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The Standard of Living of the Judean Military Colony at Elephantine in Persian Period Egypt

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Abstract
The settlement of Judean military colonists at Elephantine island at the southern border of Egypt is by far the best-documented foreign community in this province of the Persian empire. The religious life of this military colony as well as the tension between the Judeans and the priests of the local god Khnum culminating in the destruction of the local temple of Jahu at the end of the 5th century BCE have been in the focus of scholarly discussion for decades. Recent excavations at Elephantine Island and Syene (modern Aswan) indicate that the settlement of foreign colonists there was organized by the Persian administration including the creation of entirely new living quarters. Both the Aramaic papyri as well as the archaeological record provide deeper insights into the daily life and living conditions of these colonists. This paper discusses rations disbursed to military colonists at Elephantine as well as household sizes as proxies for the standard of living of the Judean settlers at Elephantine.

Introduction[1]

The Aramaic papyri discovered by Otto Rubensohn and Friedrich Zucker at the island of Elephantine in 1906–1908 have been attracting the interest of scholars for more than 100 years[2] because of principally two reasons: 1) The papyri indicate the existence of a temple of Jahu besides the one in Jerusalem, thus raising questions on the nature and religious life of the Judean settlement living at the southwestern periphery of the Persian Empire. 2) Two drafts of a petition in the archive of Jedaniah son of Gemariah include a vivid description of the destruction of the Yahu temple at Elephantine at the end of the 5th century BCE. The fact that the priests of the nearby temple of the ram-headed local god Khnum played a major role in this conflict indicates religious motives that led to the destruction of the temple.[3] The reconstruction of the religious life of the Judeans at Elephantine is still in the focus of the scholarly discussion of the Elephantine papyri although most of the documents are legal documents, lists, accounts, letters, etc. referring to the daily life as well as legal issues of these military colonists.[4]

Additionally, new source material has been published since the discovery of the Aramaic papyri from Elephantine:

- The Aramaic ostraca excavated by a French mission on the eastern part of the southern Kom of Elephantine published in 2006—almost 100 years after their discovery—mostly consist of lists and letters reflecting matters of daily life of the Judean settlement.[5]
- The excavations of the German and Swiss Archaeological Institutes contributed not only to the identification of the Yahu temple but also to a better understanding of the living quarters of the military colony.[6]
- Recent excavations of a garrison town surrounded by a great wall in the Persian period by the Swiss Institute at Aswan revealed that living quarters with houses similar to those at Elephantine were erected simultaneously at Syene.[7]

In order to explore the full potential of the papyrological and archaeological evidence from Elephantine for a history of foreign settlements in the Persian Empire, it is necessary to ask new questions and to apply new methods. Economic history, currently being subject of a revival in ancient history, provides research questions (e.g., on demography, economic growth, standards of living) and methodological approaches (e.g., quantifications, proxies, new institutional economics) that may be applicable to our material.[8] In this paper, I will discuss rations disbursed to military colonists at Elephantine as well as household sizes as proxies for the standard of living of the Judaean settlers at Elephantine.

Wheat Wages

In recent years, several methods were developed to compare standards of living on the basis of quantifiable data. Robert Allen, for instance, introduced the concept of welfare ratio/consumption baskets.[9] For this purpose, he calculated the daily wages of a laborer as well as the costs of supporting a family. The so-called "consumption basket" includes all items that a family would supposedly consume in the course of a year. By multiplying the quantities of items with their actual prices, Allen was able to estimate the costs of living for a family. By comparing the costs of living with the yearly income of a laborer, he established the so-called welfare ratio indicating how much of these costs were covered by the income of the laborer.[10] Walter Scheidel, however, criticized Allen's approach because of the lack of relevant data for many regions and time periods in antiquity.[11] In his opinion, only Roman Egypt would provide sufficient data for this method. Even the basis for Allen's consumption basket, Diocletian's price edict (301 CE) setting price maxima for different goods, did not reflect real prices, as Scheidel demonstrated by comparison with data from Roman Egypt.

As an alternative approach, Scheidel proposed the concept of wheat wages. He defines wheat wage as "the daily wage of an unskilled laborer expressed in liters of wheat."[12] The idea is to convert the wages of workers into wheat equivalents and to calculate the daily wage of a worker in kind. In doing so, it is possible to compare wages from different regions and time periods no matter if paid in silver or in kind. Due to the work of Scheidel, a broader data set is already available: His analysis revealed comparably high wages for Babylonia in the Neo-Babylonian Period (9.6–14.4 l) or Classical Athens (8.7–15.6 l), Byzantine/early Arabic Egypt (7.7–13.4 l), and high medieval Cairo (7.5-13.5 l), but relatively low wages for Ptolemaic Egypt (3.2–6.2 l).[13] Scheidel notes that most estimates fall within a core range of 3.5–6.5 liters of wheat per day.

Although it is well documented that the military colonists at Elephantine and elsewhere received a salary (*prs*) in silver, the exact amount of silver per month is unknown.[14] But they were also provided with rations in kind (*ptp*), as some documents show.[15] TAD C3.14, a fragmentary account, reveals that the garrison at Syene was provided with barley coming from the provinces of Thebes and the Southern District.[16] Moreover, it contains an account on the disbursement of barley to different groups of people:

(26) *[k]l npš 20 20 10 4 bgw*
(26) [A]ll (told) 54 souls. Herein—

(27) *[2] lḥd šʾ 1 r 2 lšʾ 3*
(27) [2]: for (each) one b(arley), 1 a(rdab), 2 q(uarters amounting) to b(arley), 3 a(rdabs);

(28) *20 2 lḥd šʾ 1 lšʾ 20 2*
(28) 22: for (each) one b(arley), 1 a(rdab) to b(arley), 22 a(rdabs);

(29) *[n]pš 20 10 lḥd šʾ 1[1 r 2 l]šʾ 20 20 20 10 5*
(29) 30 [s]ouls: for (each) one b(arley), 1[+] (= 2) a(rdab), [2 q(uarters) to] b(arley), 75 a(rdabs).

(30) *kl npqtʾ yw.[..]*
(30) All the outlay ...[...]...

(31) *šʾ 100*
(31) b(arley), 100 a(rdabs).

While 22 persons received a minimum ration of 1 artaba per month, 30 persons got a maximum of 2.5 artabas per month. In order to compare these data with other regions and time periods, it is necessary to convert the rations of barley (in artabas) into wheat wages (in liters). Thus, we need to know the exact size of an artaba and the ratio of barley and wheat in terms of their caloric value. Although it is widely accepted that the Persepolitan artaba equals ca. 30 liters, the exact size of an artaba in Persian Period Egypt is actually subject of discussion.[17] The artaba was a dry measure introduced in Egypt under Persian rule, as our account as well as other Aramaic texts show.[18] Vleeming pointed out that the Egyptian artaba attested in demotic texts of the Ptolemaic Period was in some cases larger in size than the Persepolitan one (40 liters).[19] Although the Aramaic documents from Persian period Egypt give no hint on the actual size of the artaba, I assume that the measure used by the Judean settlers at Elephantine was similar to the Persepolitan one (ca. 30 l).[20]

As for the caloric value of barley and wheat, scholars refer to different numbers.[21] Although the caloric values of 1 kg of wheat and barley are quite similar[22], differences occur when calculating with liters because of the specific weight of both cereals.[23] Thus, Scheidel and Michael Jursa assume that 1 liter of barley equals 0.8 liter of wheat in terms of caloric value.[24] On the basis of this assumption, it is possible to calculate the wheat wages of the different groups of recipients (Table 1).

BARLEY IN ARTABAS/MONTH	BARLEY IN LITERS/MONTH	WHEAT IN LITERS/MONTH	WHEAT IN LITERS/DAY
1	30	24	0.8
1.5	45	36	1.2
2.5	75	60	2

Table 1: Rations mentioned in TAD C3.14 converted into daily wheat wages.

The comparison of these numbers with wheat wages from other regions or time periods reveals that the provision of the military colonists of Elephantine with rations of barley of 0.8–2 liters per day was relatively low and is even lower than the very modest numbers from Ptolemaic Egypt. It definitely does not reach Scheidel's core range of 3.5-6.5 liters per day.

Caloric Value of Rations

Another approach is to estimate the caloric value of the barley rations. The basic question is how many people could have been fed through the caloric value of the monthly rations. For this purpose, it is necessary to convert the liters of barley into their corresponding weight that is the basis for the calculation of the caloric value: 1 liter of barley corresponds to 0.62 kg because of the specific weight of barley,[25] with 1 kg barley providing 3,320 kcal.[26] Based on these assumptions, it is possible to calculate the caloric value of each ration per month/day (Table 2).

BARLEY IN LITERS/MONTH	BARLEY IN KG/MONTH	BARLEY IN KCAL/MONTH	BARLEY IN KCAL/DAY
30	18.6	61,742	2,058.4
45	27.9	92,628	3,087.6
75	46.5	154,380	5,146.0

Table 2: Caloric values of the rations mentioned in TAD C 3.14.

Many scholars assume that the average need for calories would be about 2,000 kcal per day.[27] Thus the basic ration of 1 artaba of barley per month would be sufficient to feed one person, but not a whole family. The papyri inform us that the military colonists lived with their families at Elephantine, as we shall see below in the section on housing. Therefore, it is reasonable to compare the rations with the caloric needs of a nuclear family. If we assume a caloric need of 7,300 kcal per day for a family of four,[28] even the highest ration would not be sufficient to feed the whole family. Jursa, for instance, assumes that the monthly ration of 90 l of barley attested for Uruk may be sufficient for a family of four persons.[29] On the other hand, the payment of 1 artaba barley (or 30 l) is also attested as remuneration for *kurtaš* workers in Persepolis.

How can we explain these relatively low rations? On the one hand, women at Elephantine probably received rations for themselves (cf. TAD B5.5). Thus, their rations were also part of the monthly income of a family at Elephantine. On the other hand, military colonists received payments (*prs*) in silver as a number of documents from Elephantine and elsewhere demonstrate.[30] Hitherto no document is known mentioning the amount of silver the military colonists received as a salary.[31] This money, however, was certainly used to buy supplementary food and other things of daily use. Regular payments in silver also explain the important role that silver played in the economic life of the Judeans at Elephantine.[32] Legal documents like sales, loans, dowries, etc., as well as several letters, demonstrate the high degree of circulation of silver and its important role for business activities.[33]

Household Size

The comparison of costs/incomes is a relatively simple approach to discuss living standards in ancient societies. Ian Morris discussed the following proxy data for living standards: stature, nutrition, mortality/life expectancy, disease patterns, and housing.[34] For our purpose, the aspect of housing may be of special interest. Two different categories are distinguishable: house size and house inventories. According to Morris, increasing house sizes and far richer house inventories are indicators for changing consumption patterns and an increasing standard of living. Especially, dowry lists provide valuable information on actual prices for different goods and give an impression of the relative wealth of a household. Jursa, for instance, compared dowry lists of the Old and Neo-Babylonian Period in a diachronic perspective. He came to the conclusion that dowries of the Neo-Babylonian Period included greater quantities of metal objects (e.g., bronze vessels, but also silver money) than those of the Old Babylonian Period.[35] This tendency corresponds to the increasing size of houses in the same time period.[36] In a synchronous perspective, dowry lists may provide useful information on social inequality. Michael E. Smith, for instance, differentiates three categories to estimate the relative wealth of a household: diversity, value, and origin of goods.[37] Both proxies, house size and house inventories, are to some extend available for Elephantine.

In this paper, I would like to confine myself to the size of houses at Elephantine as witnessed by the archaeological and papyrological record. As mentioned above, the living quarters of the Judeans at Elephantine have been re-examined by Achim Krekeler in the late 1980s.[38] The Judaean quarter at Elephantine (Fig. 1) consisted of compact multi-storey buildings that were probably built in a short period of time on the leveled remains of the older building layer. According to the excavator, the use of standardized mud bricks indicates that there was a centralized supply with building material. The Judean quarter was probably built on behalf of the Persian rulers in order to settle military colonists there.

Two types of houses are distinguishable: The one-party-house and the double-house. These houses were separated by narrow streets. This new type of house differed considerably from older one-storey houses and allowed settlement of a dense population on a limited space at Elephantine. The houses M, Q, and Z provide examples of a simple house consisting of three rooms covering an area of approximately 30 m²: an entrance room with staircase, a dwelling, and a sleeping room. A saddle quern in the entrance area is attached to each housing unit. In the course of the 5th century BCE, the houses were modified



Figure 1: The Judaean quarter at Elephantine (von Pilgrim 2002, 195 Abb. 12**).**

by installations of inner walls and staircases in order to create new housing units.

House M (Fig. 2) is a good example for the development of these houses in the course of the 5th century BCE:[39] House M (54 m²) originally consisted of two roofed rooms and an open court including two troughs. The walls of the former one-storey house were built of 2–1½ rows of mud bricks. In a second building phase, the house unit originally intended for one family was transformed into two separate units by the installation of supplementary walls. The western unit consisted of an entrance unit with saddle quern (M3), a staircase (M2), and a room that can be identified as a workshop according to the findings of vessels, two unfinished stelae, tools, etc. (M1). In room M7, 44 almost complete vessels were found, some of them resembling those of the so-called Aramaean house (house G). The eastern unit consisted of an entrance room with saddle quern and a staircase in the northeastern corner (M5). Several terracotta figurines were found in this room. The other room (M4) is characterized by a fireplace. According to the excavator, an increasing population or divisions of property may have been the reason for these modifications.

It is also possible to refer the archaeological record to the papyrological evidence: Based on the dimensions mentioned in TAD B2.3, Cornelius von Pilgrim was able

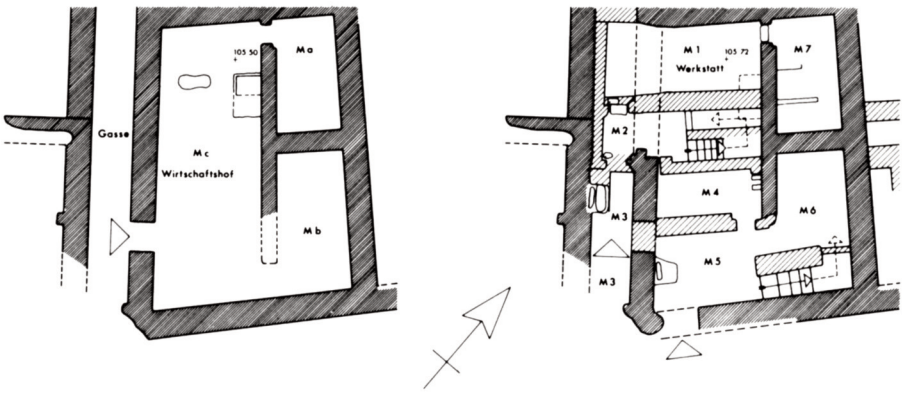


Figure 2: House M in the Judean quarter at Elephantine (Krekeler 1988, 171 fig. 12b).

to correlate the rather small house of Mahseiah/Mibtahiah (39.88 m²) with the remains of house MA in the archaeological record.[40] Consequently, he identified the two units of house M with the houses of Dargamana and Hosea. Mahseiah possessed another house that he handed over to Mibtahiah in 446 BCE (TAD B2.7). This house is to be identified with the northeastern part of house O in the archaeological record—just opposite house G (the "Aramaean house") where Rubensohn and Zucker found several amphoras.

The papyrological record also allows the reconstruction of the lifecycle of a house at Elephantine as the archive of Ananiah son of Azariah shows: In 437 BCE, two Caspians, Bagazushta and Ybl, sold the abandoned house of ʾpwly to Ananiah for 1 karsh and 4 shekels (TAD B3.4). The courtyard of this house was not built yet and there were no beams in the windows. The Caspians obviously did not hold any legal title to the house. Therefore, the legal document includes an extensive defensive clause against third-party claims. Three years later (TAD B3.5; 434 BCE)—the time period necessary to get clear title on a property according to Egyptian law—Ananiah gave half of a large room and a chamber (11 x 7 1/3 cubits = ca. 81 area cubits [42,525 m²]) to his wife Tamet. In 420 BCE (TAD B3.7), Ananiah gave another room, as well as half of the courtyard and the staircase, to his daughter Jehoishma. In 404 BCE (TAD B3.10), he arranged that Jehoishma would inherit the southern room (8 ½ x 7 cubits = 59 ½ area cubits; total: 98 area cubits [51,45 m²]), as well as half of the courtyard and the staircase after his death. Finally, he gave it to her immediately (TAD B3.11; 402 BC). In the same year, Ananiah and his wife Ta(pa)met sold the remaining parts of the house (150 area cubits [78,75 m²]) to his son-in-law, Anani son of Haggai, for 1 karsh and 3 shekels. Anani noted that he delivered the old document written on behalf of Bagazushta.

Both house M and the archive of Ananiah demonstrate that the original houses at Elephantine were modified considerably in the course of time. The foundation of new households may have been a mayor incentive to divide larger houses into smaller apartments. The archaeological and papyrological record, however, provides us with a number of house sizes as Table 3 shows.

The archaeological record shows that the houses or apartments at Elephantine had a rather modest size of 33–65 m². This general picture is confirmed by the papyrological evidence indicating that these apartments were inhabited by nuclear families of 4–5 persons. The houses at Elephantine are smaller than contemporary civilian houses in Egypt or Babylonia.[41]

House/apartment	Size
House Q	33 m²
House Z	36 (49) m²
TAD B2.3–4 (House MA)	39.88 m²
TAD B3.5	42.525 m²
TAD B3.10	51.45 m²
House M	54 m²
House J	65 m²
House P	65 m²
TAD B3.11	78.75 m²

Table 3: House/apartment sizes according to the papyrological/archaeological record.

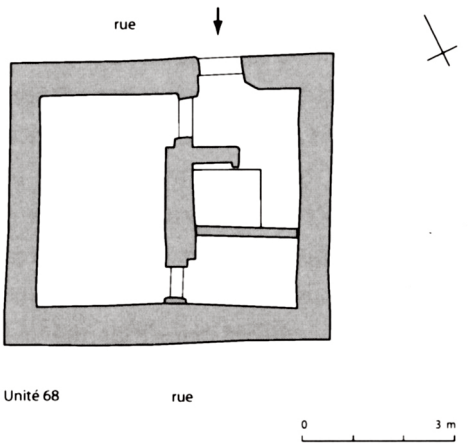


Figure 3: House type III at Tell el-Herr (Marchi 2014, 41 fig. 52**).**

Recent excavations in Egypt reveal that the Judean quarter at Elephantine was by no means an exception. The Swiss Institute, for instance, excavated buildings at Syene dating to the Persian Period resembling those at Elephantine in design and dimensions.[42] Similar observations were made by the excavators of Tell el-Herr, a fortress of the Persian Period in northwestern Sinai.[43] In the last quarter of the 5th century BCE, house units characterized by their uniform shape were built within the fortress: House type III (Fig. 3) is of almost quadratic shape and consists of three rooms.[44] This house type is comparatively small (ca. 25 m²), providing space for a maximum of 1–2 persons.[45] In contrast to the houses at Elephantine/Syene, there are no traces of a staircase leading to a second storey that would have provided supplementary space. A functional analysis of the rooms within the houses allows an identification of kitchens, living rooms, and storage rooms.

Within the fortress, the houses were arranged in *insulae* consisting of two rows of houses of type III attached to each other.[46] The overall design of the quarter indicates that it was built on behalf of a central authority, as it is the case for the Judean quarter at Elephantine.

The entirely new design of these house units compared to contemporary houses in Egypt must have had a considerable impact on the organization of social life. The houses were no longer closed units consisting of rooms concentrating around an inner courtyard, but were open to the outside world through windows that were necessary to regulate the climate of these compact buildings. Due to the smaller size of the ground floor, there was the tendency to build multi-storey houses.[47] Because of the limited space for domestic activities, in both Elephantine and Tell el-Herr there were special buildings with batteries of ovens for the production of bread that were probably commonly used. Moreover, there is evidence that the quarter in the western sector of Tell el-Herr was specialized in the production of garments. Production facilities were also part of the settlement at Elephantine, as the workshop in house M discussed above shows. It is not clear if these production units were intended for the supply of the military settlement only or also for commerce.

Conclusions

This paper discussed different approaches in order to evaluate the standard of living within the military colony at Elephantine. The observations made on rations disbursed to the military colonists as well as household sizes at Elephantine can be summarized as follows:

The provision of the military colonists with rations of barley was relatively modest compared with other regions and epochs, as the application of the concept of wheat wages on data from an account regarding the disbursement of barley shows. A calculation of caloric value of these monthly payments of barley revealed that they were not sufficient to feed a whole family. The Aramaic papyri, however, show that the colonists lived with their families at Elephantine/Syene. Thus, only the combination with payments in silver may have provided a sufficient income for them. The supply with silver is reflected by many references to silver as a means of payment in economic transactions among the Judeans of Elephantine.

Recent archeological investigations indicate that the building of the settlement was organized by a central authority at the beginning of the Persian Period in Egypt. This settlement consisted of modest houses sufficient to house nuclear families of 4–5 people. A comparison with excavations at Syene and Tell el-Herr indicates that the living quarter at Elephantine was an example for a more or less uniform type of settlement for foreign military colonists in Persian period Egypt. The rather modest buildings at Elephantine (33–65 m²) constituted an entirely new type of housing with considerable consequences for the organization of social life.

Archeological and papyrological evidence shows that, in the course of time, the Judeans of Elephantine divided parts the house units to provide apartments for new households. Although the overall design of houses at Tell el-Herr was similar to those at Elephantine/Syene, the purpose of the quarters at Tell el-Herr was not housing whole families because the house units provided only space for one or two persons. The archaeology in Elephantine and Tell el-Herr indicates that, due to the limited space, commonly shared facilities were in use (e.g., for bread production). Additionally, specialized zones for leather production are observable at Tell el-Herr.

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1 Research for this paper was conducted by the author within the DFG research training group 1878 "Archaeology of pre-modern economies" at the

University of Bonn. I thank the participants of the workshop as well as Dr. Renate Müller-Wollermann for their comments and suggestions.

2 Most of the Aramaic papyri from Elephantine were originally published by Eduard Sachau, *Aramäische Papyrus und Ostraka aus einer jüdischen Militärkolonie zu Elephantine. Altorientalische Sprachdenkmäler des 5. Jahrhunderts vor Chr.* (Leipzig: Hinrichs, 1911). Emil Kraeling published the archive of Ananiah son of Haggai: Emil G. Kraeling, *The Brooklyn Museum Aramaic Papyri: New Documents of the Fifth Century B.C. from the Jewish Colony at Elephantine* (New Haven: Yale University Press, 1953). The siglae for Aramaic documents used in this paper refer to Bezalel Porten and Ada Yardeni, *Textbook of Aramaic Documents from Ancient Egypt*, 4 vols. (Jerusalem: The Hebrew University of Jerusalem, 1986–1999). Cf. Bezalel Porten, "The Aramaic Texts," in Bezalel Porten (ed.), *The Elephantine Papyri in English: Three Millennia of Cross-Cultural Continuity and Change*, 2nd ed., Documenta et Monumenta Orientis Antiqui 22 (Leiden: Brill, 2011), 75–275.

3 For the discussion of the motives, see Pierre Briant, "Une curieuse affaire à Élephantine en 410 av. n.e.: Vidranga, la sanctuaire de Khnum et la temple de Yahweh," *Méditerranées* 6/7 (1996), 115–138; Cornelius von Pilgrim, "Tempel des Jahu und 'Straße des Königs'. Ein Konflikt in der späten Perserzeit auf Elephantine," in Sibylle Meyer (ed.), *Egypt: Temple of the Whole World: Studies in Honour of Jan Assmann*, Studies in the History of Religions 97 (Leiden—Boston: Brill, 2003), 303–317.

4 E.g., Angela Rohrmoser, *Götter, Tempel und Kult der Judäo-Aramäer von Elephantine. Archäologische und schriftliche Zeugnisse aus dem perserzeitlichen Ägypten*, Alter Orient und Altes Testament 396 (Münster: Ugarit-Verlag, 2014); Gard Granerød, *Dimensions of Yahwism in the Persian Period: Studies in the Religion and Society of the Judaean Community at Elephantine*, Beihefte zur Zeitschrift für die alttestamentliche Wissenschaft 488 (Berlin: De Gruyter, 2016).

5 Hélène Lozachmeur, *La collection Clermont-Ganneau. Ostraca, épigraphes sur jarre, étiquettes de bois*, 2 vols., Mémoires de l'Académie des inscriptions et belles-lettres 35 (Paris: de Boccard, 2006).

6 Cf. the discussion below.

7 Wolfgang Müller, "IV. Excavations in the town centre from the Late Period to Late Roman times (Area 15)," in Cornelius von Pilgrim et al., "The Town of Syene: Report on the 5th and 6th Season in Aswan," *Mitteilungen des Deutschen Archäologischen Instituts Kairo* 64 (2008): 314–338.

8 For an overview, see Walter Scheidel, Ian Morris and Richard P. Saller, *The Cambridge Economic History of the Greco-Roman World* (Cambridge: Cambridge University Press, 2007).

9 Robert C. Allen, "How Prosperous were the Romans? Evidence from Diocletian's Price Edict (AD 301)," in Alan Bowman and Andrew Wilson (eds.), *Quantifying the Roman Economy. Methods and Problems* (Oxford: Oxford University Press, 2009), 327–345.

10 Recently, Reinhard Pirngruber adopted this concept to data from Babylonia of the 1st millennium BCE: Reinhardt Pirngruber, "The Value of Silver: Wages as Guides to the Standard of Living in 1st Millennium BC Babylonia and Beyond" (version 1, August 2014), *Imperium and Officium Working Papers* (2014), http://iowp.univie.ac.at/sites/default/files/IOWP_Pirngruber_ValueofSilver_v01.pdf, accessed 7 November 2016.

11 Walter Scheidel, "Real Wages in Early Economies: Evidence for Living Standards from 1800 BCE to 1300 CE.," *Journal of the Economic and Social History of the Orient* 53 (2010): 427–436.

12 Scheidel 2010, 436–437.

13 Scheidel 2010, 452–458, esp. 453 tab. 4; cf. Michael Jursa, *Aspects of the Economic History of Babylonia in the First Millenium BC: Economic Geography, Economic Mentalities, Agriculture, the Use of Money and the Problem of Economic Growth*, Alter Orient und Altes Testament 377 (Münster: Ugarit Verlag, 2010), 814–815.

14 Cf. TAD A2.3; A3.3; B4.2; B4.4; D7.9; see also O. Clermont-Ganneau X11 (Lozachmeur 2006, 421 pl. 292–293).

15 E.g., TAD B3.13, B5.5.

16 Cf. Bezalel Porten, *The Archives from Elephantine: The Life of an Ancient Jewish Colony* (Berkeley: University of California Press, 1968), 81–82.

17 For a summary of discussion, see: Christopher Tuplin, *The Arshama Letters from the Bodleian Library, Vol. 3: Commentary* (Oxford: Bodleian Library 2013), http://blogs.bodleian.ox.ac.uk/wp-content/uploads/sites/116/2013/10/Volume-3-Commentary-20.1.14.pdf, 91–94, accessed 7 November 2016, with further literature.

18 The etymology of the word remains obscure: Günter Vittmann, "Iranisches Sprachgut in ägyptischer Überlieferung," in Thomas Schneider (ed.), *Das Ägyptische und die Sprachen Vorderasiens, Nordafrikas und der Ägäis. Akten des Basler Kolloquiums zum ägyptisch-semitischen Sprachkontakt, Basel 9.–11. Juli 2003*, Alter Orient und Altes Testament 310 (Münster: Ugarit-Verlag, 2004), 137–138; Jan Tavernier, *Iranica in the Achaemenid Period (ca. 550–330 B.C.): Lexicon of Old Iranian Proper Names and Loanwords, Attested in Non-Iranian Texts*, Orientalia Lovaniensia Analecta 158 (Leuven—Paris—Dudley: Peters, 2007), 449–450.

19 Sven P. Vleeming, "The Artaba, and Egyptian Grain-

measures," in Roger S. Bagnall, Gerald M. Browne, Ann E. Hanson, and Ludwig Koenen (eds.) *Proceedings of the Sixteenth International Congress of Papyrology: New York, 24–31 July 1980* (Chico: Scholars Press, 1981), 537–545. On the artaba in Greco-Roman Egypt, see Roger S. Bagnall, "Practical Help: Chronology, Geography, Measures, Currency, Names, Prosopography, and Technical Vocabulary," in Roger S. Bagnall (ed.), *The Oxford Handbook of Papyrology* (Oxford: Oxford University Press, 2009), 186–187 with further literature.

20 Richard T. Hallock, *Persepolis Fortification Tablets*, Oriental Institute Publications 92 (Chicago: University of Chicago Press, 1969), 72.

21 For the discussion of these numbers, see Rainer Nutz, *Ägyptens wirtschaftliche Grundlagen in der Mittleren Bronzezeit*, Archaeopress Egyptology 4 (Oxford: Archaeopress, 2014), 155–157.

22 3,320 kcal for 1 kg barley; 3,340 kcal for 1 kg wheat; cf. Lin Foxhall and Helen A. Forbes, "*Sitometreia*: The Role of Grain as a Staple Food in Classical Antiquity," *Chiron* 12 (1982): 46; see also Alan Bowman, "Agricultural Production in Egypt," in Alan Bowman and Andrew Wilson (eds.), *The Roman Agricultural Economy: Organization, Investment, and Production* (Oxford: Oxford University Press, 2013), 247; Nutz 2014, 156–157.

23 1 kg barley equals ca. 0.6 kg; 1kg wheat ca. 0.75 kg; Nutz 2014, 155–156.

24 Scheidel 2010, 439; Jursa 2010, 812.

25 Jursa 2010, 812; Nutz 2014, 155–156.

26 Foxhall/Forbes 1982, 46; see also Bowman 2013, 247; Nutz 2014, 156–157.

27 Willem M. Jongman, "The Early Roman Empire: Consumption," in Walter Scheidel, Ian Morris, and Richard P. Saller (eds.), *The Cambridge Economic History of the Greco-Roman World* (Cambridge: Cambridge University Press, 2007), 598: ca. 2,000 kcal; Allen 2009, 340: 1,940 kcal; Pirngruber 2014, 3: 2,100 kcal; see also Nutz 2014, 93–94.

28 Cf. Jongman 2007, 599: 1 man 2,600 kcal + 1 woman 2,100 kcal + 2 children 1,300 kcal; Bowman assumes 13,000 kcal per day for a family of 5 persons (Bowman 2013, 248).

29 Jursa 2015, 359.

30 Cf. note 14.

31 Porten assumed 12 shekels per month, an extraordinarily high amount of silver compared with data, e.g., from contemporary Babylonia (Porten 1968, 73–75; cf. Michael Jursa, "The Remuneration of Institutional Labourers in an Urban Context in Babylonia in the First Millenium BC," in Pierre Briant, Wouter F. M. Henkelman, and Matthew W. Stolper [eds.], *L'archive des Fortifications de Persépolis. Ètat des questions et perspectives de recherches*, Persika 12 [Paris: de Boccard, 2008], 387–427; Michael Jursa "Labor in Babylonia in the First Millennium BC," in Piotr Steinkeller and Michael Hudson [eds.], *Labor in the Ancient World: A Colloquium held at Hirschbach [Saxony], April 2005* [Dresden: ISLET-Verlag, 2015], 345–396).

32 On the circulation of silver in the oases of the western desert of Egypt in the Persian Period, see Damien Agut-Labordère, "L'orge et l'argent. Les usages monétaires à Ayn Manâwir à l'époque perse," *Annales. Histoire Sciences Sociales* 69 (2014): 75–90.

33 E.g., TAD B2.5, B2.6, B3.3, B3.8 (dowries); TAD B3.1, B4.2, B5.5 (loans); TAD B3.4, B3.12 (sales). For the letters, cf. TAD A2.2; A2.6; A3.8; A4.10.

34 Ian Morris, "Economic Growth in Ancient Greece," *Journal of Institutional and Theoretical Economics* 160 (2004): 709–742.

35 Jursa 2010, 810.

36 Jursa 2010, 806–7.

37 Michael E. Smith, "Household Possessions and Wealth in Agrarian States: Implications for Archaeology," *Journal of Anthropological Archaeology* 6 (1987): 297–335.

38 Joachim Krekeler, "VII. Untersuchungen im Stadtgebiet nordwestlich des späten Chnumtempels," in Werner Kaiser et al. "Stadt und Tempel von Elephantine. 15./16. Grabungsbericht," *Mitteilungen des Deutschen Archäologischen Instituts Kairo* 44 (1988): 172–174; Joachim Krekeler, "Spätzeitliche Bauten," in Werner Kaiser et al. "Stadt und Tempel von Elephantine. 17./18. Grabungsbericht," *Mitteilungen des Deutschen Archäologischen Instituts Kairo* 46 (1990): 214–217; Joachim Krekeler, "Stadtgebiet nordwestlich des späten Chnumtempels: spätes Neues Reich bis Spätzeit," in Werner Kaiser et al. "Stadt und Tempel von Elephantine. 19./20. Grabungsbericht," *Mitteilungen des Deutschen Archäologischen Instituts Kairo* 49 (1993): 177–179; Joachim Krekeler, "Stadtgrabung am Westkom von Elephantine. Wohnbauten des 1. Jahrtausends v. Chr.," in Manfred Bietak (ed.), *Haus und Palast im Alten Ägypten*, Untersuchungen der Zweigstelle Kairo des Österreichischen Archäologischen Institutes 14 (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1996), 109–111; Joachim Krekeler, *Stadtgrabung am Westkôm von Elephantine: Stadtentwicklung und Bauten vom Neuen Reich bis in die Römerzeit* (PhD dissertation, Hannover University, 1998), esp. 73–76

39 Cf. Krekeler 1988, 172–174.

40 Cornelius von Pilgrim, "Textzeugnis und archäologischer Befund. Zur Topographie

Elephantines in der 27. Dynastie," Heike Guksch and Daniel Polz (eds.), *Stationen. Beiträge zur Kulturgeschichte Ägyptens, Rainer Stadelmann gewidmet* (Mainz: Philipp von Zabern, 1998), 485–497.

41 Egypt: priestly house VII at Karnak temple: ca. 70 m² (Aurelia Masson, "Le quartier des prêtres du temple de Karnak: rapport préliminaire de la fouille de la Maison VII, 2001–2003," *Cahiers de Karnak* 12.2 [2007]: 593–623); Babylonia: part of a house: 73.5 m²; small house: 90 m² (Heather D. Baker, "House Size and Household Structure: Quantitative Data in the Study of Babylonian Urban Living Conditions," in Heather D. Baker, Michael Jursa [eds.], *Documentary Sources in Ancient Near Eastern and Greco-Roman Economic History. Methodology and Practice* [Oxford: Oxford University Press, 2014], 19).

42 Müller 2008, 315–327, esp. 316 fig. 3: house 4: 50 m²; house 5: 58 m².

43 Séverine Marchi, *L'habitat dans les fortreses de Migdol (Tell el-Herr) durant les Ve et IVe siècles avant J.-C. Étude archéologique* (Paris: Presses de l'université Paris-Sorbonne, 2014) with further literature. Tell el-Herr may be identical with Migdol, a fortress mentioned in the Aramaic letter TAD A3.3 (Marchi 2014, 6).

44 Marchi 2014, 40–41.

45 Marchi 2014, 189.

46 Marchi 2014, 163–164.

47 This development culminated in the so-called tower house in the Greco-Roman period; cf. Felix Arnold, *Elephantine XXX. Die Nachnutzung des Chnum-tempelbezirks. Wohnbebauung der Spätantike und des Frühmittelalters*, Archäologische Veröffentlichungen 116 (Mainz: Philipp von Zabern, 2003); Séverine Marchi, *Les maisons-tours en Égypte durant la Basse-Époque, les périodes Ptolémaïque et Romaine. Actes de la table-ronde de Paris, Université Paris-Sorbonne (Paris IV), 29–30 novembre 2012*, NEHET. Revue numérique d'égyptologie 2 (Paris: Université Paris-Sorbonne, 2014).