Session: FEEDING THE CITY

THE URBAN SYSTEM OF ROMAN EGYPT

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INTRODUCTION

This paper does not address the question *how* the cities of Roman Egypt were fed, but starts from the assumption *that* the cities of Roman Egypt were fed from their own territories, and explores some of its consequences.¹ More in particular, it presents an attempt to describe the urban system of Roman Egypt. It offers a rough estimate for levels of urbanisation, a relative ranking of town sizes and tries to put the available estimates of urban population size into perspective.

1. LEVELS OF URBANISATION

The level of urbanisation can be defined as the proportion of the total population that is living in urban centres. This definition can be expressed as a general equation and in a form applied to Roman Egypt:

Urban population * 100 = Urbanisation in % Total population $S_{Alex} + (N_{tot} * S_{av})$ *100 = U $A_{inh} * D_{pop}$ In which: = the population size of Alexandria, in pers. SAlex = the total number of urban centres, excluding Alexandria N_{tot} = the average population size of the urban centres, in pers. S_{av} = the inhabited area, in km^2 A_{inh} = the total population density, in pers./km² D_{pop} U = the resulting level of urbanisation, expressed as a percentage

¹ This paper forms a summary of the first two chapters of my forthcoming book *Fragile Hierarchies. The Urban Elites of Third Century Roman Egypt* (Leiden, Brill, 2005), which is a revised version of my dissertation, defended at Leiden University, The Netherlands, October 2003.

The equation is not primarily designed to offer a full description of urbanisation, but to lay bare some of the quantitative properties of Roman Egypt's population. Nevertheless, for cross-cultural comparisons of levels of urbanisation it is important to keep in mind the character of the definition. What counts as 'urban centre' is not determined on the basis of economic complexity or size or historical importance but on the basis of administrative criteria. Here it will be assumed that the category of urban centres consists of all nome (district) capitals. This has great practical advantages because it obviates the need to determine for each individual settlement its true status. However, it needs to be realised that in theory some towns included in the category of urban settlements might have been rustic backwaters, while some villages that are not reckoned to be urban might have reached the size of small towns.

The use of the equation has at least one advantage. As it is the broad band of possibilities, not the exact figures, that needs to be established, there is no need to discuss in detail all the difficulties that individual estimates for each variable present. The discussion of the population size of Alexandria, for example, forms a minefield of problematical passages and hypothetical inferences. For the equation, it simply suffices to take the lowest and the highest estimates that have been offered in the literature and explore the plausibility of their results.

The scholarly literature offers the following figures:

S _{Alex}	= 200.000-600.000 inhabitants
N _{tot}	= 40-50 towns
S_{av}	= 15.000-25.000 inhabitants
A _{inh}	$= 15.000-25.000 \text{ km}^2$
D_{pop}	= 200-320 pers./km2

What these figures imply for levels of urbanisation can be demonstrated with the help of a matrix. A calculation that uses maximum figures for all variables, based on a population of 8 million, a size of Alexandria of 600.000 inhabitants, 50 towns and an average town size of 25.000 inhabitants, leads to a level of urbanisation of 23%. A calculation with minimum figures, based on a population of 3 million, a size of Alexandria of 200.000 inhabitants, 40 towns, and an average town size of 15.000 inhabitants leads to a level of urbanisation of 26%. Combinations of high with low estimates produce extreme results. Combining maximum values for the size of Alexandria and the towns, with minimum values for population density and inhabited area result in levels of urbanisation that on comparative grounds can be considered implausible: 61%. Conversely, in a minimum/maximum calculation, levels of urbanisation drop to 10%.

	Max	Min
Max	23%	10%
Min	61%	26%

Put differently, it seems likely that this is a universe whose properties expand or contract more or less simultaneously. Increases in one variable are more likely to have been met with increases than by compensatory diminishments in other variables. The exact correlation between the different variables is impossible to determine, but it seems not very likely that, say, an increase in the inhabited area would not also imply at least some increase in the level of urbanisation. We are dealing with a balloon, not a seesaw. The corollary is that combinations of maximum with minimum estimates are unlikely to occur.

If this argument is accepted, it would be very difficult to argue that levels of urbanisation were substantially below 20% - which is a finding of real importance, given the fact that such a figure is high in comparative perspective. Even in the most extreme (and therefore unlikely) scenario with a combination of maximum and minimum estimates, levels of urbanisation are still at a respectable 10%. Such figures support the idea that Roman Egypt was heavily urbanised in the Roman period.

2. URBAN POPULATION SIZE

For a number of towns, estimates of the size of the urban population are available. Going from North to South, the population of Thmouis in the Eastern Delta comprised 25.000 inhabitants at minimum, that of Arsinoe in the Fayum 44.000 persons at maximum, that of Oxyrhynchos of anything between 20.000 and 42.000, that of Hermopolis of 45.000 and that of Apollonopolis Heptakomia of 9.000 inhabitants.

These estimates are based on extrapolation from much smaller figures that occur in some papyri. These figures concern, for example, the number of houses or the number of taxpayers in a particular district. These are then extrapolated to obtain a total estimate for the urban population. For example, each house is multiplied by the average number of inhabitants. Each taxpayer is multiplied by the number of non-tax paying people. Each quarter is multiplied by the total number of quarters. And so on. Needless to say, the estimates have wide margins of error. All estimates are obtained by extrapolation. With each multiplication, the margin of error becomes progressively larger. Nevertheless, it is important to realise that all calculations involve similar procedures. Most multipliers are used in more than one calculation - most notably the multiplier of average number of persons per house. Even if these multipliers prove to be in need of correction, the relative ranking would remain unaffected. Paradoxically, we end up with a set of figures each of which might be quite far off the mark, but which as a series can be considered to be relatively reliable.

What to do with the five figures we have, however? We have estimates for four large towns and one small town. The first conclusion to draw is also the most obvious. It can hardly be doubted that some of the towns of Roman Egypt were relatively large, in the order of 20.000 to 45.000 inhabitants. Despite their individual weaknesses the figures show collectively that the urban landscape of Roman Egypt consisted of some settlements that could easily rival those in other regions of the Roman Empire.

It is however an open question whether we can assume that such large towns were the norm. The figures should therefore be put into perspective by studying relative rank. We need to know how the large towns of Thmouis, Arsinoe, Oxyrhynchos and Hermopolis compare to the other nome capitals. We need to know whether there existed more towns as small as Apollonopolis Heptakomia.

3. RELATIVE RANK

The proposition that will be explored here is that the size of the administrative districts (the nomes) forms an indication of the population size of their capital towns. This proposition is based on the following reasoning. The economical territory of each town (the area from which the town was fed) can be supposed to have been formed by its own administrative territory, that is, by its nome. All nomes belonged to the same ecological system: their agriculture depended on the Nile. Therefore, agricultural conditions can be supposed to be roughly homogeneous. From the produce of each nome a fixed proportion was exported as taxes and rents to Alexandria and beyond. From the remainder, both the rural and the urban population were fed. As average agricultural productivity is supposed to be the same from nome to nome and levels of labour input and food intake can be supposed to be stable, the density of the rural population should also be the same from nome to nome. The urban population did not produce its own food, but was dependent on rural production. The size of the towns depended

on the size of the rural production, which depended on the size of the nome. Nome size can therefore be taken as an index of town size.

We know the sizes of the nomes of the Nile Valley and the Fayum. The third century nome capitals with known nome size are listed in Table 1. There occurs wide variation. The spectrum runs from a mere 72 km² in the case of the Ombite nome, to ca 1.400 km² in the case of Hermopolis. The majority of nomes had sizes below average, while three, Oxyrhynchos, Arsinoe and Hermopolis, possessed a size more than twice the average.

Let us compare the estimates discussed in the previous section with nome size. Thmouis must of course be left out of account, for it was located in the Delta, and no nome size is known. That in the case of the other figures the correlation is roughly correct can hardly be doubted. The towns with large populations appear to have had correspondingly large nomes. Apollonopolis Heptakomia has in comparison a rather small nome.

It also becomes quickly apparent that the estimates produced in the previous section can hardly be representative of all nome capitals. Three of the four constitute the top of the list. On the basis of the size of their nome, there can hardly be any doubt that Arsinoe, Hermopolis, and Oxyrhynchos were the largest towns of the Nile valley.

For the rest of the list, there is only one estimate available, that of Apollonopolis Heptakomia. It is very hard to use that single estimate as a basis to produce a curve connecting the top of the list with the rest. Would Hypsele, with a nome of 125 km^2 , be significantly smaller than Apollonopolis Heptakomia, with a nome of 206 km^2 ? How much larger would Tentyra with a nome size of 300 km^2 be? We have to balance between caution and precision. Ascribing exact sizes to each town produces a misleading sense of precision that will make the enterprise too speculative. Not to dispose entirely of figures, it seems useful to produce minimum – maximum estimates instead. These have been listed in Table 1.

Table 1 Nome capitals with known nome territory						
Nome capital ²	Nome ³	Size territory	Estimated size			
		nome (in km ²) ⁴	urban			
			population ⁵			
Hermopolis	Hermopolite	ca 1.000	45.000			
Arsinoe	Arsinoite	ca 900	44.000 or less			
Oxyrhynchos	Oxyrhynchite	780	20.000-42.000			
Herakleopolis	Herakleopolite	643+	17.500-27.500			
Ptolemais (Hermiou)	Thinite	613	17.500-27.500			
Panopolis	Panopolite	575	15.000-25.000			
Antaiopolis	Antaiopolite	531	15.000-25.000			
Koptos	Koptite	331	12.500-20.000			
Diospolis (Parva)	Diospolite (Parva)	306	12.500-20.000			
Tentyris	Tentyrite	300	12.500-20.000			
Thebes / Diospolis	Theban / Diospolite	284	10.000-15.000			
(Magna),	(Magna)					
Memphis	Memphite	281	10.000-15.000			
Lykopolis	Lykopolite	250	10.000-15.000			
Apollonopolis	Apollonopolite	206	9.000			
Heptakomias	Heptakomias					
Aphroditopolis	Aphroditopolite	200	7.500-12.500			
Apollonopolis (Magna)	Apollonopolite (Magna)	137	7.500-12.500			
Nilopolis	Nilopolite	133	7.500-12.500			
Hypsele	Hypselite	125	7.500-12.500			
Kynopolis	Kynopolite	ca 110	7.500-12.500			
Ombos	Ombite	72	5.000-10.000			
Average (rounded)	20 towns	410	14.000-22.000			

² Based on Calderini and Daris (1935-1996) and Bagnall (1993) appendix 3.
³ Based on Calderini and Daris (1935-1996) and, to a lesser extent, Bastianini and Whitehorne

 <sup>(1987).
 &</sup>lt;sup>4</sup> Taken from Bagnall (1993) appendix 3, adapted to third century circumstances.
 ⁵ Figures in normal type are based on rank-size distribution; those in bold type on independent

4. EXPLORING THE URBAN SYSTEM OF ROMAN EGYPT

The urban hierarchy sketched in the previous section concerns the Nile Valley. The last step is to extrapolate the argument to the rest of Egypt. In the absence of any quantifiable information, this needs the application of thick paint with a broad brush. In the previous section, a relative ranking for twenty nome capitals was established. In all there must have existed approximately forty to fifty nome capitals. To obtain a sense of the hierarchy of the whole of Roman Egypt, we may simply multiply the spectrum of town sizes with 2 to 2,5, and place Alexandria on top.

The resulting urban system can be described as follows. Seen for the whole of Egypt, it consists of one very large centre (Alexandria), a couple of quite sizable towns (among them Hermopolis, Arsinoe and Oxyrhynchos), some towns of intermediate size and a majority of rather small ones. Expressed in orders of magnitude, the differences may have been 1:10:25:50. Hermopolis was about five times as large as Apollonopolis Heptakomia, while Alexandria was ten times as large as Hermopolis.

A comparison with Roman Italy is instructive.⁶ The situation in Roman Italy is roughly similar to that of Roman Egypt, with an urban system that is also strongly pyramidal in form. However, there is also a difference. The variation in population size between Alexandria and a town the size of Hermopolis appears to have been large. It dwindles, however, in comparison to Roman Italy. No matter how large we think the second largest city was, the gap with Rome was larger than the gap in Roman Egypt. In formal language: the primacy of the urban system was less marked in Roman Egypt. There can be little doubt that this greater primacy was a function of the political power of Rome.

The Egyptian proportions convey a sense of differences in feel. Seen from Alexandria, all towns in the *chora* must have looked small, no matter what their differences were. Conversely, for the visitor from the *chora*, Alexandria must have been dazzling. What is at least as important, is the internal differentiation between nome capitals. Some towns were mundane centres, of high social and economic complexity, but others were hardly more than backwaters. The former are best known, because it is from these that the bulk of the papyri are originating. Somehow we have to keep our minds open for the world of the much smaller communities.

⁶ Based on Morley (1996).

5. NON-AGRICULTURAL PRODUCTION

By way of conclusion, we may try to test the model. Instead of discussing individual exceptions of towns that may or may not conform to the prescribed pattern, it is more interesting to look for structural shortcomings in the argumentation. Here, I focus on one subject, because of its relevance for the theme of the session: non-agricultural urban production.

There can be little doubt that a very significant proportion of the urban population of Roman Egypt was engaged in non-agricultural production. Two registers of landholders from Hermopolis help indirectly in supplying some figures. They suggest that in Hermopolis in the mid-fourth century there were something in the order of 1.000 landowners. The obvious corollary is that the rest of the population did not own land. As we have seen, the total population of Hermopolis can be estimated at 45.000 inhabitants. Whatever the exact figure, and no matter how the calculation is made, there can be no doubt that the great majority of the urban population did not own land. It does not seem far fetched to suppose that at least a large number of these persons had other sources of income.

Anyone familiar with the debate on the ancient economy and the nature of ancient cities will recognise the importance of that finding. It would at least modify the idea that cities were consumption cities that lived from the proceeds from the surrounding territory. There is however a draw-back, and that is that the model is partly based on precisely that assumption. In order to establish a relative hierarchy of towns, I assumed that towns were fed from their countryside. This certainly does not mean that any independent non-agricultural production immediately causes distortions from the patterns, but the high figures found for Hermopolis give reason to pause. Is it still legitimate to assume that a town's size is determined by its territory alone? Put in the extreme, one might argue with some justification that in the model is an in-built paradox: the higher the levels of urbanisation the model produces, the less likely are the assumptions correct on which it is based.