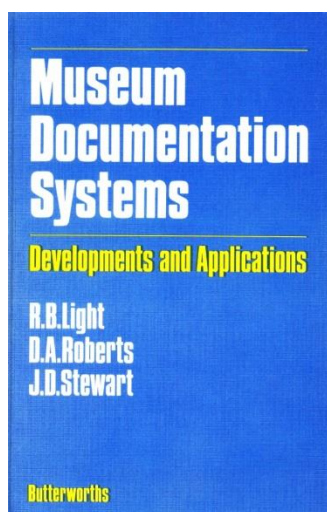


THE EPHESIAN AMPHORAE DATA BASE

Tamás Bezeczký

Before we discuss these specific data base, we have to examine the development and functionality required. The data bases are specifically tailored to the given research circumstances. The examination and publication of the finds, namely the amphorae, would have been vastly more difficult by traditional means. The overview of the data stemming from archeological, geological and statistical sources warranted the usage of modern e.g computer assisted data processment. The first data bases using IT in archeology stem from the early 1980ies and were limited by technology: large, stationary and expensive mainframes were unable to store pictures in large quantities and were limited to text files.¹ They made the management of the finds easier and established the first international standards in data processing.



Chapter 27

The history of Hungarian museum documentation, its present application and future aspects

Istvan Éri and Tamas Bezeczký

Introduction

Efforts to standardize and centralize the coordination of museums in Hungary started in the 1890s. The formulation of the principles and their practical application in all aspects of museums began in the period before the First World War. The problems of documentation, recording and inventory were also discussed. Since the Central Advisory Board of Museums and Libraries was authorized only to give recommendations and to suggest different methods, the results were rather rare. An investigation into documentation and recording methods showed that there were about 28 kinds of inventory and documentation system throughout the country. Most of them were used for the purpose of administration with very little or no technical or scientific information. At the same time, there were about half a million museum objects with no data given about them.

Fig. 1 Museum Documentation Systems, ed. R.Light, A.Roberts, J.Stewart, Cambridge, (1986) in Éri, I. – Bezeczký, T. The History of Hungarian Museum Documentation, its present application and future aspects, 277-283.



Fig. 2 Bezeczký, T. (ed.) Múzeumi nyilvántartás II, (Válogatás a számítógépes nyilvántartás külföldi irodalmából / Selection of the published computer based documentation systems), FIGYELŐ, 11 MRMK (Institute for Conservation and Methodology of Museums), Budapest, 1979.

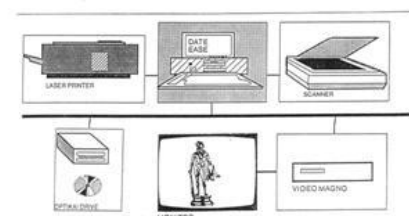
¹ IBM STAIRS

The real breakthrough came with the spread of the personal computer (PC) systems worldwide. Not only the hardware, but also the rapid development in software led to new means of analysis. This resulted in data bases with more user friendliness, as data was also available as picture files and new discoveries. I am certain, that the coming generations will review these developments with a smile on their faces as they start to work in virtual reality.

Hungarian National Museum Computer in Archaeology Project

1982-1991/1

IMAGE DATABASE IN USE



The modernisation of the manual archaeological documentation system at the Hungarian National Museum was begun about ten years ago. There is now a computer database containing descriptions, photos and films of all the objects in the collection. DataEase was chosen to create this database because it allows contact with such effective systems as Oracle and Ingres. Without these, the handling of our collection of half a million objects on the one system would have been impossible.

All the information on the objects - such as name, size, provenance, etc. - is stored in a format which accords with international museum standards. The database is also augmented by supplementary databases, such as a terminology database, which ensures unified names.

For a long time we have been trying to find a subsystem allows us to view objects which cannot be adequately shown in a photograph. For example, certain details may not be visible, the object may be too big, or it may need to be seen from all sides. Short video sequences of the objects can be stored on VHS (normally about 200-300 objects per cassette). The DataEase-based system uses a special program to search the cassette for the part of the film showing the requisite object, and the sequence can then be displayed on a separate screen. This way the objects can be looked at 'live', the long searching in the store-rooms will be unnecessary and the danger of damage to objects from use will be reduced.

How it works

The system installed at the Hungarian National Museum is in fact just one of many possible configurations from a wide palette of image retrieval database systems ranging from... (text is partially obscured by the image of the computer screen). The system is shown on a high resolution b/w display (2048 x 1630, 150...).

Fig. 3 Bevezeky, T. – Rezi-Kató, G. The Hungarian National Museum Project: Computer in Archaeology, in *Múzeumi Hírlevél* 1991122/6, 5-8 and Bevezeky, T. – Rezi-Kató, G. – Harsányi, Z. Images and DataEase, *Collector's item, Dialogue*, 3(1991) 15-16.

THE EPHESIAN DATA BASE

The information about the amphorae is contained in the ARES (FileMaker Pro) data base created by Péter Hornung. I am especially grateful to him for his patience, attention and expertise in creating the data basis programme that allowed me to record and process the various data of the amphorae.

My research (2001-2011) was supported by the Institute for the Study of the Ancient Culture (Austrian Academy of Sciences) and the Austrian Science Fund (FWF). The amphorae are kept at the store-room of the Austrian excavation house in Selçuk. The bulk of the available amphorae were found in Ephesus. There were more than a hundred excavation sites there. I studied the material of eight sites (Tetragonos Agora, partly Terrace House 2, Magnesian Gate survey, Prytaneion, Basilica Stoa, State Agora well, Serapeion, Arap-Dere

survey). This data base primarily contains the amphorae of the Roman period.² The amphorae of the Tetragonos Agora will be discussed first. (Fig. 4)

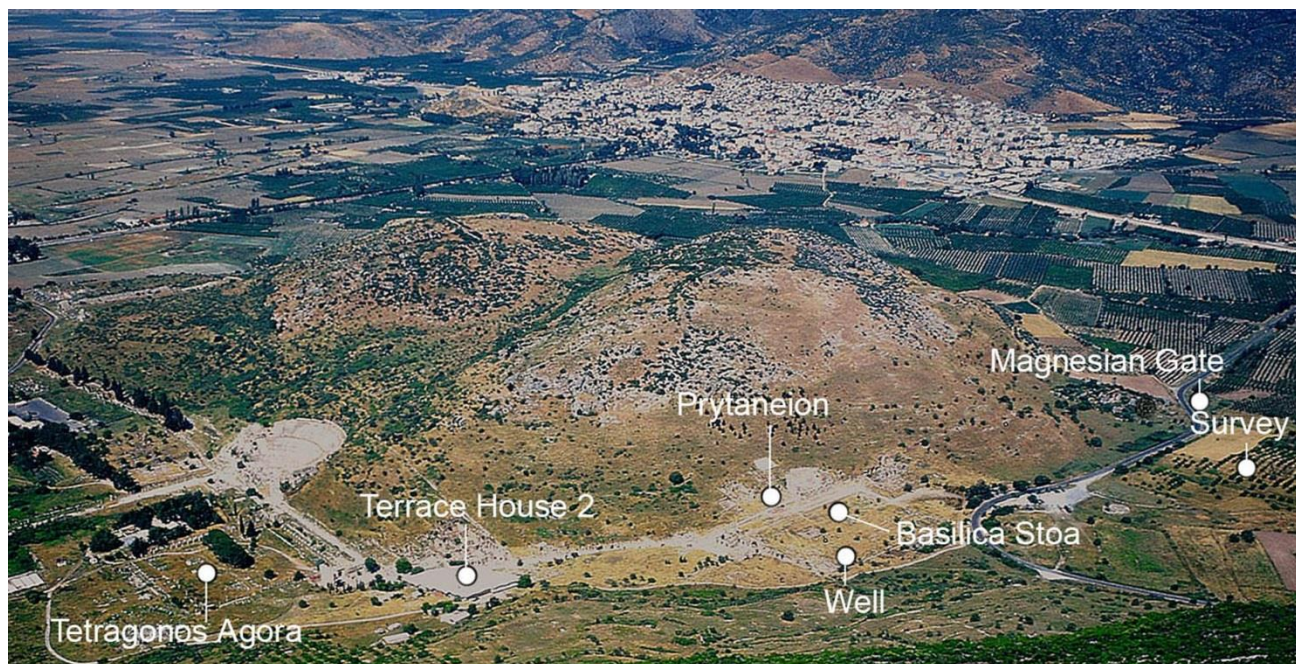


Fig. 4 Ephesus, Tetragonos Agora

This is the largest group. The amphorae in the Agora are very fragmentary. Only the characteristic parts: rim, base and handle (RBH) were considered. More than 35% of the pieces are handle fragments which, unfortunately, do not always allow the identification of the type (obvious it was easy the types Rhodian, Koan, Dressel 2-4, amphorae). The amphorae are stored in numbered boxes according to the years they were found.



Fig 5. The amphorae in the Austrian Excavation Depot

² The Tetragonos Agora excavations were directed by Peter Scherrer since 1987.

The following descriptions demonstrate the structure of the Ephesian data base. The data base has been reorganized several times since the beginning. The charts show important fields in some important tables. It is only a sample of the content and working method.

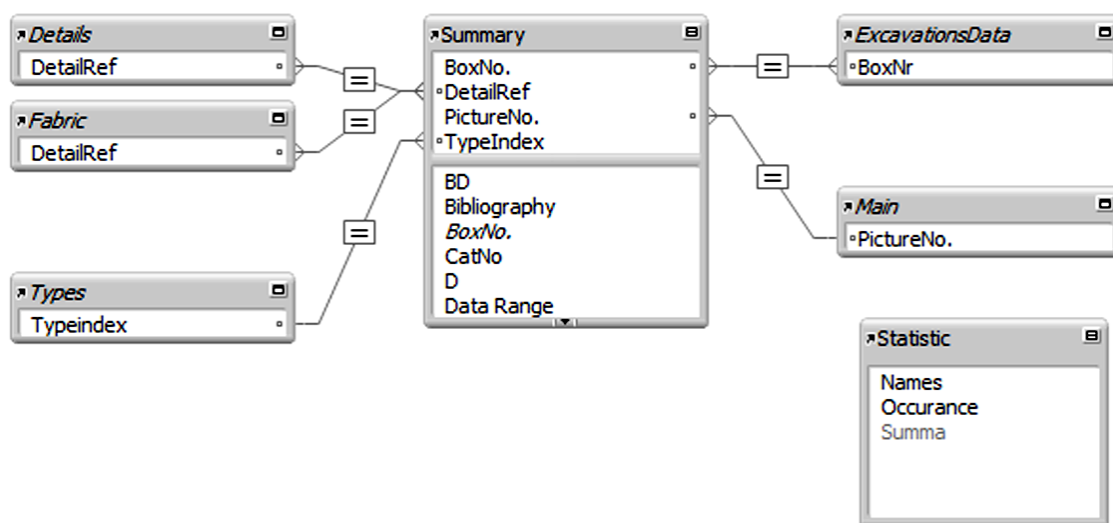


Fig. 6 Summary layout chart

At the beginning of the research in 1998 we started by reviewing the data of more than 10 years of research by traditional means. After six weeks of intensive work we realized, that a completely new approach would be needed. A picture data base would be necessary to review the data and finds not only „on-site” but also in Vienna. A spreadsheet containing 2010 lines of excavation data as well as the „Fundjournal”, containing the description of the ceramic and other objects had to be systematically organised.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	GRABUNG	KISTENNR	DATUM	SONDAGE	LFM	OST	TIEFE	BEFUND	SCHICHTNR	STRATUM	BEMERKUNG	MUNZEN	DATIERUNG	BEARBEITET
2	Eph-Ago	87/001	19870811	87/1	94 50-97 00	1.00-12.00	4.15-4.00			Stratum I: rezente Agoraoberfläche: Erde bis erhaltenen Plattenboden bzw. Moloz		M87/001		
3	Eph-Ago	87/002	19870813	87/2	67 00-70.00	16.50-32.00	4.40-4.25	rez. - SpA-Ago		Erde auf derzeitiger Agoraoberfläche bis Moloz				
4	Eph-Ago	87/003	19870813	87/2	67 00-70.00	16.50-32.00	4.15-4.00	R-Ago		FKA, unter dem Moloz				
5	Eph-Ago	87/004	19870813	87/2	67 00-70.00	16.50-32.00	4.00-3.80	R-Ago		FKA, mit viel Ker. und Steinabschlag				
6	Eph-Ago	87/005	19870814	87/2	67 00-70.00	16.50-32.00	3.80-3.70	R-Ago		FKA		M87/004		
7	Eph-Ago	87/006	19870814	87/2	67 00-70.00	16.50-32.00	3.70-3.50	R-Ago		FKA		M87/005		
8	Eph-Ago	87/007	19870814	87/2	67 00-70.00	16.50-32.00	3.50-3.40	R-Ago		FKA				
9	Eph-Ago	87/008	19870817	87/2	67 00-70.00	18.50-32.00	3.50-3.10	R-Ago		FKA, zwischen den Kanälen		M87/006-008,121		
10	Eph-Ago	87/009	19870817	87/2	67 00-70.00	18.50-32.00	3.10-2.90	R-Ago		FKA		M87/009-010,013		
11	Eph-Ago	87/010	19870817	87/2	68 50-70.00	30.00-32.50	4.20-max. 2.80	R-Hauptkanal		Füllung im schrägen Hauptkanal				
12	Eph-Ago	87/011	19870817	87/1	94 50-97 00	1.00-12.00	4.05-3.90			Stratum II - III: Moloz und röm. Aufschüttung unmittelbar darunter		M87/012		
13	Eph-Ago	87/012	19870817	87/1	94 50-97 00	1.00-12.00	3.90-3.60			Stratum III: röm. Aufschüttung				
14	Eph-Ago	87/013	19870818	87/1	94 50-97 00	4.00-12.00	3.60-3.20			Stratum III: röm. Aufschüttung unter dem Bauarbeitsniveau		M87/018-019		
15	Eph-Ago	87/014	19870818	87/1	94 50-96 30	1.70-4.20	3.55-3.45			Putzen des großen Fundaments 1-1/87 an OIK von Stratum III: röm. Aufschüttung				
16	Eph-Ago	87/015	19870818	87/2	68 50-70.00	30.00-32.50	4.20-max. 2.70	R-Hauptkanal		Füllung des schrägen Hauptkanals				
17	Eph-Ago	87/016	19870818	87/2	68 50-70.00	30.00-32.50	2.70-1.80	R-Hauptkanal		Schwemme im Kanalinneren mit grober Einschüttung im mittleren Bereich				
18	Eph-Ago	87/017	19870818	87/2	67 00-70.00	12.50-32.00 oder -17.00?	3.00-2.80	R-Ago		FKA		M87/014-017,020-022		
19	Eph-Ago	87/018	19870818	87/2	67 00-70.00	18.50-32.00	2.80-2.60	R-Ago		FKA		M87/023-031		
20	Eph-Ago	87/019	19870819	87/2	68 50-70.00	30.00-32.50	2.70-1.80	R-Hauptkanal		Schwemme im Kanalinneren mit grober Einschüttung im mittleren Bereich		M87/041,046		
21	Eph-Ago	87/020	19870818	87/1	94 50-97 00	4.00-12.00	3.25-2.80			Stratum III: röm. Aufschüttung		M87/033-034		
22	Eph-Ago	87/021	19870819	87/1	94 50-97 00	4.00-12.00	3.25-2.80			Stratum III: röm. Aufschüttung				
23	Eph-Ago	87/022	19870818	87/2	67 00-70.00	18.50-32.00	2.80-2.60	R-Ago		Abfallgrube bis Ost: 24m, dann verbrannte Erde über Gelniveau (V-V)		M87/032,035		
24	Eph-Ago	87/023	19870819	87/2	67 00-70.00	18.50-24.00	2.60-2.40	R-Ago - H-Ago		Abfallgrube (IV)		M87/037-040,042-044		
25	Eph-Ago	87/024	19870819	87/2	67 00-70.00	18.50-24.00	2.60-2.40	R-Ago - H-Ago		Abfallgrube (IV)				

Fig. 7 The spreadsheet page no. 1

-59/93; 2/93; Amphoren aus Straßenschüttung I und darüber; 12.7.93;

Amphoren: 3 vollst. Amphorenränder am Hals gebrochen, davon 1 Exemplar mit Henkelansätzen und Stempel, Dressel 1 A; 1 Amphorenhals (zweiteilig), vermutlich Dressel 1 (A?); 1 Fuß, vermutlich zu Dressel 1A; 1 vollst. zweiteiliger Amphorenrand, mit abgebrochenen Henkeln, sehr wulstiger Lippe, Peacock 1 (Brindisi-Amphoren?);

63/93; 2/93; 3.94/3.80-3.67; 13.7.93;

Amphoren: 4 RS; 4 Spitze; 24 Henkel]

64/93; 2/93; 3.67-3.28; 13.7.93;

Amphoren: 4 RS, davon 1 vollst. Hals mit Rand und Henkelansatz; 13 Henkel, davon 1 mit Stempel AN/OS; 1 Standringfrgm.; 4 Spitze;

65/93; 2/93; 3.28-2.97; 14./15.7.93;

Amphoren: 6 RS, davon 1 mit Henkel; 5 Spitze; 14 Henkel;

Fig. 8 The „Fundjournal”

The next logical step was the data unification and systematic data recording. Because this process was done by a single person, it took years instead of months. In the beginning, photography was done on an analog camera and film reel. By the year 2000 the switch to a digital camera was made, the device of choice was a Nikon coolpix. The amphorae in each box are also recorded group photos. The 11.518 fragments found at the Agora are in 2.291 photos. At Terrace House 2, there are 1.888 fragments in 567 photos. At the rest of the sites, there are fewer amphora fragments.

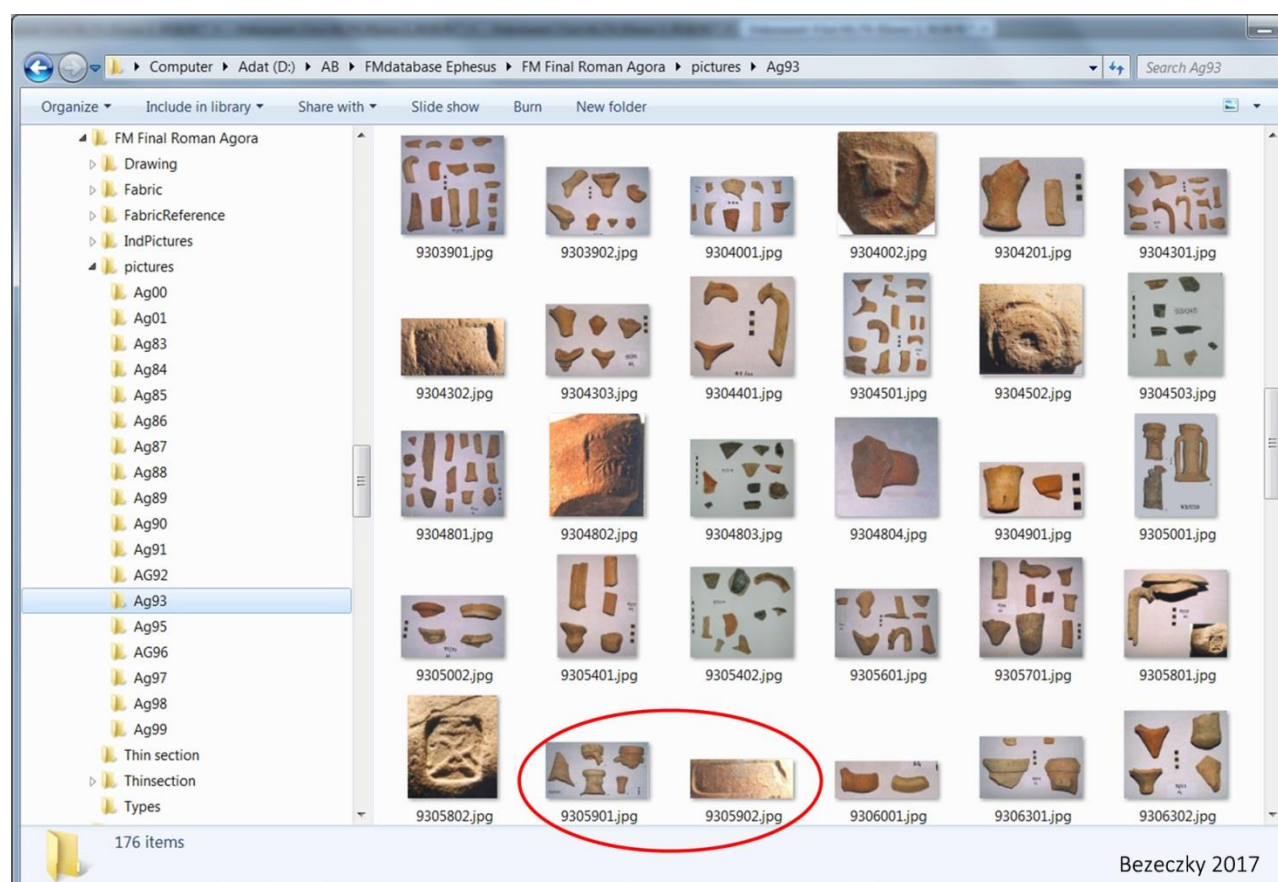


Fig. 9 The amphorae in each box are also recorded group photos (year 1993).

FileMaker Pro - [Main]

File Edit View Insert Format Records Scripts Window Help

◀▶ 995 ◯ 1901
Total (Unsorted)

Show All New Record Delete Record Find Sort


Layout: DataEntry View As: Preview

PictureNo. 1008 DataEntry FileName Agora

[Master Picture](#) |
 [Go To Detail](#) |
 [Go To Fabric](#) |
 [Go To Summary](#)


BoxNo. 93/059 X **New Record**

DrNo	Location	Type	CatNo.	Note
	1	N	Dressel 1	
0422	2	RNH	Lamboglia 2	P: HMA, ThS Sauer
0017	3	RNH	Lamboglia 2	P: HMA, ThS Sauer
0005	4	RN	Brindisian	P: HMA, ThS Sauer
0422b	5	B		



93/059

Location	DetailType
3	Stamp

New Detail


FabricSortCode It P2 LayerID 2D

4 5 4

Late 2nd cent. BC – mid 1st cent. BC street I:
surface of street I

FineWare

Location Colour	FabricCode
2 reddish yellow (5YR 6/6)	Adriatic 2, T2
3 light red (5YR 6/6)	Adriatic 2, T2
4 pink (7.5YR 7/4-6/4); white (10YR 8/2)	Brindisian 1,

New Fabric

The pictures are imported in the Main (DataEntry) layout. (Fig. 10) Here the finds are identified: first the location, the shape (rim, neck, handle), the type – if a catalogue number was assigned as Cat.No, unique identifying number – and if a drawing was made, it is also entered in the data base. A note would be added if a petrological examination was made. If an amphora find contains a stamp, this also would be noted with a separate picture. If the finds have a catalogue number, the color of the find is defined according to the Munsell-colour scale or a fabric code is assigned. The field LayerID shows further information about the find's location. Each find is also entered with the excavation and dating period, showing a complete chronology of the entire excavation. This data was recorded in Ephesos and in Vienna.

6

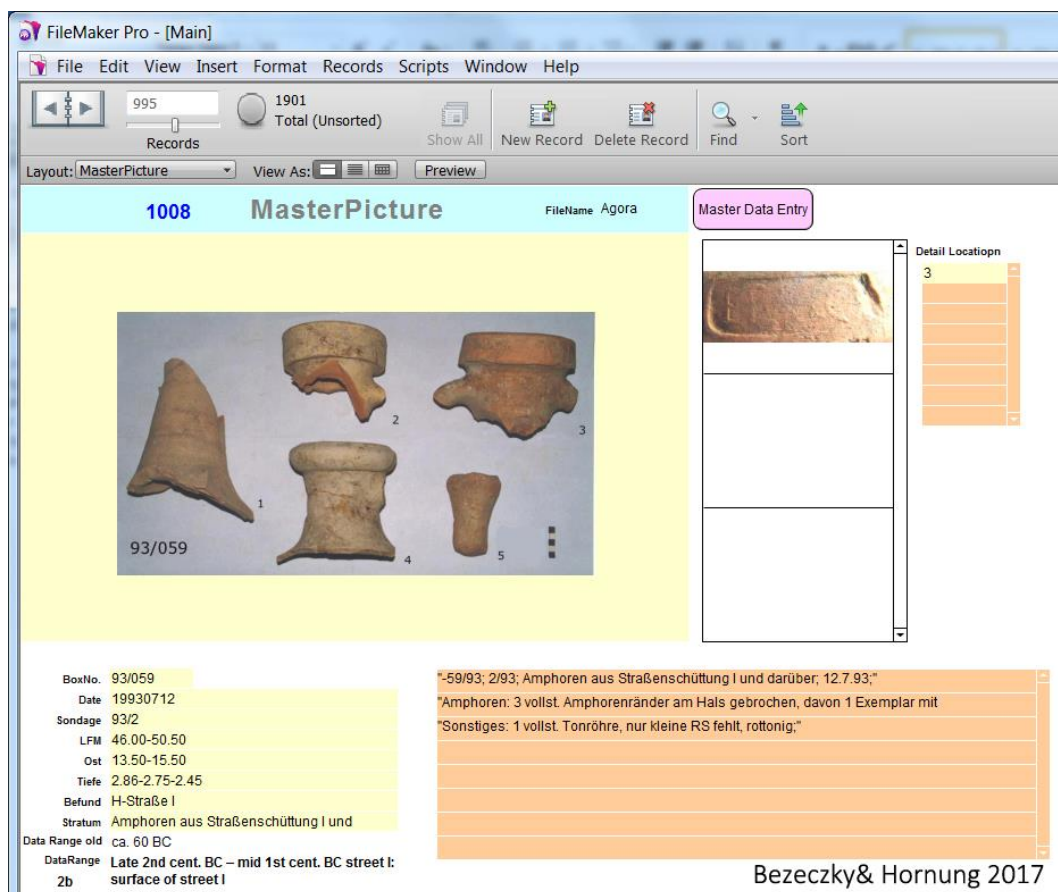


Fig. 11 Master Picture layout

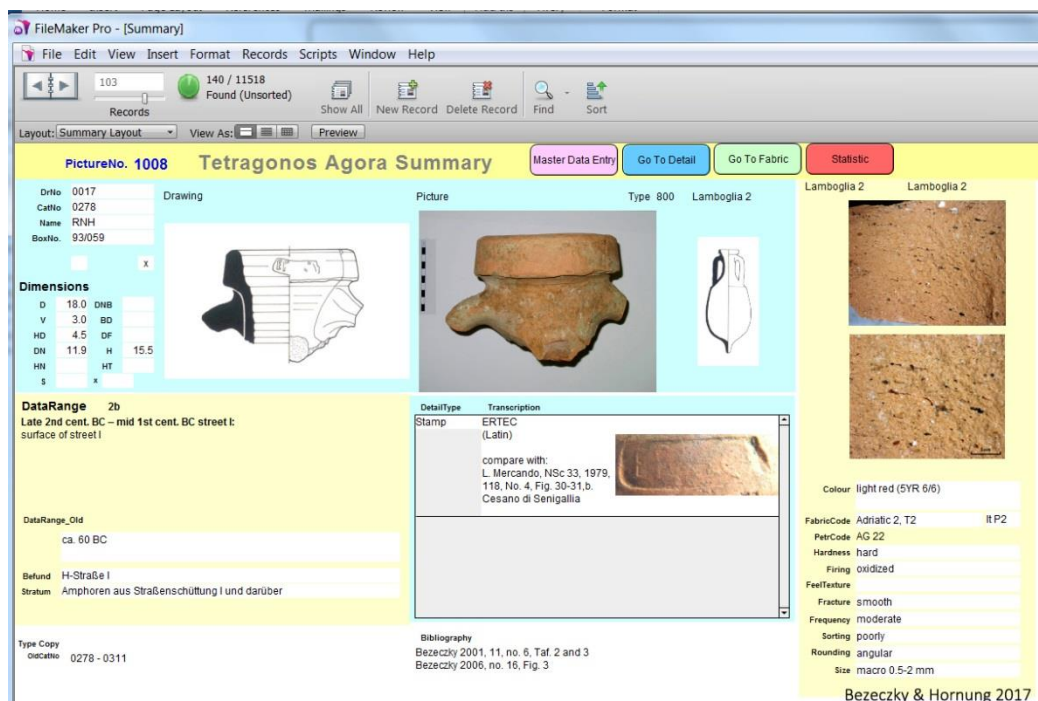


Fig. 12 Summary layout

This so-called Summary layout offers exits to different features (details = stamps, fabric, types, excavations data and main). The features of the individual amphora fragments are recorded in this separate layout. All the stamps were recorded individually, Detail layout.

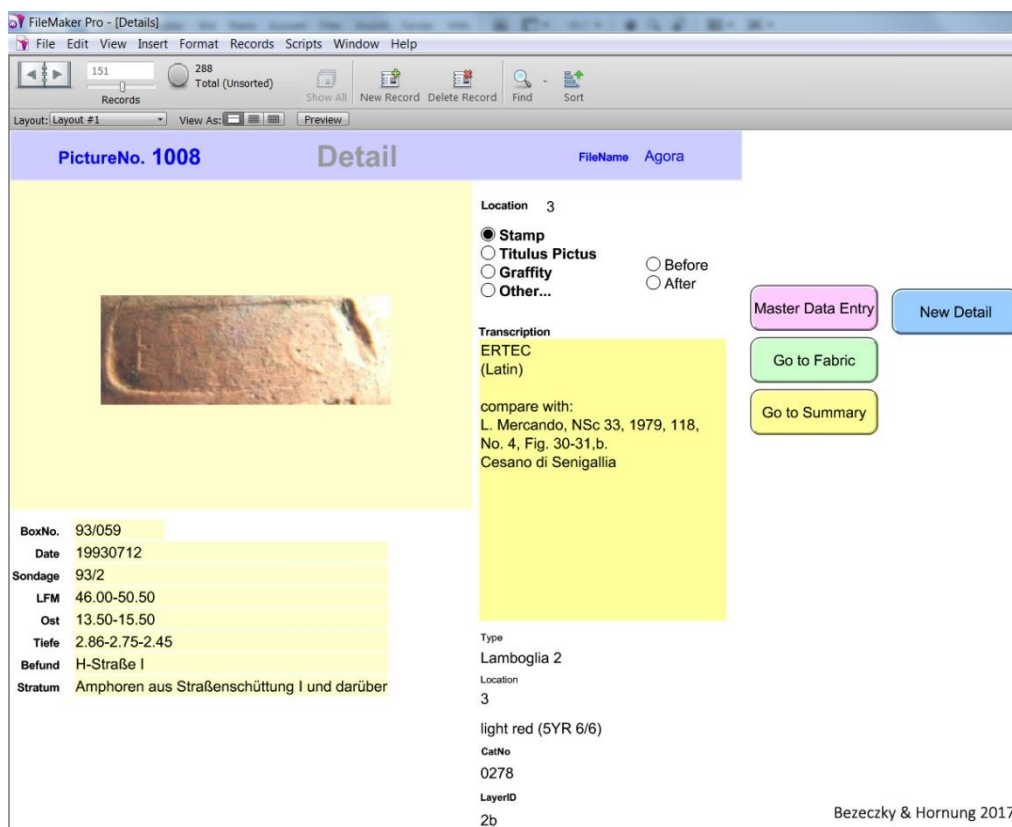


Fig. 13 Detail layout

After all findings are described and entered in the data base, it is possible to select those types best representing its class. The significant pieces had their own drawings and photos. We have 667 drawings and 625 photos of the fragments at the Agora and 352 drawings and 187 photos of the fragments at Terrace House 2.

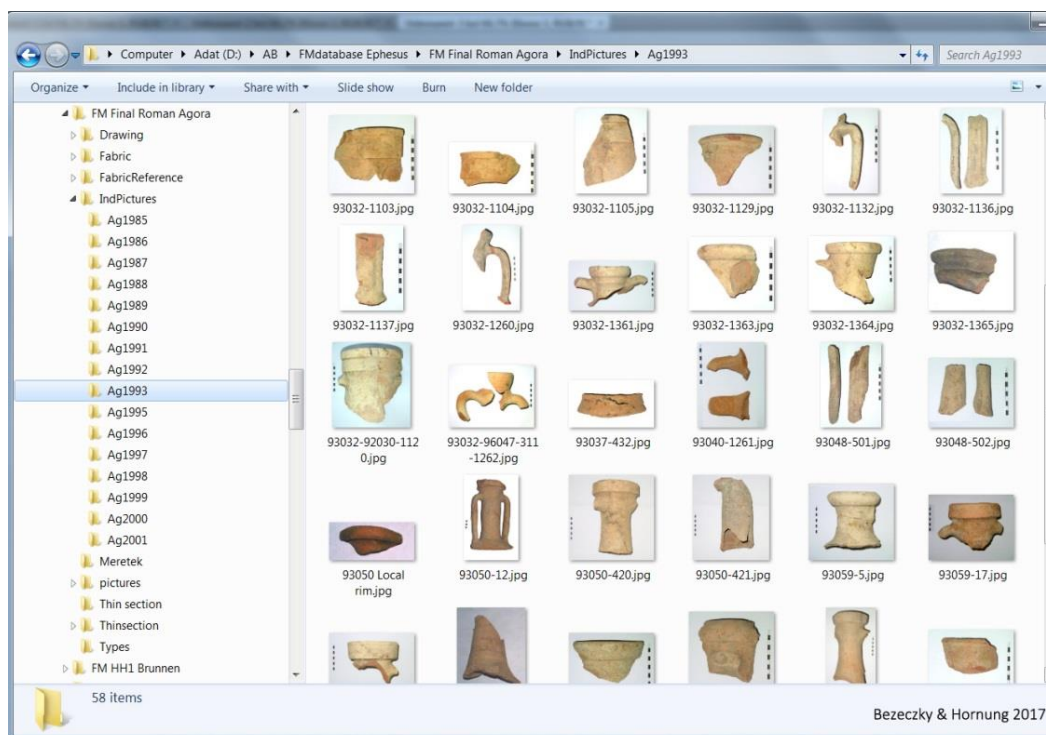


Fig. 14 Individual pictures

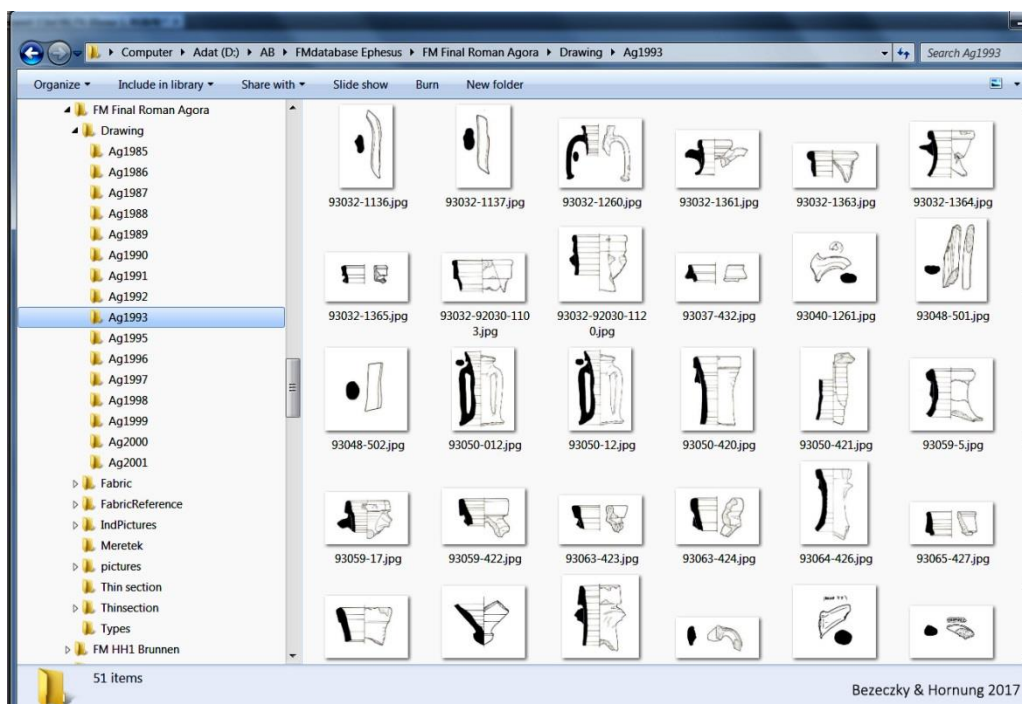


Fig. 15 Individual drawings

All data bases profit from singular data entry and the unique sorting and filtering possibilities. This explains some redundant data on some layouts but enabled the understanding of later added data (colour, type, descripton, etc.).

FileMaker Pro - [Fabric]

File Edit View Insert Format Records Scripts Window Help Bezezcky & Hornung 2017

110 877 Total (Unsorted) Show All New Record Delete Record Find Sort

Layout: Fabric Layout View As: Preview

PictureNo. 1008 Fabric Agora FileName: Agora 110

FabricCode	Adriatic 2, T2	It P2	Colour	light red (5YR 6/6)	Frequency	moderate
BoxNo.	93/059		Hardness	hard	Sorting	poorly
Type	Lamboglia 2		Firing	oxidized	Rounding	angular
Location	3		Feel/Texture		Size	macro 0.5-2
DrNo	0017	CatNo. 0278	Fracture	smooth		

Master Data Entry New Fabric Goto Detail Goto Summary

Limestone or Chalk	Mica	Shells, fossils	Rock fragments	Oxide minerals	Clay pellets (natural)	Voids	General
sparse	sparse			sparse		moderate	moderate
Sorting_	poorly			poorly		poorly	poorly
Rounding_	angular			subangular		angular	angular
Size_	macro 0.5-2			macro 0.5-2		mega >2	macro 0.5-2
Colour_	white			reddish			

PetrCode: AG 22

Fig. 16 Fabric layout

The data base contains photomicrographs at 1:10 and 1:20 magnification of the fresh breaks of the amphorae. The Agora has 1978, Terrace House 2, 818 photos. (Fig. 16)

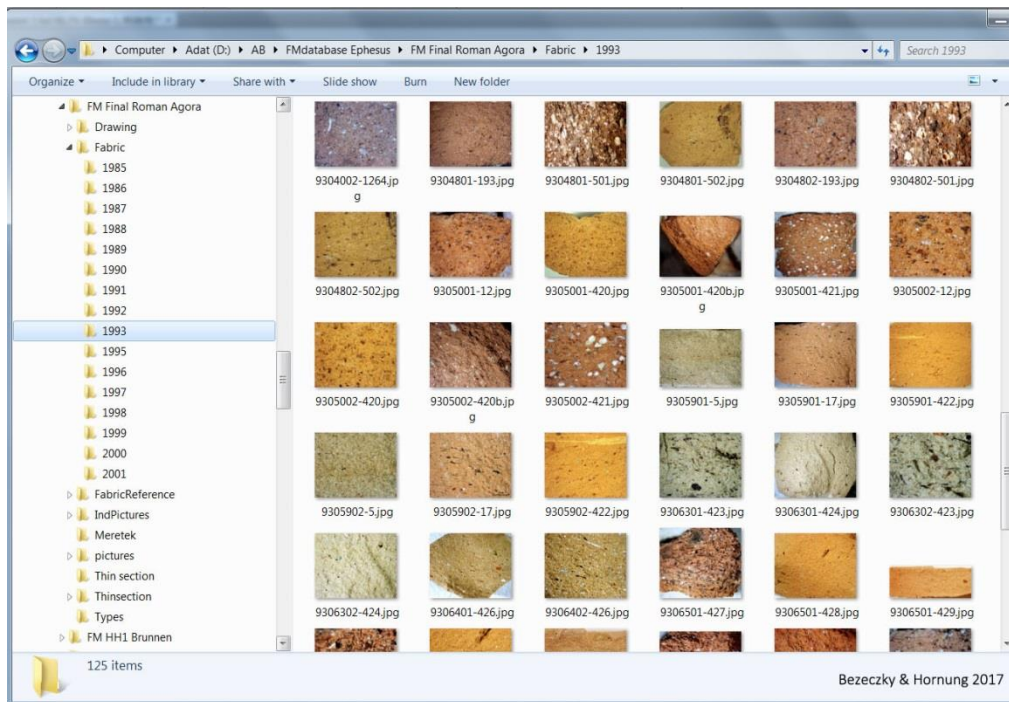


Fig 17 Photomicrographs in the data base

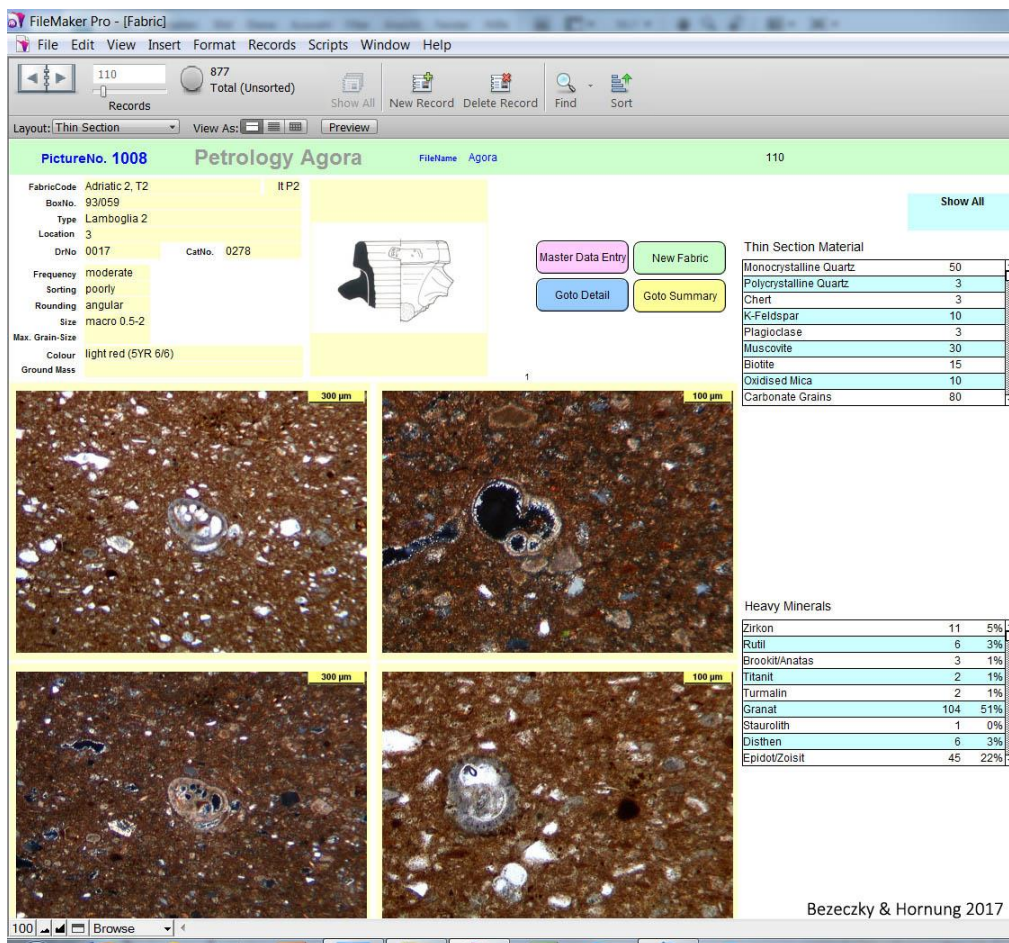


Fig 18 Petrology layout

We recorded the petrological data (thin section and heavy mineral) and the photomicrographs of the thin sections.³ (Fig 18)

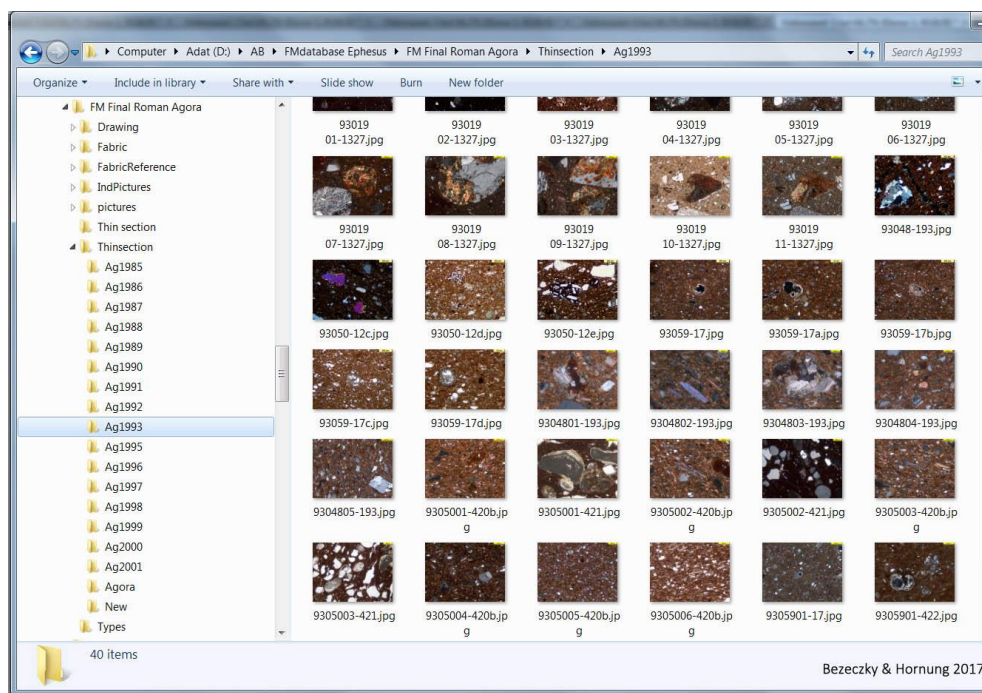


Fig. 19 Photomicrographs in the data base

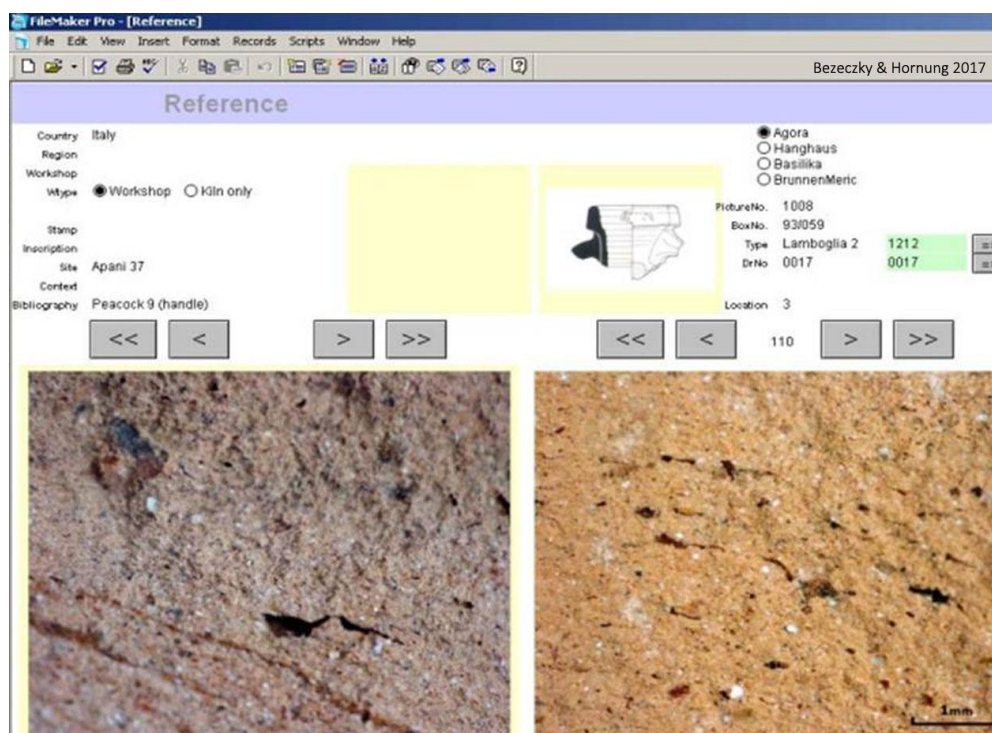


Fig. 20 Reference layout

There is a collection of reference photomicrographs of the amphorae from the Italian, African and Spanish kilns and workshops.⁴ The reference amphorae and the ones found in Ephesus can be compared within the same screen. (Fig. 20)

³ The petrological analyses were prepared by Roman Sauer (Universität für Angewandte Kunst Wien)

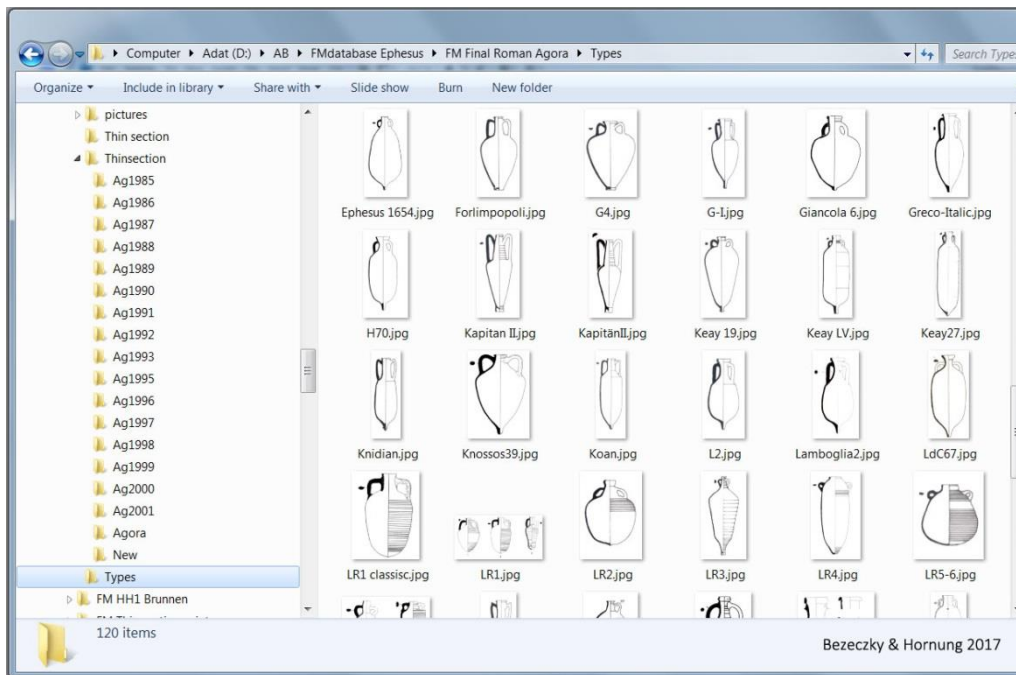


Fig. 21 Amphora types in the data base

When describing the various types of amphorae, we used the labels that are generally accepted. After the Southampton data base was published, we adopted the labels it uses.⁵ (Fig. 21)

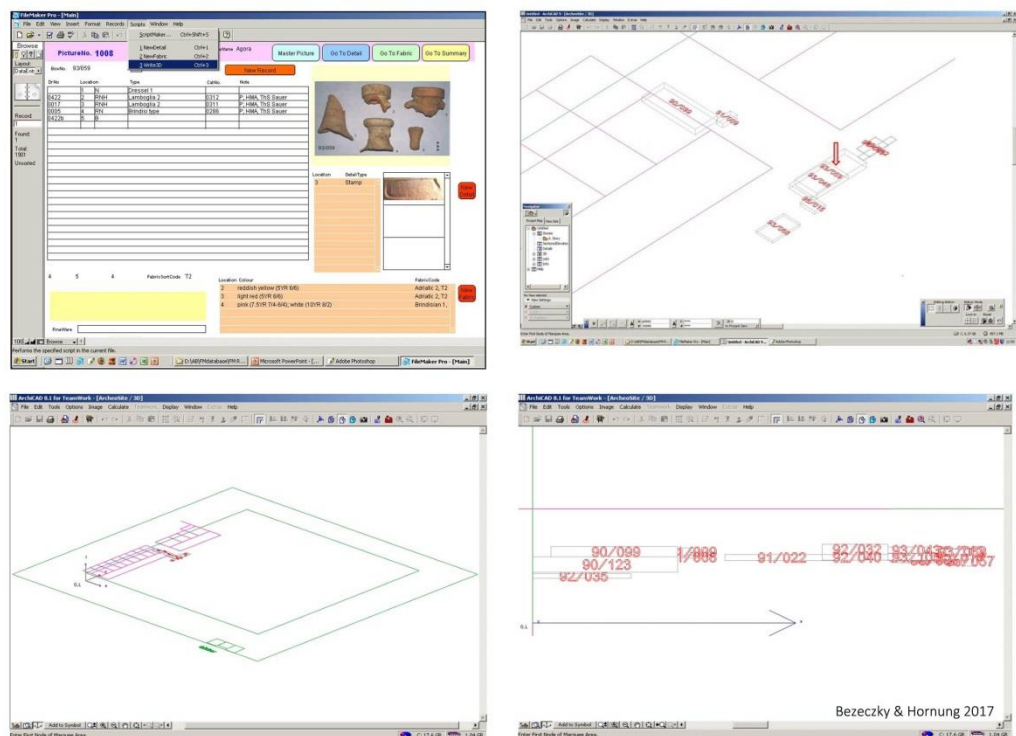


Fig. 22 Visualisation of position of the box on the map

⁴ The author would like to express his special thank to all his colleagues who made it possible to draw samples from published finds. I am especially grateful for the support I have received from Professor David Peacock (Archaeology Department of Southampton University).

⁵ http://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/

The data base is connected to 3D software (ARCHICAD, Graphisoft).⁶ The numbers of the boxes were used as unique identifiers. The position of the objects found nearby can also be viewed. This makes it possible to understand their relationship. (Fig. 22)

Finally, the data base allows several statistical analyses. We have studied the number of the different amphora types in the different layers. As the example shows, the Late Rhodian amphorae are present in different layers. Overall, 451 amphora shards have been discovered. The earliest one stem from the late second century B.C and continue in the mixed layers till before mid sixth century A.D. (Fig 23)

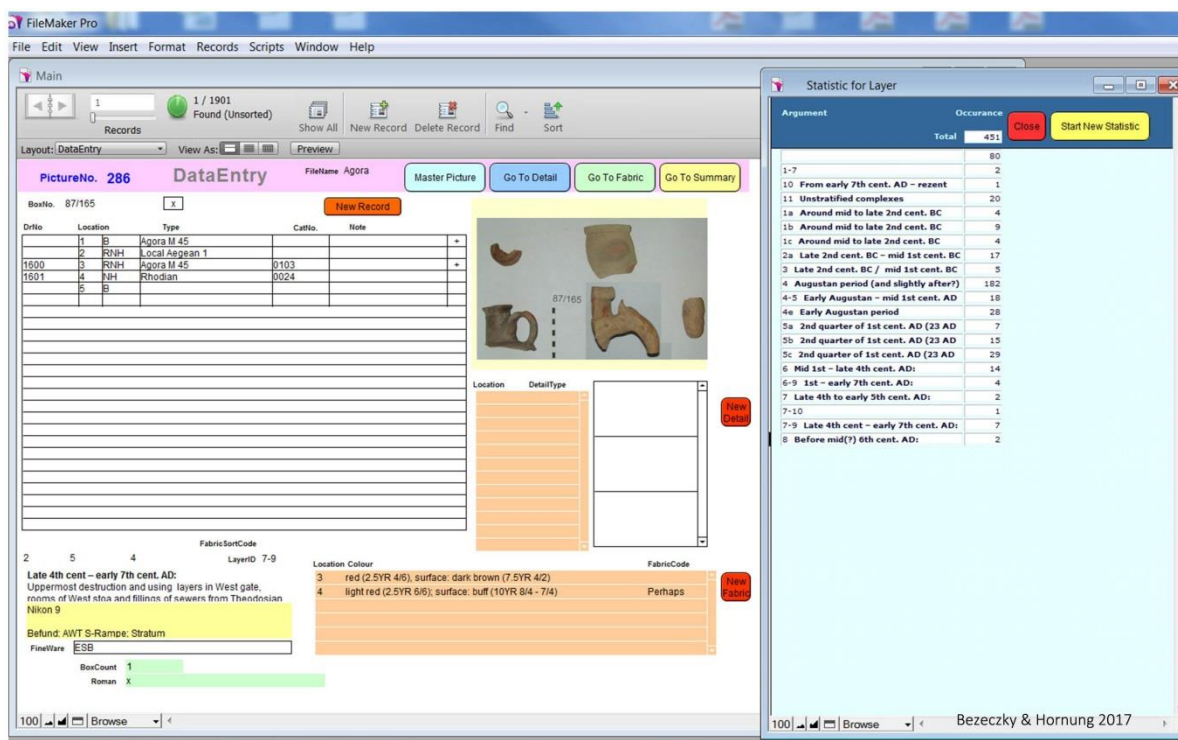


Fig. 23 Statistical analyses of the Rhodian amphora in layers

The creation and data entry in the data base required long. Especially the creation of the photographs and the amphorae definition required great effort. Despite the large photographic data the data base operates quickly: thanks to the file management system, the individual data is not stored in the data base itself, rather it is stored in separate files and accessed separately.⁷ The individual descriptions were used in publications, using the data base itself for printing.⁸ This was especially useful for the fabric.

We presented the data base first at the conference in Athens. It appeared in the conference papers in 2004.⁹

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Bezeczy, T. (2013) The Amphorae of Roman Ephesus, *Forschungen in Ephesos* XV/1, Wien.

Bezeczy, T. (2017) Amphora Databases: The Case of Rhodian and Istrian Amphorae, In Protection and Enhancement of Cultural Heritage. The Case of Transport Amphorae. Rhodes.

⁶ This application also created by Péter Hornung.

⁷ Size on the disk 2.49 GB; Contains 7.717 files, 193 folders.

⁸ Bezeczy 2013, Plates 57-101.

⁹ Bezeczy 2004, Fig. 7.