MITTEILUNGEN

COLLECTING DATABASES ABOUT AEGEAN SUBJECTS ON-LINE (DBAS PROJECT)*

1. The research project

Interdisciplinary approaches are particularly suited for the research on ancient civilizations where there is a continuous need of correlation among archaeological, linguistic, philological and historical sources of information. With the help of the tools of the modern science of informatics it appears that this kind of approach may now be greatly facilitated.

The purpose of the present project, denoted as DBAS (as an acronym for Data Bases about Aegean Subjects), is to establish on a firm basis a method for interdisciplinary research on various aspects of the Aegean civilisation. The starting point of the project is obviously to create an extensive collection of data from several different sources including purely archaeological or context data as well as iconographical or strictly philological documents. The collection will be made available on-line to the community of interested researchers in the field. A clear definition of the methodology and aim of the data collection and presentation is important.

A straight collection of data, with an analytical detailed description, is quite useful by itself as a means to make many different items available at a single site. The present project, however, is designed to go beyond such a minimal level. To this purpose all the data collected in the data bases have been the object of a preliminary scientific analysis and up to date discussion, taking also the more advanced literature results into account. The outcome of this underlying research will be the data presentation in a format that makes the search for correlations simpler, multipurpose, extensive and fully unbiased. Selected available bibliographies will make the research

* We wish to thank Prof. I. Pini and Proff. J.-P. Olivier and L. Godart for their kind permission to digitize some of the drawings and photos published in CMS and CHIC. This paper is the result of a joint work of the DBAS team: the introduction is by Prof. A. M. Jasink; the second section by Dr. L. Bombardieri; the third one by Dr. F. Gonzato; and the last one on technical devices by Drs. M. Baldi and F. Carminati.
The choice of submitting the Cretan Hieroglyphic Corpus to a data base process is due to A. M. Jasink, scientific director of the DBAS project, who first recognized the utility of a statistic analysis of this class of seals in a series of preliminary studies on general and specific Cretan Hieroglyphic topics. See Jasink 2002, Jasink 2005, Jasink 2006.

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background of the data bases transparent. Some technical details of the data bases are outlined in section 4.

The overall architecture of the web site where the project is hosted is illustrated in Figure 1, showing the merging in a joint system of a number of general features including:

– linking of different data/sets:
  archaeological, iconographical, philological data and other records on selected topics will come together in dedicated data bases;
– linking of different data bases:
  data bases on close or related matters will be combined to allow for search of chronological, geographical or thematic correlations. To further enlarge the perspective, the data bases will be connected to additional resources available at the site, like downloadable fonts, selected thematic bibliographies, photo galleries, etc.;
– linking to different web-sites:
  the DBAS structure will ensure, with appropriate tools, the connection to other web-sites offering different materials related to the main research themes developed in this project. This is a particularly relevant feature making DBAS an open structure not only to enlarge its records but mainly to involve other scholars and to improve the scientific quality of the available data.

As far as the contents to be included in this structural frame are concerned, the research approach complies with some basic criteria. In the first instance, some of the topics considered in the project are documented by such an enormous amount of materials and data that a full repertoire could not be worked out in a reasonably short time. In all these circumstances the choice has been to restrict the data bases to a more limited, self-consistent, ensemble. This has been the case for the data base on the Cretan Hieroglyphic seals, as it will be discussed in the following. With this approach the web site can be made available in short times and is indeed already active in its starting configuration in *http://dbas.sciant.unifi.it*. This is not an actual limitation; rather, the project is conceived as modular and will be developing continuously with new acquisitions either from the research group working on the project or from outside sources, as already mentioned above.

A characteristic feature of the project will be the inclusion, at the same level, of archaeological and philological data, with the purpose of favouring interdisciplinary researches. From a geographical point of view, the proposed data bases will cover different areas of the Aegean basin, going from Crete ("Cretan Hieroglyphic seals", "Textile work areas in Bronze Age Crete", "Knossos shepherds"), to mainland Greece ("Pylos shepherds", "Mycenaean *Insignia Dignitatis*"), to Western Anatolia ("The question of Ahhiyawa", "The Aegean presence in Western Anatolia"), to Cyprus ("Cypriot and Aegean Collections in the National Archaeological Museum in Florence") and to more articulated issues ("Mycenaean and Homeric World"). Some of the data bases considered are intimately concerned with the interactions

in the Aegean area. In addition, different data bases will possibly be linked with each other exactly with the purpose of sorting out new elements on the economic, religious and cultural connections.

To better illustrate the structure and the aims of the project, the data bases on Cretan Hieroglyphic seals and on the Mycenaean *Insignia Dignitatis* are described in sections 2 and 3, respectively.

2. The data base on Cretan Hieroglyphic seals

This is the first data base of the DBAS joint system. Therefore, particular attention has been devoted to define the way of collecting and combining data from different sources in a proper linking frame. Analysing the feasibility of a data base application for a peculiar study of the Aegean Glyptic it was necessary to deal with the large amount of information on the Glyptic and with the possibility of increasing the internal links among the various elements.

As to the first point we felt it necessary to limit the survey to a reduced *Corpus* of seals, since the starting motivation was not the creation of a complete repertoire of the Aegean Glyptic, a lengthy albeit useful task in many respects (Crowley and Adams 1990; Crowley 2003). We found of major interest to include in our analysis the Cretan Hieroglyphic Glyptic of the Middle Minoan period. This *Corpus*, even if limited in geographic diffusion and chronological distribution, raises some interesting questions which involve the relation between iconographical and script elements. Moreover the peculiar, technical as well as iconographical or epigraphic, aspects of this glyptic production were in the last years deeply analysed by some specific studies (Olivier 1981, Olivier 1990, Olivier 1995, Younger 1990), till the complete analysis and full publication of the *Corpus Hieroglyphicarum Inscriptionum Cretae*, namely the CHIC (Olivier and Godart 1996).

Our purpose has been to link the two kinds of records, iconographical and epigraphic, with each other, in order to answer the following questions about the supposable connections of identified Hieroglyphic signs with other iconographic elements:

– are some (or many) of the iconographic elements in a specific relation with a series of the script signs groups?
– is there any recurrence or any repeated association that can suggest this kind of hypothesis?

These kinds of problems can be more easily clarified with the help of a data base, which can clearly sort out the different associations of the elements on the seal and then, processing the data, produce a quantitative and qualitative analysis of the recurrences, founded on statistical grounds.

Guided by these introductory requirements we first built a sketch and then worked out the main frame of the data base, identifying in the filing of the seals three main levels extending from the general to the particular and comprising:

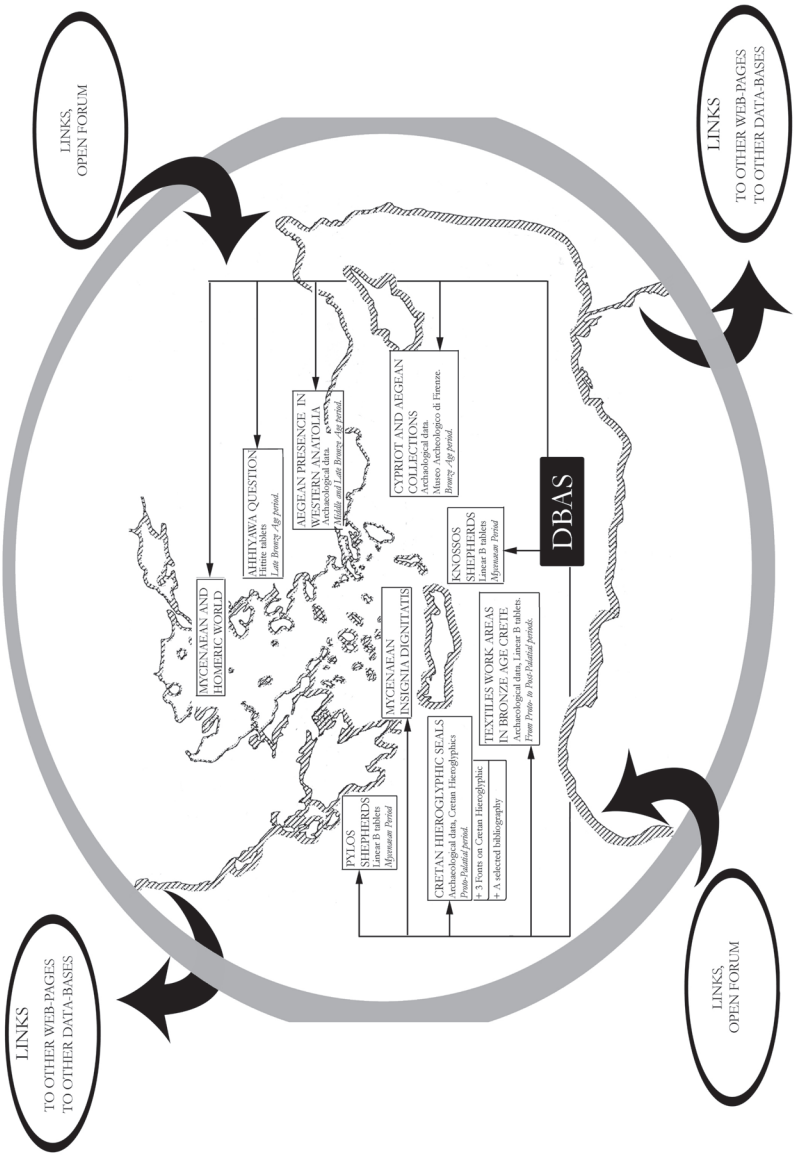

Fig. 1. A Scheme of DBAS Project

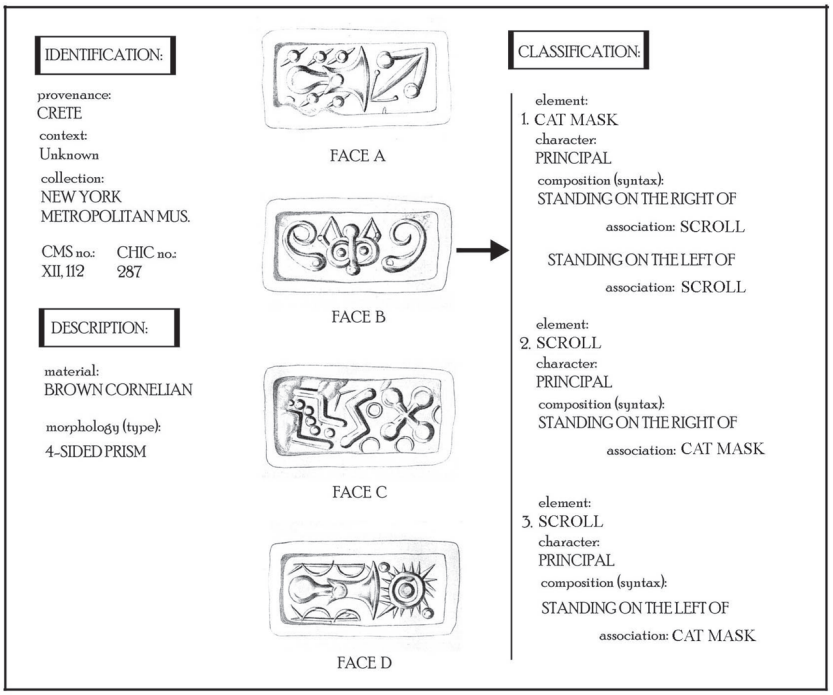

Fig. 2. A Sample from the Cretan Hieroglyphic Glyptic Data Base

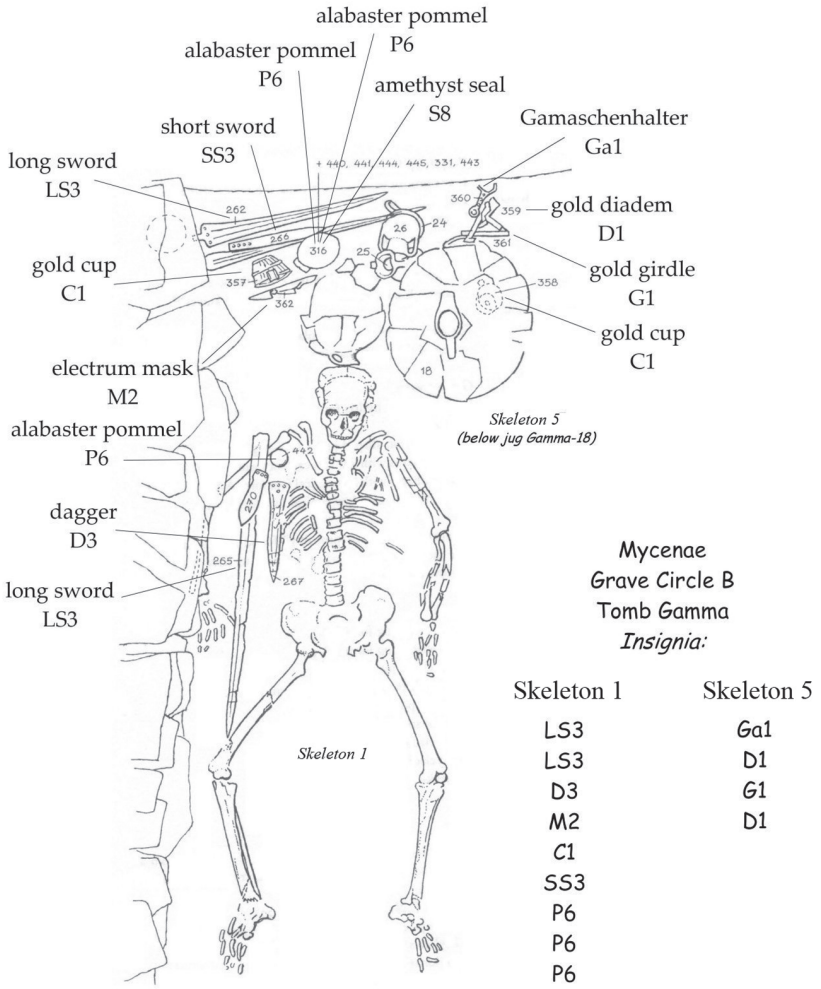

Fig. 3. Illustrative study of a funeral context from Mycenae, Grave Circle B, tomb Gamma, north-west sector (Dietz 1991: 108): every insignium gets a code, through which the data base operates

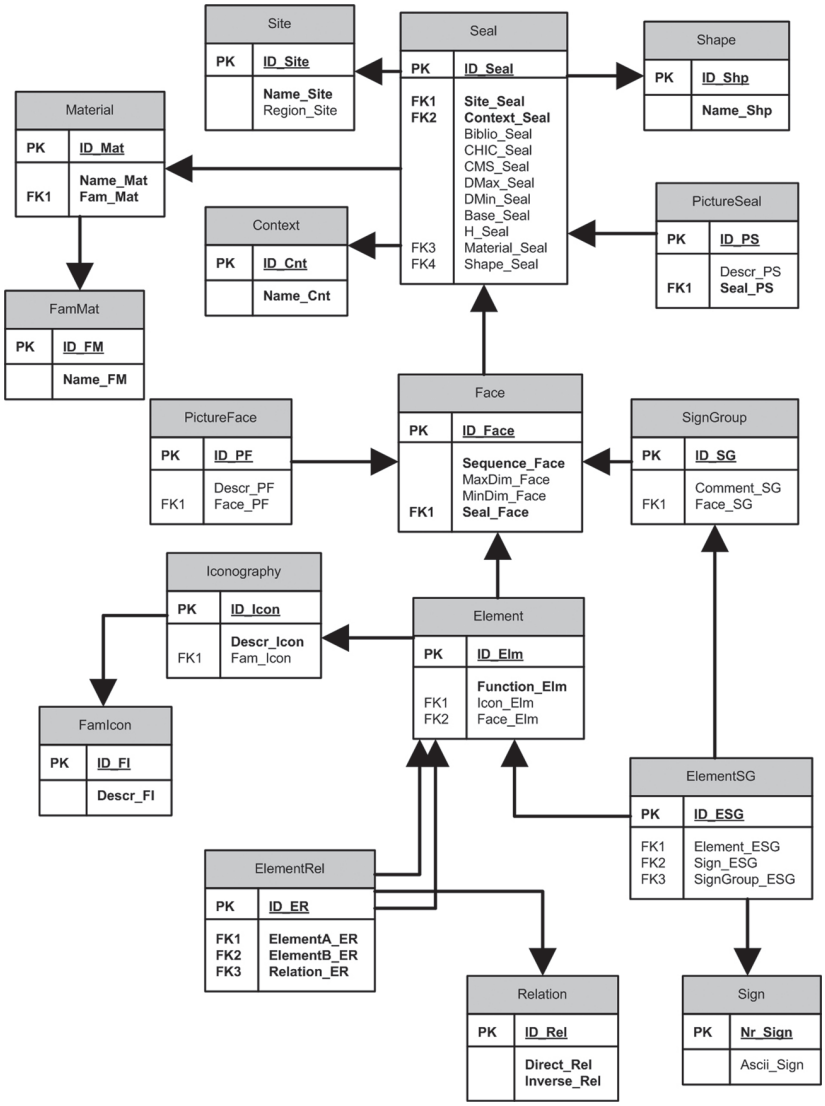

Fig. 4. The Basic Frame of the Cretan Hieroglyphic Glyptic Data Base

– Identification
– Description
– Classification

The identification level deals with the basic reference of the seal and defines the provenance (site, area, or, when these are not known, just the plain provenance), the context of finding (funerary, palatial or domestic context and, if available, storage rooms or workshops context), the collection (museums or private collections) and the identification number in both CMS and CHIC.

The second level is the description of the general aspect or the so-called factual elements of the whole seal, which means the dimensions, the material and the shape. As to the dimensions, the sufficient input is simply the linear measurement of seal found in the CMS or CHIC repertoires. As to the materials and shapes, two specific and closed lists were worked out checking and selecting the definitions given in the different repertoires. As is known, many different material specifications or even more morphological definitions, in some cases not easily distinguishable from each other, are widely employed, as a result of the practice of introducing always new definitions for the same item. Moreover, the different languages used in the different studies and even in the CMS volumes themselves can lead to a further overproduction of terms.

For the list of the materials 22 types were sorted out (*steatite, calcite, haematite, obsidian, chalcedony, agate, cornelian, jasper, amethyst, rock crystal, marble, calcareous stone, basalt, lavic stones, sardonyx, quartz, serpentine, bone, ivory, bronze, silver, gold*), organized in 4 main families (*soft stones, hard stones, bones and ivory, metals*).

For the typological list of the seal shapes we distinguished 27 types mostly adopting definitions based on elementary morphological features (and so related to geometric solids) and otherwise maintaining the most used and common definitions (*3-sided prism, 4-sided prism, 8-sided prism, 4-sided bar, cylinder, cube, hemicylinder, hemispheroid, amygdaloid, elliptical, bordered disc, bordered discoid, discoid, lentoid, petschafts, bell-shape, signets, foliate backs, cushion, conoid, gables wedge, zoomorphic shape, scarab, pitcher, cross shape, pyramid*).

The third level of filing the seals is the classification, which represents the deepest and more complex analysis, based on the screening of the figurative field and the study of its different elements. The classification system was articulated into four sublevels:

– Element (definition of the elements)
– Character (definition of the character of the elements)
– Composition (composition of the elements or syntax)
– Association (combination with other elements)

The first sublevel allows for the identification of every single element which is classified by using a definition system based on a sorted list (implemented from an accurate check of all the definitions in the CMS and the comparable

terms suggested by Yule 1980, by Younger 1993 and by Olivier and Godart 1996). The purpose of this general and preliminary survey was to avoid any sort of overlap among the given definitions and, at the same time, to lead to the simplest and highly self-evident definition. Complex or generally too detailed definitions (implying an over-interpretation of the element) were avoided and wide definitions were used to include elements otherwise not easily distinguishable. The procedure led to 8 families (*animals, flora, geometric patterns, human figures, tools, vessels, artefacts, scripts*) sorted out from more than 100 elements. We decided to keep the CHIC numeration for the just identified Hieroglyphic signs and they were inserted in the data base following the ID number of Olivier and Godart (1996). This can help any further search and make new associations among Hieroglyphic and Iconographic elements more clear.

The second sublevel deals with the character of the element. It specifies the role and therefore the nature of the element in the scene, and can be primary (in the case of a *main motif*) or secondary (in the different case of a *filling motif*).

The sublevel of the composition allows for the definition of the reciprocal relations among the elements in the scene. Also in this case the first aim was to clarify the composition in the most objective way, avoiding both general definitions (such as *a spiral in the field*, which doesn't outline any sort of relation with the other elements and is consequently of little help) and very detailed ones (which are instead based on a subjective interpretation of the whole scene, and are not useful as well). Thus we decided to select a reduced series of relations which can be reciprocal or even reversible and correspond to a clear spatial identification. These are the common space relations (such as *standing*, if we have just one element, *standing above* and the opposite *standing below*, *standing right to* and *standing left to*, *standing back*, *standing around*, *standing right up to*, *right down to*, *left up* or *left down to*).

Association is the fourth sublevel adopted in our classification and is planned for the identification of the associated elements, checking again the given list of the elements.

If every face of the seal is described following this sequence of classification (Figure 2), we can finally obtain a statistic analysis of the relations among the elements (Hieroglyphic and Iconographic) considering not just a single face scene, but more widely taking into account all the faces over all the Hieroglyphic seals.

We entered in some details of the structure of this data base to emphasize that the data base is actually the outcome of a thorough scientific analysis of the seals of the selected Corpus to disentangle and submit to the classification all the useful elements for the successive statistical analysis.

3. The data base on Mycenaean *Insignia Dignitatis*

A section of DBAS is dedicated to a data base on the attributes of power in the Mycenaean world and will include all the *insignia dignitatis* of that society, supplemented with a specific bibliography about this topic and, more in general, the archaeology of power. The section is partly based on previous work carried out at the University of Florence (Gonzato 2004) and should represent a valid support for the study of the material symbols and for the comprehension of the processes exploited by the élite to impose an ideology and preserve the leadership (De Marrais et al. 1996).

This data base includes three sections. The first is concerned with a catalogue *raisonné* of the attributes of power in the Mycenaean Age, found in burials from mainland Greece. The items of the inventory have been selected through specific researches based on studies of social archaeology, ethnography and semiology (Leach 1976; Appadurai 1986; Bourdieu 1991; Wason 1994; Bourdieu 2002; Kohl 2003).

After an initial selection of the data, our purpose was to set up a quite representative and easy to consult repertoire including the relevant interpretations useful to compare evidences from different places. The first step was, therefore, to determine the criteria for the definition of an attribute of power. To this purpose, we have elaborated a peculiar classification, based on three main points (Gonzato 2006):

– *Type*: attributes of power normally have specific forms (crown, sceptre, sword …). The first important step to understand the underlying ideology is to ascertain the process leading exactly to these characteristics. In some prehistoric societies the use of similar (if not the same) attributes of power has been noticed. Therefore, comparisons between different cultural contexts and communities, which probably used the same symbolic language in the elitarian contacts (Earle 1997: 198) can be established. Diadems, sceptres, funerary masks, ceremonial swords and daggers, axes, elms, cuirasses and breastplates, seals, and, as for funerary rites, *stelai* and horses' burials, are some of the privileged items used to transmit social messages.
– *Material*: the physical and chemical nature of the material, together with an esthetic, therapeutic or religious value, contribute to make an item an *insignium*.
– *Cultural biography*: it is important to know how commodities acquire an extra value through successive changes (gift exchanges, long distance trades …).

The attributes of power included in the data base have been distinguished according to class, chronology and location. Every single finding is accompanied by all the necessary information (chronology, context, size, material, description, photo and the relevant bibliography) for a correct reading.

The search through the data base allows for the combination of more parameters selected from a given list (Figure 3). In this way it is possible

to find out the appropriate recurrences for specific purposes. It is also possible to inquire on the combination of different *insignia* inside the burial context, so as to find out the relation among the attributes of power and to understand if the deposition of such items was incidental or, rather, in a steady association. This approach to social archaeology is in keeping with the method suggested by Imma Kilian-Dirlmeier (1986), who studied some male burials of the grave circles in Mycenae and identified specific association of *insignia*, probably relevant to different social ranks, and can open the way to further progresses of our understanding of the socio-political organization of the Mycenaean world.

The second section of the data base collects the evidences of Linear B about the classes of *insignia*. Through the analysis of the written sources it is possible on the one side to compare the archaeological results with findings in the Mycenaean archives and on the other side to give evidence for the presence of attributes of power, otherwise scarcely proved by the archaeological survey. This is the case of the cuirass (Åström 1977, 36; Wilkie 1987; Hewitt 1993: 66), which is largely documented by the Linear B tablets from the deposit of the *Room of the Chariot Tablets* in the south-east area of the West Wing of the palace of Knossos (Driessen 1990). This is an example of the complementary value of archaeological and written sources, that should be considered at the same level.

The third section, which will be developed in the near future, will include the study of the iconographic evidences of the attributes of power. The systematic investigation of the *insignia dignitatis* in the Mycenaean world can enlighten the function and development of this important category of archaeological materials.

In conclusion, a data base of *insignia dignitatis* based on criteria pertaining to ethnography, sociology and anthropology, offers a wealth of information on the spatial and chronological distribution of these specific records. In addition, through the cross-checking of the archaeological, linguistic and iconographic data, improvements of our comprehension of social developments in the Bronze Age Greece can be realized, considering also that this approach to the Archaeology of Power can be paralleled by similar researches undertaken in other regions of the Mediterranean.

4. Technical details

The structure and the technical details of the data bases included in DBAS are outlined with reference to the data base on Cretan Hieroglyphic seals. The web site and the data bases are hosted on a server of the University of Florence, where an OS Linux from the third release of Red Hat enterprise edition is installed, with web server apache 2.0, php 4.3.2 and MySQL 4.1.11. The input and consultation interfaces are programmed in the PHP language).

First of all, the different kinds of data to be dealt with were defined. The resulting structure is described here briefly. As it can be seen from Figure 4, the main object of the data base are the seals and their different faces. In the classification of the seals, data related to material, context, place of finding and shape were inserted. Additional information include the CHIC and CMS catalogue numbers and the dimensions of the seal.

The core of the data base develops around the faces, where some symbols are represented that we denoted as elements. Since the different elements can be either writing or iconographical signs and eventually ornamental fillings, the main problem was concerned with the proper insertion of the data to carry out inquiries on the possible signs combinations represented on the seals faces. To this purpose we inserted every sign in the table "element", describing at first just the represented item, without considering its possible value as a written sign, so that every iconographic element could be identified in an univocal way and connected to the face it belongs to and to the seal itself. Another important point to consider is the arrangement of every sign in relation to the others. So we created the table "ElementRel", which includes the identifying codes of the first and second element and their mutual relation.

To make the data insertion easier, we created the table "Relation", with a list of all the possible relations and of their opposite. If in the data base the datum "element A on the right of element B" is inserted, automatically the opposite relation "Element B on the left of element A" is also present.

Since we are dealing with many elements already interpreted as Hieroglyphic signs, it was necessary to arrange the data to make the filing of the groups existing on the faces possible. For this purpose we created the table "SignGroup", which makes the insertion of one or more groups of signs for every face possible. This insertion method permits to manage "heterogeneous" groups of signs, with the possibility of inserting in the data base new possible reading hypotheses.

Since every element could belong to one or more groups of identified signs on a face of a seal, we created the table "ElementSG" , which contains groups of Hieroglyphic signs and iconographical elements.

Finally, we faced the problem of the data base query, defining types and number of possible queries for the user. We decided to adopt a "guided search" system that allows to choose the combination of remarkable data in disposable lists. Nevertheless, the possibility of a more complex "free search" system was also considered. The user has a disposable field in which the query script, in SQL language, can be digitized. For users not familiar with the language, examples are available with a full explanation of their functionality.

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