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AGRICULTURAL PRODUCTIVITY AND TAXATION IN LATER ROMAN EGYPT

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The blossoming in recent years of the study of late antiquity has led to a more positive and balanced picture of the fourth to sixth centuries than was once common.[1] But working grimly away in a corner of this rosier tableau has remained the overburdened farmer, taxed and overtaxed to support a bloated army and bureaucracy. Peter Brown, for example, in describing the increased stratification of late antique society and its huge disparities of income, explains these phenomena as follows: "Taxation was the greatest single cause of this change: the land-tax had trebled within living memory by 350. It reached more than one-third of a farmer's gross income. It was inflexible and thoroughly ill-distributed."[2] He reconciles this gloomy picture with what otherwise is a far more positive view by remarking that "a society under pressure is not necessarily a depressed or rigid society." And he points further to differences between East and West: "the peasants of Asia Minor, Syria and Egypt were very different from the dragooned and excluded serfs of the western provinces. They could get a good enough price for their corn in the towns to pay both their rent and their taxes. They could, therefore, meet the demands of the government without being shepherded on to the estates of the great landowners."[3]

The question at stake here is basic to our view of this period, since agriculture was the main part of the ancient economy, farmers living on the land were the vast majority of the ancient population, and taxes on land the bulk of government revenues. These generalizations can be subjected to the test of the evidence from Egypt, the only province of

[1] Versions of this paper have been delivered at Columbia University, the University of Toronto, and the University of Florence. I am grateful to Timothy Barnes for the invitation to Toronto and for discussion there, and to Manfredo Manfredi for my visit to Florence. I have also benefited from discussion with Alan K. Bowman, Deborah W. Hobson, and Klaas Worp. Abbreviations of editions of papyri used in this article may be found in J. F. Oates et al., *Checklist of Editions of Greek Papyri and Ostraca*, 3rd ed., BASP Suppl. 4 (Decatur, Ga. 1985).

[2] Peter Brown, *The World of Late Antiquity* (London 1971) 36.

[3] Brown (above, note 2) 44.

the empire to provide sufficient documentation to allow this to be done. The inquiry will begin with the distressed villages of the Fayum, textbook cases, it would seem, of desperately overtaxed farmers; but when the results of that investigation are studied in a broader context, a very different picture emerges.

I. The Decline in Production in Fayum Villages

The archival character of much of the evidence on which this part is based must be stressed at the outset, because it imposes a certain caution in assuming that what we find to be true in one village or in two is true elsewhere as well. A few statistics may be illuminating: we have 279 dated papyri from the Fayum, the Arsinoite Nome, from the years between 284 and 337. Of these, 155 come from Karanis and 66 from Theadelphia, a total of 221, or 79 percent of the total. Of the 248 ostraka which bear dates, almost all are from Karanis, with a handful from Theadelphia and a scattering from other villages.[4] It is not pure chance that dictated this situation. These villages failed; they dried up, and the land remained desert for centuries, preserving the papyri in a way that land regularly irrigated would not. We have, therefore, a kind of survival of the documents of the least fit, a reverse Darwinian natural selection. A century earlier, we find the same thing with Soknopaiou Nesos, on the north shore of Lake Moeris (the modern Birket el-Qarun); it died before the middle of the third century, leaving behind masses of documents which dwarf the pile from Karanis.[5]

If we wish to understand and assess the significance of the economic and demographic decline in the fourth century of these Arsinoite villages, Karanis and Theadelphia, we should begin by trying to see just how great this decline was. We have the information to do this in an approximate manner.

1. Karanis

First, a technical point: for what fourth-century entity do we wish to find comparable data? Karanis was in the fourth century the center of an administrative district called "the village of Karanis and its horiodiktia" (*komê Karanis kai horiodiktia*). The nature of the horiodiktia has been disputed and cannot yet be known precisely, but it was evidently an area administratively dependent on Karanis and physically adjacent.

[4] See R. S. Bagnall and K. A. Worp, "Papyrus Documentation in the Period of Diocletian and Constantine," *Bulletin of the Egyptological Seminar* 4 (1982) 25–33, for these figures, which cover publications through 1981.

[5] See D. H. Samuel in *Le monde grec: Hommages à Cl. Préaux* (Brussels 1975) 611–24, and *Proceedings of the XVI International Congress of Papyrology* (Chico 1981) 389–403, especially 391 and 402.

Now the papyri contain a number of phrases like *Ptolemais Karanidos*, "Ptolemais of Karanis"; these I take to mean that (e.g.) Ptolemais was a dependency of Karanis. The syntax of some of the phrases involving the horiodiktia is confused,[6] but in general it is clear that the village of Karanis and its horiodiktia constituted separate categories which were administratively linked and for which taxes were collected together. The smaller villages were classified as part of the horiodiktia; they include Hiera (Nesos), Ptolemais (Nea), Kerkesoucha, Kalos (or Kalon), and Kainos (or Kainon).[7] The first three of these were substantial independent villages in the second century, and their fall to dependence points clearly to the decline in this part of the Fayum.

For Karanis itself, we have partial figures for the earlier period from *P.Mich.* VI 372, an account of wheat taxes for Karanis from 179/80 or 211/12. A total of 29,065$^{19}/_{24}$ artabas[8] were assessed on the land subject to the dioikêsis (i.e. land categorized as basilikê, prosodikê, and idiotikê). Now dioikêsis-land in Kerkesoucha and Ptolemais (see below) is taxed at an average of about 3.7 artabas/aroura,[9] and by extrapolation for Karanis we may estimate some 7,855 ar. The figure is of course approximate, as the amount of land in the various categories affects the total, but 7,855 is probably if anything too low.[10]

To this may be added 1,847 ar., producing 12,696 art., in a half-dozen ousiai, estates belonging to the imperial family or prominent Romans; and as Youtie and Pearl point out, Karanis had about a dozen ousiai. We may therefore approximately double the figure provided by the broken papyrus, to 3,694 ar. and 25,392 art.[11] We then get totals of

[6] *P.Cair.Isid.* 100.6 is a notable example; *P.Col.* VII 138.6, 29, 38–39 (cf. 21) give *komês horiodiktias Karanidos*, 139.6–7 *horiodiktias kai Karanidos*, 141.25–26 *komês Karanidos kai horiodiktias Karanidos*. H. Geremek, *Karanis, communauté rurale de l'Égypte romaine au II^{e}–III^{e} siècle de notre ère*, Archiwum Filologiczne 17 (Wroclaw-Warszawa-Krakow 1969) 32, calls into question Boak and Youtie's interpretation (which I am following here) but without good reason.

[7] For Hiera, see *P.Col.* VII 150.17n. and 155; for Ptolemais, *P.Col.* VII 154.28n.; for Kerkesoucha, *P.Col.* VII 154.14n.; for Kalos (-n), *P.Cair.Isid.* 60.4, 12; for Kainos (-n), *P.Col.* VII 150.22n.

[8] An artaba is a measure of volume, which varied in size; it normally held somewhat less than 40 liters.

[9] An aroura is 2,756 square meters.

[10] If we take from the chart in *P.Mich.* VI p. 30 some specific subtotals and attribute them speculatively (but not improbably) to classes of land, we get the following results: 21,751.5 art. as regnal, taxed at about 5 art./ar., thus 4,350 ar.; 1,789 as prosodikê at about 8, or 223 ar.; 3,985⅝ private land at 1.04 art./ar. = 3,832 ar.; others, 1,418+ at 3.7 art./ar. average = 383 ar. Total, 8,788. This is probably near the true figure; but if the royal land yielded over 5 art./ar., we must reduce the total.

[11] Geremek (above, note 6) 30 calls the discrete existence of twelve or thirteen ousiai into question, but her arguments lack any cogency. As *P.Mich.* 372 is broken at the foot, there must have been at least one more in col. ii, probably also in col. iii, and the papyrus

11,549 ar. (conservatively figured) and 54,457 art. of wheat (the barley figures are negligible).[12]

2. Ptolemais Nea

The great cadastral list *P.Bour.* 42 provides us with full figures for Ptolemais Nea in A.D. 167:

	Land	*Yield in taxes*	*Rate*
basilikê	847 17/32	3,997 3/8	4.7
prosodikê	664	5,156	7.8
idiotikê	1,465 1/32	1,504 1/48	1.03
ousiai	947 1/2	6,234 3/8	6.6
totals	3,924 1/16	16,891 37/48	4.3

3. Hiera Nesos

P.Bour. 42 similarly gives us:

	Land	*Yield in taxes*	*Rate*
basilikê	2,200 25/64	11,464 33/48	5.2
prosodikê	20	172 23/24	8.6
idiotikê	1,317 13/64	1,368 27/48	1.04
ousiai	524 1/8	2,791 13/24	5.3
totals	4,061 23/32	15,797 3/4	3.9

4. Kerkesoucha

Our prime document here is *P.Lond.* II 254 (p. 225), a list of seed grain distributed to Kerkesoucha and several other villages in 133/34 (Hathyr to Mecheir). It may originate from Kerkesoucha itself, since the figures show clearly that all sums not otherwise attributed refer to Kerkesoucha. The total is over 7,000 art. of seed grain. If we set the basilikê at 7,000 ar. and omit all else, we get a minimum yield in taxes of something like 35,000 art. (at 5 art./ar.), and of course there must have been land in other categories too.

Overall, then, we get the following estimates (not making any estimate for the missing data from Kerkesoucha):

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is broken at the right. As three of the preserved listings are of very small ousiai (27 1/2, 45 41/64, and 62 53/64 ar.), the doubling proposed seems conservative; obviously the estates were not arranged in decending order of size. Their yield (6.9 art./ar.) is high but not out of line with the 6.6 at Ptolemais (see below).

[12] Geremek (above, note 6) 29 doubts even a figure of 5,846+ ar., on the grounds that *BGU* III 835 gives a figure of 2,465 (typographical error; on p. 31 she has 2,645) art. of seed grain (and hence of cultivable royal arouras) in 216/17. This is not correct. That figure is only the amount advanced in one month, Choiak, as the document plainly says, and it has no bearing on the total amount except to provide a minimum.

	Karanis	*Horiodiktia*	*Total*
state land	4,023 ar.	12,204 ar.	16,227 ar.
private land	3,832 ar.	2,782+ ar.	6,614+ ar.
total land	7,855 ar.	14,986+ ar.	22,841+ ar.
total yield	54,457 art.	67,690+ art.	122,147+ art.

In this table, the horiodiktia includes Ptolemais Nea, Hiera Nesos, and Kerkesoucha; we cannot estimate some other places which would have swelled the totals further, and it is uncertain if some of the smaller localities in the Bouriant list should be added. State land includes all categories except private.

Even with uncertainties, approximations, and missing data (especially for Kerkesoucha), these figures are useful and conservatively stated.

The corresponding figures for 308/9[13] are:

	Karanis	*Horiodiktia*	*Total*
state land	$717\frac{53}{64}$	$1,288\frac{53}{64}$	$2,006\frac{21}{32}$
private land	$480\frac{10}{16}$	$1,731\frac{11}{16}$	$2,212\frac{5}{16}$
total land	$1,198\frac{29}{64}$	$3,020\frac{33}{64}$	$4,218\frac{31}{32}$
taxes	1,448 wheat	3,079 wheat	4,527 wheat
	1,189 barley = 644 wheat	2,526 barley = 1,368 wheat	3,715 barley = 2,012 wheat
total taxes	2,092 art. wheat	4,447 art. wheat	6,539 art. wheat

The barley taxes are converted into wheat at a rate of $\frac{13}{24}$, a ratio of value in money attested in 338 by *P.Oxy.* I 85. The ratio is approximate and will have varied from time to time, but the margin of error introduced into our estimates is not likely to exceed 10 percent.

The decline in taxes is thus overall nearly 95 percent: not a decline, but a catastrophic fall. Broken down for categories, the 308/9 figures as percentages of second-century figures look as follows:

	Karanis	*Horiodiktia*	*Total*
state land	17.8%	10.6%	12.4%
private land	12.6%	62.2%	33.4%
total land	15.3%	20.2%	18.5%
taxes	3.8%	6.6%	5.4%

[13] The figures are derived from *P.Cair.Isid.* 11. It may be noted that Geremek (above, note 6) 37 attributes to R. Rémondon the view that this papyrus does not include the holdings of politai, residents of the metropolis, but only of komêtai, residents of Karanis. This view is false. The sitologoi distinguish only between komê and horiodiktia, both of which they include. Amounts for politai are explicitly included (cf. line 63) and a study of *P.Cair.Isid.* 9 shows conclusively that the figures do include the politai. It is difficult to believe that Rémondon said anything of the sort.

The 62.2% figure for private land in the horiodiktia is obviously wrong, because we do not know the figure for private land at Kerkesoucha. If we estimate the probable percentage for the horiodiktia at 15%, we would need an original total of 11,547 ar., which would require 8,765 ar. at Kerkesoucha, no doubt rather too much. Still, Kerkesoucha probably did have several thousand arouras of private land in the second century.

What is most noticeable is the great decline in tax yield in equivalent wheat artabas per aroura of total land: from 5.35 to 1.55. Even after making allowances for all approximation and even for a bit of circular reasoning, the decline is striking.[14]

5. Theadelphia

We are much worse off for Theadelphia than for Karanis, and failing new evidence we shall lack anything like precise figures. We can, however, get rough approximations by two methods which lead to similar results.

P.Berl.Leihg. 1 5 (158/59) gives figures for land under the dioikesis:[15]

royal	2,805 1/32
hieratic	62 3/4
prosodic	168
private etc.	2,247 63/64
total	5,283 49/64

This figure is 60–67 percent (depending on the figure chosen for Karanis) of the figure for this class of land at Karanis. Now we know that Theadelphia had important ousiac lands as well: 14 different ousiai are attested there over various periods compared to the 15 at Karanis.[16] We cannot evaluate the size of these holdings, but the assumption that the percentage of the Karanis figure (estimated at 3,694 ar.) was the same as for other classes is not likely to be too far off the mark. A total of some 2,400 ar. of ousiac land and a grand total of about 7,683 (66.5% of the Karanis figure) is not unreasonable. Using the other village averages, we would expect a grain income of some 36,044 art.[17] or its equivalent.

[14] Even a comparison of Ptolemais plus Hiera (where we have all the figures) to the horiodiktia in the fourth century shows a decline from 4.09 to 1.55.

[15] *P.Berl.Leihg.* II 32 gives only slightly lower figures from 164/65.

[16] G. M. Parássoglou, *Imperial Estates in Roman Egypt*, Am. Stud. Pap. 18 (Amsterdam 1978) Appendix II. Not all of the 15 attested for Karanis need have been existence at any one time; an estimate of 12 is more likely. The same thing is probably true of the 14 at Theadelphia.

[17] Averages of 6.87 for the ousiac, 3.7 for the dioikesis land.

From *P.Berl.Leihg.* I 1 and 4 we get fragments of a year's collection records for Theadelphia. Leaving aside the modest quantities of beans, we have the following:

Thoth	338 17/24	wheat	38 1/2	barley	= 359 13/24	wheat
Phaophi	126 21/24	wheat				
Hathyr	49 1/2	wheat				
. . . . .						
Pauni 16–30	3,702 7/8	wheat	732 1/12	barley	= 4,099 2/3	wheat
Epeiph 1–8	3,200 1/3	wheat	178 3/4	barley	= 3,297 1/6	wheat

Now the loss of the rest of the year prevents any exact figuring. But a daily average in Pauni 16–30 of 273 equivalent artabas of wheat and Epeiph 1–8 of 412 art. suggest that applying normal curves for the distribution of tax payments[18] we could expect daily averages something like Pachon, 150; Pauni, 250; Epeiph, 400; Mesore, 300; and through the rest of the year a monthly average of perhaps 100. We would then get a total of 34,200 art. Considering that in 167 at one point the granary of Theadelphia had 19,084 1/2 art. of wheat still on hand after the dispatch over a period of some 5,626 19/24 art. (*P.Berl.Leihg.* I 2 recto 21), an annual income of taxes in the neighborhood of 35,000 art. (wheat equivalent) is believable. All of these imperfect indications thus tend to confirm a view that Theadelphia's size and production were about two-thirds those of Karanis.

The fourth-century figures are very clear and extremely low. In 312 the sitologoi reported a total of 363 2/3 artabas of wheat taxes (the number of arouras is not specified) (cf. *P.Sakaon* 5). In 336, the total collections from villagers (no mention of metropolitans) was 451 art. The decline was thus about 98.5–99 percent, even worse than at Karanis: Theadelphia had gone from two-thirds the production of Karanis to one-fifth (I am not counting the horiodiktia of Karanis, which seems to have no equivalent at Theadelphia).

If we attempt to estimate population, the situation is similar but not identical. In Karanis, the adult male taxpaying population, at its peak, was about 1,000, and even after the plague under Marcus Aurelius (if that was the factor responsible) the figure was about 600 to 650; these imply total populations of some 4,000 at the peak and perhaps 2,300 after losses to the plague.[19] In the fourth century, by contrast, the taxpaying population comes to about 110, with a total thus of about 420. The decline here is almost 90 percent compared to the peak. Theadel-

[18] Cf., e.g., *P.Col.* VII, p. 99.

[19] See A. E. R. Boak, *Historia* 4 (1955) 156–63 and 8 (1959) 248–52, for these population estimates and for the plague. A more skeptical view about the effects of the plague is taken by J. F. Gilliam, *AJP* 82 (1961) 225–51.

phia tells a similar story. In the early second century, it had something like 700 taxpayers, or around 2,660 people.[20] By 312, the adult male population stood at some 25, the total population thus at best at 100, and things had not changed much (except perhaps a bit for the worse) in 336.[21]

The figures above showed a decline in tax yield from Karanis and its horiodiktia of about 95 percent, but of population of only some 90 percent or a bit less. At Theadelphia, we estimate a decline in tax payments of about 99 percent, but of population of some 96 percent. Put another way, in the second century, the average resident of Karanis yielded some 13.6 artabas of wheat in taxes, one of Theadelphia perhaps a bit over 13. In the fourth century, the comparable figures are about 5 and 4.5 artabas.[22] Far from increasing, therefore, the per capita tax burden declined markedly from the second century to the fourth. This decline, moreover, is reflected in the effective rates on land, from over 5 art./ar. in the second century to about 1.55 art./ar. in the fourth. Put another way, the cultivated land per inhabitant stayed relatively constant, but the taxes on it declined almost 70 percent (limiting our view to taxes in produce only). Yet paying even these low taxes seems to have been a burden.

The explanation of these declines, on the surface, is simple: the papyri contain numerous tales of woe about the failure of the water supply. The Fayum received the Nile's flood not directly but through an elaborate series of canals and holding basins. When these were not kept up, the water supply was choked off and the villages died. A court document from three residents of Theadelphia speaks eloquently: "The year before last, as well as last year, as the fields of our villages are situated on elevated ground and the nearest villages (Narmouthis, Hermoupolis, and Theoxenis) steal our water and prevent our land from being irrigated, since they are at the front of the pagi and we are at the far end of the pagus, we have become the inhabitants of a deserted village, the tax levied on our village encompassing five hundred arouras which are permanently uninundated" (*P.Sakaon* 35). Things were not quite so bad at Karanis—which is located at the opposite side of the Fayum from Theadelphia—but they were bad enough.

Faced with tales like this, why did the authorities allow the water distribution to get into such bad shape that water-stealing went on? The leading historian of irrigation in Egypt, Danielle Bonneau, writing about

[20] Cf. *P.Col.* II, p. 41, for the estimate of taxpayers.

[21] Cf. R. S. Bagnall, *Bull.Soc.Arch.Copte* 24 (1982) 35–57.

[22] Counting only village and not horiodiktia at Karanis, as we do not know anything of the population of the horiodiktia, and the second-century comparative figures are for the village only.

this problem recently, says: "Everyone is agreed in considering the return to dryness as the effect of the degradation of the irrigation system. But physical phenomena are given as the cause of this degradation; raising of the ground level by alluvial deposits, blocking of the canals by wind-borne sand, etc., whence the abandonment of the lands in question. And, as a result of this deterioration of the material conditions of agriculture, abandonment of the administrative apparatus which loses its reason for existence, namely its fiscal purpose." But Bonneau rejects this description and argues that the cause and effect are the reverse: reasons of state caused the neglect of the administrative means to keep the system working, and this neglect brought on the physical phenomena described.[23]

But why would the state do this? Bonneau argues that it was a policy of deliberate neglect, a decision that the return on investment from the Fayum was not worth the trouble because the return on the land was marginal and Rome did not really need wheat that badly; the city had other sources, she claims, and the annona system was directed at feeding the garrison army from local production in each province. As Egypt's garrison was small and its production large, efforts to keep marginal land in production were not worthwhile.

These calculations, however, are surely wrong, for Bonneau thinks that the government received only about one artaba per aroura from the Fayum (like other artificially irrigated land) as a result of its much lower productivity, which she estimates at 5 art./ar. in all, with only 1 art./ar. going to taxes. This lower productivity, however, is fictitious. As we have seen, the taxes from Karanis at its height were over 5 art./ar.; higher no doubt than many other places, but we have similar figures from other places in the Fayum, and it is another Arsinoite village, Tebtunis, at which we find the highest lease rentals on private land attested in the papyri, 15 artabas per aroura (in a crop-rotation situation, to be sure.)[24] The Fayum was in Roman times among the most productive land of Egypt, and hence of the entire empire.

Some Fayum villages died earlier than Karanis and Theadelphia: Soknopaiou Nesos in the 230s (a fate which may not have been the product of the decline of agriculture),[25] Tebtunis late in the third century. The problem was not merely one of less land and fewer people, for such a community could in principle achieve some stability and pay its taxes as well as feed its people. The problem, rather, is one of produc-

[23] D. Bonneau, "Fiscalité et irrigation artificielle en Égypte à l'époque romaine," *Points de vue sur la fiscalité antique*, ed. H. van Effenterre, Publ. de la Sorbonne, Études 14 (Paris 1979) 57–68.

[24] *P.Mil.Vogl.* III 140 (176p).

[25] See D. H. Samuel, *Proc. XVI Int. Congress of Papyrology* (Chico 1981) 400–402.

tivity of the remaining land. Karanis yielded to the government a mere 1.55 artabas or so of wheat equivalent in 309, compared to over 5 at its peak in the second century. Fourth-century Karanis might indeed be considered marginal. And yet it is from the period of Diocletian that we have clear evidence of an attempt to return the Fayum to productivity, with his new census and the recovery of land to the status of inundated and therefore taxable. Even in the late third century, therefore, the government wanted the wheat badly enough to try to return the land to production, even at these rates.[26]

It would, in theory, be possible to advance a variation of Bonneau's theory based on a rather more sophisticated economic model. We know that in the second half of the fourteenth century the Black Death produced, as a consequence of the large drop in the population, a reduction in demand for food grains. Since the productive capacity of the land was not affected so much as the population of consumers, the price of grains declined. This decline caused, in much of Europe, a reduction in the amount of land devoted to cereal farming; marginal land was abandoned and much other land turned to economically more rewarding uses.[27] We might wonder if the plague in Egypt under Marcus Aurelius, which (we estimated above) cost villages some 40 percent of their population, similarly caused a drop in the value of grain and, hence, grainland, with a concomitant rise in the cost of the now-scarcer labor.[28] A fuller investigation than is possible here would be needed for a decisive answer, but the impression created by the lists of prices in Johnson's *Roman Egypt* is in fact the reverse, namely that the price of grain rose. It fluctuated, of course, but our figures from the end of the second to the middle of the third century point to a rise in the price of wheat in line with general inflation, some 100–150 percent, while the monthly pay of guards rose by no more than 50 percent.[29]

It is interesting that the historian of early Renaissance Europe whose results are cited above, Harry Miskimin, points out that the results of the loss of population caused by the plague were by no means uniform. In northern Italy, particularly in the Po valley, the existence of dense urban concentrations of population which had to import their food supplies, and which were served by good transportation by river, meant a continuing good market for farm products and a relatively strong agricultural economy compared to most of northern Europe and En-

[26] See N. Lewis, *JEA* 29 (1943) 71–73.

[27] See Harry A. Miskimin, *The Economy of Early Renaissance Europe, 1300–1460* (Cambridge 1969, 1975²) 29–58.

[28] If the plague was not the responsible agent (as Gilliam argues; see above, note 19), the argument would not be substantially affected.

[29] A. C. Johnson, *Roman Egypt*, in T. Frank ed., *Economic Survey of Ancient Rome* 2 (Baltimore 1936) 310–12.

gland at the same time.[30] In Egypt, of course, with the great proximity of almost all of the productive land (even the Fayum) to the Nile, the cost of transportation was minimal compared to the value of the grain, and whatever wheat failed to find consumers locally could be shipped to Alexandria and throughout the Mediterranean wherever a buyer could be found. We should expect, therefore, that in the absence of other factors Egypt might, like fourteenth-century northern Italy, have kept a strong agricultural economy in the aftermath of the plague. Indeed, Egypt, which was also spared the severe incursions of outsiders experienced by many provinces, may have gained a competitive advantage. If—for some areas at least—the records show that things went badly in the third century, the cause cannot be that the economic profitability of arable land was insufficient. Above all, the extremely productive land of the Fayum will not have been abandoned for such reasons.

Fourth-century lease yields, however, show that the low tax yields from the Fayum mirror a deplorable state of the land there: we find rent rates of 2, 2⅜, 0, and 0 art./ar.;[31] in the latter cases, the lessee was obligated only to pay the taxes. In Theadelphia, we have only one lease with stated rent; it is just under 2 art./ar. (*P.Sakaon* 69, 331p). The same phenomenon is reflected in the frequent complaints that taxable land is in fact unproductive and in sales of land at nominal sums.[32] Again and again the refrain is the desperate struggle to pay the taxes, even though the taxes are a mere fraction of what they were 150 years earlier. One must suppose that the amount of truly productive land was in fact much less than that carried on the rolls, small though the latter figure was; but even land that was under cultivation yielded badly.

II. Productivity and Taxes

The Fayum thus shows low rates of taxation, lower than in the second century. Were these low rates of taxation in some way connected to the productivity of the land? Put another way, were the rates in use in the Arsinoite Nome lower than those in use elsewhere, where productivity was higher? A positive answer is difficult to disprove because no other nome has yielded unequivocal dated evidence comparable to that cited above. The provisions of the Edict of Aristius Optatus in 298 (*P.Cair.Isid.* 1), however, favor the view that a uniform overall tariff was to be applied: the prefect ordered the rates from the proclamation of the tetrarchs to be published, commenting, "Thus it is possible

[30] Miskimin (above, note 27) 66–72.

[31] There are lists in J. Herrmann, *Studien zur Bodenpacht*, Münch. Beitr. 41 (Munich 1958) and D. Hennig, *Untersuchungen zur Bodenpacht* (Diss. Munich 1967).

[32] For typical complaints about the unproductivity of taxable land, see *P.Col.* VII 174 and 175; for a sale of land at nominal rates, *P.Col.* VII 181.

for all to know the amount levied on each aroura in accordance with the character [*poiotês*] of the land." Land was divided into public (or royal) and private, and again into arable, temporarily uninundated, or permanently dry. Dry land went untaxed, but land temporarily uninundated was taxed at normal rates, no doubt on the assumption that low rates compensated for the occasional payment for unirrigated land. Any further division by geographical entity is inherently unlikely and quite unattested. The only exception is that officials at some level had, I believe, the choice of the precise distribution of the tax: thus Karanis pays partly in barley, as we have seen, while Theadelphia seems to pay all or almost all wheat, and the same will appear on investigation likely to be true of Oxyrhynchos.

Before we look at later decades, one point needs attention. The land tax in Egypt was a tax in produce under the principate and still in the fourth century. It was possible—to an extent and under conditions which we do not fully understand—to commute part of the payment to cash, i.e. to the debased silver coinage in use. The government seems not to have encouraged this practice particularly—at least prices of wheat used in such transactions seem high. In the principate, then, there can have been no real question of marketing crops for cash to pay land taxes, in the sense that Peter Brown means, and the same seems to be true of the fourth century.[33]

As to the course of tax rates in the decades after 310, we are remarkably ill-informed. The Karanis papyri offer numerous receipts for grain taxes in the 330s to 350s, with amounts but not rates; these demonstrate that most taxes were still paid in grain, and that the amounts paid by the central figures of the archive around 342 correspond roughly to an application of the 310 rates to what their landholdings seem to have been.[34] But the lack of comprehensive tax lists makes definitive conclusions difficult.

A more interesting document is a recently published Michigan papyrus which shows rates in the Oxyrhynchite Nome of 1 art./ar. on private land and 3 art./ar. on public land, in each case plus a 1/7 surcharge.[35] These are twice the wheat rates in the Isidoros papyri in 310; but there are no barley rates in the Oxyrhynchos list. This list is unfortunately not dated.[36]

[33] See the wheat prices cited in R. S. Bagnall, *Currency and Inflation in Fourth Century Egypt*, BASP Suppl. 5 (Decatur, Ga. 1985).

[34] See *P.Col.* VII, pp. 92–94.

[35] See R. S. Bagnall and K. A. Worp, *ZPE* 37 (1980) 263–64, commenting on the text published by H. C. Youtie in *ZPE* 32 (1978) 237–40.

[36] In *ZPE* 37 (1980) 264, the question is left open whether there were in fact barley rates to be added to the wheat ones given in this text. The probabilities seem to me strongly against a positive answer. The document is headed "Oxyrhynchite," and as the editor

The most plausible interpretation of this document, I believe, lies in the possibility that the entire levy in the Oxyrhynchite was collected in wheat. The Arsinoite rates in barley can be reduced to wheat at the 13/24 ratio used above, with the result of a wheat equivalent tax of 1.0375 for private land (vs. 1.14 for the Oxyrhynchite) and 2.1375 vs. 3.43 for public land. A slightly different ratio (say 14/24) would give 1.075 and 2.175. To put it another way, because of the much larger amount of "private" land in the Oxyrhynchite, the effective tax rate for a total of 202,534 ar. (the total given in the Oxyrhynchite document) was 1.59 art./ar. The equivalent figure at Karanis was 1.55, virtually the same despite the lower stated rates, because of the different proportions of "public" and "private" land at Karanis. The overall tax rate, therefore, is not much different.

Youtie dated the Michigan papyrus simply to the first half of the fourth century, on palaeographic and diplomatic grounds. My own impression is that the papyrus is palaeographically much nearer 350 than 300. At all events, it is to my mind evidence for a certain stability of overall tax rates on land over perhaps two or three decades, however much their formulation may have varied from time to time and place to place. One must remember that the divergent assessments of public and private land have nothing to do with the productivity of actual plots of land: private and public lands were distinguished only in original legal status and mode of acquisition, not in real legal status in the fourth century, much less in quality. But this in turn meant a distinction of owners: it was the Roman and Greek parts of the population who owned the more lightly taxed land, on average.[37] Our fourth-century leases from outside the Arsinoite show fairly normal rent yields—two to three times those in the Arsinoite—but taxes were evidently no higher (cf. note 31 above for lease yields). It is not that the overall burden of the land tax was great, but rather that it was applied in a manner to benefit the influential, in particular the absentee landlords who lived in the cities and metropoleis.

The taxes in kind, however, were not the only taxes. There were, as there always had been, numerous taxes in money. As the value of the coinage dropped, however, the government found it less and less attractive to collect taxes in a debased, largely copper, currency, which

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noted, at least one column is lost at right; it is either part of a more comprehensive document or an extract from one. The procedure of enumerating the categories of land, then calculating the taxes, is unlikely to have been repeated for barley, which would have been levied on the same land. Rather, we see in *P.Cair.Isid.* 11 the expected procedure: land enumerated, then wheat rates and amounts, then barley rates and amounts. The sitologoi collected both taxes, and their separation into different documents seems very improbable.

[37] Cf. *P.Herm.Landl.* for indications of the large amounts of private, and relatively small amounts of public, land owned by metropolitans in the Hermopolite Nome in the 340s.

was very bulky for the value.[38] On the other hand, Bonneau is correct to the extent that she points out the government's policy of raising the army's provisions locally: given the varying productivity of provinces and that their garrisons stood in no particular relationship to that productivity, one had the choice of transporting food or of purchasing it locally. To do the latter where necessary, the government needed cash.

In short, the government needed gold and silver, and it is in metals that the future of taxation lay. In the beginning, these levies were mostly compulsory purchases by the government. In other words, one had to deliver so much gold and silver, for which one was compensated in ordinary currency at a price fixed by the government and which was certainly below the real market value of the bullion delivered. The net effect was a surcharge on the land taxes which varied in amount and is hard to assess.[39]

After a time, the government's failure to raise the price paid for bullion in step with the open market price may have led to what Jean-Michel Carrié has described as the essential fiscalization of the charge: it became in effect a tax, as if the United States government confiscated gold at the official price of $42.33 per ounce.[40] The state raised money by a combination of small add-on taxes for transport and military provisions ranging from clothes to mules. These were in general charged in proportion to landholdings or land taxes.[41]

The fundamental problem which we face in judging the burdensomeness of the total tax levy on landowners in the fourth century is our inability to compute the total amount due in any given year, let alone over any period of time, in money taxes assessed on the basis of land. We have seen that the taxes in kind seem to come to about 1.5 or 1.6 art./ar. in wheat or its equivalent, and we have no evidence of any supplementary taxes in wheat, although vineyards paid taxes in wine and there seems to have been a levy in meat for the army charged on arable land, the amount of which we do not have evidence to estimate. There was also a charge in chaff on arable land, 25 lbs. per aroura in 310 in Karanis (*P.Cair.Isid.* 10, 13, 16, and 17).

For the sake of perspective, it will be useful to take a look at the situation in the sixth century. It is, of course, no more possible for that century than for the fourth to define general tax rates good for all times and in all places. The annual indiction was not a meaningless event: the

[38] For the monetary history of this period, see R. S. Bagnall, *Currency and Inflation* (above, note 33).

[39] Cf. R. S. Bagnall, *Cd'É* 52 (1977) 322–36, on this process.

[40] *Proc. XVI Int. Congr. of Papyrology* (Chico 1981) 431–46 at 433.

[41] Cf. R. S. Bagnall, *ZPE* 37 (1980) 185–95.

rates changed every year, sometimes up and sometimes down. The allocation of the total burden between commodities and money varied from year to year and place to place, in part at the discretion of the regional and local authorities, in part from the needs of the government. Major expenditures like wars were not financed by amortizing the cost over a period of time (either by building up reserves or by borrowing and repaying), and the tax burden might rise precipitously in time of war and fall just as rapidly when it was over.

The most illuminating document for our present purposes is *P.Cair. Masp.* I 67057 (+ p. 204), which was discussed at some length by Johnson and West.[42] This sixth-century account lists the overall figures for the taxes of Antaioupolis. It is not a normal year which is shown, but one in which there was a major military operation, perhaps, it is speculated, a campaign against the Blemmyes. As a result, the amounts in kind for the annona are supplemented by very large cash collections for specific purposes connected with the current operations. When all of these are removed from consideration, and when a payment for previous arrears of the kanonika (the regular taxes) is subtracted, the following picture presents itself.

First, there was the embolê, the grain tribute, presumably destined for Constantinople. It was in all 61,674 art., raised by taxing various categories of land at different rates. It is noteworthy that this is the amount set as the quota for the village, presumably by some global rate on all land. The actual collections, at differentiated rates, resulted in a surplus of several hundred artabas. The most noteworthy of the categories were arable land, at 1¼ art./ar., and "island" land (newly deposited silt lands) at 1½ art./ar. In addition, there was a routine annona assessment, amounting to 6,729 art. of wheat, 40,819 of barley, 83,600 lbs. of chaff, 106,179 lbs. of meat, and 212,358 units, probably sextarii, of wine, this last charged only on vineyards. If the barley is converted to equivalent value in wheat, we obtain a total taxation in grains of 90,513 art., which is about 1.75 art. per aroura of land in all categories. Comparing this to the figures we obtained for the fourth century, we find a difference of some 10–13 percent. It is hard to be confident that either the margin of error in our figures or the annual fluctuation in assessment was any smaller than this; in short, the rate of taxation in wheat is closely comparable to that two centuries or so earlier.

The tax in chaff is trivial, about 1.6 lbs. per aroura, a small fraction of the levy in Karanis in 310, perhaps in compensation for the slightly higher amounts of wheat and barley. The charge in meat is equivalent

[42] *Byzantine Egypt: Economic Studies*, Princeton Studies in Papyrology 6 (Princeton 1949) 275ff.

to a little over 2 lbs. per aroura, which in terms of value is equivalent to less than a seventh of an artaba, or in money to about ⅓ carat (the carat was an accounting unit equal to 1/24 of a solidus, the standard gold coin [4 gr.] of the time). We cannot compare this to a known rate for the fourth century, but it is not a large amount.

Beyond this were money taxes. It is difficult to filter out precisely what is a non-recurring expense, but 3,500 solidi seems a good approximation of the normal amount. This amounts to 1.63 carats per aroura. If the taxes in kind are converted to money at the normal sixth-century government standard of 10 art./sol.,[43] we can estimate that the land other than vineyard paid taxes valued at about 12,904 solidi, or 6.3 carats per aroura; put another way, this is the equivalent of 2.63 art. of wheat per aroura if all of the taxes had been in this form. In short, the totality of the money taxes and the regular annona, apart from barley, amounted to about .88 art. or 2.1 carats per aroura. Put still another way, the taxes in wheat and barley together amounted to ⅔ of the total tax burden on arable land. If the same figure were true in the fourth century, the total taxes would have been around 2.1 art./ar. equivalent in wheat. Without a detailed investigation of fourth-century money taxes—and perhaps even with such a study—it is not possible to say if this was the case. My overall impression is that the money taxes of the fourth century were no heavier than this, if that heavy. And whatever fluctuations occurred from year to year, the basic picture seems not to be a great deal different in the sixth century.

Since we have no global figures for Egypt's revenues in the fourth century, it may be useful to take a moment to look at the figures we do have for the sixth to eighth centuries, especially as it seems that the general tax burden was not a great deal different. Justinian speaks of the total wheat tribute of Egypt as set at about 8,000,000 units, presumably artabas.[44] At the average rate of wheat for the embolê collected at Antaioupolis, 1.2 art./ar., Egypt would have needed to have had some 6.7 million arouras of land under cultivation of all sorts. West and Johnson[45] have shown that this is not an unrealistic figure. Another .55 art./ar. in equivalents to wheat was paid for normal annona charges; for all of Egypt, one would suppose that meant about 3.67 million artabas of wheat or the equivalent in other produce. Finally, the money taxes collected for administrative purposes and the like, at the rate of 1.63 c./ar., would amount to around 452,000 solidi per year.

[43] West and Johnson (above, note 42) 177–78; cf. *P.Oxy.* XVI 1909 for the rate.

[44] Justinian, Edict 13; cf. A. H. M. Jones, *The Later Roman Empire* (Oxford 1964) 463, who points out that the Oxyrhynchite, Herakleopolite, Kynopolite, and Antaioupolite together paid 760,000 art. of wheat; but his evidence for that assertion is not very solid.

[45] Above, note 42, 236–37, note 31.

The estimates of total taxes thus obtained must be converted into cash to allow comparisons with the figures which we find later on. The embolê would, at the normal rate, be worth about 800,000 solidi; the annona some 367,000 solidi; and the money taxes 452,000 solidi, for a total of about 1,620,000 solidi. Some additional sum for the income from vineyards must be added to get the total for agricultural operations. We have no way of estimating this, not knowing the proportion of vineyard in the various nomes. We must, in addition, reckon with an imperial income from taxes on trades, customs duties, and various other sources which were not directly agricultural.

Mostafa Ei Abbadi has recently studied the figures provided by the Arabic historians for the income of Egypt late in the Byzantine period and in the first decades of Arab rule.[46] The figures for the tribute, given in cash, run from about 500,000 to 600,000 solidi, rather below the figure of 800,000 obtained by dividing 8,000,000 artabas of wheat by 10 artabas per solidus, but at least on the same order of magnitude.[47] The first Arab ruler of Egypt extracted 500,000 solidi which, we are told, was considered too low. His successor took out 600,000, which was considered much better. These figures are not very high; they remind one of Augustus' grain shipments from Egypt of 6,000,000 artabas per year. Another figure for the total revenues of Egypt puts them at 2,000,000 solidi, which were said to have gone a quarter each for the tribute, for the army, for the land and its cultivation, and for administration. These proportions cannot be quite right; but the total of 2,000,000 solidi may be quite close, as we reached 1,620,000 above even without considering vineyards and nonagricultural income.

To summarize briefly: there is no evidence of significant fluctuations, apart from yearly variations caused for example by major military expeditions, in the overall rate of taxation from the fourth century to the early Arab period. It does seem that in the later sixth century and later periods fewer of the taxes were collected in grain and more in money, but at least from the time of Diocletian and Constantine to that of Justinian, the total taxation on arable land seems to have been roughly constant at a level equivalent to about 2⅔ artabas per aroura. Rates varied little from region to region, although the part of the taxes collected in money and in the various commodities varied somewhat according to needs and no doubt the character of the land in a given place. How burdensome this tax rate was is another matter. It depends on what one is used to, what standard of living one expects, and how

[46] *Proc. XVI Int. Congr. of Papyrology* (Chico 1981) 509–16.

[47] And, to be sure, the invaders may have needed to use more of their resources to feed the occupying forces than the Romans did. Justinian's figure, it may be remarked, was what he thought the income should be.

much land the average family farms. It also depends on the productivity of the land. If the total yield was 5 artabas per aroura, the taxes would be over half the total, and, considering that 1 artaba was needed for seed, there would be only 1⅓ art. left. If, on the other hand, the yield was 8, the taxes would be a third, and the net after seed would still be over 4 artabas per aroura. If the land yielded 10 artabas per aroura, the farmer would have almost two-thirds of his crop to count as net income.

A second point of importance is the contrast between this overall tax rate and the Arsinoite taxes of the second century, which were about twice this level. One would expect that if tax rates were twice as high in the second century, the total taxes would have been double the level of the fourth century. And yet we have no reason to believe that this was so. Undoubtedly the income from the Arsinoite Nome was much greater in the second century. But the tax assessments in the second century are in general far more flexible and linked to productivity than the across-the-board rates of the fourth century. We have, unfortunately, no good way of estimating the total yield of land in either period. Average lease yields from the Arsinoite Nome in the first and second centuries are not much different from those of the Oxyrhynchite and Hermopolite Nomes; but the range is rather wider, and the highest figures we have come from the Arsinoite. It is very likely that the land of the Fayum, watered by a subsidiary network and not by inundation or direct canals from the Nile, was far more variable in productivity than the valley land. The very high income figures for Karanis in the second century may reflect relatively high yields compared even to other areas of the Fayum, like Soknopaiou Nesos, which seems never to have been very productive agriculturally.

It is in this light that we should see the phenomenon of agricultural decline in fourth-century Karanis and Theadelphia. What had once been among the most productive land, with total yields perhaps in the range of 12–15 art., had now become among the poorest, with yields perhaps no better than 5 art. The tax burden had also been reduced, by probably 50 percent overall, but not enough to compensate for the decline in productivity. The shift to a tax system with uniform rates, however, led this land to bear just the same taxes as land in other nomes which had not changed in productivity and whose overall tax burden may not have changed much.

So far as the Arsinoite Nome goes, then, the fourth century presents us with a picture of villages reduced to a shadow of their former selves by the near collapse of artificial irrigation. Their tax burden was in an absolute sense, and relative to that 150 years earlier, light; but it rested inflexibly on much unproductive or poor land, and meeting it was difficult. It is not surprising under these circumstances that we find that

there was little interest in village land on the part of metropolitans; in contrast with the relatively large ownership of land in Philadelphia in 216,[48] in the Karanis tax register 90 percent of the land was owned by villagers, only 10 percent by residents of the metropolis; the average tax payments for villagers and metropolitans are almost identical (*P.Cair. Isid.* 9 and 11). The metropolitans' land was of course leased out, and in general so also was that belonging to women, which amounts to about 10–15 percent. About 75–80 percent of the land was thus farmed by its owners, and only 20–25 percent was available for lease.[49] I cannot offer firm figures from an earlier time, but it is my impression that in the second-century Fayum the percentage of land leased out was larger. The reduction in leasing is to my mind a symptom of decline, for it makes the opportunities available to an entrepreneurial peasant minimal, and it prevents significant economic mobility on the part of such entrepreneurs. We have evidence of the activities of rather prosperous farmers who were principally lessees in the first and second centuries, but those who do not already own land are squeezed out in the much tighter land picture of the fourth century.[50]

Taxation of land, then, was at a low level after Diocletian's "reforms" and remained at a low level throughout the fourth century and indeed the rest of Byzantine rule in Egypt. The effects of this low-rate taxation, however, were disparate. Its inflexibility made it burdensome in villages with low productivity, and its unequal distribution on "private" and "public" land (all of it by now actually in private ownership) favored those who held the "private" land—in the aggregate, metropolitans rather than villagers, though both groups owned both categories. Some villages were abandoned in the Fayum as a result, although the continuing activity of the nome capital suggests that much of the nome was unaffected, as was much of the rest of Egypt.

The social and economic pressure engendered by the system bore mainly on the villages. Smaller villages will have been hard put to stand up under inflexible tax burdens and the system of liturgical service, while larger villages will have had a better chance of withstanding pressure by distributing it more broadly.

That the decline of some villages was painful for their residents, we may believe—indeed, we cannot escape this conclusion; but the noisiest may not have been the most hurt. People migrated to more prosperous areas, near or far. Others in better areas did well, and there had not

[48] For the (as yet unpublished) source of this information, P.Yale inv. 296, see J. F. Oates, *Atti XI Congr. Int. di Papirologia* (Milan 1966) 451–74 and *Proc. XII Int. Congr. of Papyrology* (Toronto 1971) 385–87.

[49] On leasing, see J. G. Keenan, *Proc. XVI Int. Congr. of Papyrology* (Chico 1981) 483–84.

[50] See *P.Soterichos*, introduction, and cf. R. S. Bagnall, *BASP* 17 (1980) 97–99.

been a century since the third before Christ when residents of Egypt played such a prominent part in the affairs of the Mediterranean world. It is in part the increasing integration of Egypt into the later Roman Empire which makes the information we can gather from its abundant documentation of generalized value.