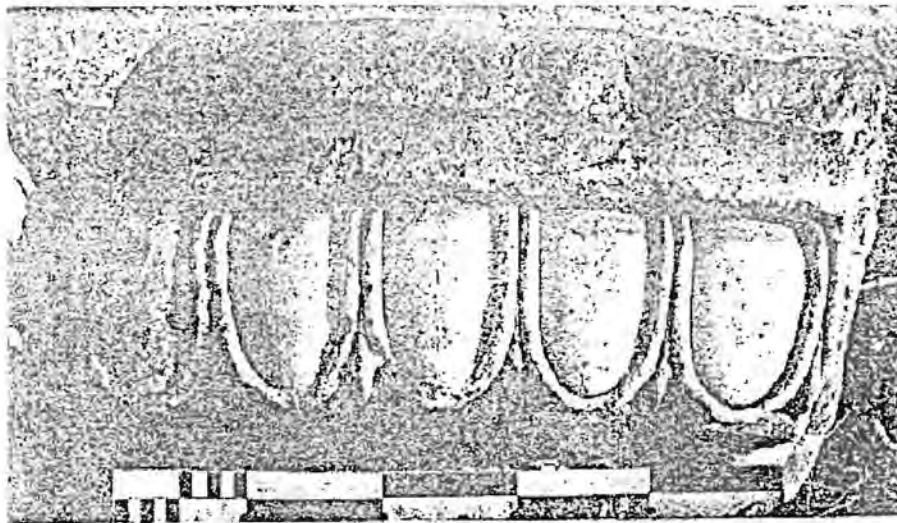
Drwg/photo reference: Martin, 1973, Fig.6-8.

Table Cym-5



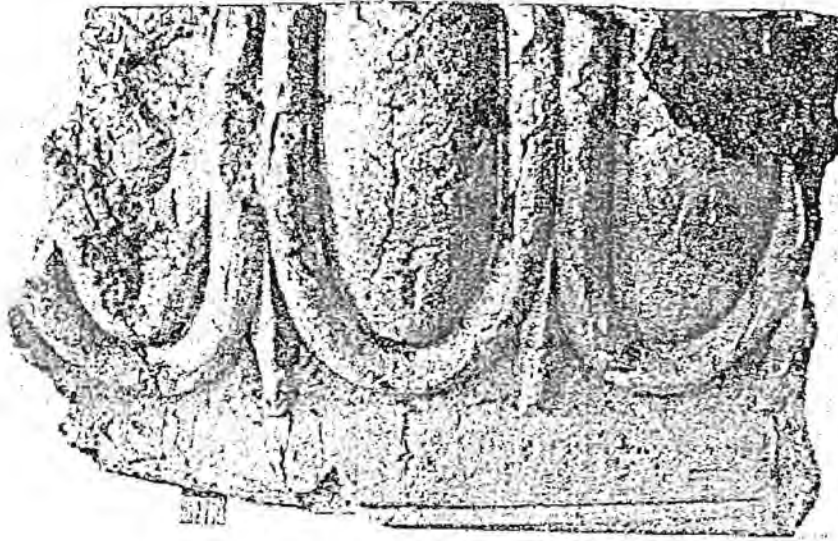
Drwg/photo reference: Buschor, 1957, Beil.11.2

Table Cym-6



Drwg/photo reference: Wiegand, 1941a, Plate 220.

Table Cym-7



Drwg/photo reference: Buschor, 1957, Beil.21.1.

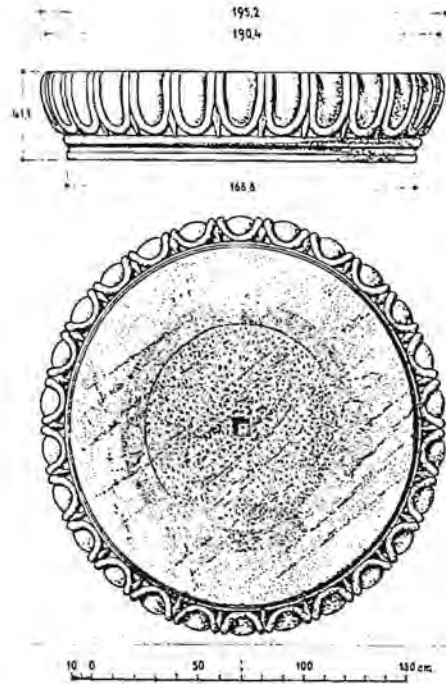
Table Cym-8



Drwg/photo reference: Akurgal, 1962, Plate 101.23.

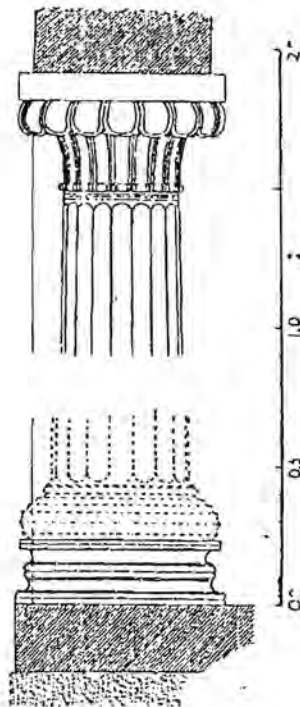


Table Cym-9



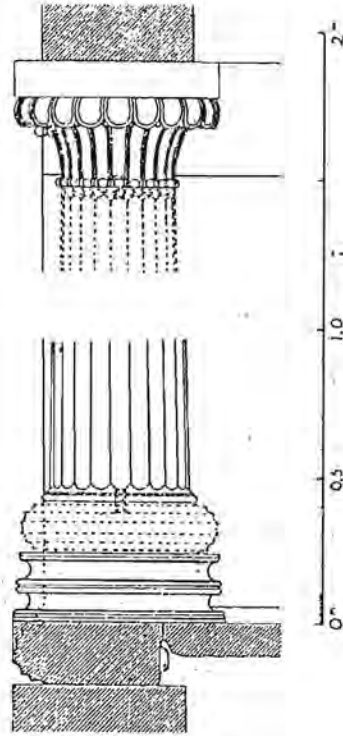
Drwg photo reference: Reuther, 1957, Drw.39.

Table Cym-10



Drwg/photo reference: Dinsmoor, 1913, Fig.3.

Table Cym-11



Drwg/photo reference: Dinstmoor, 1913, Fig.3.

Table Cym-12



Drwg/photo reference: Ohnesorg, 1993, Plate XX.1, 3.

Table Cym-13



Drwg/photo reference: De la Coste-Messeliere, 1957, Plate 55.

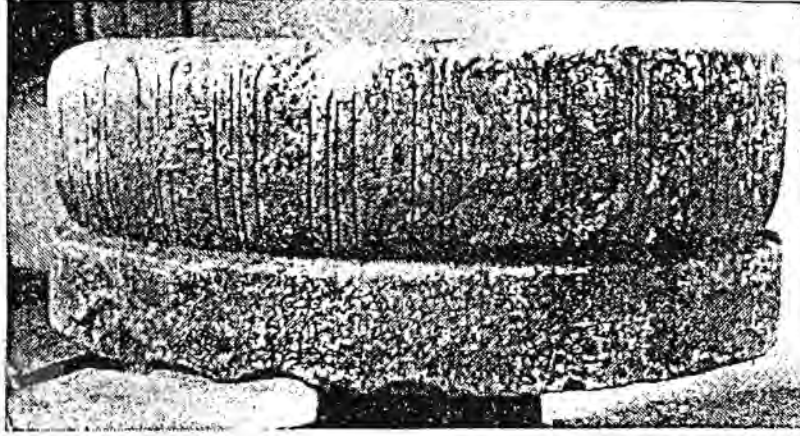
Table Cym-14



Drwg/photo reference: Ohnesorg, 1993, Plate XX.4-5.

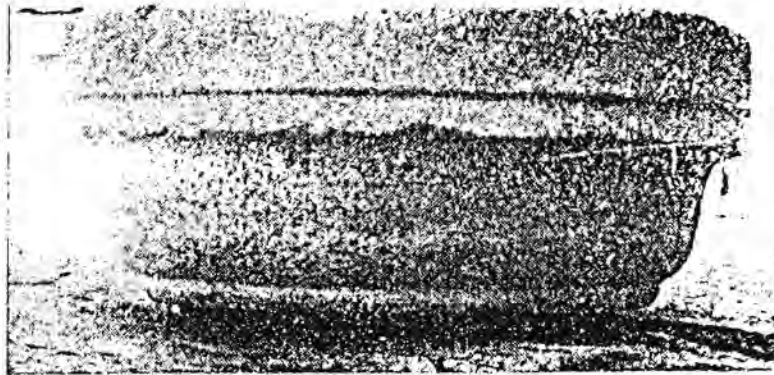


Table Cym-15



Drwg/photo reference: Ohnesorg, 1993, Plate XX.6.

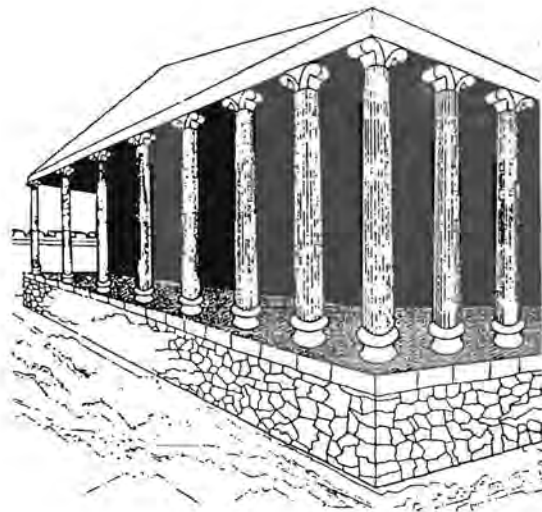
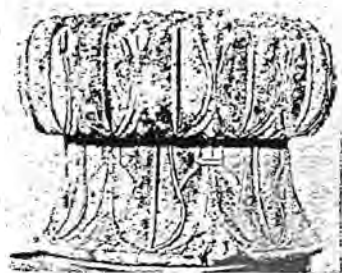
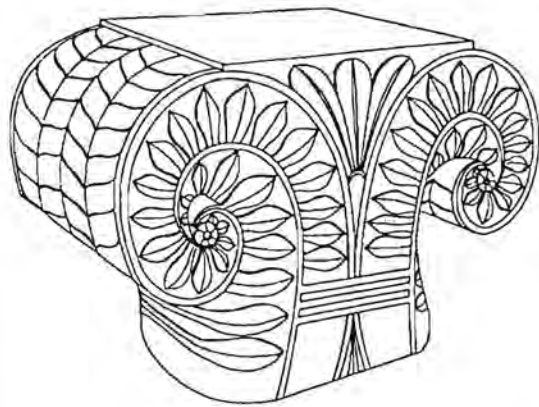
Table Cym-16



Drwg/photo reference: Ohnesorg, 1993, Plate XX.7.

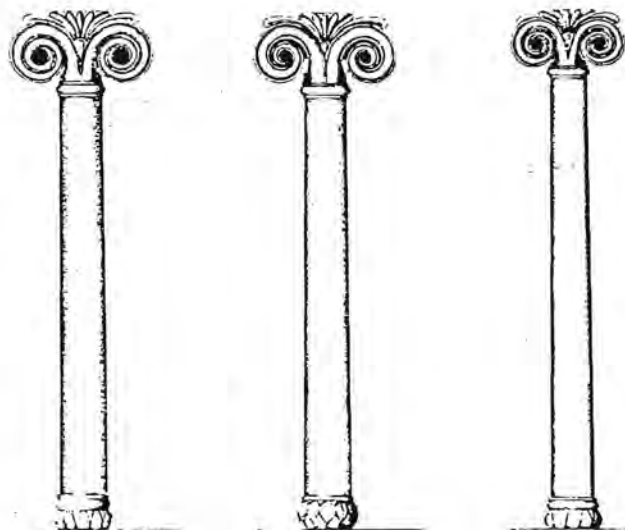
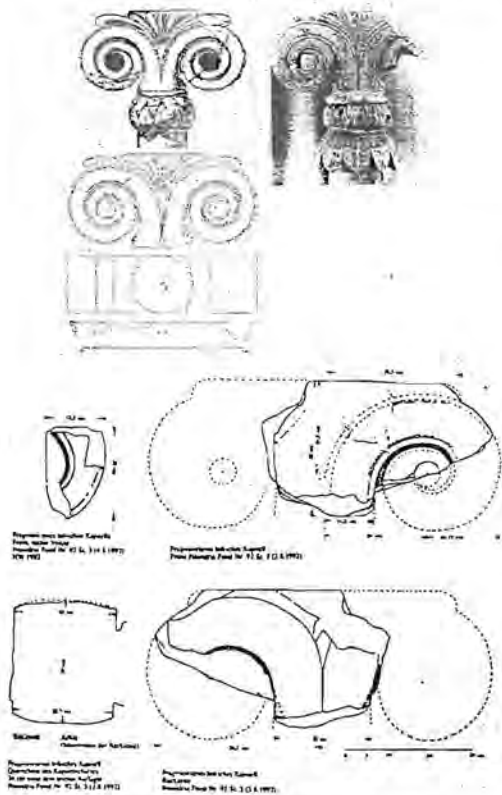
D Aeolic capitals (Aeol-)

Table Aeol-1



Drwg/photo reference: Top: Kuhn, 1986, Fig.3; Bottom: Betancourt, 1977, Plate 20; Right: Kuhn, 1986, Fig.10.

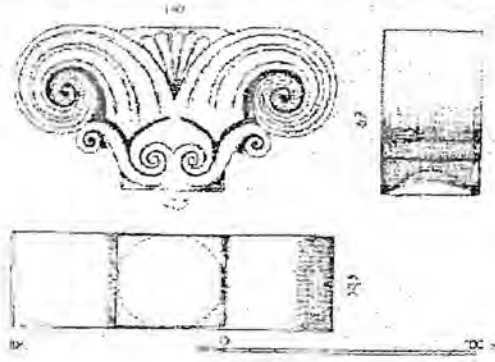
Table Aeol-2



Drwg/photo reference: Top: Betancourt, 1977, Fig.32 [manipulation of Koldewey's dwgs] and Plate 41; Clarke, 1886, Fig.2.
Bottom: Wiegartz, 1994, Beil. 13; Right: Wesenberg, 1971, Fig.164.

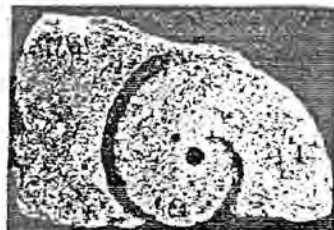
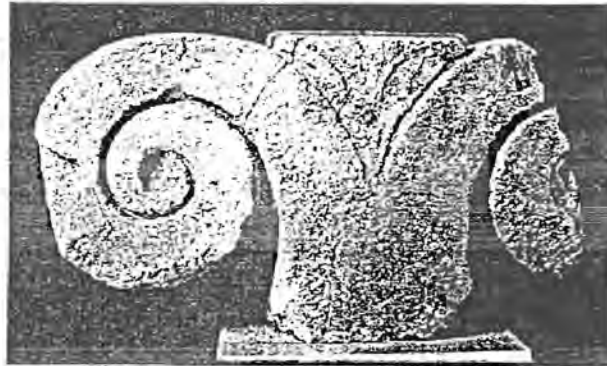


Table Aeol-3



Drwg/photo reference: Top: Boehlau & Schefold, 1940, Plate 40; Bottom: Betancourt, 1977, Plate 42.

Table Aeol-4



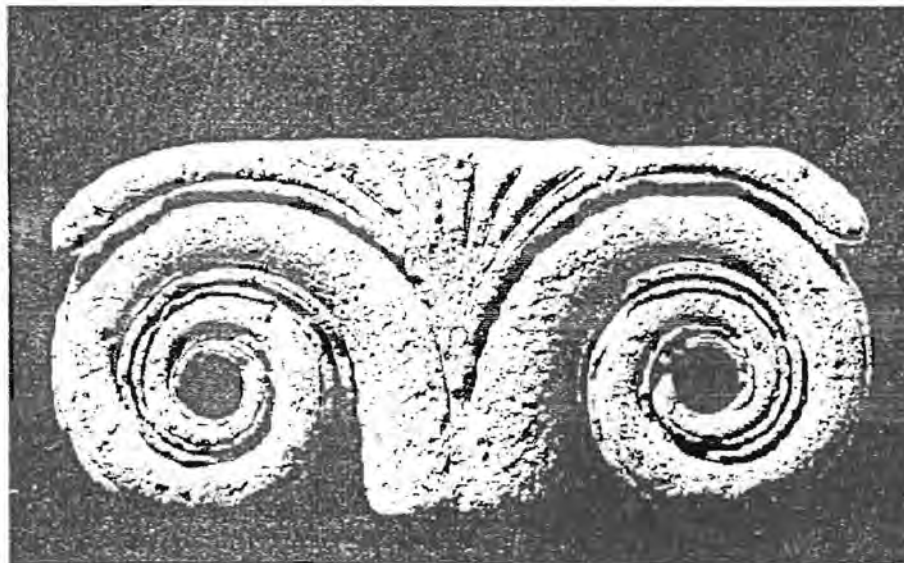
Drwg/photo reference:

Table Aeol-5



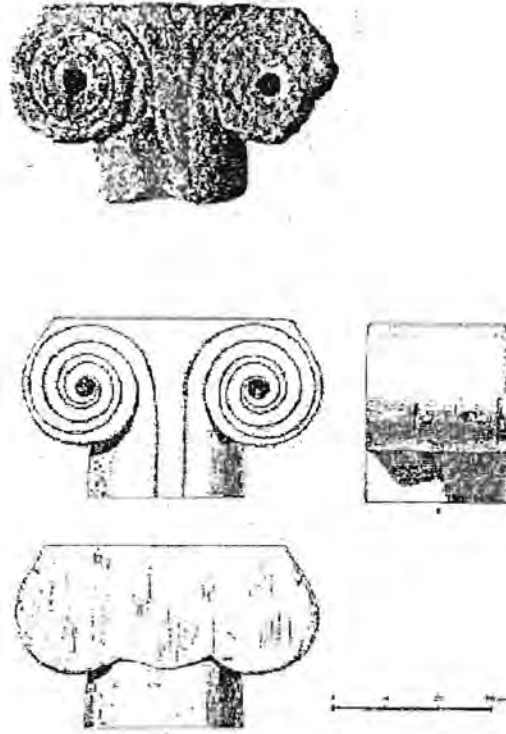
Drwg/photo reference: Top: Condis, 1950, Fig.3; Middle: Koldewey, 1890, Plate XVI.1-3; Bottom: Scully, 1964, Fig.5.

Table Aeol-6



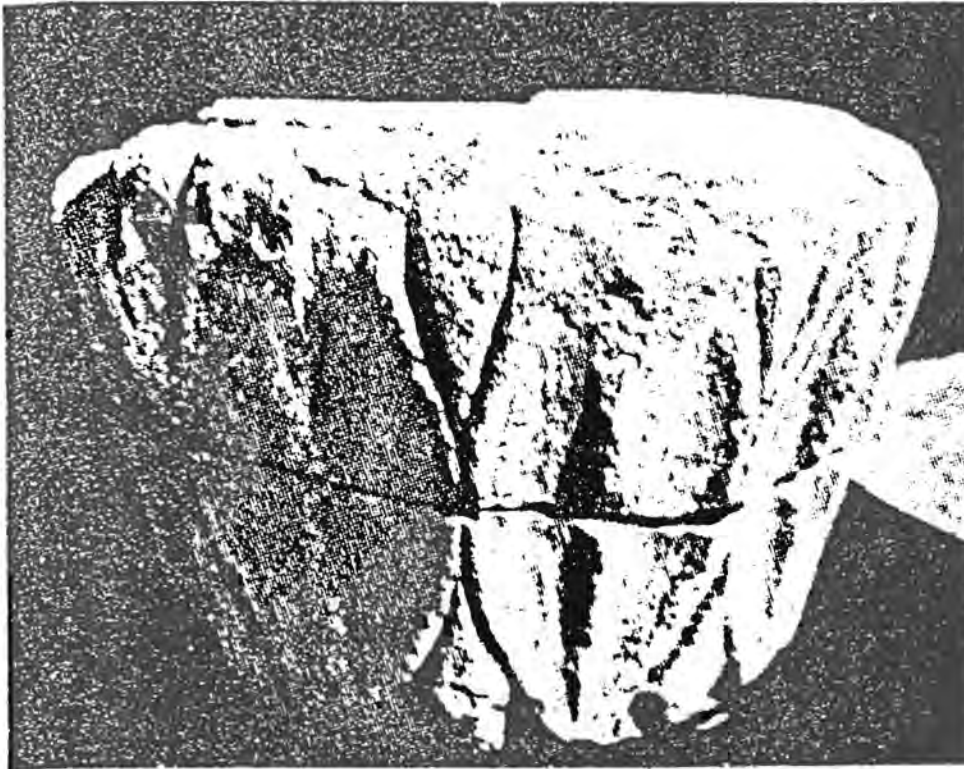
Drwg/photo reference:

Table Aeol-7



Drwg/photo reference: Condis, 1950, Fig 1 [photo] and 2 [drwg].

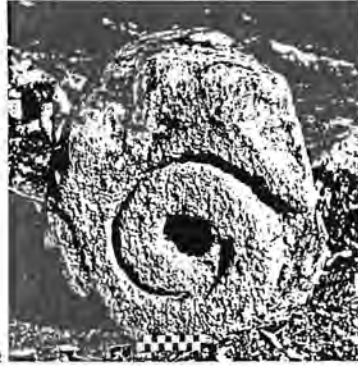
Table Aeol-8



Drwg/photo reference: Martin, 1958, Plate 26.3.



Table Aeol-9



Drwg/photo reference: Radt, 1991, Plate 56.1-3

Drwg/photo reference:



E Torus capitals (Tor-)

Table Tor-1

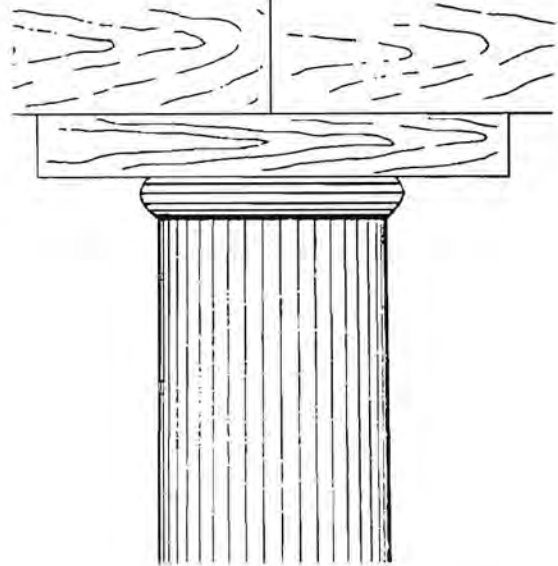
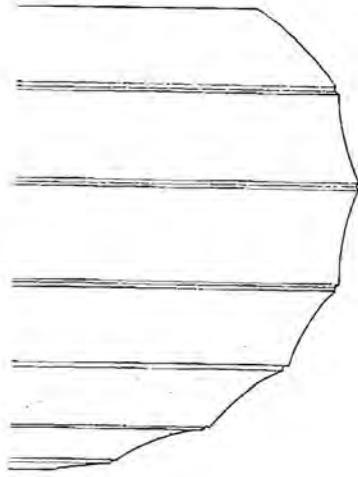
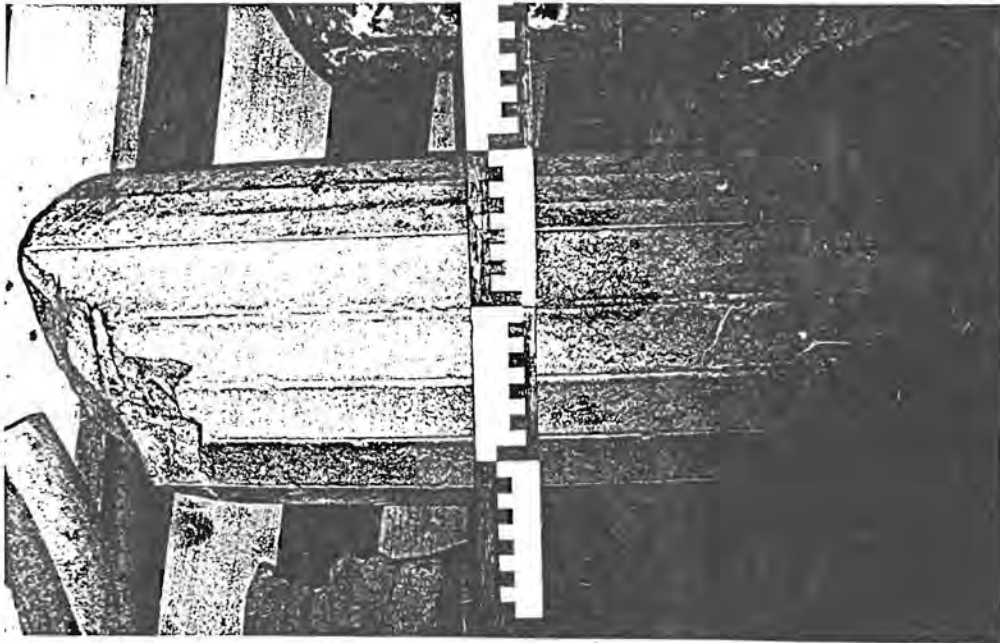
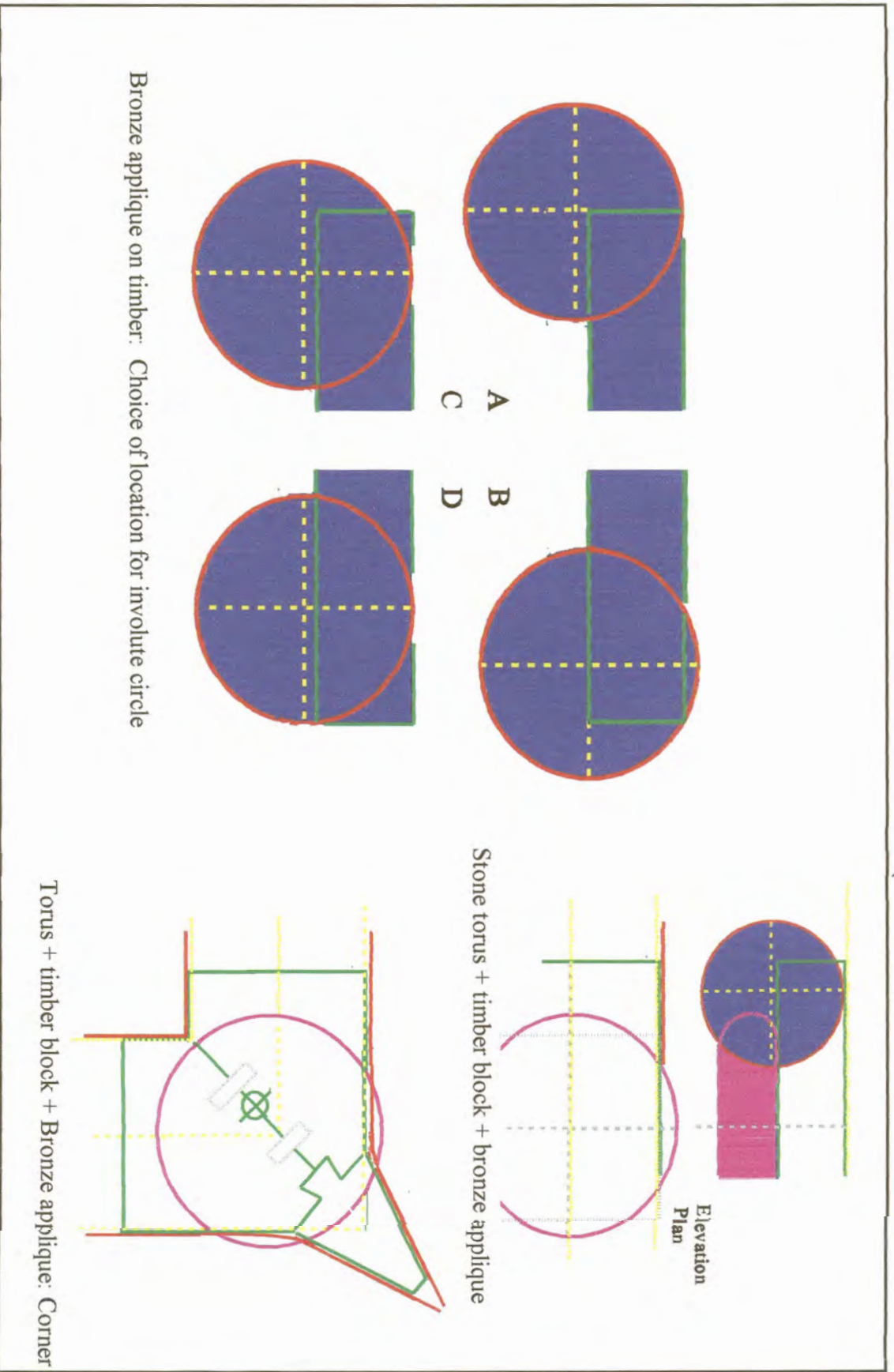


Abb. 5. Waagrecht kannellierter Torus
mit ionischem Profil (aus drei Fragmenten)





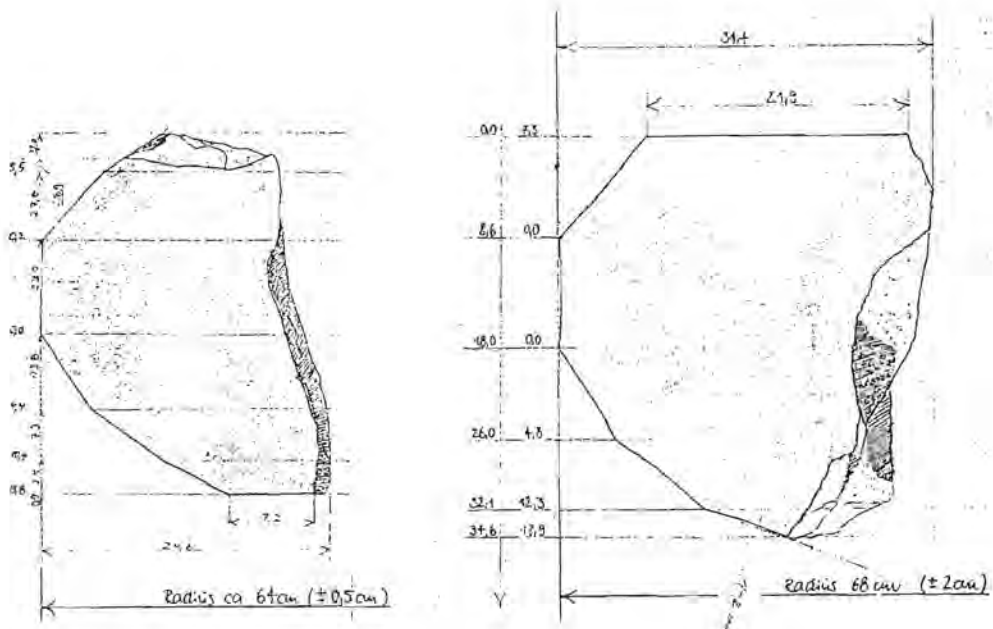
Bronze applique on timber. Choice of location for involute circle

Stone torus + timber block + bronze applique

Torus + timber block + Bronze applique: Corner

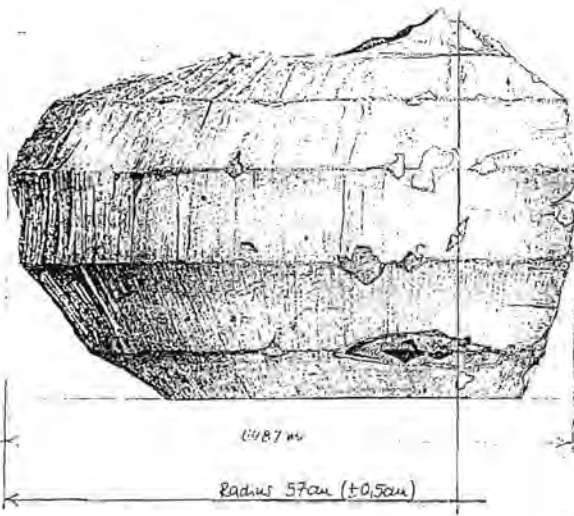
Exploration of a suggested timber, stone and bronze applique Ionic capital using capital Tor-1 of the 1st dipteral Heraion
(With reference to Kienast, 1999)

Table Tor-2



a

b



c

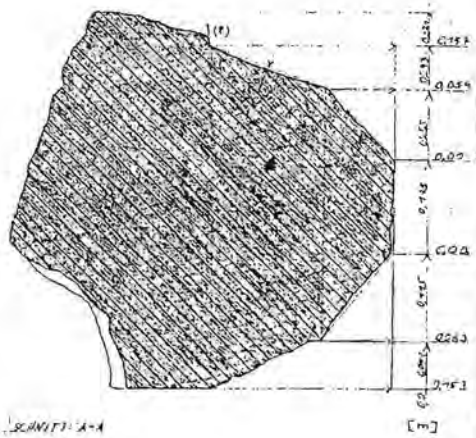
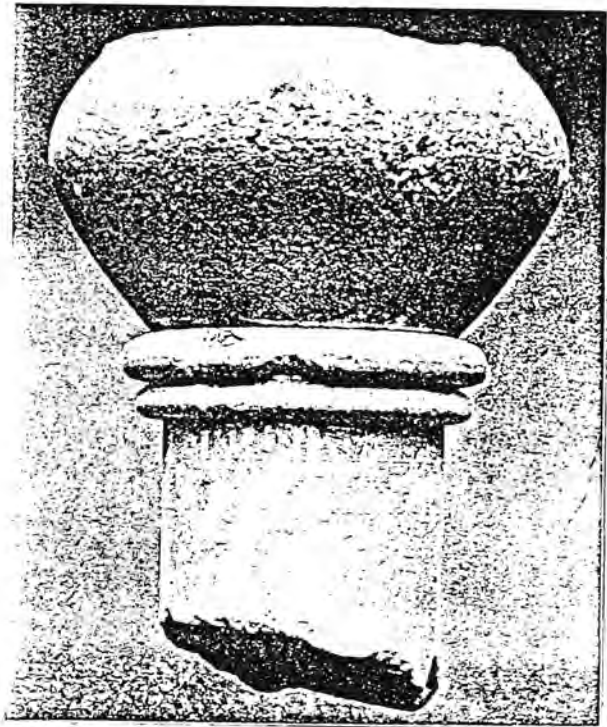


Abb. 5 Kannelierte Tori aus Kalkstein, wahrscheinlich Teile von Kapitellen. – a. Fragment A 670. – b. Fragment A 675. – c. Fragment A 158

DWG REFERENCE: Schneider, 1996, Fig.5.

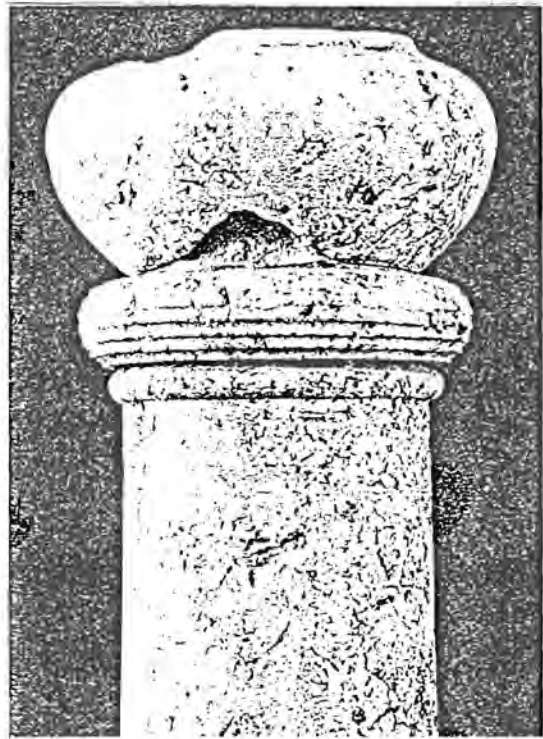


Table Tor-3



Drwg/photo reference: Buschor, 1930, Beil.XI.

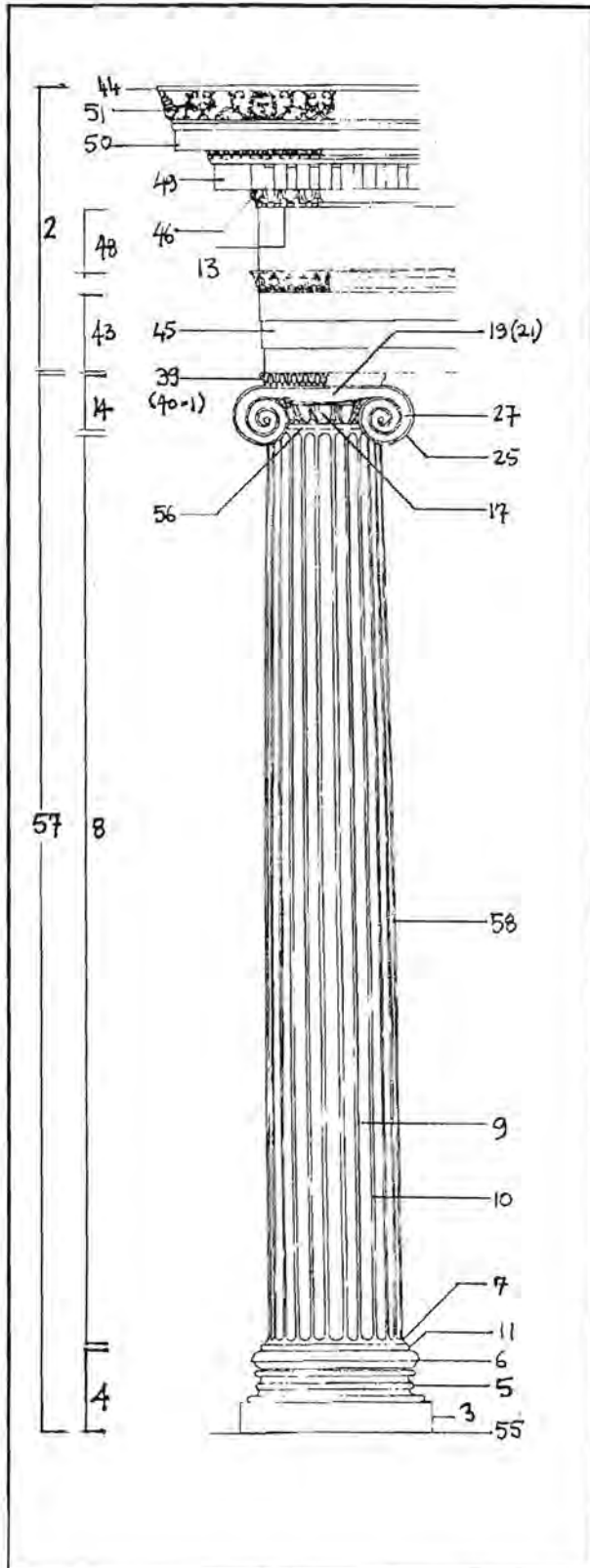
Table Tor-4



Drwg/photo reference: Buschor, 1930, Beil.XII.

F Visual lexicon of the Archaic Ionic Order and capital.

F - Visual lexicon of the Ionic order and capital



VISUAL TERMINOLOGY

(These items refer to Fig.D1-D7)

- 1 Pediment
- 2 Entablature
- 3 Plinth
- 4 Base
- 5 Spira (Cylindrical or Scotia+torus)
- 6 Torus
- 7 Apophyge
- 8 Column shaft
- 9 Fluting
- 10 Arris
- 11 Fillet
- 12 Bolster palmette
- 13 Astragal
- 14 Standard capital
- 15 Echinus
- 16 Ionian leaf cyma echinus
- 17 Ionian ovolo echinus
- 18 Domed echinus
- 19 Canalis
- 20 Canalis channel
- 21 Cord shaped canalis
- 22 Straight canalis
- 23 Offset- or angular (*Knick*) canalis
- 24 Bow shaped (Upturned cord) canalis
- 25 Volute
- 26 Inclined volute
- 27 Volute channel/spiral
- 28 Volute channel/spiral bead
- 29 Volute eye
- 30 Volute origin
- 31 Volute ordering device
- 32 Volute spandrel palmette
- 33 Bolster
- 34 Bolster fluting
- 35 Bolster bead
- 36 Rectangular additions to capital top bearing
- 37 Capital bearing offset
- 38 Capital top bearing surface
- 39 Abacus
- 40 Abacus cyma
- 41 Outward curving abacus
- 42 Rectangular abacus
- 43 Epistyle
- 44 Listel
- 45 Fascia
- 46 Egg-and-dart moulding
- 47 Leaf cyma moulding
- 48 Frieze
- 49 Dentil moulding
- 50 Cornice
- 51 Sima (*Cyma recta*)
- 52 Column taper
- 53 Diagonal volute
- 54 Corner capital
- 55 Stylobate
- 56 Column bearing/ capital bottom bearing
- 57 Column
- 58 Entasis

Figure 1 Interpretation of the Classical Ionic Order as in the Athenaion at Priene (Kotratschek, 1948, p.4). The correct version of this building's Order is shown in Akurgal (1985, Fig.69).

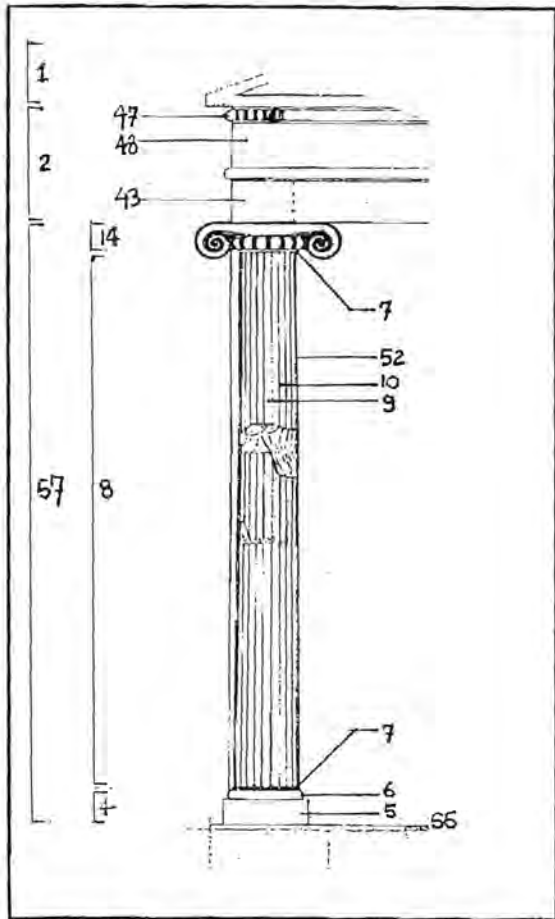


Figure 2 Archaic Ionic Order as in the Demeter temple IV at Iria, Naxos (Gruben et al, 1987, Fig.39).

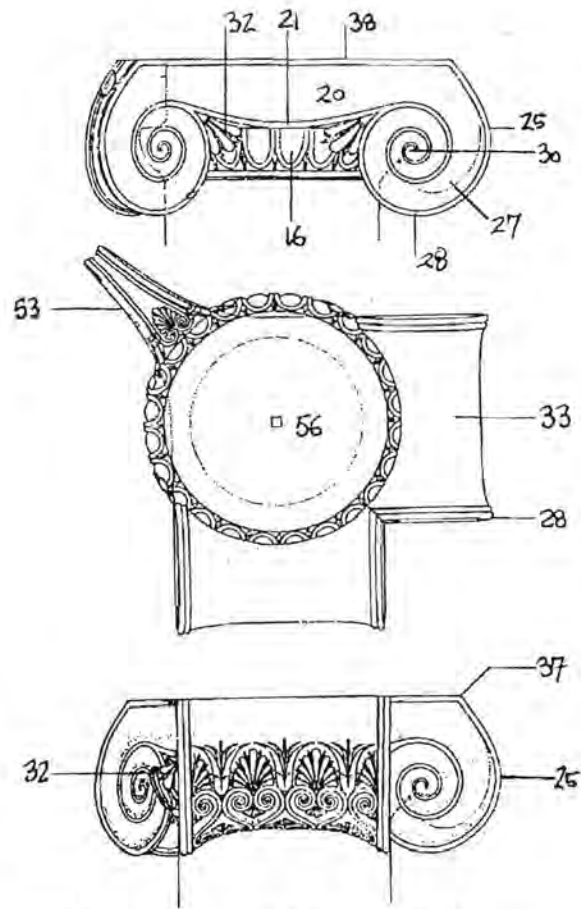


Figure 3 Ionic corner capital, Heraion IV, Samos (Gruben, 1960, Fig.46; [bottom drawing is author's addition]).

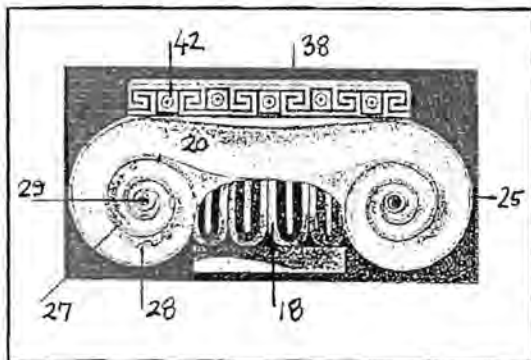


Figure 4 Ionic capital from the Acropolis, Athens (Von Luschan, 1912, Fig.3).

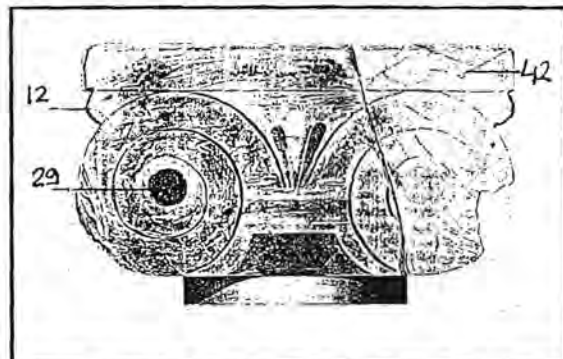


Figure 5 Aeolicising capital from the Acropolis, Athens (Borrmann, 1887, Plate 18.3).

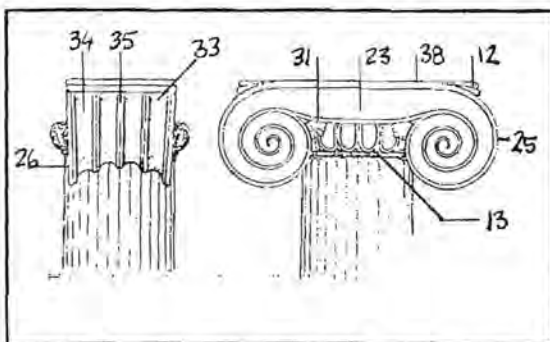


Figure 6 Ionic standard capital from the Archaic Didymeion (Gruben, 1963, Fig.19).

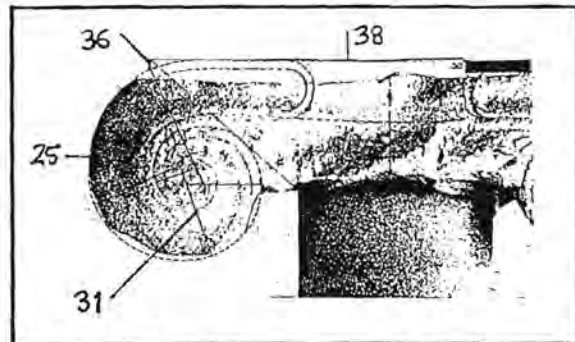


Figure 7 Ionic capital with separated canalis, Paros (Item 775, Paros Museum. Author's photograph)