

The Inventory of the Getic Necropolis – Statistical Analysis

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Abstract

The “Funerary” program is made in Excel 2000, with the basic idea being to make a program with a friendly and accessible interface for users without knowledge of Excel. This is done using only Visual Basic for the application programming language. The novelty of this concept consists in assigning representative numerical values to each type of object. This way, a proper quantity and quality estimation of funerary inventories can be made. There are two statistical types: numeric and graphic. We consider this to be an efficient method for fast evaluation of an unlimited number of graves or necropolises, with the researcher focusing his attention on the relevant sites. The resultant conclusions may show new aspects of the material and spiritual life of the respective people that cannot be obtained through classic methods. We believe that the possibility of this type of quantification in archaeology (by replacing all objects with numerical values and applying mathematics to them) may lead to the development of new scientific branches that are currently unimaginable.

1 How the “Funeral” Program Functions

1.1 Introduction

The “funeral” program is made in Excel 2000. The main idea was to create a program with a friendly interface that is readily accessible to the user, without the user having knowledge of Excel. Visual Basic for Applications was the programming language used for this application. The novelty of the concept lies in attaching numerical values to each type of object that is representative of its value. In this way, a correct quantitative and qualitative appreciation of the funeral inventories can be achieved. The statistics are of two types: numerical and graphical. We suggest that this is the unique method of rapid evaluation of an unlimited practical number of graves and necropolises, focusing the attention of the researcher upon the sites that are truly important. The conclusion that results from this evaluation can reveal new aspects of the material and spiritual life of those populations, which cannot be obtained by classical methods (i.e., using quantitative methods exclusively). We believe that the possibility of quantification of this type in archaeology (by replacing all the objects with numerical values and application of mathematics upon these values) could lead to the development of new scientific branches, which at present are inconceivable.

1.2 Functioning of the Program

Introduction of the data by the archaeologist is strictly supervised by the program, and in case of errors, explication boxes will pop up with the type of the errors, as well with the way of correcting them. When introducing the data, only a left-click with the mouse will be needed and only numerical values or the character “x” are introduced. The program will not even allow a window to be closed with the upper right “Close” button; rather, the window must be closed using exclusively the controls within the program. Inside the program, the calculations are made with two decimal places

and the graphs are displayed only with integer numbers, so the values displayed are multiplied by 100. In the following paragraphs, we will explain briefly the content and the functioning of each Excel spreadsheet within the program. At the start of the program, a pop-up box with the names of the effecters will be shown. The program has implicit values of 85 and 43, respectively, for objects of funeral grave goods. This can be modified for the general case and any new facilities can be added.

1.3 Graves Sheet

In Figure 1, the Graves Sheet, the first column is the number of the grave, introduced strictly in an increasing order. The next 85 columns represent the type of object designated by “Txx” The heading of each column has the name of the object written in the commentary. The color of every fourth column is modified from the normal white to blue to make it easier to distinguish the columns while scrolling vertically. The structure of the sheet is as a branching dendrogram with different levels, the topmost being the “Funeral Grave Goods” which is broken into three categories that form the second level of dendrogram. The second level categories are named: “Handmade Vessels,” “Wheel Made Vessels,” and “Imports,” which are each further broken down into numerous sub-categories. The third level categories are labeled “Txx” (where “xx” is a two digit number).

Functioning of the Keys. The button labelled “Blocked/Unblocked” changes color from green to red. When the sheets are blocked, the button will read “Blocked” and be colored red. When the sheets are unblocked, the button will read “Unblocked” and be green. Using the “Block/

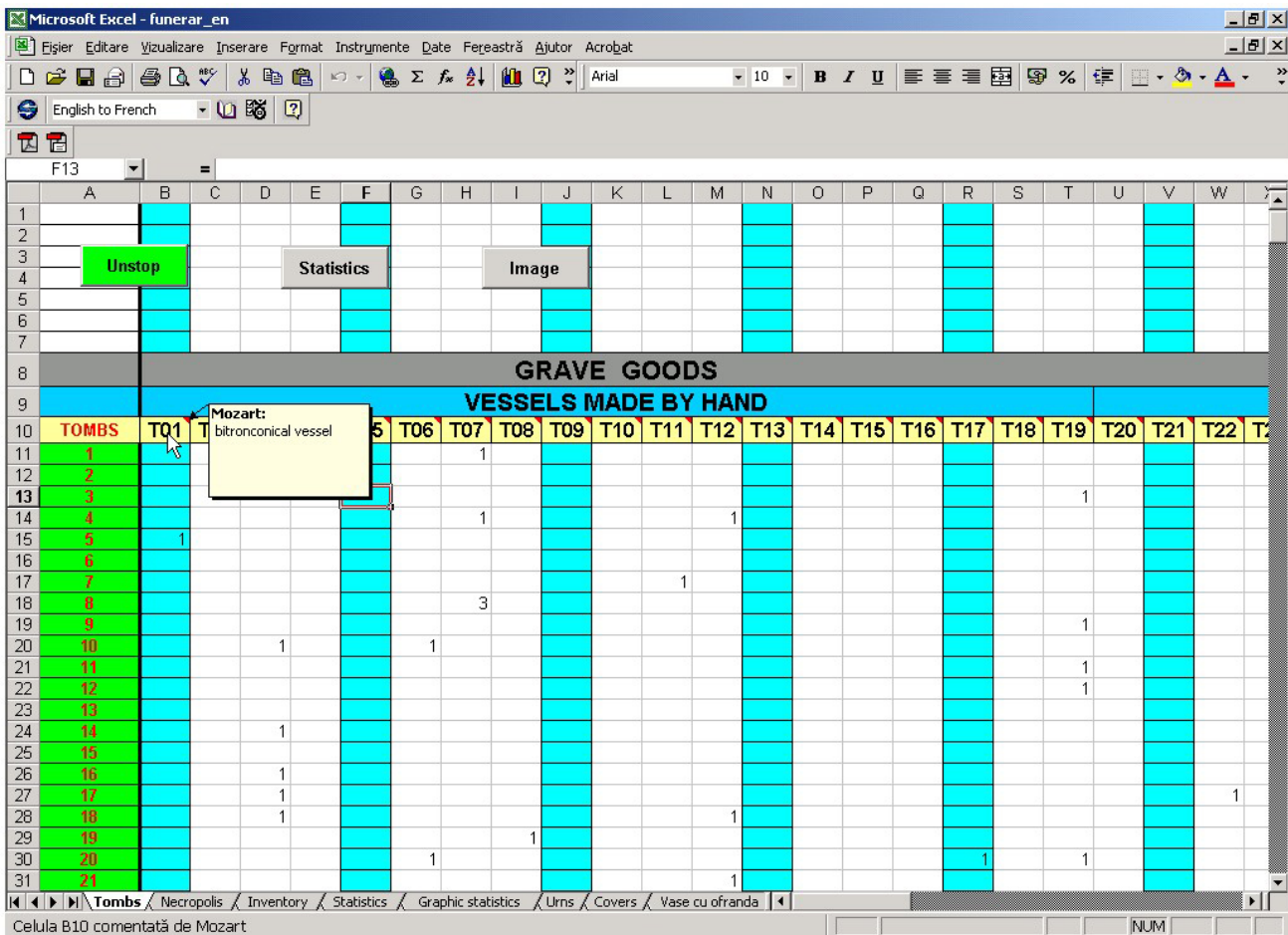


Figure 1. Graves Sheet.

Unblock” button will block (or unblock) the following sheets: “Graves,” “Necropolis,” “Inventory,” “Urns,” “Covers,” “Vessels with offerings,” and “Vessels for offerings.” The purpose is to avoid the modification of the data while displaying statistics and graphs.

The button labelled “Image” displays a representative image for each column of objects. This image is saved as a file in the directory “c:\images\” and will be designated by i1, i2, i3, i4, etc. Left click on a column and then click the button marked “Images.” This will display a window or show a warning box if no image is designated. The program can be modified from displaying the representative images of the column to displaying individual images for each cassette.

Clicking on the button labelled “Statistics” creates the sheet “Statistics” as follows:

- From line “Graves i” where $i = 1-85$, the program executes the sum of products of the object from the sheet “Graves” with the correspondent coefficient of the object from the sheet “Inventory” (Figure 2) and arranges them in the sheet “Statistics” at the rubric “Graves statistic” in the two columns named “Grave no.” and “Value.”
- At the rubric “Necropolis - Statistic” and “Necropolis - i” the sum of the graves values which belong to that necropolis are associated.

1.4 Necropolis Sheet

Each “Necropolis” is associated with “Grave - Initial” and “Grave – Final.” By design, the graves are in a continuous order (between the first and the last grave, the numbers are strictly in an increasing order without breaking the sequence). One should be warned, though, that the program stops the calculations right at the moment when a number has not been introduced in the rubric “Necropolis.”

1.5 Inventory Sheet

To each type of object, the archaeologist assigns a numerical representative value for that type of object, proportionate to its importance. In the column “x” numerical values are introduced for the same type of object, but in fractions (or decimals).

1.6 Statistics Sheet

The sheet “Statistics” is calculated by clicking the button marked “Statistics” from the sheet “Graves” (Figure 3). The “Graphs” button, when clicked, initiates the form called “Grave Number.” This form contains a text field box where the researcher must type in the “Grave Number,” and it also has two radio buttons with mutual exclusion named

	A	B	C	D
	NR. CRT	OBJECT TYPE	VALUE	X
1				
2	1	bitruncated vessel	0,36	0,001
3	2	truncated vessel	0,35	0,002
4	3	bell shape vessel	0,34	0,003
5	4	cylindrical vessel	0,33	0,004
6	5	pot	0,32	0,005
7	6	jar	0,31	0,006
8	7	tureen	0,24	0,007
9	8	porringer	0,23	0,008
10	9	bowl	0,22	0,009
11	10	semispheric vessel	0,21	0,01
12	11	amphoroidal vessel	0,17	0,011
13	12	mug	0,16	0,012
14	13	small pot	0,15	0,013
15	14	cup	0,11	0,014
16	15	cup	0,13	0,015
17	16	tumbler	0,12	0,016
18	17	miniature vessel	0,11	0,017
19	18	rush light cup	0,1	0,018
20	19	unknow vessel	0,09	0,019
21	20	pithos	4,2	0,02
22	21	amphora	4,1	0,021
23	22	tureen	3,4	0,022
24	23	porringer	3,3	0,023
25	24	"fruit bowl"	3,2	0,024
26	25	bowl	3,1	0,025
27	26	krater	2,4	0,026
28	27	mug	2,3	0,027
29	28	cup	2,2	0,028
30	29	cup	2,1	0,029
31	30	itruncated vessel with two handle	1,3	0,03

Figure 2. Inventory Sheet.

“Objects/grave no.” and “Objects * Coefficient,” along with a “Validation” button. The first radio button creates the graph “Graves – Statistics” in which the program reproduces from “Graves” the number of objects from the selected grave line on the sheet. The second radio button calculates the product of the objects from the sheet “Graves” and its coefficient from the sheet “Inventory” for the selected grave (i.e., the number of objects multiplied by their coefficient).

1.7 Urns, Covers, Vessels with Offering, and Vessels for Offering Sheets (Figure 4)

On these sheets, for each necropolis (in this case the rows) the values for each category (i.e., the number of objects from the necropolis in that object category - represented as columns) are introduced by the archaeologist and represent the number of objects from a certain necropolis used

	A	B	C	D
	NR. TOMB	VALUE	NR. NECROPOIS	VALUE
1				
2				
3				
4				
5				
6	1	37,54	1	107,71
7	2	9	2	115,83
8	3	9,09	3	2081,5
9	4	0,4	4	2064,76
10	5	0,36	5	2260,92
11	6	6	6	861,16
12	7	0,17	7	3,19
13	8	9,72	8	1150,85
14	9	29,09	9	415,46
15	10	3,95	10	5534,77
16	11	2,39	11	3325,22
17	12	104,09	12	1359,95
18	13	9	13	16549,88
19	14	0,34		
20	15	2,4		
21	16	3,64		
22	17	3,74		
23	18	0,5		
24	19	2,63		
25	20	135,42		
26	21	13,16		
27	22	9,78		
28	23	0,09		
29	24	156,13		
30	25	0,32		

Figure 3. Statistics Sheet.

as funerary objects. The program automatically assigns a value of “0” for empty data fields.

1.8 Funerary Objects - Statistics Sheet

This sheet contains the button labeled “Statistics,” which when clicked displays the form named “Funerary Objects – Statistics.” This form contains data entry text boxes named “Necropolis Number” and the expansion box with the four types of funerary objects (i.e., Urns, Covers, Vessels with Offerings, and Vessels for Offerings) (Figure 5). When the “Validation” button is clicked, the calculations are executed for the entire necropolis, for the types of objects that were selected on the form. A graph will be produced on the sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
	NECROPOLIS	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	
1																								
2	1	1					1	1				1									2			
3	2			1																	1			
4	3	4	10	27	7		7	2			1		1							17		2		
5	4	4	10	31	3	1	5	4												2		1	1	
6	5	10		25	4	1	7					1								4				
7	6	2		14	3	2	6															3		
8	7						3						1								2			
9	8			6		6	1					1								2				
10	9			1		7						1								5				
11	10			4	1		2					1								2				
12	11	1		14	6	2	8	1				9								28		1	1	
13	12	1		3								1												
14	13	21	1	14	6		30	2	1		6	9								5	3	13	3	
15																								
16																								
17																								
18																								

Figure 4. Urns Sheet.

NECROPOLIS	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22
1	100	0	0	0	0	100	20	0	0	0	100	0	0	0	0	0	0	0	66,67	0	0	0
2	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
3	80	62,5	96,43	70	0	53,85	28,57	0	0	25	0	14,29	0	0	0	0	0	0	70,83	0	100	0
4	100	100	96,88	100	100	50	44,44	0	0	0	0	0	0	0	0	0	0	0	22,22	0	50	3,33
5	100	0	96,15	100	100	100	0	0	0	0	0	50	0	0	0	0	0	0	66,67	0	0	0
6	100	0	100	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
7	0	0	0	0	0	60	0	0	0	0	0	50	0	0	0	0	0	0	66,67	0	0	0
8	0	0	100	0	54,55	100	0	0	0	0	0	50	0	0	0	0	0	0	33,33	0	0	0
9	0	0	100	0	77,78	0	0	0	0	0	0	20	0	0	0	0	0	0	100	0	0	0
10	0	0	57,14	50	0	100	0	0	0	0	0	50	0	0	0	0	0	0	40	0	0	0
11	50	0	60,87	85,71	28,57	38,1	2,86	0	0	0	0	34,62	0	0	0	0	0	0	54,9	0	50	14,29
12	100	0	100	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
13	91,3	33,33	70	75	0	71,43	22,22	2,86	0	0	100	45	0	0	0	0	0	0	16,13	100	100	42,86

Figure 5. Funerary Objects - Statistics Sheet.

named “Funerary Objects - Graphs” and will display only the selected necropolis.

The statistics include the following: of the 85 types of objects from the sheet “Graves” only the first 43 types are used as funerary objects (urns, covers, vessels with/for offering). For the graves from each necropolis, the program compares two pieces of data to the sum of each column from the sheet named “Graves:”

1. The number of funerary objects (i.e., urns, covers, vessels) selected belonging to each type; and
2. The number of funerary objects selected belonging to the corresponding necropolis.
3. The percentages of each are displayed in a separate field. At this point, another four sheets are created

1.9 Funerary Objects - Graphs Sheet

This sheet displays the selected line from the sheet named “Funerary Objects – Statistics.”

NECROPOLIS	T01	T02	T03	T04	T05	T06	T07	T08	T09	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22
1	11,11	0	0	0	0	11,11	11,11	0	0	0	11,11	0	0	0	0	0	0	0	22,22	0	0	0
2	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0
3	4,65	11,63	31,4	8,14	0	8,14	2,33	0	0	1,16	0	1,16	0	0	0	0	0	0	19,77	0	2,33	0
4	5,48	13,7	42,47	4,11	1,37	6,85	5,48	0	0	0	0	0	0	0	0	0	0	0	2,74	0	1,37	1,37
5	16,67	0	41,67	6,67	1,67	11,67	0	0	0	0	0	1,67	0	0	0	0	0	0	6,67	0	0	0
6	5,71	0	40	8,57	5,71	17,14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,57	0
7	0	0	0	0	0	50	0	0	0	0	0	16,67	0	0	0	0	0	0	33,33	0	0	0
8	0	0	31,58	0	31,58	5,26	0	0	0	0	0	5,26	0	0	0	0	0	0	10,53	0	0	0
9	0	0	6,67	0	46,67	0	0	0	0	0	0	6,67	0	0	0	0	0	0	33,33	0	0	0
10	0	0	40	10	0	20	0	0	0	0	0	10	0	0	0	0	0	0	20	0	0	0
11	1,1	0	15,38	6,59	2,2	8,79	1,1	0	0	0	0	9,89	0	0	0	0	0	0	30,77	0	1,1	1,1
12	16,67	0	50	0	0	0	0	0	0	0	0	16,67	0	0	0	0	0	0	0	0	0	0
13	14,79	0,7	9,86	4,23	0	21,13	1,41	0,7	0	0	4,23	6,34	0	0	0	0	0	0	3,52	2,11	9,15	2,11

Figure 6. Urns - Statistics Sheet.

Procentual statistics

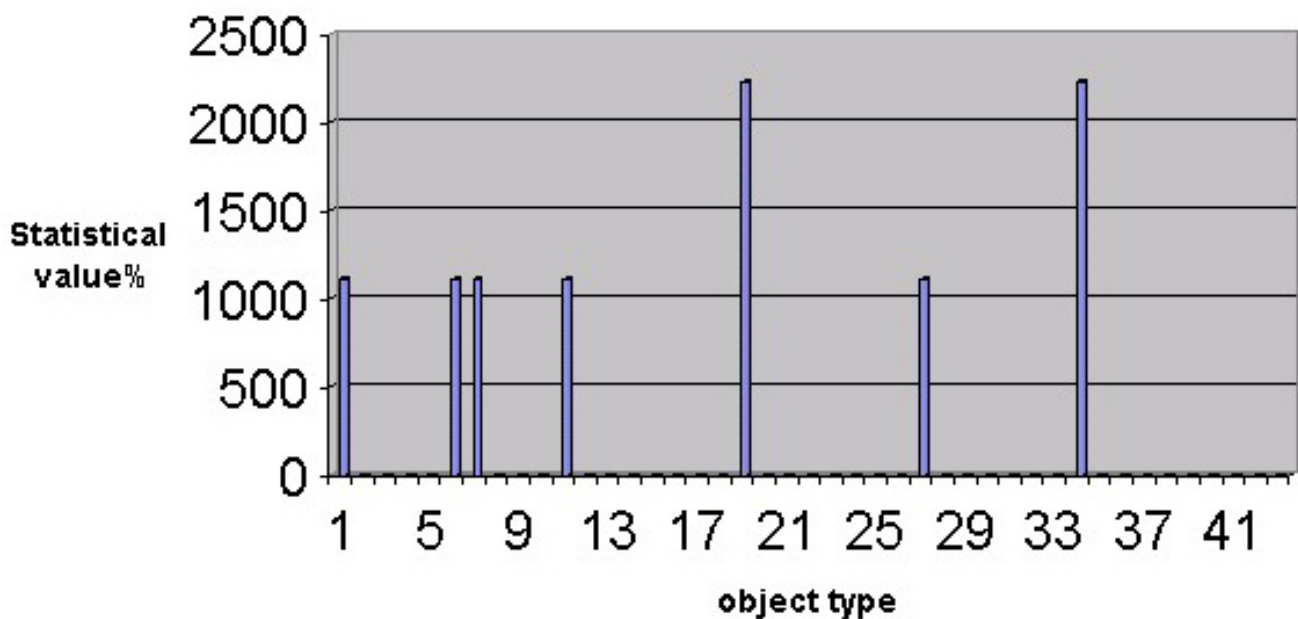


Figure 7. Percentage - Graphs Sheet.

1.10 Percentage - Graph Sheet

This sheet renders those 43 values from the necropolis and the type of the object selected (Figure 7). A sum of the four types of objects is made and this value of the selected type of object is reported. Warning: the graphs displayed at this point are derived from the previous calculations up to the point where the “Statistics” button was clicked. (Or until the “Statistics” button is clicked again.) There are no indications to say which graph it is. The last graph generated is saved somewhere on that sheet and continually displayed until another graph is generated (which then replaces the current graph).

2 Conclusions

The use of this program, specifically based on the needs of the archaeologist, helps to create, in a relatively short period of time and with precise results, statistics necessary for the interpretation of funerary grave goods, in this case with a specific look at the vessels which were deposited. The main purpose of this study was to determine whether or not there are pots of different shapes which had special functions in the graves of a necropolis. Also, by giving quantifiable values to the objects found in graves, one can identify the ratio of graves belonging to a rich person and graves belonging to common people. This helps to formulate conclusions concerning the position and the social hierarchy in a community of those who were buried in the grave.

Examples.

1. The Getic tumulus (mound burial) necropolis of Enisala (Simion 1971):
 - 86.68% of the urns were big vessels, especially

- those that were handmade or Greek amphorae;
- 70% of the covers of the urns were bowls or dishes made by hand or by wheel;
- 80.94% of the vessels are vessels given with offerings;
- 85.71% of the objects which were used for drinking, eating, or offerings are bowls and amphorae. At least some of these were used at the funerary ceremony and others were just placed there, probably on the funeral pile with the deceased.

2. In the Getic necropolis of Zimnicea (Alexandrescu 1980) archaeologists studied 177 graves. These graves contained numerous and various types of vessels. The statistical analysis of these graves and vessels gave the following results:
 - 66.2% of vessels with a big capacity were used as urns;
 - 56.3% of bowls and dishes were used as covers;
 - 100% of vessels for eating and drinking functioned as vessels with offerings;
 - 70.27% of bowls, cups, miniature vessels, and vessels with an unknown shape due to fragmentary condition, were used as vessels for offerings.
3. Another statistical analysis by this program was made in order to determine the general function of different pot shapes in the graves of a necropolis. The necropolis of Enisala (Simion 1971) yielded the following results:
 - 100% of bitonconic vessels were used as urns;
 - 96.15% of bell vessels were used as urns, and 3.85% were used as covers;
 - 100% of cylindrical vessels were used as urns;
 - 100% of pots were used as urns;
 - 100% of jars were used as urns;
 - 100% of handmade bowls were used as covers;

- 20% of handmade dishes were used as covers, 40% were used as vessels with offerings, and 40% were used as vessels for offerings;
- 50% of handmade cups were used as urns and 50% were used as vessels for offerings.

Specific values were given to the objects: the everyday handmade vessels have the smallest values, the wheel-made vessels of local production have higher values, the imported vessels are of even higher values, and the funerary inventory (especially the metallic ones) has the highest values. In the Getic tumulus necropolis of Enisala (Simion 1971), of 60 graves, 3 were calculated to have a high value and in Canlia (Boroffka, Trohani 2003), of 78 graves, 4 had the highest values.

This statistical analysis was the means which the authors—one an archaeologist and one an engineer—tried to “speak the same language” in order to discover whether there are certain constants with regard to the vessels placed in Getic graves. Of course, based on the data from the

graves sheet, other statistics can also be calculated. For example, one could attempt to determine more accurately whether there is a meaningful ratio between the vessels and the funerary inventory. One could also try to determine the way of placing the funerary goods in the graves.

Referentes Cited

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