

Meager Returns:  
Agricultural Wages in Roman Egypt

Edward Fox  
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Senior Thesis

*The necessaries of life for man in this climate may, accurately enough, be distributed under the several heads of Food, Shelter, [and] Clothing.*

Henry David Thoreau

In February 247A.D, Eirenaios the manager (*phrontistes*) of a unit of the large estate belonging to Aurelius Appianus in the Fayum part of Egypt recorded in his account book that for the month he had employed 500 days of labor from workers unaffiliated with the estate. He paid them 2 drachmae a day.<sup>1</sup> Unlike payments made to permanent employees of the estate, the casual laborers are anonymous. There is no indication even of how many different workers performed the labor. The workers on the Appianus estate are in fact typical of casual laborers in surviving sources: they are anonymous and poorly paid. Unfortunately little attempt has thus far been made by modern scholarship to determine how these men (and perhaps occasionally women) lived. This paper will attempt to shed some light on the identity of these unknown Egyptian laborers and also the economy in which they functioned.

The traditional story about agricultural wage labor throughout the Empire is that it was not used much by the large and medium sized farms because they relied primarily on slaves or contract tenants.<sup>2</sup> The surviving Roman agricultural handbooks advise estate owners to avoid using hired labor as much as possible.<sup>3</sup> In Egypt, however, it is clear that wage labor played a major role on the commercial estates. For example, on the Appianus estate in the 3<sup>rd</sup> century A.D at least half of the work performed was done by casual laborers throughout the year.<sup>4</sup> If one assumes that the Appianus estate is even somewhat typical, then understanding who wage laborers were is critical to modeling the functioning of the rural economy in Roman Egypt and that of the entire Roman Empire.

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<sup>1</sup> While in the rest of the Empire, Roman state coinage largely replaced previous currencies, Egypt maintained its own unique coinage until Diocletian closed the Alexandrian mint at the close of the third-century A.D.

<sup>2</sup> Peter Garnsey, *Cities Peasants and Food in Classical Antiquity* (1998), 134-150

<sup>3</sup> Columella, Cato and Varro, writers of the surviving Roman agricultural manuals, hardly even mention wage labor. To be fair their manuals are recommendations for how to run Italian estates which leads to the focus primarily on slave labor. Cato does mention that an estate owner should pay attention to the availability of labor in the area (*de agricultura* I.1.3).

<sup>4</sup> Dominic Rathbone, *Economic Rationalism and Rural Society in Third-Century Egypt* (1991), 153

Paul Erdkamp in his insightful work, *The Grain Market in the Roman Empire*, takes the established view as to the composition of rural wage-labor: “not all were peasants, some harvesters came from town, and others were part of the rural proletariat.”<sup>5</sup> When Erdkamp uses the rather unusual phrase, “rural proletariat,” he is describing rustics without access to land who survived by performing wage-labor. Yet, surviving evidence from Egypt suggests that it would be very hard for a man to subsist on his labor alone, let alone support a family. Estimating the cost of living, it is relatively clear that a rural proletariat could not have sustained itself in Roman Egypt. This conclusion is all the more important, since if a rural proletariat could have existed anywhere in the Roman Empire it was Egypt. Despite Egypt’s importance as a grain producer, it never developed a slave economy like much of the rest of the Empire, which left many more opportunities for free laborers.

The wages paid to Egyptian laborers were sometimes so low that they were below the reproductive cost of labor. This means that the wages were not enough to provide the basic food, shelter, clothing and tax money necessary for the worker to continue laboring on a prolonged basis. Even where the wages were high enough to support the subsistence of that worker for a day, they could not possibly have supported him over a long period of time as employment was inconsistently available. In other words, the agricultural wage labor force in Egypt must have been made up of workers who had other sources of income: namely at least some land to which they had access through ownership or tenancy. A true rural proletariat, while a hallmark of pre-modern Europe, was a phenomenon that did not exist in the Roman world.

The implication that rural wage laborers worked at least some land on their own, is supported by Egyptian landholding patterns. Throughout the Empire large numbers of very small plots are attested to in ancient sources and Egypt is no exception. While Egypt had the

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<sup>5</sup> Paul Erdkamp, *Grain Market in the Roman Empire* (2005), 83.

most fertile lands in the Empire it is hard to imagine how many of the holdings could have supported entire families without additional sources of income. Because these holdings were often small enough to have been worked fairly efficiently by one man, there would often have been huge surpluses of labor available on these peasant farms as sons (and to some degree daughters) grew to adolescence. This meant that additional labor expended on the farm would yield very small production gains because the land was already overworked. Therefore peasants might be willing to work for meager wages, as they would still be larger than the minute gains from laboring more on the farm. This is a phenomenon called *externalization of labor costs*.

This paper will break down into four main sections. The first will give the reader a background in Roman Egypt and explore the availability and viability of surviving evidence concerning agricultural wages and prices. The second will then build a method for evaluating the purchasing power of wages. Only two authors have attempted to estimate the cost of living in Egypt even though it is a very useful way of looking at the lives of peasants. The method employed here will utilize recently published papyri and correct for errors in previous estimates. The third will summarize the results of this test and show that there is no possibility of a self-sustaining rural proletariat. The last will clarify the concept of externalization of labor costs and argue that this can and does explain the low wages observed in Egypt. This is an expansion of previous work on externalization of labor costs, which is traditionally confined to explaining non-agricultural activity. Moreover the results presented in section three seem to be the first quantifiable evidence of the externalization of labor costs in the Ancient World.

## **I) Background**

Egypt was one of the most important provinces in the Roman Empire, but its predominant position in this study derives primarily from the peculiarities of its climate. Egypt's

dry climates preserved papyrus, a reed used by the Romans as paper throughout the Empire, better than any other place in the Empire. Papyrus is unfortunately quite fragile and survives from much of the rest of the Empire (ironically) only when it was partially burned. In Egypt though, papyri of all kinds have been preserved. This allows modern scholars to draw a much more complete picture of the daily in Egypt than in any other part of the Empire. For an economic historian “Egypt provides substantially more evidence than all other areas put together.”<sup>6</sup>

In particular, Egypt provides an unparalleled glimpse into the world of the rural poor. These men and women are almost entirely missing from ancient sources and little better represented in modern works. Yet they made up a vast majority of the Roman Empire’s inhabitants. The standard estimate is that 80 percent of the Empire’s population lived outside of cities, even at the height of urbanization. Many estimates even put this number at 90 percent. History is mostly silent when it comes to talking about the lives of a vast majority of these rustics. For every book dealing with the diet of everyday Roman people there are five dealing with the feasting of the Roman elite. This disproportionate deference to the urban elite by scholars may have originally resulted from a lack of interest. Today, the comparative dearth of work on peasants does not derive from a failure to understand their importance, but rather to a lack of source material. By and large, Roman history is based off of literary and epigraphic (inscriptions etc.) history and Roman peasants failed to leave much in way of either kind of evidence.

There are various ways of attempting to get around these problems. One is using comparative evidence from rural pre-modern Europe. Paul Erdkamp uses this technique liberally and often very incisively in *The Grain Market in the Roman Empire* noted above. This method is particularly helpful because of the vast amounts of quantitative evidence extant from pre-

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<sup>6</sup> R.P. Duncan-Jones, “Price of wheat in Roman Egypt under the Principate” *Chiron* 6 (1976): 242.

modern Europe compared to the ancient world. For this reason finding parallels between the Empire and pre-modern Europe is very helpful for dealing with the ancient economy in general.

On the other hand, one should not forget that for all their parallels, the Roman Empire was a very different place from the states which existed in the same territories on the eve of the industrial revolution. For this reason, scholars ignore at their peril evidence from the only part of the ancient world to produce quantitative evidence in any bulk: Egypt. It is not that Egypt has been ignored by historians of the Roman Empire, far from it, but it has traditionally been treated as *sui generis* (one of kind) that findings from Egypt were presumed to have little relevance to the rest of the Empire. Historians who studied Egypt tended to focus exclusively on Egypt. To some degree this wall has slowly begun to come down.

The work of Dominic Rathbone has been particularly influential in both showing possible uses of Egyptian data as well as its pitfalls. Rathbone's 1995 article, "Monetisation, not price-inflation in third century A.D. Egypt?" has been particularly successful in challenging the well ingrained theory of inflation within the Empire during the late second and especially during the third-century. Rathbone demonstrates that in Egypt, contrary to the traditional view, that there were two long periods from the mid first century to 160 A.D. and from 190 to 270 A.D. in which prices were largely stable. These periods of stability were interrupted by serious inflation between 160 and 190, perhaps as a result of the Antonine Plague.<sup>7</sup> Rathbone's article poignantly illustrates the danger of ignoring quantitative evidence in the ancient world. For decades, scholars have thought that an instrumental part of the "crisis of the third-century" was runaway inflation, yet no author undertook a serious study of prices in Egypt, which, when examined

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<sup>7</sup> Rathbone "Monetisation, not price-inflation in third century A.D. Egypt?" in *Coin Finds and Coin Use in the Roman World* eds. Cathy King and David Wigg (1995): 321-339.

seem to contradict this theory. Additionally, Rathbone's other works on price formation in Egypt and on the Appianus estate are invaluable resources to any scholar writing about Egypt.<sup>8</sup>

Just as a study of inflation in the Roman Empire is incomplete without the inclusion of Egyptian evidence, the study of wage labor in the Roman Empire must be complemented by Egyptian evidence. For over 20 years, Peter Garnsey has been suggesting that free laborers must have played a greater part on estates throughout the Empire than has traditionally been thought. Garnsey argues that because of the small size of the plots owned and leased by peasants, they would be anxious to supplement their modest income by performing wage labor. Thus "the main components of the rural labour force -- owner-occupiers, farm-tenants and wage-laborers— constitute three overlapping categories."<sup>9</sup>

While this paper affirms Garnsey's conclusions, his arguments are based on rather scant evidence which goes little beyond deduction from small plot sizes within the Empire, which in itself are poorly documented outside Egypt. Paul Erdkamp in his article "Agriculture, Underemployment, and the Cost of Rural Labour in the Roman World," has identified some more specific reasons why peasants holding land would be anxious to work: the seasonal and structural underemployment discussed below in section four (pages 30-35).<sup>10</sup> Erdkamp, however, uses this argument to show why peasants were employed in transport and textiles rather than wage-labor. In addition, Erdkamp falls victim to making too many anecdotal comparisons to the pre-modern world. One might be inclined to think that in an article which

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<sup>8</sup> Dominic Rathbone "Prices and price formation in Roman Egypt" in *Économie Antique Prix et formation des prix dans les économies antiques* (1997); Rathbone (1991)

<sup>9</sup> Garnsey (1998), 148. The article was originally published in 1981 and its most recent publication includes an addendum which somewhat grandiosely claims that the article marked a first in the field of Roman history in recognizing the overlap between, peasant owners, tenants and wage-labor.

<sup>10</sup> Paul Erdkamp "Agriculture, Underemployment, and the Cost of Rural Labour in the Roman World" *Classical Quarterly* 49 (199), 556-72

contains the “the Cost of Rural Labour” in the title would include some evidence for what the cost of labor actually was. Again Egypt can provide direct evidence, but is ignored.

This paper will focus on Middle Egypt during the 2<sup>nd</sup> and 3<sup>rd</sup> centuries A.D. The reason for this restriction relates more to the accidents of history than anything specific about this period or this region. A vast majority of the surviving papyri come from Middle Egypt. I will argue later that the conclusions reached in this paper are largely applicable to Egypt as a whole, but trying to account for Upper Egypt and the Delta simply adds more uncertainties without adding much in the way of evidence. Middle Egypt was composed of three administrative areas (nomes): Arisonite, Oxyrhynchite and Hermopolite.<sup>11</sup> The nomos varied to some degree in size, population density, and soil quality. Nevertheless the nomos were far more similar than different and this paper will usually treat the three as a unified whole. The nomos were part of “a monetised integrated economy” through which goods and to some degree people moved relatively easily.<sup>12</sup> Moreover, the nomos shared similar social structures and were administered in very much the same way by Roman authorities.

Using surviving census returns primarily from Middle Egypt, scholars can apply fairly sophisticated demographic techniques. From this one learns that the life expectancy at birth was about 25 years for both men and women. If a child made it to age five then the life expectancy would increase to 45 years. The disparity of these numbers shows the very high level of child mortality. Most Egyptian men married in their early 20's, but women tended to get married at very early ages, 12 was common. Early marriage and lack of effective contraception led to very

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<sup>11</sup> See appendix 1 for a map.

<sup>12</sup> Dominic Rathbone “Prices and price formation in Roman Egypt” in *Économie Antique Prix et formation des prix dans les économies antiques*, (1997), 212.

high fertility rates:<sup>13</sup> the average woman gave birth to six children during her lifetime.<sup>14</sup>

Childhood death rates were so great that the Egyptian population size is usually assumed to be stable, even with the average mother giving birth to six children. More importantly it makes no attempt to account for child exposure. One scholar has tentatively estimated that as many as one in five of all infants born were exposed. If this is true in Egypt, the figures cited above understate the number of pregnancies by 20%.<sup>15</sup>

These high fertility and child mortality rates are very important to understanding the workings of the average Egyptian family. A typical Egyptian mother would spend a good deal of her life either pregnant or attending small children. For this part of her life she would mostly have to be provided for. There would also have been large variation in family size. Some families might have 6 or 7 children and only have one survive to adulthood, while others might have the same number and have all survive to adulthood.<sup>16</sup> Clearly this could cause a glut of surplus labor on the family farm if three or four sons survive to adulthood. The implications of this are discussed in section four.

Along with demographics, the survival of papyri gives significantly more information about landholding patterns than is available in any other Roman province. The villages (*komai*) were responsible for keeping a land register for tax purposes and a number of these survive either fully or partially. Even when the entire register is extant, it is not always apparent to what extent the village is “typical.” Landholding patterns must have varied from village to village and none to none depending on a number of factors including soil fertility, amount of public land and

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<sup>13</sup> J. M. Riddle, *Contraception and Abortion from the Ancient World to the Renaissance* (1992); the widespread practice of infanticide seems to argue against Riddle’s rather optimistic views on the prominence and effectiveness of ancient contraception.

<sup>14</sup> R. Bagnall and B. Frier, *The Demography of Roman Egypt* (1994), 139

<sup>15</sup> William Harris, “Demography, Geography and the Sources of Roman Slaves” *JRS*, 89 (1999): 62-75, 74. Cf. Harris “Child-Exposure in the Roman Empire” *JRS* 84 (1994), 1-22. To add some perspective Harris cites that exposure rates in Vienna, Paris, Milan and Florence ranged from 20-35% in the pre-modern era.

<sup>16</sup> *Ibid.*

proximity to the Nile. Villages in the Fayum for example generally had more public land than in other parts of Egypt.<sup>17</sup> Nor would tenure patterns have remained completely static during the second and third centuries. Nonetheless, some general conclusions about ownership can be drawn.

Egyptians, like most inhabitants of the Greek world, made use of partible inheritance: the father would leave each of his sons at least some land. Women were also eligible to inherit. Married Egyptian women could and usually did hold property of their own.<sup>18</sup> This no doubt explains the multiple holdings and tiny plots attested in the land registers. A surviving tax record from the Oxyrhynchite nome may be representative.<sup>19</sup> In the most complete column, seven of eight landholders own multiple plots. The rest of the document, which is more fragmentary, bears out this pattern.<sup>20</sup> In the most extreme case, Petsirion son of Sirion owned 2 and 13/16 arouras (1.8 acres) in 5 separate plots! Ex ante, partible inheritance is a strong argument against the existence of a rural proletariat. Quite simply if one's father owned land, one would be quite likely to receive some part of it, even if it was too small to fully maintain a family.

Of greater concern for this paper is the size of total holdings. Unfortunately there are no extant registers from the 2<sup>nd</sup> and 3<sup>rd</sup> centuries. There are, however, a number of extant registers from the beginning of the 4<sup>th</sup> century. At first glance these registers seem to reveal a society full of incredible inequality. The Hermopolis register lists 238 landholders: eight of these men held over half of the total land. Moreover, the holdings of 116 of the owners account for a mere 3.5%

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<sup>17</sup> Andrew Monson in "The Evolution of Land Rights: Public Farmers and Privatization in Roman Egypt" *Institutions: Economic Political and Social Behavior 10<sup>th</sup> Annual Conference of the International Society of the NIE* (2006). Monson's explanation that the Fayum's high land-labor ratio prevented the privatization of land is rather unconvincing.

<sup>18</sup> Rowlandson (1996), 152-170. Cf. Roger Bagnall "Landholding in Late Roman Egypt" *JRS* 82 (1992), 138. At Karanis in 308/9 A.D women owned about 17% at Philadelphia around the same time women possessed 25% of the land reported in the register. In the larger cities of Antinoopolis and Hermopolis women seem to have owned much less, around 8 percent.

<sup>19</sup> P. Oxy. VII 1044. For further analysis see L.C Youtie *ZPE* 21 (1976), 1-11

<sup>20</sup> Rowlandson, 129

of the total land held. More than 30% of the Hermopolites owned less than 5 arouras.<sup>21</sup> As discussed below this amount of land is insufficient to support a family. But for the Hermopolites who fell into this category, the situation is less dire than one might imagine. Hermopolis was a metropolitan center by Egyptian standards and thus most of these men must have had sources of income other than their farm holdings. Nonetheless it does show a good example of Egyptians with holdings small enough to provide only part of their income, who found it necessary to find occupation outside their farms and that the distinction between urban and rural was hardly clear.

Another register to survive is that of Karanis from 307 A.D. The Karanis register is of more interest to this study to the extent that it can help us model the landowning in Egyptian villages as opposed to in the more metropolitan centers, as agricultural wage laborers would have resided in the villages. Even though no official landholdings survive from Karanis, these can be estimated from tax payments. The results are certainly more positive than those from Hermopolis. Only 10% of holders own less than 10 arouras. Some discount must be made however for the poor quality of the land in Karanis whose irrigation had fallen into disrepair and as such much of the land was unusable. Even so, it seems reasonable to conclude that in most cases “under one third of the villagers would possess less than 10 arouras.”<sup>22</sup> One might deem any plots under 10 arouras, “small plots.” The labor of one family was more than sufficient to work 10 arouras and 10 arouras might not have supported larger families. Thus one might say that about one third of the rural population were small holders.

One man required about 5-6 arouras of private land for subsistence. A farmer from the Ptolemaic period considered 5 arouras the minimum necessary to save himself and his animals from starvation.<sup>23</sup> This would have of course depended on the usual factors quality of the land

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<sup>21</sup> Alan Bowman, “Land Holding in the Hermopolite Nome in the Fourth century A.D.,” *JRS* 75 (1985) 137-163

<sup>22</sup> Rowlandson (1996), 123

<sup>23</sup> P. Tebt. I 56. Cited in Rowlandson, 120

etc, but 5 is a good benchmark. Returning to the Hermopolis register momentarily, 30% of the landowners owned plots too small to support even one man. Actual yields in the ancient world are usually measured by return to seed not by acreage. The usual return quoted for Egypt is 10:1 and the standard sowing seems to have been 1 artaba<sup>24</sup> of wheat per aroura.<sup>25</sup> Thus this works out to an average return of around 10 artabas of wheat per aroura.<sup>26</sup> The implications of having a large percentage of the rural population as free holders are examined in depth in section four.

Lastly the survival of papyri means that in Egypt there is far more price and wage evidence than from any other province. A majority of these prices and wages come from papyri detailing the financial accounts of commercial farming estates. This gives scholars far more information about the daily lives of common people than is available in other provinces. There are of course problems here too. The main question is how do prices recorded in the papyri relate to those faced by a wage-laborer? It is here Rathbone's work on price formation is particularly useful.

First there might be a small selection bias. This occurs when there are reasons why different kinds of transactions would be more likely to survive. In the case of wheat, if a selection bias exists it should be toward lower prices. The transactions which survive tend to be from larger purchases in terms of size. There would have usually been no written record of small purchases made at the local market by a laborer, while larger transactions by commercial farmers would have been documented. If there was any discount for purchasing in bulk, then the prices that survive would generally be lower than those faced by a laborer buying these commodities at a local market. While evidence for marketplace sales is thin, surviving papyri suggest a slim 5%

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<sup>24</sup> Roughly 38 liters. For a more thorough discussion of the size of the artaba see below, 20-1.

<sup>25</sup> Rathbone (1991), 243

<sup>26</sup> Just as a test, in Appendix 3, the cost of living test is applied to a second-century peasant holding 5 arouras. It yields a surplus of about 10 artabas, 20% of the crop. This again suggests that the cost of living estimation used here tends to understate the actual cost of survival.

markup for wheat and around 10% for wine.<sup>27</sup> Regardless, the prices recorded by estates must be a lower bound for the prices that an average laborer might have paid. Even admitting this selection bias, the extant prices and wages should fairly closely approximate those faced by a laborer.

But how closely would prices attested in one nome parallel those faced by a laborer in another? This is of critical importance to this paper. For example in 105 A.D, laborers in the Fayum in the Arisonite nome were being paid 5 or 6 obols ( $5/7$  or  $6/7$  of a drachma), while the cost of wheat in the Oxyrhynchite nome was 7-8 drachmae, but there is no extant price of wheat from the Fayum area. This paper will assume that the Oxyrhynchite price of wheat is representative of the prices faced by the Fayum laborer. In the very short term, this is too strong an assumption; there must have been small local gluts and shortages. Over longer periods of years and decades however prices between the nomes are very highly correlated.<sup>28</sup> Additionally there is no evidence that prices were higher in any of the nomes relative to the others. Over the medium and long term, the supposition that prices in one nome were representative of those in the other nomes is very reasonable.

The paper will also make a second supposition about prices: short term inflation was negligible during the periods from 100-160 and 190-270. Specifically during those periods this paper will treat prices falling within 25 years as if they came from the same year.<sup>29</sup> This assumption contradicts the conventional story of serious inflation in the third-century. But given that Rathbone has demonstrated the two periods of quite stable prices, this seems reasonable.

Since prices within the nomes moved together over the long term and for long periods were

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<sup>27</sup> Rathbone (1997), 212

<sup>28</sup> Rathbone (1997), 212

<sup>29</sup> On the other hand I have excluded all prices coming from the period from 160-190 as too tough to tackle. Not enough information is extant to do yearly calculations and in light of the high rate of inflation it becomes impossible to estimate the cost of living. Thus the wages from P. Milan Vogl. VII 304 and III 153 (dated to 166 and 169-70) are not included in the calculations below

generally unaffected by inflation, it is possible to attempt to calculate average prices for the various goods over 25 year periods. Average prices will be far less susceptible to short term swings in price and should better represent the overall position of wage-laborers at the time.

## **II) Method**

There is a very basic way of testing the viability of a rural proletariat: could Roman agricultural workers afford the basic necessities of life on their wage? If not it is fairly clear that they must have had another source of income. The method employed here is quite simple: it attempts to gauge the cost of purchasing the food needed to fulfill the laborers caloric requirements using wheat and wine and oil prices. The minimum annual cost of clothing and shelter are approximated using surviving prices as well. Last, the annual tax due for a wage laborer is estimated. The outlays for food, shelter, clothing and taxes would have made up the vast majority of the spending of a laborer.

It is very interesting that only two previous scholars have attempted this sort of test. A.C Johnson and Hans Drexhage, the two authors who have attempted to compile all extant prices from Egypt, also make some attempt to calculate the cost of living.<sup>30</sup> However, the calculations of these authors are problematic. Writing in 1936, Johnson did not have access to a great many papyri which have been published in the last 70 years. He was also writing before the advent of nutritional science. Drexhage's work utilizes recent publications, but reaches some unlikely conclusions and fails to include taxes. Regardless, neither follows up their calculations with any sort of analysis of what the implications for rural labor and no other authors have sought to analyze their results.

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<sup>30</sup> A.C Johnson, *Roman Egypt*, (volume II of Economic Survey of Ancient Rome, Tenny Frank ed,) (1936) 301-307 and Hans Drexhage *Preise, Mieten/Pachten, Kosten und Lohne im ROMEISCHEN Agypten bis zum Regierungsantritt Diokletians*, (1991).

The neglect of this kind of evidence speaks to the bad name of quantification among Roman historians. Using data from the ancient world is indeed fraught with danger, but it seems senseless to let evidence go unused because it could be unrepresentative. Perhaps the conclusions of this paper, like so many previous hypotheses about the ancient world, will be disproved by the publication of only one bundle of new papyri. This should not drive scholars to take refuge in the more traditional literary sources of evidence. Scholars would do well to remember that the writings of Cato, Columella and Varro, the writers of the surviving agricultural manuals from the Roman world, suffer from a strong bias as well. As many scholars have pointed out it is entirely possible that the Roman upper class was saying one thing and doing quite another.<sup>31</sup> It may be no more accurate to try to extract the realities of how Italian estates were actually run from Cato than from a bundle of fragmentary papyri. Moreover, often surviving price evidence can provide information about the lives of the common people which is entirely unavailable in other sources of evidence. This body of evidence, even in Egypt, will never be complete enough to allow scholars to draw conclusions with the certainty that an economic historian can have looking at modern data, yet that is no reason to avoid price evidence all together.

Scholars of the ancient world are often quite suspicious of numbers which seem to have far more precision than is warranted. I readily admit that the numbers presented here are just a rough gauge of the cost of living faced by a wage-laborer. The reader should be well aware that the accuracy implied by the equations used to calculate the cost of living is illusory. Wherever possible, the method employed here tries to put a lower bound on the cost of living. It is intended to show that even under the best circumstances a man could not have survived long without access to land or permanent employment.

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<sup>31</sup> Cf. Keith Hopkins on the Roman Upper class and commerce.

### *Wages and the problem of days worked*

Agricultural wage laborers in Egypt were overwhelmingly, if not exclusively, male. While laborers tend to be anonymous, those who are named are men. All of the permanent laborers on the Appianus estate and elsewhere throughout Egypt were men as well. Occasionally women were employed as wage-laborers during the peak labor periods, but practically none would have made their living as agricultural wage laborers.<sup>32</sup> Wage-laborers were primarily between then ages of 15 and 40. While there may have been laborers who fell outside this category on the older end, they probably were few. Demographically, the rural poor must have died at even greater rates than the averages suggested by cited above: few lived to forty. This paper will thus assume from here in that every wage-laborer was a male between the ages of 15 and 40. This is of critical importance in estimating the caloric needs of a day laborer.

Wage laborers are especially well suited for a cost of living analysis because they usually received all or most of their remuneration in cash. If these laborers did not have access to land this put them in a rather unique position for peasants: they would have purchased almost all of their food in cash; they would have paid their taxes in cash and paid their rent in cash. Unlike permanent employees who received almost all their remuneration in kind, wage laborers would have bought almost of their necessities. This means that the cost of living analysis presented below reflects the reality of daily life far better than if it was applied to a subsistence farmer whose interactions with the market place may have been quite limited.<sup>33</sup>

The largest obstacle to reconstructing the life of a wage-laborer is determining how many days he could find employment. All the other estimates that appear in this paper in terms of per diem wage and costs are based off surviving evidence, but no explicit evidence exists about how

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<sup>32</sup>Walter Scheidel, "The most silent women of Greece and Rome. Rural labor and women's life in the ancient world (II)," *Greece and Rome* 43: 1-10.

<sup>33</sup> See Appendix 3

many days wage laborers were employed. It is clear that laborers were not able to find employment whenever they wanted. The parable of the laborer in Mathew is good proof of this. In the episode, the owner of a vineyard goes town and hires some laborers at dawn. He returns later and finds there are still men looking for work and he hires more. The employer returns at the end of the day and finds there are men still waiting and asks them why they remain idle. They reply “because no one has hired us.” The parable is effective precisely because everyone understands that day laborers will go into the village and many will not find work.<sup>34</sup> In particular, laborers had little trouble finding employment during the most active times during the farming season: sewing and harvesting. Finding work in between could be challenging. Xenophon, concerning an episode in Greece in the 4<sup>th</sup> century B.C, wrote:

The troops on the island of Chios subsisted, so long as summer lasted, upon the produce of the season and by working for hire up and down the island. When winter came, however, they were without food and poorly clad and unshod.<sup>35</sup>

Xenophon did not deem it necessary to say that no work could be found in the winter as his readers would have known it.

Therefore, the number of days worked is treated as variable in this paper. It is however possible to put an upper bound on the number of days worked as all sources suggest that more than 300 would have been highly unusual. If a laborer needed to find more than 300 days of work to support himself, it seems unlikely he could have done so. 200 days per year would have been more typical.<sup>36</sup> Instead of assuming a fixed number of days of employment, we will attempt to determine a minimum number of days which a laborer would have needed to be employed to

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<sup>34</sup> Mathew 20: 1-16

<sup>35</sup> Xenophon Hellenica 2.I.I. Cited in Erdkamp, 81.

<sup>36</sup> Duncan-Jones (1979), 160

survive purely from his wage-labor. This number can then be evaluated against what is known about employment patterns to see if it is feasible in the long run.

What is clear from the evidence is how much wage-laborers were paid per day. Wages did vary depending on the task and the time of year. In particular, tasks which required extremely strenuous activity were better paid than lighter jobs. Moreover, at harvest time when labor was most in demand, there is some evidence that wages were increased.<sup>37</sup> Therefore one must be especially careful in handling wages coming from the harvest, because they probably did not represent the wages a laborer could have earned during other parts of the year.<sup>38</sup> When both harvest and regular wages are available, this paper assumes that the laborer worked 15 days at harvest wage and the rest at the regular rate.<sup>39</sup>

### *Food*

Estimating the per annum cost of food is key to any cost of living index. This is especially true in the ancient world. Even in the United States today families in the bottom quintile of income still spend 40% of their after tax earning on food.<sup>40</sup> This number would have been dwarfed by the expenditure of the poor in the ancient world who did not have access to land. R.W Goldsmith's estimation that 60% of income was spent on food is likely too low for the rural poor. His estimate is based on the average population, while the poor in all societies spend a greater portion of their income on food. Caloric requirements are also the least flexible of one's daily needs. One might be able to survive in a motley assortment of rags or temporarily evade taxation, but no one can continue without a daily intake of calories. The number of

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<sup>37</sup> Rathbone (1991), 159-61. Cf. D. Foraboschi "Remunerazione e Produttività del Lavoro nel P. Mil. Vogl. 153" in *Studi Classici e Orientali* 21 (1972): 39-51.

<sup>38</sup> Particularly see: P. Flor. 322, P. Fayum 102 and for the possibility P. Fayum 331 represents a harvest wage see below, 26.

<sup>39</sup> This is just a rough calculation based on one week for the wheat harvests and one week for harvesting vines.

<sup>40</sup> United States Department of Agriculture: [http://www.ers.usda.gov/publications/EIB23/eib23\\_reportssummary.pdf](http://www.ers.usda.gov/publications/EIB23/eib23_reportssummary.pdf)

calories one needs to sustain activity varies greatly, however, depending on two factors: first the size of the person and second the work he or she does.

Peoples of the Roman Empire were significantly smaller than their modern counterparts. As such they required a correspondingly smaller amount of calories to sustain activity. The average male was about 5 feet 4 inches and weighed around 135 pounds.<sup>41</sup> Egyptian agricultural laborers would have been smaller than this on average as they were part of the extreme poor and would have suffered from malnutrition at greater rates. On the other hand, wage-laborers often performed activities which required a great deal of energy. The Food and Agriculture Organization (FAO) estimates that a person who works as a manual laborer requires about 50% more calories each day than an office worker.<sup>42</sup> The average laborer would require around 3,300 k-calories (henceforth just calories) when working on the farm. On days when he was unemployed however, the laborer might require only 2400 calories.<sup>43</sup> Therefore the per annum caloric requirements of the worker in question are very much dependant on the number days he worked:

$$\text{Annual calories} = 3,300 (\text{days employed}) + 2400 (365\text{-days employed}) \quad \text{(I)}$$

The cost of obtaining these calories can be estimated from extant wheat prices. Wheat is an ideal proxy because it constituted a majority of the calories in the diet of an Egyptian peasant and because there are 35 reliable extant sources for wheat prices during the 2<sup>nd</sup> and 3<sup>rd</sup> centuries. Egypt owed its importance under the Empire to its place as the preeminent producer of wheat.<sup>44</sup> In other parts of the Empire, peasants ate barley and millet in large quantities as well as wheat,

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<sup>41</sup> I have drawn this number from L. Foxhall and H.A. Forbes “Σιτομετερίά: The Role of Grain as a Staple Food in Classical Antiquity” *Chiron* 12 (1982): 41-90, 48. It is not however a number that should be in much doubt, but historians of the ancient world seem to pay very little attention to skeletal remains.

<sup>42</sup> FAO Energy and Protein Requirements (2006): <http://www.fao.org/docrep/007/y5686e/y5686e07.htm#bm07.1>.

<sup>43</sup> Ibid.

<sup>44</sup> Through the grain tithe and state purchases, Egypt exported 15 million artabas (150,000 tonnes) of wheat to the rest of the Empire, roughly enough to feed 1,500,000 people.

but in Egypt, even the poorest peasants consumed mostly wheat. For example, contracts for the maintenance of Egyptian apprentices often include wheat as the only alimentary requirement.<sup>45</sup> Wheat likely made up as much as seventy or eighty percent of the calories of poor Egyptian peasants.<sup>46</sup>

Still Egyptians did consume other food stuffs. Most prominently in terms of calories, laborers frequently drank wine or beer. Imbibing might have accounted for another 10% or so of calories.<sup>47</sup> Vegetable oil was also an important part of the diet. Drexhage in his calculations assumes that daily wine consumption of a laborer will be 400 calories and oil 150 calories. When they were lucky, peasants might even have enjoyed a bit of milk, cheese and even a smidgen of meat. Obtaining calories from all of these sources would be more expensive than getting the same number of calories from wheat. Thus assuming all the calories came from wheat again puts a lower bound on the cost of food. In a second equation (IV), this paper will calculate food expenses treating wine and oil as necessities.

On days when he was unemployed, even laborers without land would have hunted, fished or gathered wild greens. Historian Diodorus Siculus claimed that Egypt was famous for the availability of wild vegetables.<sup>48</sup> How many calories worker could obtain on these days off through hunting and gathering must have varied greatly depending on for example access to the Nile for fishing or availability of fallow fields in which to collect greens. One should also consider that a laborer might have often gone into town and waited all day without finding

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<sup>45</sup> Duncan-Jones "The Price of Wheat in Roman Egypt und the Principate" *Chiron* (1976) 241-62. E.g P. Mich V 355; P. Oxy XXXIV 2721.

<sup>46</sup>Garnsey, 239. C.f. J.K Evans "Plebs Rustica II" in *American Journal of Ancient History* 5:2 (1980) 134-173. Wheat was so important that it certainly seems possible that it was a Giffen good for Egyptian peasants. A Giffen good is a product which people buy more of when the price goes up. Wheat was so important to the survival of Egyptian peasants that it is easy to believe that an increase in its price could have caused a cut in all other spending just to obtain the necessary calories. This is anecdotally confirmed by Rathbone (1996), 242.

<sup>47</sup>As Rathbone points out in "Price and Price formation," the consumption of wine as an everyday staple was increasing through the 2<sup>nd</sup> and 3<sup>rd</sup> Centuries.

<sup>48</sup> Diodorus Siculus I.80 5-6

employment and thus have had little chance to forage. As a rough estimate one might guess that a laborer in reasonably favorable circumstances could collect around 1000 calories on average on days when he was unemployed.<sup>49</sup> Therefore calories from wheat are estimated as:

$$\text{Calories from wheat} = 3,300 (\text{days employed}) + 1400 (365\text{-days employed}) \quad \text{(II)}$$

Wheat is incredibly calorie rich food. A kilogram of un-milled wheat provides around 3300 calories assuming that no has spoilt. In extant documents, un-milled wheat in Egypt is measured in artabas, a measure of volume. The size of the artaba varied to some degree, but unless otherwise stated, this paper will assume this refers to the “standard Roman artaba” which held 48 choenixes (a Greek measure of volume) or 38.75 liters.<sup>50</sup> 38.75 liters of un-milled Egyptian wheat would have weighed around 31kg,<sup>51</sup> and thus contained 100,000 calories. Thus:

$$\text{Cost of food}_1 = \frac{3,300 * (\text{days employed}) + 1400 * (365\text{-days employed})}{100,000 (\text{cal/artaba})} * X \text{ drachmae per artaba} \quad \text{(III)}$$

If however, like Drexhage one considers 400 calories of wine and 150 calories of oil a necessary part of the Egyptian diet and the cost of food can be reckoned as:

$$\text{Cost food}_2 = \frac{2750 * (E) + 850 * (365 - E)}{100,000 (\text{cal/art})} * X + \frac{365 \text{ days} * 400}{14,000 (\text{cal/keramion})} * Y + \frac{365 \text{ days} * 150 \text{ cal of oil}}{2,225 (\text{cal/cotyla})} * Z$$

Where X is the cost in drachmae of one artaba, Y is the cost of one keramion (ca. 17.5 liters) of wine and Z is the cost of one cotyla (c.a 2 liters) of vegetable oil. (IV)

The difference in the cost of living implied by the two equations is quite significant. In many cases using IV instead of III increases the cost of living by 25% per year. There are

<sup>49</sup> Evans, “Plebs Rustica II” 139-144. Evan’s assigns foraging a smaller caloric role than this so again this should a lower bound on the cost of food.

<sup>50</sup> Duncan-Jones, “Variation in Egyptian Grain-Measure” *Chiron* 9 (1979), 347-75. I have reckoned the choenix as .96 liters to conform to the fact that a Roman artaba held 48 choenixes which was equivalent to 4.5 Italian modii, which in turn held about 8.5 liters.

<sup>51</sup> Foxhall and Forbes, 43

arguments for using each, but in the end **IV** probably comes closer to the actual cost of living. It is true that for the extremely poor **IV** must overstate the cost of food. In Egypt during the 2<sup>nd</sup> century, wine was 10 times more expensive than wheat per calorie.<sup>52</sup> Therefore, a starving man would be unlikely to be consuming a half liter of wine a day as **IV** assumes. But as was noted above, **III** understates the cost of food. Man cannot live by bread alone. The food costs estimated by equation **III** seem far too low. The both the previous scholars, Johnson and Drexage who have tried to approximate the cost of food in the early second century, estimate that the minimum outlay would have been around 200 dr.<sup>53</sup> Using **III** and even assuming the laborer was employed 365 days, the outlay calculated is only 108 dr. Generally **IV** seems more accurate.

One should note that the price of wheat likely varied from year to year from season to season. This should be largely canceled out in this paper by averaging the extant prices over a 25 year period. Yet laborers did not face constant prices. The cost of wheat could vary quite a lot even from month to month.<sup>54</sup> This added to the problems of living of wages alone. Months or years of high prices occasionally followed one another in succession like in 250-2. Though these high prices might be balanced out on average by months and years of low prices, this would be little consolation to a laborer who starved to death during the high prices.

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<sup>52</sup> 1 artaba wheat contained ca 100,000 calories and cost on average 9 dr. 1 kermanion wine contained c.a. 14,000 calories and cost c.a. 6 dr.

<sup>53</sup> There are problems with the calculations of Drexage and Johnson as well. For reasons which are beyond me, Drexage, the recent chronicler, reckons the artaba to hold 25.2 liters which implies it held about 25-30 choenixes. Artabas of this size are unattested in our sources. From the 2<sup>nd</sup> and 3<sup>rd</sup> century no artaba is attested holding less than 40 choenixes. Because of this, in Drexage's calculations the number of artabas needed to feed a man is quite high. He calculates a worker needed 14 artabas a year as well as large quantities of wine and oil. Johnson estimates 10. Using the method outlined above, even if one assumes that a worker ate only wheat and he was employed 365 days a year, he would only consume 12 artabas per year. Both Drexage and Johnson's estimates of these seem too large especially if the laborer was unemployed for significant periods. Johnson himself notes that his 100 dr. per year for *opsonion* (wine, oil and relishes) is "too high." The cost of a generous yearly allotment of oil and wine during the second-century was closer 80 than 100.

<sup>54</sup> Duncan-Jones "Price of Wheat" 244 points out one series in which the price of wheat in Tebtunis in 45/46 A.D fluctuated nearly 100% in less than three weeks.

Nonetheless both these estimates tend to show that equation III per and does include any non-wheat based calories underestimates the cost of food by quite a bit. Even if the worker was employed 365 days, III yields a food outlay of only 108 drachmae.

### *Shelter*

Along with food, a person needs shelter to survive. To some degree Egypt's mild climate lessened this burden on peasants but it did not eliminate it. Egypt's houses were built of sun-dried brick and "cost but little to erect."<sup>55</sup> It would, however, be unwise to assume that the cost of shelter for a wage-laborer was negligible. On the Appianus estate the rent of a single occupancy room (*kella*) was 100 drachmae per year, which in a good year would have bought almost enough wheat to feed a man for a year.<sup>56</sup> Still it is hard to estimate minimum the per annum rent for a wage laborer because most extant prices come from the larger cities. These were higher than a laborer would have faced renting a room in a village. Additionally, many leases that are extant deal with entire houses instead of single room leases. In places where there is some indication of the size of the house, one can make some estimate of the cost of a single room.<sup>57</sup> This is more art than science. The estimates of the cost of housing must be fairly rough, but one can still get a reasonably good idea using these sources. The estimate used in this paper for housing in the 2<sup>nd</sup> century (19 dr.) is much closer to Johnson's (20 dr.) than Drexhage (4.32 dr.). Drexhage's figures for housing costs all seem unbelievably low. A blanket cost 28 dr. in 138 A.D. It is hard to believe that one could find housing for an entire year for one seventh the cost of a blanket.<sup>58</sup>

### *Clothing*

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<sup>55</sup> Johnson *Roman Egypt* (1936).

<sup>56</sup> Rathbone (1991), 165: In year of low prices it would have cost around 120dr. to feed a man.

<sup>57</sup> This method is applied to: S.B. 9626, P. Tebt. 2.372, ZPE 50 (1983) 74.7, P. Milan Vogl. 3.143 P. Oxy 44. 3200,

<sup>58</sup> BGU 1564

The last of Thoreau's necessities is clothing. As with housing, Egypt's mild climate made this expense relatively smaller than it would have been in other parts of the Empire. Still temperatures in the winter in Middle Egypt do dip to around freezing and so warm clothes were a necessity. Even in the summer clothes simply wear out and fall apart. The best way to gauge the minimum expense on clothing is from surviving contracts in which the master agrees to pay for all expenses of his apprentice including clothing.<sup>59</sup> The estimate used here is lower than Drexhage or Johnson's, but since these authors do not attempt to account for miscellaneous expenses this balances out to some degree.

### *Taxes*

Thoreau's list of necessities is missing a major expense: taxes. It is not always easy to tell how heavy the tax burden was on peasants.<sup>60</sup> Most indications are that it was weighty, especially in Egypt. Egyptians were liable for a litany of taxes even if they did not own property. Consider the contract of a weaver in the first-century A.D. The weaver agreed that his employer Heron would pay him a small salary and:

Shall pay on my behalf for the aforesaid period of time, annually the poll tax...the weaver's tax, and the surtax of one third and the work on the embankments and the bath tax and the tax on fountains.<sup>61</sup>

Peasants and laborers were not protected from this burden by their poverty. Ironically, at least by modern standards, village residents paid more in regular taxes than rich city dwelling citizens.<sup>62</sup> For example, residents of Alexandria were immune from the poll tax which was an

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<sup>59</sup> E.g. P.Oxy. 275

<sup>60</sup> In terms of the entire Empire, the burden of Roman rule is a controversial topic. For the two sides of the debate, see David Cherry *Frontier and Society in Roman North Africa* (1998) arguing the Empire was an oppressive load, and for the opposite view see Clifford Ando *Imperial ideology and provincial loyalty in the Roman Empire* (2000).

<sup>61</sup> PSI VIII 902, as translated by E.M. Husselman.

<sup>62</sup> Depending on their level of income this regressive tax system was balanced by the liturgy system in which more wealthy residents were assigned the honor of having to pay for various public services. Still Romans did not share the modern conception that the poor should bear less tax burden.

oppressive expense for peasants. Papyri contain many records of peasants in tax flight (*anarchasis*). Impoverished Egyptians would flee their home and make for the big city or the desert because they were unable to face a massive backlog of taxes. Instances of *anarchasis* in the papyri increase as time goes forward in the 2<sup>nd</sup> and especially in the 3<sup>rd</sup> century.

Landless laborers would have avoided one major source of taxation: taxes in kind collected on private and public land. Yet they still would have had to pay the poll tax, dike tax and various other taxes. In estimating these costs, Sherman Wallace's *Taxation in Egypt* (1936) remains the unsurpassed source. Unfortunately Wallace's work contains little evidence for the third-century.<sup>63</sup> On the Appianus estate from which most third century wages come, there is fairly abundant evidence about taxation. For those third-century wages where there is no tax information, there is little to be done but assume that the Appianus estate was typical.<sup>64</sup>

#### *Miscellaneous Expenses*

Lastly this paper makes some attempt to account for miscellaneous but necessary expenditures such as bowls, knives, bedding, fuel for fires and other sundry items. These expenses while not easily encapsulated in a single category could be just as necessary as any of those listed above. An artaba of un-milled wheat would be little good to a laborer without any way of turning it into flour or other edible forms. Still, estimating these expenses is challenging because of their diverse nature. As a general proxy, miscellaneous expenses are set equal to the clothing outlay.

### **III) RESULTS**

Of the extant papyri, the method outline above was applied to 16 which detailed wages in 79 A.D, the early and mid second-century and the mid third-century. While very many other

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<sup>63</sup> Egypt's tax system sorely needs an author to update and expand on Wallace's work especially filling in the lacuna in the third-century as well as possible.

<sup>64</sup>Particularly: BGU. 14 (A.D 255).

documents pertaining to wage labor survive, none are datable with enough precision to be included in this test. As was noted above, 2 papyri (P. Milan Vogl. VII 304 and III 153) which are from 165 and 169 A.D, were also not tested because they fall during the period of high inflation.

The results of the test are shown in summarized in appendix 2 and an explanation of each calculation is presented in appendix 2.1-16. The most striking result is that during the 2<sup>nd</sup> century it would have been nearly *impossible* for a landless peasant to survive by performing wage-labor alone. If one assumes that 200 days was the typical per annum employment of a wage-laborer, not one of the 23 attested wages could have supported his bare subsistence using equation **IV** as a measure. Even using the lighter standard of equation **III**, only in two cases could 200 days of work have supported a laborer. Of these two, only the 9 obol wage attested in P. Fayum 331 (Appendix 2.9) would be capable of giving any sort of margin of safety. Even here one is tempted to doubt whether this wage might not represent some exceptional circumstance. There is no indication remaining on the papyri of what work was performed, but merely records a payment to workmen (ἐργάται) at a rate of 9 obols per day.<sup>65</sup> 9 obols is the same rate as was paid to harvesters in P. Fayum 102. It seems likely that this is either a harvest wage or payment for an especially strenuous task and therefore is not an indication of a wage available in the long term. Regardless, even if a worker could obtain work at this wage for 200 days he still could not support himself if his diet had a significant number of calories from non-wheat sources.

It is certainly possible that in a good year an Egyptian seeking to support himself through wage-labor could find 300 days employment. However, if **IV** is used as the measure, even under these “lucky” circumstances only 2 of the 23 wages would have allowed a laborer any sort of

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<sup>65</sup> Bernard Greenfell, Arthur Hunt and David Hogarth, *Fayum Towns and their Papyri*, (1900), 302

surplus. Again of these two, only the wage attested in P. Fayum 331 would have allowed a worker enough of a surplus to help support a family. Taking an optimistic view one can assume that the wife of the family was self-sufficient.<sup>66</sup> Even if this were true, the cost of raising a child in second-century Egypt would have been at least 60 dr. per year.<sup>67</sup> In a good year a laborer earning 9 obols a day could support at least one of his offspring. None of the other wages attested would allow a man to support even one child. Even for workers earning 9 obols a day, supporting a family would be an untenable position. While one year he might find 300 days, if he only found 200 the next his child would starve.

Drawing conclusions about the third-century is far more difficult. One is tempted to conclude laborers were paid better than in the second-century but there is simply too few examples to make a conclusion. There is extensive evidence about the cost of wheat and wine and the other proxies used to evaluate the cost of living, but there is very little extant wage evidence from outside the Appianus Estate where evidence is plentiful.<sup>68</sup> It is possible then to make much better estimates about the cost of living for laborers on the Appianus estate from 250-260 A.D. than any other location or time in Roman Egypt. First one can fix the cost of housing which is the hardest proxy to calculate in cost of living. To rent a single occupancy room on the neighboring estate cost 40 drachma, 24 days labor and a piglet. This works out to 108dr.<sup>69</sup> Second one can fix the minimum clothing outlay, as servants on the estate were allotted

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<sup>66</sup> This seems like a very optimistic assumption given how often Egyptian women were pregnant or nursing. Moreover, opportunities for women to work outside the home were limited compared to those of men, see 14. Within the home women could produce marketable goods, primarily textiles, but I am less optimistic than some that this could generate enough income for a woman to be self-sufficient.

<sup>67</sup> FAO recommends 1400-1600 calories a day for children aged 4-8. 1400 a day means 51,000 a year or about 5 artabas. This would have cost about 50 dr. on average. Raising a child must have cost at least 10dr on top of this, between clothing; non-wheat based food, and perhaps increased housing costs (since housing is estimated for a single occupancy room).

<sup>68</sup> The following paragraph is drawn largely from Rathbone (1991), 155-165

<sup>69</sup> Ibid, 178. It is also a good reminder that the rural economy was not fully as monetized as this paper is prone to implying.

48 dr. per year for clothing. Third there is abundant evidence for wages which the harvest and non-harvest wages can be distinguished.

All in all the conclusions drawn about the Appianus estate fit the general pattern of the second century. Using **IV** as the measure, a laborer would need to find about 250 days work to survive alone, a hard but not impossible task. Even if he found 300 days of work he could not support one child. Of the wages attested on the Appianus estate only four of nearly 60 were below the reproductive cost of labor. Before becoming too optimistic, one should note that the standard rate at the neighboring Titianus estate was only 1 dr. 5 obols which is well below the reproductive cost of labor. Again there are simply too few attested wages to make any conclusions about whether laborers in the third century were any better off.

Incredibly, using **IV** as the measure, 13 of the 23 per diem wages that are extant from the second century did not meet the reproductive cost of labor. Each day these laborers worked they received less than the minimum income necessary to sustain the same activity for the next day. This means that even if these workers found employment 365 days a year that they still could not subsist on wage-labor alone. This is not an aberration based on the quirks of the particular test applied here. If one applies A.C Johnson's estimates,<sup>70</sup> of the 23 attested wages, 12 are below the reproductive cost of labor. Using Drexhage's estimates are problematic. First, his estimates of yearly expenses do not include taxes, therefore 60dr. are added to his results. More importantly he makes estimations by century which causes significant problems given the high rate of inflation during the period from c.a. 160-190. This means that his estimates overstate the difficulty of a wage-laborer surviving in the period before 160. All that said when his method is

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<sup>70</sup> 10 artabas of wheat per year, *opsinon* of equal value as the wheat, 20 dr. for clothing, 60 dr. for taxes and 20 dr. for housing.

applied, roughly the same number of wages turn out to less than the reproductive cost of labor (12/23).

These numbers seem hard to believe at first. It boggles the mind that someone could be paid less per day than it costs to live. Surely this system must be unsustainable. After all where would estates get their workers if laborers could not afford the basic necessities required to sustain the same activity the next day. Owners of estates worked by slaves were acutely aware that they needed to give their slaves food shelter and clothing to allow them to be productive in the future.<sup>71</sup> Paradoxically these day-laborers were receiving a real wage lower than that of a slave. This is a curious if tragic historical phenomenon. The only wage laborers who Johnson estimates the cost of living for are the workers on the Epimachus estate from 79 A.D. (P. Lond. 1 131). He finds that:

Expenditures exceed his income. Either we should reduce the amount spent on food and *opsonion* very materially or else disregard the assumption that he was employed without keep.<sup>72</sup>

This paper noted above that Johnson likely did overstate the cost of the *opsonion*, but even correcting for this, a laborer working 365 days a year still ended up short of subsistence. Johnson concluded this was impossible: either there was an error in his calculation of the cost of living or wages included food. Yet the papyri give no evidence that food was included in the wage and the only reason to conclude this is the sheer exiguousness of the stated wage. There is however another explanation for the meagerness of these wages: externalization of labor costs.

#### **IV) Explanation: Externalization of Labor Costs**

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<sup>71</sup> Cato *de agricultura*, 56.

<sup>72</sup> Johnson, 305

Developed in the context of pre-modern Europe, externalization of labor costs simply means that part or all of the reproductive labor cost of labor deployed “outside the primary economic niche”<sup>73</sup> is borne by agriculture. Externalization of labor cost has been applied in the past to explain how industrial wages could be below the reproductive cost of labor. Just as above, one wonders how the factory could get its labor, if it paid so little that employees could not subsist working everyday. The answer is that agriculture continued to bear part of the cost of sustaining those workers. In other words, the men and women receiving industrial wages below the reproductive cost of labor were farmers who worked part time as weavers. The farmers still received much of their sustenance from their plots and worked in textiles to supplement their income.

Paul Erdkamp has seized on this concept and applied it to the ancient world. In particular, Erdkamp has focused on how transport and rural production of textiles must have been aided by externalization of labor costs. Yet his proof of this is primarily reliant on anecdotal comparisons to early modern Europe. This is not to say that his hypotheses are wrong, but at no time does he attempt to quantify the phenomenon. But externalization of labor cost can be quantified here in the case of Egyptian rural wage labor. In this case, however, it is two different agricultural sectors which are sharing the burden instead of industrial and agricultural. The commercial agricultural sector paid wages below the reproductive cost of labor and the subsistence agriculture partially supported those laborers. No one has as yet written about this phenomenon, but it seems to be the only answer for how Egyptian agricultural wages could consistently be below the reproductive cost of labor.

In order to better understand why wage-labor was so poorly remunerated; consider a peasant owning about 7 arouras. Assuming for the moment that this peasant was unmarried, this

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<sup>73</sup> Erdkamp 2005, 84. Cf. Mendels (1972)

plot of land would have met his subsistence requirements. Depending on the quality of land, in a bad year 7 auroras may or may not have tided a single individual through. Nonetheless, this individual seems fairly self-sufficient. Why would he possibly ever take on a job which did not even pay for his food and shelter for the day?<sup>74</sup>

The answer lies partially in the cyclical nature of labor in the agricultural world.<sup>75</sup> During the periods of sowing and in particular during reaping, crops require huge labor inputs. During harvest time, many crops including wheat will spoil if they remain un-harvested too long. In pre-modern Europe, and presumably sometimes in the Roman Empire, this resulted in a paradoxical occurrence: an area under population pressure suffered a labor shortage during harvest season.<sup>76</sup> At other times, however, while the crops are growing there is almost nothing productive that can be achieved by working on the crops. There is only so much weeding one can do. Columella estimated that to work 10 *iugera* (9 auroras) one man would only need to work 105 days of the year. This seems like an underestimate, but nonetheless a good illustration of how a small holder might be underemployed.

Egypt's climate would have *partially* insulated her farmers from the force of this cycle. For example, wheat spoils less quickly in warmer climates, somewhat reducing the labor crunch during harvest time. Also due to Egypt's warm climate, farmers would have had an easier time finding crops to grow in winter as well as summer. While all farmers would have been faced with lulls in labor demand, the peasant farmer would have felt them more severely.

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<sup>74</sup> Since I have assumed here that the individual already owns a shelter, the cost of shelter is the income he forgoes by not renting out his room (*kella*).

<sup>75</sup> The following discussion owes much to Erdkamp (1999) and (2005).

<sup>76</sup> Franklin Mendels "Proto-Industrialization: the first phase of the industrialization process" *Journal of Economic History* 32 (1972), 242.

Commercial farmers grew vines which need a more even distribution of labor throughout the year, but peasants with as little as 5 arouras probably seldom took the risk of growing grapes.<sup>77</sup> All farmers would have partially diversified the crops they were planting, which meant that they would be harvested at different time. Subsistence farmers would have been more constricted in their ability to diversify than commercial farmers, as his crop choice was limited to what was calorically efficient to grow.<sup>78</sup> Even farmers with small plots could help ameliorate the harvest crunch by planting on the north and south sides of slopes if they had them on their land.<sup>79</sup>

Focusing on these periods when farmers had little to productive to do, it becomes easier to see why a peasant might be willing to work for paltry wages, even wages that did not meet his daily requirements. The opportunity cost of wage-labor was essentially zero during these periods. It was argued above that the proportion of farmers who owned 5 arouras or less in 2<sup>nd</sup> and 3<sup>rd</sup> century Egypt was still relatively high (up to one-third of the rural population), it becomes easy to see that there would have been a large number of peasant farmers who would have been willing to perform wage labor for small wages. Moreover, even though commercial farmers were less affected by cyclical need of labor, they were still prone to similar seasonal demands as subsistence peasants. This meant that during many parts of the year there would have been a huge supply of labor and relatively low labor demand. This helps to explain the low wages paid to laborers during the non-harvest period.

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<sup>77</sup> As Erdkamp (1999) points out, peasant farmers would have been more wary of the vagaries of the market than commercial farmers as they had no cushion to fall back on. While in the long run, wine might have been more profitable than growing wheat or other consumables. A bad year growing wine could result in the starvation of the family or at least loss of land. In contrast a bad year when growing wheat would still probably produce enough to feed the family even if there was no surplus to be sold at market.

<sup>78</sup> They could not for example grow flowers, or grapes as noted above (n. 5) unless they were willing to chance the market.

<sup>79</sup> The crops on the south slope would get more sun and therefore be ready for harvest sooner than those on the north side.

As well as being seasonally underemployed,<sup>80</sup> peasants might also be structurally underemployed. For example, let the individual previously considered, the single peasant who owned 7 arouras, now be married with one or more adolescent sons. The land might still produce enough almost enough food for the family to subsist, but this household is now structurally underemployed. It now has excess labor capacity that might not be filled even in the harvest time and let alone in the lull periods. If the original farmer was capable of working the plot fairly efficiently alone, this excess labor cannot be used very productively on the original 7 arouras. There would be declining marginal return to labor expended on the original land. As an example, assume that the man has two sons. By working the land himself, the father earns a modest surplus. Later as the first son comes of age he begins to work on the land. His labor is less productive than his father's but produces at the least as much as he consumes. When the younger son begins to work the land as well, however, the benefit is much smaller than when his brother began to work, because there are already two men working the plot. The plot is so overworked that the labor of the younger son does not produce nearly as much as he consumes. While as a whole the family may still produce enough to feed all its members, clearly the younger son is underemployed.

From an efficiency point of view there are many solutions to his problem. Theoretically the family could buy more land, but this would not have been an option open to subsistence farmers. These families lived year to year, seldom saving anything more than the seed necessary for the next years planting. Nor would they have had much in the way of access to credit to fund such a purchase. A more likely option would be to become tenants on either private or public

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<sup>80</sup> Used here in the non-technical sense: none of the economic definitions of underemployment fits this situation. Still the word captures something of the underutilization of economic resources that is excess labor potential.

land. Compared to the other parts of the Empire, Egypt gave the most opportunities to lease land.<sup>81</sup> Yet for the same reasons that peasants would have been unable to purchase more land, they likely would not have been able to rent land as well. Even if the rent was not to be collected until after the harvest, they would have been unable to come up with the extra capital (seed, animals, implements etc) needed to farm the new land. Again this goes back to the lack of available credit.<sup>82</sup>

If credit was made available, the family from this example would probably have hesitated to take it. Recall, that while one member of the family may have been underemployed, the family as a whole remained self-sufficient. Taking on credit, with very high interest,<sup>83</sup> exposed the family to a great deal of risk. With no savings, just one bad harvest could send the family into debt, resulting in the seizure of the 5 arouras and possibly debt-bondsmanship for the father. It seems safe to assume the family would be unwilling to bear this kind of risk even if the expected return would be more profitable than simply working the 5 arouras alone.

On the other hand share-cropping very well might have helped to eliminate the structural unemployment of the peasant family. Since a sharecropper paid only a percentage of the crop to the landlord, he bore no risk in terms of debt. In addition, the landlord provided the capital needed each season by the tenants. The family that has been used as an example might have leapt at the opportunity to become sharecroppers of a small plot. Yet it seems unlikely that they would have often had the opportunity. Rathbone asserts that Egyptian landowners sought to

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<sup>81</sup> In Egypt where slave labor was confined to the domestic sphere, a larger portion was farmed by tenants and sharecroppers. This will have been explained more fully in the previous section which discusses landholding and productivity in 2-3 C. Roman Egypt.

<sup>82</sup> Erdkamp 2005, 16-18 argues that peasants had almost no access to credit. One exception he cites, however, are loans made against the harvest by landlords. Whether this would be extended to new tenants is unclear, but due to the high interest rates of these loans they amounted to little more than a sharecropping arrangement where the tenants took all the risk.

<sup>83</sup> Almost all extant agricultural loans made to peasants charged very high rates of interest unless it came from family.

avoid leasing wherever possible.<sup>84</sup> Of the land that was leased, estate owners preferred to do it through renting as opposed to through sharecropping for precisely the same reasons lessees might have preferred to sharecrop. In sharecropping the owner bore the risk. Lastly among sharecroppers, an estate owner would have preferred families without other holdings. Finding families or men without other sources of income would guarantee the owner that the plot would be worked intensively. This assured the landowner of the highest possible return from this plot. Therefore a family that already owned 5 arouras would probably be at the bottom of his list of prospective sharecroppers. All this is to say, that just like the various farming techniques helped with but did not eliminate seasonal unemployment, sharecropping could not relieve structural underemployment for most families.<sup>85</sup>

The two kinds of underemployment, cyclical and structural, outlined above lie at the heart of the miniscule wages paid to laborers on commercial farms. The opportunity cost, the value of the best option forgone, was almost zero for working away from the farm when peasants were either seasonally or structurally underemployed. Therefore they were willing to work for less than the reproductive cost of labor since this was still greater than any surplus gained from overworking their small plot.

## **Conclusion**

On the Appianus Estate agricultural tenants often were forced to commit to performing a certain number of days labor for the as whole. These are usually the only wage-laborers who are named in the account books of the Estate.<sup>86</sup> Occasionally money is credited to the account of these tenants for wage-labor performed by a relative who was unaffiliated with the estate. These

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<sup>84</sup> Rathbone, (1991), 184.

<sup>85</sup> Rowlandson (1996) 206 ff: unfortunately no tangible estimate of land leased as a percentage of total arable land is given.

<sup>86</sup> Rathbone (1991), 177. Rathbone concludes that they are named because they already have an account with the estate as tenants.

men must have been typical of the laborers who performed the 500 days of work recorded by Eirenaios the manager in 247 A.D. They were small holders who supplemented their income by working on nearby estates. They worked for meager wages because they were underemployed on their own holdings.

The evidence presented shows quite clearly that a rural proletariat which survived off wage-labor could not have existed in second-century A.D. Middle Egypt. While the cost of living analysis presented here can only roughly gauge the minimum cost of subsistence, the wages generally fall far short of allowing subsistence. Even in light of the margin for error, it seems safe to conclude that no rural proletariat existed. There is not enough evidence to draw any conclusions about the third-century. There is no particular reason to believe, however, that the situation would have changed radically enough to allow for the creation of a rural proletariat. The land registers of the early fourth-century seem to indicate that property holding patterns shifted slowly. The only way a rural proletariat could have emerged was through a decline in the number of small holders. There were propertyless Egyptians, but they survived by finding access to land through tenancy or by becoming the permanent work force on the larger estates.

The conditions in Middle Egypt likely mirrored those in rural areas Upper Egypt and the Delta. Therefore it is very likely that if a rural proletariat could not have existed in Middle Egypt then it could not in Upper Egypt or the Delta. More importantly I believe that this result has significant implications for the entire Empire not just Egypt. As was noted earlier, historians have begun to accept that perhaps Egypt was not as unique as originally thought. In this case, however, the way in which Egypt differed, in its lack of a slave economy, amplifies the conclusion. Paul Erdkamp noted that the “predominance of slave labour on commercial farms in

most of Italy and some other parts of the Mediterranean world precluded the existence of a large landless class of agricultural wage-laborers.”<sup>87</sup>

In Egypt no such slave economy existed, yet a class of agricultural wage laborers failed to emerge. This almost certainly seems to preclude the development of a rural proletariat in Italy and the rest of the Empire where slavery dominated. Though land registers are less complete from Italy, a significant class of small holders continued into the third century.<sup>88</sup> It seems likely that Erdkamp’s description of rural labor being composed of a rural proletariat as well as small holding peasants cannot be correct.

The conclusions also seem to affirm historian’s general suspicion that peasants were significantly underemployed. That anyone would be willing to work for wages below the reproductive cost of labor suggests that the opportunity cost for peasants of spending a day working on the estate during non-harvest periods must have been close to zero. It also suggests that peasants had few better alternatives. This illustrates that the reason the Empire’s economy failed to grow is that it was unable to produce opportunities in the urban centers profitable enough to siphon off the underemployed peasants in the field.<sup>89</sup>

Interestingly the second century evidence seems to provide empirical proof of the phenomenon of externalization of labor costs in the Roman Empire. The externalization of labor costs from commercial agriculture to subsistence agriculture is not one which has been studied as yet either in the context of the Roman world or pre-modern Europe. It gives the interesting insight that estate owners actually profited from the continued existence of small holding peasants. Paradoxically it might have been cheaper in many cases to work their estates with hired labor than slaves, even if one ignores the original cost of purchasing the slaves. Owners

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<sup>87</sup> Erdkamp, *The Grain Market*, 82

<sup>88</sup> Garnsey, “Non-Slave Labour,” 139. Cf. Evans “Plebs Rustica II”

<sup>89</sup> This is of course the famous development model in Adam Smith’s *Wealth of Nations*.

had to “pay” slaves a minimum subsistence wage through providing food, shelter and clothing.

This is indeed an interesting result that invites further study.

#### Appendix 1: Roman Egypt<sup>90</sup>

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<sup>90</sup> Image from Bowman (1985), 140

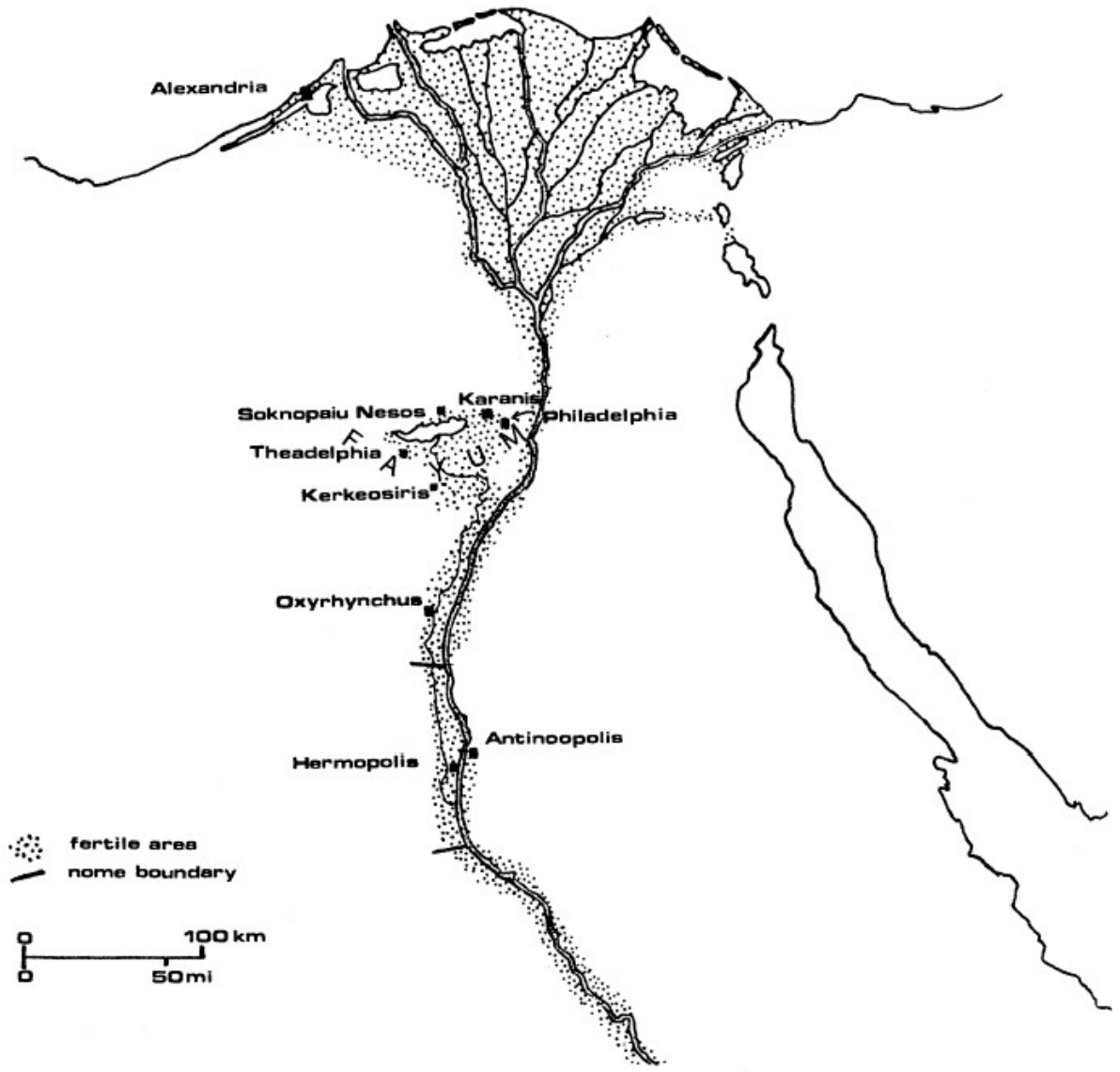


FIG. 1. THE HERMOPOLITE NOME IN THE FOURTH CENTURY.  
DRAWN BY J. BOWMAN