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Equus Data Management System (SGDE): a Research Tool for the Study of the Horse in the Iberian Iron Age

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Abstract

A set of six files (all of them complete Databases on their own) on the role of the horse in the Iberian Iron Age (including horse trappings, literary sources, iconography, faunal remains, coins and bibliography) have been integrated into SGDE (Sistema de Gestión Documental Equus). The system is an attempt to reconcile the conflicting research requirements of an interdisciplinary team with different needs, experience, and responsibilities; and the implementation of a coherent and user-friendly system capable of managing data of different kinds. The files include texts, original Latin and Greek sources, image fields, preliminary statistical treatment of numeric data, graphics, etc., all within the same graphic environment, using colour codes and button links to navigate within the system.

1 The horse in the Iberian Iron Age. A research project and *SGDE*.

The *SGDE* has been designed and built within the framework of Research Project PB94/0189 'The Horse in the Iberian Iron Age Culture: an Archaeological, Social and Historical Study'. This project was approved and financed by the DGICYT (Dirección General de Investigación Científica y Tecnológica), and it attempts to carry out a global and interdisciplinary study of the role that horses played in the Iberian Culture, taking into account, systematically, all available sources of information:

1. Archaeological data. Horse bits, spurs, etc. are well documented in cemeteries, sanctuaries and settlements, and they provide us with valuable information not only on technical matters (bitting practice, types, etc.) but also on the social use of the horse (horse bits and spurs as status symbols in grave goods, etc.).
2. Iconographic data. Horses played a prominent part in Iberian cult and ritual, as indicated by small bronze or stone votive offerings in the shape of horses found frequently in sanctuaries. A deity associated with equids was probably worshipped by the ancient Iberians. Moreover, monumental funerary sculpture proves that horses were a very important status symbol and that a *hippeis* or *equites* class was perhaps in existence.
3. Numismatic data. Horses figure prominently in Iberian coins as aristocratic and/or city icons. In fact, nearly all mints in *Hispania Citerior*, and many in *Ulterior*, include horses and riders as the main symbols on the reverse of their coins.
4. Literary data. Many ancient sources tell us about the importance of horses in ancient Iberia, as well as about customs regarding equestrian practices and even some myths in which horses play a very prominent part.
5. Archaeozoological data. There are many animal remains incorporating evidence for the horse not only in settlement rubbish dumps, but also in cemeteries and sanctuaries.

Despite the extensive data a systematic analysis of the different aspects and sources mentioned above has not been undertaken so far. For example, we do not yet have a typology, or even a catalogue of extant bits and spurs, or a complete and systematic iconographic study. Within the project each of the different types of information is now being studied by a specialist[1].

2 SGDE: Sistema de Gestión Documental Equus or Equus Data Management System

SGDE acts as the nervous system of the Project. It integrates within a single, coherent, easy-to-use software, all the different catalogues, each in a custom designed database, one for each of the different types of information cited above, and a bibliography common to all of them.

At the design stage, it was recognised that each of the different specialists had different needs, which demanded the design of different structures for each database: for example, the '*Literary Sources*' file required a good Greek font well adapted to the keyboard, a good system of keywords for use within searching procedures, long text fields not limited by a

rigid structure, etc.. Alternatively, the '*Iconography*' file required large image fields, good 'pull down menu' fields to avoid typing mistakes, etc. Also, good import capabilities were found to be necessary to import data from pre-existing files held in the different softwares used by different people in the research team. The fact that undergraduate students were also going to input data as part of their training had also to be taken into account, and that the number of people with access to SGDE was going to be relatively large. It was also recognised that the computer literacy of students and researchers alike was uneven, and that, to say the least, some of the more senior researchers were not sympathetic, and not likely to be patient, with computer-generated problems.

Finally, it was also felt that in the second stage of the Project a high degree of interrelationship between the different files would be necessary, as different researchers would have to look at and use data derived from other expert's files. It was therefore necessary that all files should be similar in appearance and use, and that common procedures should be designed to perform common tasks, while at the same time clearly distinguishing the different files or topics by colour coding or some other means.

After extensive testing of different software packages operating in a graphic Windows environment (including Borland Dbase V and Microsoft Access), Claris FileMaker 2.1 was chosen as the development platform for *SGDE*. In our opinion, this software provided the best balance between power and 'user friendliness'. Its compatibility with Apple Macintosh was also a bonus. The design of buttons, macros ('scripts'), reports and visually effective screens was very easy and intuitive; the Claris philosophy of design made learning by non-computer experts very intuitive and straightforward. For example, FileMaker kept the philosophy of 'files', 'records' and 'fields' better than other packages, and seemed to be able to import and use data from Dbase III+ files even easier than Dbase V. The absence of a real 'relational' capability between files was not found to be decisive, nor was the absence of a developed OLE system for importing images. After all, it was not the idea to modify images once they had been imported into the data. As many people were using *SGDE*, it was felt that the files had to be as secure as possible, and this demanded not only blocking screens and the use of passwords for some options, but also some sort of 'isolation' from other software. Apart from this FileMaker 3.0 has now solved many of these limitations and now accepts OLE and has a full relational capability; it has also dealt with the embarrassing file size limits of the earlier versions.

3 The customised access icon and main menu screen

With these considerations in mind, it was first decided that, for security reasons, no user of *SGDE* would be allowed to freely navigate through the complex directory tree of the main PC -or the secondary laptop computers of the Project. There are, within these areas, many other files (images, Dbase files, etc.) with similar names but different extensions that could lead to confusion if navigation was free. Instead, a custom-built icon was created using IconMaker, which gave direct access not only to FileMaker but also to the *SGDE* Main Menu screen (See Fig. 1).

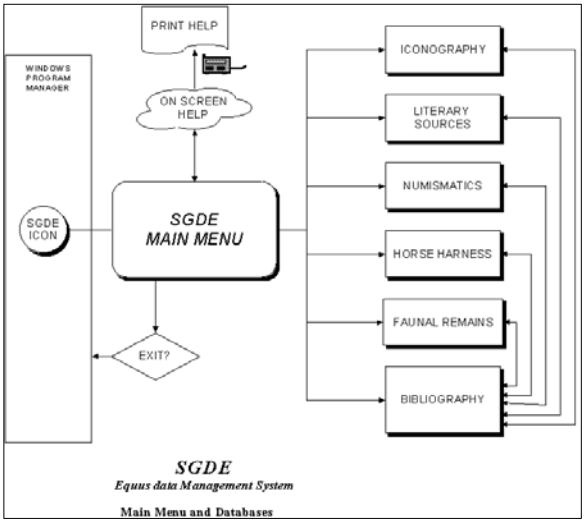

Figure 1.

The *SGDE* Main Menu screen was designed to be visually attractive with a view to future use as a public-access Database (see figure 2). From here six different buttons open the main screens of the six main files. Each file is colour-coded (Iconography, Light Blue; Literary Sources, Orange; Numismatics, Salmon; Horse harness, Navy Blue; Faunal Remains, Green; and Bibliographies, Yellow), and this colour code is maintained not only in buttons but also in the different screen backgrounds of each file. To keep a sense of unity, however, a single logo[2] is placed in each of the screens and in all printouts (see figures 3, 5, 7 etc.). All screens in all files are also uniformly divided into four horizontal sections (see figures. 9 and 10): a header with the logo and name of the file; the record proper, a section with click buttons to

perform different tasks or navigate within the system, and a footer with the copyright data.

Figure 2.

The *SGDE* Main Screen also gives access via a 'help' button to a description of *SGDE* goals, operating tips and other information. This help file can also be printed.

To ensure that all files are properly closed before exiting *SGDE*, it is emphasised to the users that the best way to exit from their respective files is to return to the Main Menu (also by clicking on a button) and exiting from there (Figs. 1-2).

4 The Bibliography file

The six main files in *SGDE* are not directly linked with each other, although some relational functions using site names fields is being considered. The different databases are all independent and complete on their own. The only exception is the bibliography file. Instead of having different bibliographical lists prepared as files for each database, it was decided that all references relevant to any of part of the project would be stored in a single database with powerful in-built features. Any bibliographical reference in any of the 'contents' databases is cited in a single field using the abbreviated 'Harvard' system; to check the complete reference, or to make any search, The '*Bibliography*' can be opened by clicking a button from any of the other five databases without having to close them first (Fig. 1); once it has been consulted, the '*Bibliography*' can be abandoned as easily as it was opened. This is the only case in which a normal user of *SGDE* is allowed to open two files at once. Of course, all files can be opened if necessary at the same time by authorised users using the normal Windows controls provided by File Maker. The '*Bibliography*' can also be called and operated independently, just as any of the other databases in *SGDE*. A relational link is now being established in version 3.0 of File Maker.

Figure 3.

The '*Bibliography*' main screen (Fig. 3) displays a single reference/title (record), with added information grouped in four blocks. Currently the whole file contains about 11.000 references. The first block contains the usual data (author, date, title...); the second a system of keywords by subject (clavetema), current work (clavetrab), cultural area or complex (clavecultura), region or province (clavelugar) and an 'open' keyword field (clave 1). It is then possible to make searches not only by author, title, periodical, etc., but also by region, archaeological culture, subject, or any combination of these. In case memory fails, a button in the lower part of the screen opens the 'Keyword Dictionary' ('Diccionario Claves') to show all current abbreviated keywords (e.g., in Fig. 3 '*CHT*' means 'chariots' in the Subject Keyword field; '*ESC*' means 'sculpture', and so on).

The last field in this second block is used to prepare customised reference lists for papers, thus avoiding the necessity to type all references every time a paper (or chapter in a monograph) is written. This field works as follows: while the user is preparing his paper in a word processor, he keeps open the Bibliography Database, and each time he cites a title in his paper, he also marks the field 'Clave1' in '*Bibliography*' with a personal keyword (be it an asterisk * or any short word); then, when the paper is ready, the user only needs to select the marked titles, using the 'Search' functions in FileMaker, and then click on the 'Print Bibliography' button in the lower part of the main screen (Figs. 3 and 4). This is a macro that displays the different elements of a full bibliographical reference in 'text' rather than in

'label' format, that is, with all elements one behind the other, separated by commas, etc. It also saves them in a format acceptable to WordPerfect or any other word-processing package in a special subdirectory within a temporary file that can be inserted in the finished paper as a ready-made Reference List. The macro groups author and date in the first line then, in the following line, title and periodical, volume, pages, place name etc. depending on the type of publication (monograph, paper, etc.). Fig. 5 shows the preliminary output of a search (in this case, titles from E. Cuadrado) ready to be sent to a DOS or Windows File at a click on the button "WPprint" in the upper right side of the screen. In the situation when the selection was not correct, it is also easy to abort and return to the main screen (clicking on button 'Máscara'). The logic, orders and sequence to create such a 'script' are detailed in Figure 4; the most complicated part is to cover all possibilities in the shortest possible programme, and to ensure the placing of commas in the right places depending on the type of publication (with or without page numbers, place of publication, etc.).

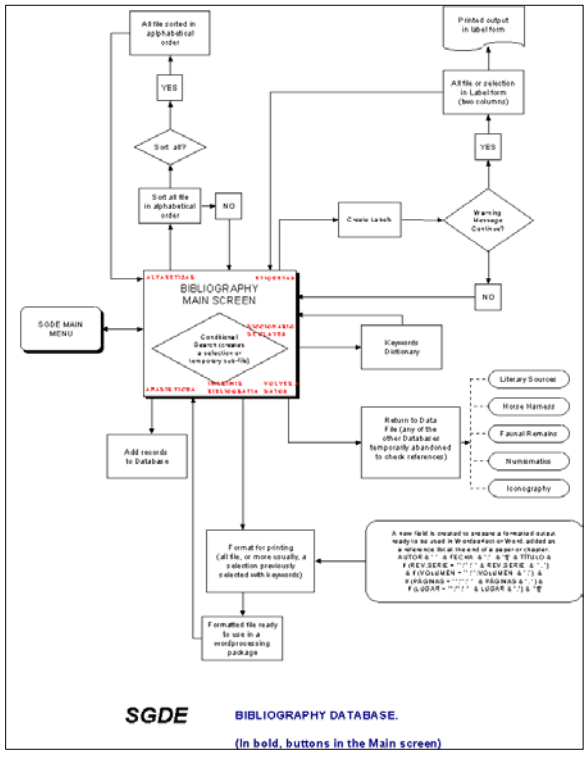

Figure 4.

Other options in '*Bibliography*' are shown in the flowchart in Fig. 4, and the appropriate buttons are visible in the lower part of the main screen (Fig. 3). The most common tasks are prepared as macros and assigned to buttons. It is thus easy to create and print labels, sort the whole file -or a selection- alphabetically, add records, or return to the Main *SGDE* screen. Other options (such as 'delete records') are password-protected and are not directly accessed from the *SGDE* screens. When an option might have undesirable consequences, or requires the use of a more complex FileMaker command, a warning message appears before the operation is done, and asks for confirmation.

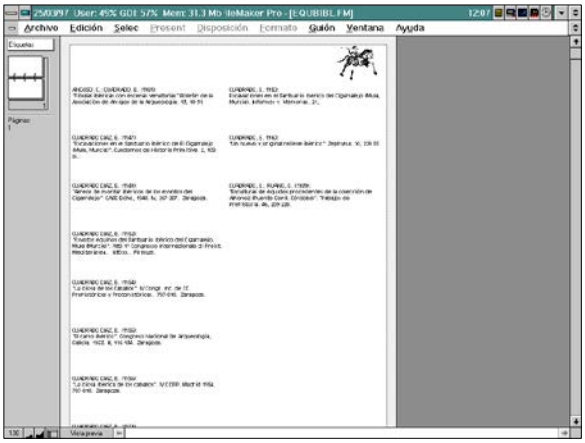

Figure 5.

The third block in the Bibliography main screen (Fig. 3) provides Library and Library reference codes for any particular title; the fifth block indicates if a title is relevant to a particular type of information (that is any of the other five Databases) or to all of them. These fields are filled simply by ticking a box.

5 Horse Harness database

If Bibliography is both a self-contained file and a resource tool for all other five databases, the latter are the real cataloguing and research instruments. All of them are similar in appearance, but they do have distinctive features according to their specific needs.

The '*Horse harness*' database[3] can be used as an example of the basic structure of the other four data sets (see Fig. 6). It is colour-coded in Dark Blue (buttons, background of the screens), and is usually opened from the Main Menu screen described above. The main screen shows a complete record. On the right hand side there is a graphic field, displayed in a big area to allow the scrutiny of minor details of the drawing of the object; it is not therefore a 'postage stamp' image. As we explained above, these fields are not designed to be modified, as they have been designed to avoid lengthy descriptive fields of the objects, and therefore they have been embedded

rather than linked. The original scanned files (one for each object) are kept in 100 Mb ZIP disks ready for other uses (such as the preparation of plates). These files have been reduced in size as much as possible prior to their insertion in *SGDE*, first during the scanning process (adjusting size, DPI, etc.) and then, sometimes, in Adobe Photoshop and Corel.

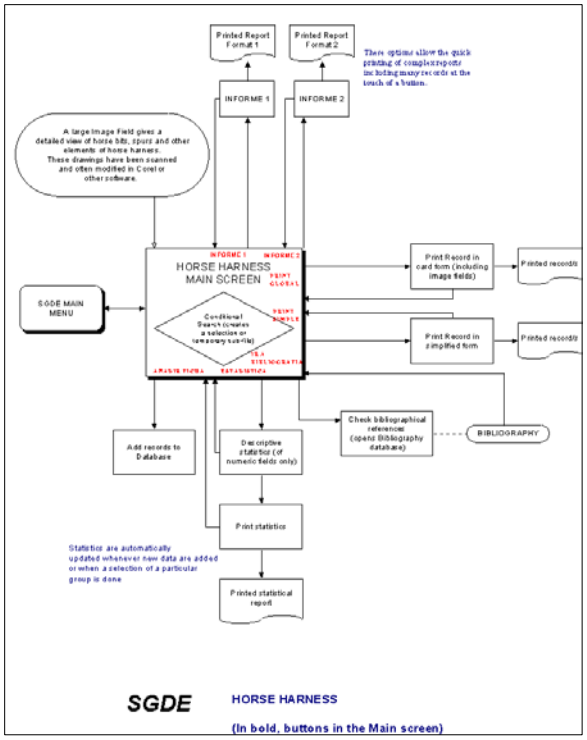

Figure 6.

The other fifty three fields in the record structure are of different types and formats, and are thus filled using different typing procedures. Some, such as 'Object', are predefined using lists of previously inserted data covering all possibilities; the list is displayed as a pull down menu when the cursor is placed on the relevant field. The selection is double-clicked and put in place. This is to ensure that no typing mistakes are made when filling fields commonly used for searches. Other fields are defined as 'tick boxes' or 'fill circles' (see Fig. 7), while most of them have to be typed in the traditional way.

Buttons in the lower part of the main screen give access to the principal functions, which include two report formats (using a landscape page format and small print). One report format is designed to show numeric data (measurements etc.), and the other is used for catalogue and Museum control. Up to forty-five records - including header and logo- can be shown on a single printed page in this way.

The remaining two options produce printouts in one record/one page format (just as in a manual file). The first option gives a complete 'print screen' effect (except that the dark blue background is transformed into white to save toner) (see. Fig. 7). The second option only prints a selection of the fields. These records can then be bound or kept in files.

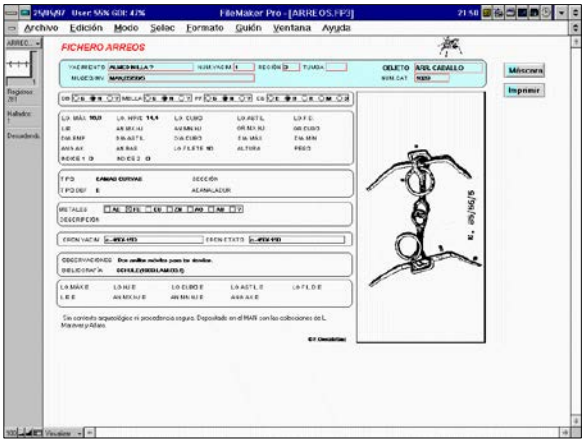

Figure 7.

Another button opens the '*Bibliography*' file, as described above, to allow scrutiny of the complete bibliographical references for each object. This is done without closing the actual database, which can be seen again when the reference search is completed.

The 'Statistics' button opens another screen (Fig. 8) in which some simple descriptive statistics are given for each of the numeric fields in the database. These "off the shelf" numerical routines include Maximum and Minimum values, Mean, Number of occurrences and Standard Deviation. Of course, these results are only useful if applied to a selection of the data (spurs, or different types of bits, etc.). Many fields are empty because this database is also designed to be expanded in the future and will include a 6,000 record Dbase file containing nearly all known Iberian Iron Age weapons. Numeric fields to cover the different measurements of swords, spears, etc. have had to be defined in advance to ensure the smooth import of data.

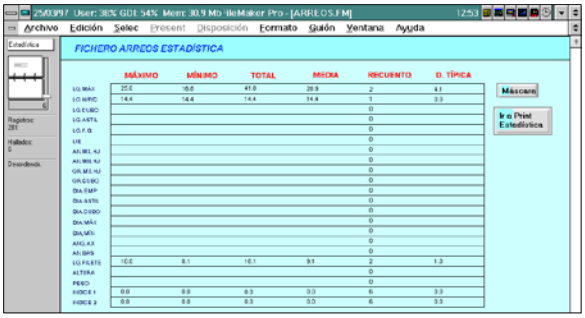

Figure 8.

From the 'Descriptive Statistics' screen it is possible either to return to the main screen or to print the results (Fig. 8, buttons in the upper right side). This procedure and its graphic layout is common to all screens in this database (see Fig. 6) and to all databases in *SGDE*.

6 Other databases in *SGDE.*

The other four Databases included in SGDE are quite similar in structure to the '*Horse Harness'* Database. All include different field formats, embedded image fields, simple statistics for numeric fields, different report options, etc. All screens in each database have the same colour as canvas and as button background; and all screens in all databases share the same *SGDE* logo, as explained before.

The '*Iconography*' database includes in its main screen a large photograph of the object (see Fig. 9), which is sometimes a quite complex file in itself. For example, the image in Fig. 9[4] is a composition of three different photographs unified in scale and tone and then placed over a theoretical reconstruction drawing. The whole process was performed using an image processing package, and then imported into *SGDE*. As photographs are not always very clear, a line drawing of the object (sculpture, painted vessel, etc.) is included in another screen, opened by clicking on the 'Go to Drawing' button at the lower part of the screen. Other available options are similar to those described for '*Horse Harness'* file.

Figure 9.

The '*Numismatics'* file includes all known mints, series and dies of coins with horses as reverse types. It is therefore imperative that good 1:1 photographs of both obverse and reverse are present in the main screen (Fig. 10). Other available options are similar to those described for the '*Horse Harness'* file, and this includes elementary statistical output.

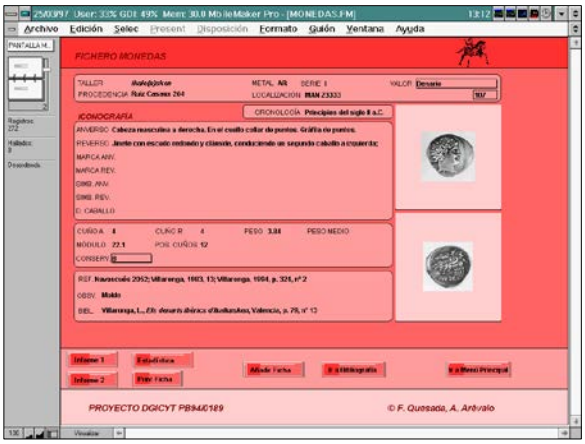

Figure 10.

The '*Literary sources'* database is quite simple. A good, clear Greek font, well adapted to the keyboard, had to be found to include the literal field of the relevant source, and a system of keywords to describe the main features of the text and facilitate search had to be designed. A pull down menu system is employed in these fields to avoid typing mistakes, and because the number of possible options is limited. A printout of the main screen is shown in Fig. 11.

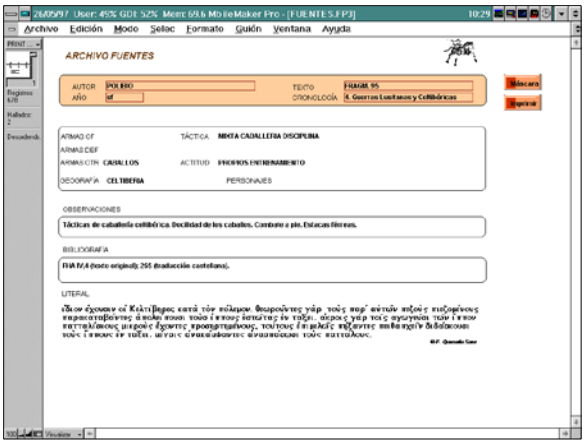

Figure 11.

Finally, the '*Faunal remains*' file catalogues all published archaeozoological reports from Iberian and Celtiberian Iron Age sites. The most interesting detail is perhaps that a pie or composite pie/bar chart comparing the proportion of equids to other animals is included for each site (see the printout of the main screen in Fig. 12). These charts are designed in Harvard Graphics and then linked - and not embedded- to the file, so that modifications of data can promptly and easily be included in *SGDE*[5].

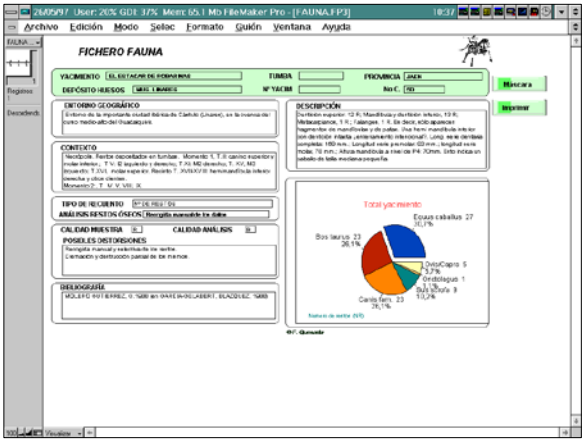

Figure 12.

Notes

1 Horse harness: F. Quesada (Dpt. of Archaeology, Universidad Autónoma de Madrid); Iconography: F. Quesada and R. Castelo (Dpt. of Archaeology, Universidad Autónoma de Madrid); Coins: A. Arévalo (Dpt. of Archaeology, Univ. of Cádiz); Literary Sources: J. de la Villa, (Dpt. of Classics. Univ. Autónoma de Madrid); Mediterranean connections: J.R. Carrillo (Univ. de Córdoba); Celtic connections: M. Gabaldón (Univ. Autónoma de Madrid); Archaeozoology: S. Martín and the team of A. Morales (Laboratory of Archaeozoology, Universidad Autónoma de Madrid).

2 A warrior on horseback from pottery decoration in the Liria style (Valencia). Dated to the end of the 3nd century BC.

3 And not simply 'File' because this is in fact a complex file with other, graphic, files embedded into it, and thus can be considered an independent Database in is own even if integrated in *SGDE*.

4 A dismounted rider, guiding his horse by the reins, is killing a fallen enemy. The spearhead blow enters through the mouth of the vanquished and the point is visible on his back, having pierced head and neck. After the reconstruction hypothesis by I. Negueruela.

5 File Maker 4.0 is now available, with enhanced macros and good Internet capabilities.

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