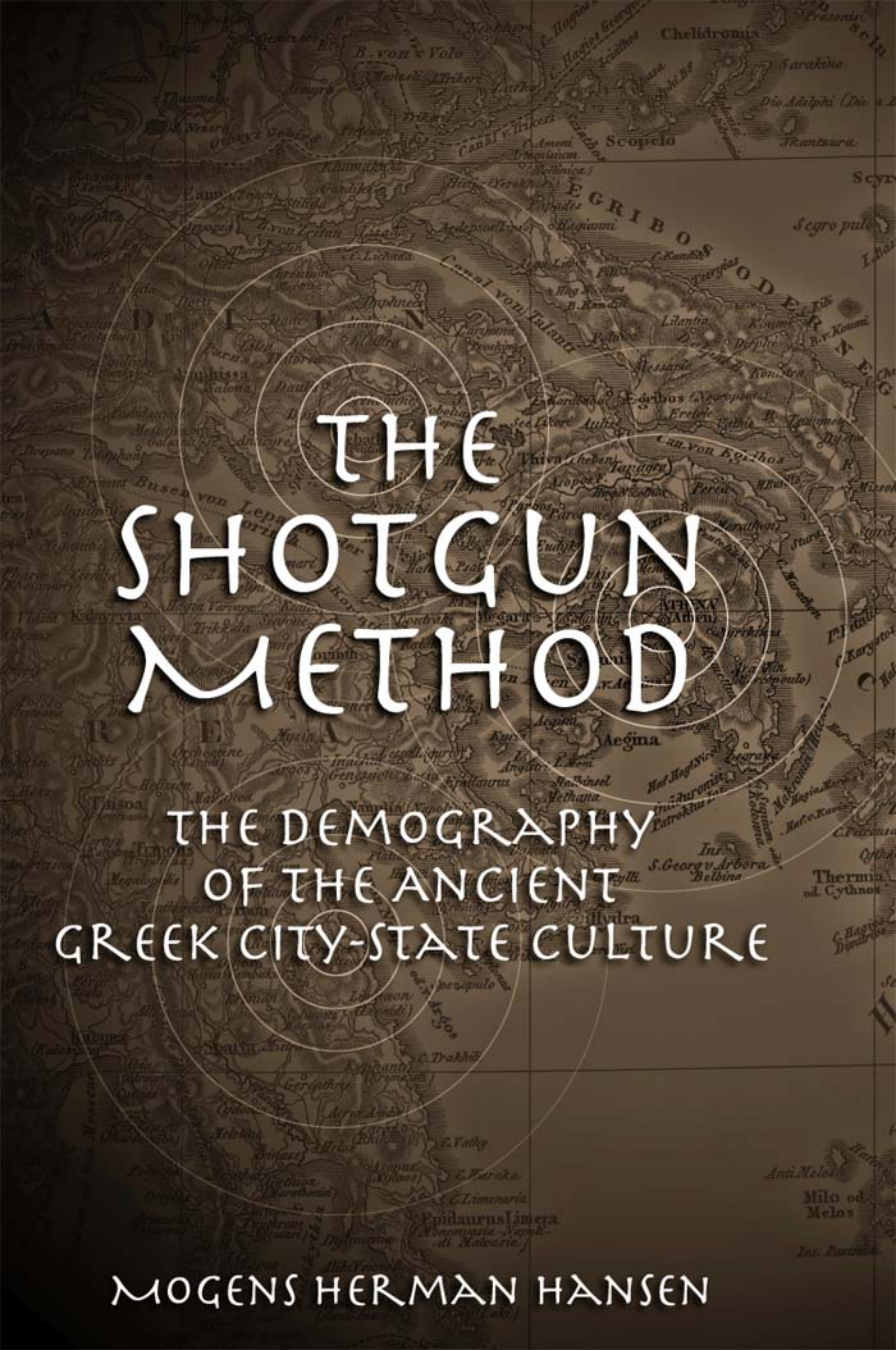
THE SHOTGUN METHOD
THE DEMOGRAPHY OF THE ANCIENT GREEK CITY-STATE CULTURE
MOGENS HERMAN HANSEN

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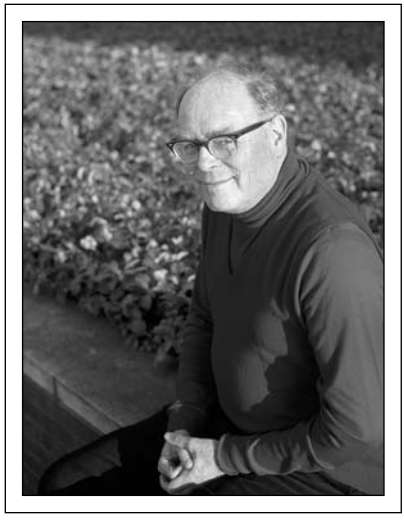

THE FORDYCE W. MITCHEL MEMORIAL LECTURE SERIES

The Fordyce W. Mitchel Memorial Lecture Series, sponsored by the Department of History at the University of Missouri–Columbia, began in October 2000. Fordyce Mitchel was Professor of Greek History at the University of Missouri–Columbia until his death in 1986. In addition to his work on fourth-century Greek history and epigraphy, including his much-cited *Lykourgan Athens: 338–322,* Mitchel helped to elevate the ancient history program in the Department of History and to build extensive library resources in that field. The lecture series was made possible by a generous endowment from his widow, Marguerite Mitchel. It provides for a biennial series of lectures on original aspects of Greek history and society, given by a scholar of high international standing. The lectures are then revised for publication by the University of Missouri Press.

THE SHOTGUN METHOD

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MOGENS HERMAN HANSEN

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CONTENTS

PREFACE

I met Fordyce Mitchel in January 1983 in Princeton at the Institute for Advanced Study where we both spent the spring term. I had heard about this learned scholar and read most of his studies in Athenian history and epigraphy. We got on extremely well and became close friends or, rather, developed a kind of uncle-nephew relationship. He was sixty-four, I was forty-two, and after just two weeks he could say, "Now, Mogens, listen to Uncle Mitch . . ." During the day we discussed fourth-century Athens, but in the evenings over a bottle of good red wine (usually a Robert Mondavi) he told me about the American South and I him about what the world looked like from a Scandinavian perspective. We were not alone in the building, and out of these evenings developed what became the informal B-Building seminars. We attracted Gerhard Thür, Bruce Frier, and Egon Verheyen. The five of us met almost every evening at ten and kept up a lively discussion for an hour or more—of course, university gossip loomed large in our conversations. Next morning before seven Mitch and I were the first on the spot and resumed our investigations, I behind my typewriter building up my inventory of politically active Athenian citizens, and he reading yet another of the innumerable photocopies he possessed about Athenian history and epigraphy.

I tend to distinguish between two types of scholar: the chandelier and the spotlight. The chandelier illuminates a large

room with a soft light. The spotlight throws a sharp cone of light over a very restricted field, and the rest of the room lies in darkness. Most scholarly books are written by spotlights. But the spotlights need the chandeliers to throw their specialist knowledge into perspective. Mitch was the chandelier type, and I profited from his learning and experience of life.

The portrait used on the series page is one I took in April 1983 before I left for Denmark. Mitch and I did not get an opportunity to meet again, but I treasure what I remember of my stay in 1983 and I am most grateful to Ian Worthington for the invitation to deliver the Fordyce Mitchel Memorial Lectures in 2004. Mitch told me about his family, and in October I had the opportunity to meet his daughter and wife who had funded this lecture series and thus made it possible for me to get to Mitch's old university and give the lectures in his memory.

ABBREVIATIONS

References to literary texts follow the abbreviations of *OCD*[3] (1996).

References to inscriptions follow the conventions of *SEG*.

Periodicals are abbreviated in accordance with the *American Journal of Archaeology* (1991 and 2000 issues).

CPCInv. = M. H. Hansen and T. H. Nielsen, *An Inventory of Archaic and Classical Poleis* (Oxford 2004).

Centuries B.C. are abbreviated C6, C5, and C4 = sixth, fifth, and fourth centuries B.C.

C4e the early fourth century, ca. 400–380 B.C.

C4f the first half of the fourth century B.C.

C4m the mid-fourth century, ca. 360–340 B.C.

C4s the second half of the fourth century B.C.

C4l the late fourth century, ca. 320–300 B.C.

All dates are B.C. unless otherwise stated.

The Shotgun Method

I

The Shotgun Method Used to Establish the Number of Inhabitants in the Ancient Greek City-States

Seeing the title of this book you have probably wondered: what is "the shotgun method"? The term is one I coined back in the 1980s,[1] but the method it describes has been used by many ancient historians whenever they have to quantify their data. To study ancient history is like hunting hares. The hunter uses a shotgun instead of a rifle. His weapon does not hit the bull's eye and is not constructed for big game, but the spreading out of the pellets to cover a broader field is very efficient when used against smaller animals. Similarly, the quantifications presented by the ancient historian are never precise, but within certain limits they can provide us with extremely valuable information about ancient societies.

The history of ancient populations is one obvious field where we have to use the shotgun method for want of precise data. We lack not only sources that have been lost but also sources that never existed. What I intend to do in this investigation is to use the shotgun method to establish the number of

1. In a lecture I gave at Ormond College, Melbourne, in 1988. See Hansen 2004, 16.

inhabitants in the ancient Greek city-states. Back in the 1960s when as an undergraduate I read Moses Finley's fascinating book *The Ancient Greeks* I wondered: how many ancient Greeks were there altogether in the period covered by Finley's book, that is, the first millennium B.C.? I had no idea, and Finley's book did not provide an answer.[2]

Today I shall put the same question: how many ancient Greeks lived in all the poleis, both those in the Greek homeland and those founded as colonies from Spain to Caucasus and from the Crimea to Libya? Before I address this question I shall have to explain whom I include and exclude in my search for "ancient Greeks." The population of a polis comprised citizens, free foreigners, and slaves. In Hellenic and Hellenized poleis the citizens were Greeks, as were most of the free foreigners,[3] principally traders who for economic reasons and exiles who for political reasons had moved from one polis to another. The exception was manumitted slaves, of whom some would be of barbaric descent and some still first-generation barbarians.[4] Among persons of servile status, the Spartan helots and the Thessalian *penestai* were Greek, but in Athens and in most other poleis a large number of slaves, probably the majority, were of foreign extraction, as is evident from their names (Thrax, Sikon, Lydos, and so on).[5] But there is reason to suppose that many slaves became Hellenized and by acculturation came to count as Greeks. One indication of this can be found in Aristophanes. While Greeks from Boiotia, Megara, or Sparta are represented in the comedies as speaking their own dialect, all the Athenian slaves speak impeccable Attic Greek, an indication that the typical slave either was Greek or, rather, had been Hellenized.[6] Another indication is

2. Finley 1963, 1–5: "Who Were the Greeks?"
3. See Hall 2002, 186.
4. Garlan 1988, 73–84.
5. Meiggs-Lewis, *GHI,* 79; Garlan 1988, 46–47.
6. I owe this important observation to an unpublished paper by Professor

the tombstones set over slaves: they are all in Greek, none in other languages. Therefore, I include the entire population of the Greek homeland, and, in the colonial regions, I include the entire population of Greek colonies and Hellenized communities. But as in the Polis Centre's inventory of poleis *(CPCInv.),* I exclude the populations of indigenous communities, such as the Sikan, the Sikel, the Elymian communities in Sicily, and others.[7] So my totals do include some non-Greeks, principally among the slaves and manumitted slaves, but the overwhelming majority of those I include were probably Greeks, most by birth, some by acculturation. I am, of course, fully aware that the Hellenization of indigenous communities in, for example, Karia was far from complete in the age of Alexander the Great and that quite a few of the Hellenized poleis in the colonial regions included a good many inhabitants whom the Greeks would look upon as barbarians or semibarbarians.[8]

So how many ancient Greeks were there in the age of Alexander? I know that I am asking a question to which there will never be a precise answer. As I said earlier: we lack not only sources that have been lost but also sources that never existed. Therefore, none of the ancient Greeks themselves, not even Aristotle, would have been able to come up with an answer to the question. Perhaps some of the Roman officials who served under Augustus and Tiberius would have possessed enough information to suggest an approximation for the period when Christ preached in Palestine.[9] I leave it to specialists in Roman demography to answer that question. Here I shall move 350 years back and focus on the Hellenic world in the classical

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Alan Sommerstein. One exception is the Scythian archer in *Thesmophoriazousae* (see Colvin 1999). Also, the freedom of speech that according to Ps.Xen (*Ath. Pol.* 1.12) and Demosthenes (9.3) was granted to slaves indicates that slaves could speak their masters' language.

7. See, for example, Fischer-Hansen 2002; and *CPCInv.* 36, 173, and passim.

8. *CPCInv.* 7, 150–53, 1390–96. For Karia, see 1108–37.

9. *NT Luc.* 2.1–5; see Corbishley 1936, 88–93.

period. By using the shotgun method is it possible for us who are not ancient Greeks but ancient historians to suggest a minimum and a maximum and to get a rough idea of the total population of the Greek world when, in 334 B.C., Alexander the Great set out to conquer the Persian empire?

The data I am going to use are those collected by the team of scholars who contributed to the Copenhagen Polis Centre's *Inventory of Archaic and Classical Poleis.*[10] But first I shall provide you with a survey of earlier attempts to answer the question.

The fundamental study to which all historians still have to turn is Karl Julius Beloch's *Die Bevölkerung der griechisch-Römischen Welt* (The Population of the Greek and Roman World). Though published in 1886, it is to date the only comprehensive treatment of the topic: it comprises detailed studies of the population of mainland Greece, including Epeiros, Makedonia, and the Aegean Islands, that is, the Kyklades and Sporades. There is an ultrashort section about Thrace but nothing about the Pontic region. The population of the poleis in western Asia Minor and the islands along the west coast is treated retrospectively in various parts of a chapter focused on the Hellenistic period. A very short section about Libya is followed by a long one about Sicily and a much shorter one about southern Italy. In his conclusion Beloch estimates that the population of the Greek mainland in 432 B.C. totaled some three million people;[11] there are no totals for Thrace, Asia Minor, southern Italy, and Libya, whereas the Greek population of Sicily is assessed at around six hundred thousand in 415 when the Athenians attacked Syracuse.[12]

The book was a masterpiece for its time but is, of course, seriously outdated. Beloch did not have access to all the

10. *CPCInv.* ix–x.
11. Beloch 1886, 506.
12. Beloch 1886, 298.

archaeological information that has been obtained during the past 120 years. Numerous excavations conducted all over the Mediterranean have provided us with information about the size of many of the urban centers, and the rapidly growing number of surveys conducted since the 1970s has increased our knowledge about the population settled in the hinterland.[13] Beloch had to base his investigation on the available literary and epigraphical sources. For the Greek world the epigraphical material at his disposal was mostly lists of nineteen- or twenty-year-old ephebes, especially those from Boiotia.[14] Almost all his calculations and conclusions were based on army figures derived from literary sources and converted into population figures on the assumption that the defense force of a Greek polis constituted about one-quarter of the total free population,[15] to which Beloch added a number of slaves or serfs.

Quite apart from the problem that we cannot always trust the army figures reported in the sources, a major complication is that, by and large, Beloch tends to equate army figures with population figures.[16] He sometimes admits that there may have been citizens who did not serve in the field army.[17] But then he ignores such reservations and makes his calculations on the assumption that every adult male in the year classes from twenty to fifty served in the field army.[18] That may have been

13. For a survey of surveys, see Alcock 1994, 250; Alcock and Cherry 2004; and Corvisier 2004.

14. Lists of Boiotian ephebes: Beloch 1886, 167–72.

15. Beloch 1886. Die waffenfähigen Männer equal one-quarter der Gesammtbevölkerung (42, 53). Waffenfähige Männer equal men 20–60 (13–14). The ratio between children and adults is approximately one to two. Adult males over 18 equal around one-third of the total free population (53). But the men who served in the field army were those aged 20–50, and they constituted no more than about one-fifth of the total population (163).

16. Noted by Jardé 1925, 136–37; and Salmon 1959, 456.

17. See, for example, his discussion of the Boiotian army at the battle of Delion (1886, 163).

18. See Beloch's calculation of the population of Corinth (1886, 120–21):

the case when a polis was besieged and the walls had to be manned with every living soul, or when a battle was fought against an invading army in the territory of the polis just outside the walls. But it is unbelievable that a field army operating outside the territory of its polis was made up of every single citizen of military age. I have cautiously suggested that the field army comprised only some 80 percent of the citizens in the same year classes.[19] It follows that many of Beloch's calculations have to be increased by 25 percent when we convert an army figure into a population figure. Nevertheless, some historians continue to use Beloch's calculations or make calculations themselves along the same lines.[20]

3,000 hoplites aged 20–50 means 5,000 in the hoplite class (aged 18–80 or older), equaling a total adult male citizen population of around 10,000 and a maximum of 12,000. In the third volume of the second edition of his *Griechische Geschichte* (1922) Beloch included a chapter on population (263–313), and here he admits (268) that many must have been unfit for military service or exempted from military service for other reasons. He also estimates the average number of unfit and exempted at about 20 percent of all and presents a new calculation of the population of Corinth: 3,000 hoplites aged 20–50 = 3,750 when unfit and exempted (= 20 percent of all) are included = 5,600 in the hoplite class (those aged 20–50 = two-thirds of those aged 18–80+) = a total adult male citizen population of 14,000 (those aged 18–80+ = two-fifths of those aged 0–80+) (275–76n7). Elsewhere he states that he now reports *wahrscheinliche Mittelzahlen,* whereas the numbers he calculated in 1886 were *Minimalzahlen* (308n2). For the percentage of unfit, see also vol. 3.2, p. 403. Strangely enough, Beloch's chapter on population in *Griechische Geschichte* has—almost—fallen into oblivion, whereas his earlier monograph is still cited and discussed in all major accounts of ancient Greek demography.

19. Hansen (1985, 16–21) suggests that at least 20 percent of all citizens of military age must have been unfit for military service and that another 5 percent must have been exempted for other reasons. To be on the safe side, however, I assume in my calculations that only 20 percent of all citizens aged 20–49 were exempted from military service in the field army (see my calculation on p. 38 of the Athenian field army in 323).

20. Discussing the population of Corinth, Salmon (1984, 165–69) equates a force of 5,000 hoplites with the Corinthian citizen population of hoplite census. There is no mention of citizens over 50 (or 60), and no mention either of citizens aged 20–50 (or 60) but unfit for military service.

A different approach has been to calculate the population of the members of the Delian League and, on the assumption that the figures obtained are representative of the entire Greek world, to extrapolate the results to cover all poleis in the Greek mainland. Since the publication in 1939 of *The Athenian Tribute Lists,*[21] the method has been used for calculating the population of various regions, such as Chalkidike[22] or the Troad.[23] It is Eberhard Ruschenbusch who—audaciously—has applied the method to the entire population of classical Greece.[24]

Allowing for a frightening large number of exceptions, Ruschenbusch believes that there was a close correlation between the height of the *phoros* paid by a member polis and the size of the population of the polis in question. He further believes that, as a rule of thumb, a *phoros* of one talent equaled a population of about 800 adult male citizens and around 3,200 inhabitants.

The only direct source is Diodoros who at 13.104.7 tells us that in 405 Lysander exposed Iasos to an *andrapodismos,* killed 800 adult male citizens, and sold off the women and children. From the tribute lists we know that Iasos paid a *phoros* of one talent, so here is an example of one talent[25] equaling 800 citizens. The leap from 800 citizens to 3,200 inhabitants is made on the widely accepted assumption that the adult male citizens constituted a quarter of the total population, the same assumption that Beloch used for most of his calculations.

21. Meritt, Wade-Gery, and McGregor 1939.

22. Zahrnt 1971, 137–38, but see Nixon and Price 1990, 160–61 with n. 40.

23. Cook 1973, 383, but see Nixon and Price 1990, 160–61n40. For a full study, see Tenger 1995.

24. Ruschenbusch 1983, 1984a, 1984b. Over the following two pages I have to disagree with Ruschenbusch's method and conclusions. I would like to stress that here, as always, I have learned a lot from Ruschenbusch's publications and that our several controversies, especially over demography, have not diminished my respect for his scholarship.

25. *IG* I^3 263.V.21 (449); *IG* I^3 279.I.69 (432); *IG* I^3 280.I.63 (431).

Next Ruschenbusch shows that a number of islands that paid a *phoros* of one talent had roughly 3,200 inhabitants in the late nineteenth century.[26] That was in his opinion the carrying capacity of the islands in question, and, he argues, since the economy of these islands had not changed significantly since classical antiquity, it must have been the carrying capacity in C5 too. Consequently, each of these islands in antiquity must have had a population of about 3,200 inhabitants, a figure corresponding to 800 adult male citizens.

As corroboration Ruschenbusch refers to a roster of citizens from around 300 B.C. in which are listed approximately 485 adult male citizens from two of the four poleis on Keos. The island must have had around 900 adult male citizens altogether. In the late nineteenth century Keos had about 4,000 inhabitants, a figure that fits the roughly 900 adult male citizens circa 300 B.C.[27]

Applying his rule of thumb—one talent equals 800 citizens and 3,200 inhabitants—Ruschenbusch constructs the following population figures for 238 poleis recorded in the tribute lists:[28]

TABLE 1.1

PERCENTAGE OF MEMBERS	NUMBER OF INHABITANTS
13.8	265
22.2	530
10.5	1,065
10.9	1,600
21.4	3,200
5.9	4,800
15.1	5,330 minimum

26. Ruschenbusch 1984b, 265.
27. *IG* XII.5 609, see Ruschenbusch 1982.
28. Ruschenbusch 1984a, 55.

Assuming that there were altogether 750 poleis in mainland Greece, including the Aegean, he makes this further calculation:

TABLE 1.2

NUMBER OF POLEIS	NUMBER OF INHABITANTS	TOTAL
103	265	27,427
166	530	88,245
79	1,065	84,135
82	1,600	130,800
160	3,200	513,600
44	4,800	212,400
113	5,330 minimum	640,000
Total 747		1,697,000

The result is that these 747 poleis had 1,697,000 inhabitants. According to Ruschenbusch there remain 33 very large poleis whose populations are assessed at altogether 1,752,000. Deducting 450,000—that is, what Ruschenbusch calculates as the population of the poleis in Thrace and western Asia Minor—the grand total is a population of about 3,000,000 in mainland Greece. That is a little below the 3,365,000 attested in 1907, a figure that Ruschenbusch takes to be the carrying capacity of Greece in the preindustrial period.

This breathtaking calculation is a colossus with feet of clay. Let me here point out just a few of the problems that subvert the whole construction. The *phoros* of one talent paid by Iasos is attested for the years 449–431, but Iasos had been conquered and destroyed already in 412 (Thuc. 8.28.2–4), and therefore a total of 800 citizens killed in the *andrapodismos* of 405 cannot be connected with the *phoros* paid in the 440–430s and is unlikely to be a normal population. Furthermore, it is unlikely that the 800 men killed by Lysander constituted the entire citizen population. We know from numerous sources that, usually, quite a few of the citizens succeeded in

escaping from an *andrapodismos* and returned to their city some years later.[29]

Second, the roster of citizens from Keos may be a list of citizens of military age fit for military service, not a list of all adult male citizens. It follows that the total number of adult male citizens in Koresia and Ioulis was more than 700, so, assuming that Karthaia and Poiessa had the same number of citizens as Ioulis and Koresia, the total for the island was 1,400–1,500 adult male citizens rather than 900.[30] Furthermore, the *phoros* paid by the Kean poleis was first four talents, later three talents, and later again six talents,[31] not about one talent as one should have expected in accordance with Ruschenbusch's rule of thumb.

In 1990 Lucia Nixon and Simon Price rejected all Ruschenbusch's calculations out of hand. Bernhard Tenger's careful study of the poleis in the Troad is based on the assumption that, with modifications, the height of tribute may be used as a yardstick for the size of population, but two of the main conclusions are that Ruschenbusch's rule of thumb does not fit the Troad—it is generally too pessimistic—and that, even allowing for modifications, the correlation between *phoros* and population breaks down for poleis that paid a *phoros* of more than one talent.[32]

A third method for calculating the total population of ancient Greece is to try to establish the average number of persons per square kilometer and then multiply by the total area of mainland Greece. The method was applied already by Beloch to supplement his calculations based on army figures.[33] In recent

29. *CPCInv.,* 122.

30. Cherry, Davis, and Mantzourani 1991, 324–25.

31. *IG* I^3 263.IV.21 (four talents); *IG* I^3 279.I.74 (three talents); *IG* I^3 288.I.10 (six talents).

32. Nixon and Price 1990, 158–62; Tenger 1995, 157 (one talent equals 800 citizens does not fit the *poleis* in the Troad), 159 (no conversion possible for *poleis* paying a *phoros* of more than one talent).

33. Beloch 1886. Sizes of regions and territories in square kilometers are recorded throughout the book, and a survey is printed on p. 506.

years it has been used by several historians[34] and, in particular, by the French specialist in ancient Greek demography Jean-Nicolas Corvisier. Based on a detailed study of the population of Epeiros, Makedonia, and, especially, Thessaly,[35] Corvisier concludes that the density of population was about forty persons per square kilometer in the plains and about fifteen persons in the mountains. Including Epeiros and Makedonia, mainland Greece covers about 150,000 square kilometers, of which roughly 20 percent is level and about 80 percent mountainous country.[36] The total population of mainland Greece was then calculated to be around 3 million people.[37]

One problem with this method is that whenever we have some specific information about the population of a polis and the size of its territory, we reach much higher figures.[38] Athens, Corinth, Aigina, and some other economic centers are, of course, exceptions.[39] But so are Mantinea and Phleious.[40]

34. For example, Salmon 1959, 456–59.

35. Corvisier 1991, 229–94. Corvisier's study of the Thessalian population is conducted along three main lines: a rough sketch of the carrying capacity, an analysis of the available army figures, and a study of the possible population of all the urban centers in Thessaly (142 altogether). Corvisier's conclusions have been severely criticised by Helly (1995, 280–87); see Appendix 6.

36. Corvisier and Suder 2000, 32–35.

37. In his fundamental study of the Greek demographic expansion, Scheidel (2003) uses Corvisier and Suder (2000) for the Greek homeland and Beloch (1886) for the colonial regions when he has to suggest a rough estimate of the number of Greeks in C4.

38. See the lists in Salmon (1959, 457) and Corvisier and Suder (2000, 34).

39. In C4 Attika had a population of at least 200,000 (Hansen 1988, 12) settled in a territory of 2,500 square kilometers, which equals 80 per square kilometer. Corinth had a population of around 70,000 (Salmon 1984, 165–69) settled in a territory of 900 square kilometers (Beloch 1922, 276), which equals about 78 per square kilometer. Aigina had a population of, perhaps, 35,000 (Figueira 1981, 22–52) settled in an island of 85 square kilometers, which equals 411 per square kilometer, but see Hansen (2006, 5–12).

40. Mantinea had a population of 14,000 or more (Hansen 2004, 19–20, 42–44) settled in a territory of 295 square kilometers (*CPCInv.,* no. 281, p. 518), which equals about 47 per square kilometer. Phleious had a population

A fourth method has been to assess the total population on the basis of what is called the carrying capacity of a region, that is, "the maximum number of persons sustainable by a given territory under specific conditions, e.g. at a given standard of living."[41]

The use of this concept in the demography of classical Greece is based on a number of assumptions:[42]

(1) The economy of classical Greece was, basically, a subsistence economy; not only the individual poleis but also the various regions as a whole were self-sufficient in foodstuffs.

(2) No import of grain was needed (except perhaps in very bad years). Most poleis were economically autarkic. Trade was local between town and hinterland. There was very little long-distance trade, except for a few luxury goods.

(3) During the late archaic and classical periods the population of Greece had been growing. In the course of C4 it had reached the carrying capacity, and, accordingly, no further growth was possible. On the contrary, a decline followed in the early Hellenistic period and in C3 and C2. The Greek polis world experienced a negative growth of population.[43]

(4) The nineteenth century A.D. was another period of rapid population growth, and in many regions the carrying capacity was reached once again late in that century.

(5) The "specific conditions"—for example, precipitation, fertility of the soil, methods of production, and yields of crops—had not changed significantly between the fourth century B.C. and the nineteenth century A.D. The standard of living had

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of, perhaps, 20,000 settled in a territory of around 140 square kilometers (*CPCInv.,* no. 355, p. 613), which equals 143 per square kilometer.

41. Wilson 1985, 24.

42. For documentation, see Chapter 4.

43. The principal source is Polyb. 36.17.5–7, a much discussed passage (see Walbank 1979, 680; and Salmon 1959, 468–76). The veracity of Polybios's account has been questioned but has repeatedly been confirmed by the landscape surveys (see, for example, Jameson, Runnels, and van Andel 1984, 553–54).

probably not changed much either. Thus, in Greece the extent and use of arable land were probably in the late nineteenth century what they had been in C4l. In both periods the carrying capacity had been reached, and in both cases much of the natural population growth was disposed of by emigration.

If we make all these assumptions it follows that the size of the population of Greece in C4 must have been close to the population figure of the late nineteenth century, which we know from the census of, say, 1889.

Our lack of sources both for the total population of Greece in the classical period and for individual regions can therefore be remedied by looking up the population figure given for that region in the census of 1889 and by taking that figure to be the carrying capacity of the region both in the late nineteenth century A.D. and in the late fourth century B.C.[44] The total population of Greece in the late nineteenth century was about 3 million people. Accordingly, it must have been around 3 million people in the fourth century B.C. too.[45]

To test this method we must study a region whose ancient population we know from contemporary sources and see whether the nineteenth-century population was roughly the same magnitude. There are only two regions for which the sources we have suffice to assess the minimum population in C4e, namely, Attika and Boiotia. Attika was an exceptional case both in C4e and in the late nineteenth century A.D., after Athens had become the capital of Greece in 1834. But Boiotia can be presumed to be typical, and we know from a C4e historian that in 395 Boiotia had an army of at least around 25,000 effectives and thus a population of 150,000–200,000 persons altogether.[46] But

44. On carrying capacity, see Sallares 1991, 73–81; for the view that the C4 population equaled that of the nineteenth century A.D., see 51, 75, 80.

45. Ruschenbusch 1984a, 56.

46. *Hell. Oxy.* 19.4. For the calculation, see Bintliff and Snodgrass 1985, 141–42; Hansen 1997a, 62–63; 2004, 13; and infra p. 84–87.

in 1889 the region that corresponds to ancient Boiotia had a population of approximately 40,000–42,000 persons.[47]

So a study of the only "typical" region for which we can assess the population figures in C4 and in the nineteenth century independently of one another reveals that the carrying capacity of Boiotia was a minimum of 150,000 persons in C4 but a maximum of 45,000 persons in the nineteenth century A.D. This example alone should teach us not to use nineteenth-century figures as an indication of the ancient population. For a closer scrutiny of carrying capacity as a source for population figures, see Chapter 4.

As my survey shows, all four methods focus on the Greek mainland and are based on data relating to the population of Greece proper. There are no comprehensive studies of the population of all the colonies, although many of the colonial settlements were much larger than the mother cities in the Greek homeland.[48] Not even the west coast of Asia Minor is included in the studies I have mentioned, and that in spite of the fact that the Troad, Aiolis, and Ionia were believed to be part of Hellas itself, that is, what modern historians sometimes prefer to call "the Greek homeland" or "the Greek heartland."[49] To restrict demographic calculations to the Greek mainland is to do only half of the job one set out to do.

All four types of investigation end up with a total of around 3 million people in mainland Greece in the classical period. The total is not a priori implausible, but the various ways it is

47. Sauerwein 1991, 267–69.

48. The only treatment that includes all the Greek colonies is Beloch's chapter in his *Griechische Geschichte* (1922, 263–313) in which his conclusion is that, in C4e, there was a total of 8–9 million ancient Greeks of whom close to 4 million lived in the Greek mainland (308), a conclusion questioned by later historians (Corvisier and Suder 2000, 35), or passed over in silence (Scheidel 2003). But see infra p. 28.

49. See *CPCInv.,* 150–51.

reached do not inspire confidence, unless we bear in mind that all four approaches are minimalistic. A weak point in Beloch's investigation is that, calculating the free population, he tends to equate army figures with population figures, and the numbers of slaves or serfs he adds are not even guesstimates but just guesses. Even those who accept some of the principles behind Ruschenbusch's calculations have to admit that his rule of thumb is too pessimistic for small agrarian poleis and does not work at all for larger poleis. As to number of persons per square kilometer, we have to envisage the possibility that Epeiros, Makedonia, and Thessaly were less densely populated than the Peloponnese and central Greece, not to speak of the islands, Asia Minor, and all the colonies. Finally, the comparison of modern census figures with C4 sources shows, if anything, that Greece was more densely populated in the late classical period than in the second half of the nineteenth century.

A fifth and completely different approach is to use the degree of urbanization as a source for the population of a polis and, by extrapolation, of all poleis. In this case the principal evidence consists of physical remains of walled cities and of traces of settlements in the hinterland of the city in case an archaeological landscape survey has been conducted in the territory. For the urban center of the polis we can assess the habitation area as a percentage of the walled area and then assume an average number of persons per hectare of inhabited space. For the territory, second- and third-order settlements have been traced in those cases in which a survey of the hinterland has been conducted. The method has been used for individual poleis (for example, Metapontion),[50] sometimes for a part of a region (such as southern Argolid with the poleis Hermion and Halieis),[51] and

50. Carter 1990, 406 with n. 2.
51. Jameson, Runnels, and van Andel 1994, 549–51.

in some fascinating studies by John Bintliff it has been applied to a whole region (namely, Boiotia).[52] It was also used as the principal method by Corvisier in his calculation of the population of Thessaly, which, again, was the basis for his calculation of the total population first of northern Greece[53] and then of all of Greece (see Appendix 6). What I shall do here is to apply the method to the entire Greek polis world in the late classical period and to cover not just the Greek mainland but also all the colonies and all the communities that in C4 had been sufficiently Hellenized to count as poleis.

In C4 the great majority of poleis had a defense circuit, sometimes one that enclosed the acropolis only, but most commonly one that encompassed the entire town. Of the 1,035 communities included in the Polis Centre's inventory, 166 are unlocated. Of the 869 located poleis, 438 had defense circuits of which some remains are still visible, and a further 90 poleis are referred to in written sources as being fortified. Thus, 60 percent of all located poleis are explicitly attested as walled settlements. In most cases the remains are dated to the archaic or classical period or both. In some cases they are undated but possibly of the classical period and, if so, to be dated to C4. In 69 cases the walls enclose the acropolis only.[54] The presumption is that some or all of the habitation area lay beneath the acropolis and can no longer be measured unless it has been carefully surveyed.[55] So, for the present purpose, we must restrict our investigation to the 369 circuits that enclosed the town. Many

52. Bintliff 1997a.

53. The evidence we possess for Epeiros and Macedon is much more flimsy, and accordingly Corvisier's description (257–92) is much more sketchy.

54. *CPCInv.,* 136–37, 1368–75.

55. One example of such a survey is that conducted by Bintliff and his team around Hyettos in Boiotia. The acropolis wall encloses an area of approximately 6 hectares, but a surface survey of the area beneath it testifies to an urban center of altogether 26 hectares (see Bintliff 1999, 15).

of them are so badly preserved that the only inference we can make is that the town must have been fortified. Yet for altogether 232 poleis there are sufficient remains of the circuit to allow us to assess the area enclosed by the walls.[56]

Table 1.3

NUMBER OF HECTARES	NUMBER OF POLEIS
0–4	10
5–9	33
10–19	38
20–49	68
50–99	44
100–149	16
150+	23
Total	232

The total area enclosed by all 232 walls comes to 15,628 hectares, which is a minimum. For some of the city walls recorded here we know that they enclosed *more than,* say, 20 hectares or 30 hectares (recorded in Appendix 3 as 20+ or 30+ hectares).[57] These walls may have enclosed a much larger space, but for my calculation I have consistently used the minimum figure. On the assumption that the 232 walled cities are representative of all the 1,000 or so communities in our inventory, the grand total of walled urban space in the late classical Hellenic world is 67,360 hectares.

But is it legitimate just to add up the urban space of all the 232 walled poleis and to presume that they are representative of

56. Hansen 2004, 28–29, 33–40, which lists 233 poleis. In this publication I have excluded Alipheira (no. 266), since the C4 walls enclose the acropolis only (5.2 hectares), whereas the walls that enclose the town are undated.

57. In some cases the space recorded is not the area enclosed by the walls but habitation space established by survey of the urban area (Hyettos, Orikos, Pantikapaion, and so on).

the altogether 1,000 or so poleis? When some 60 percent of all located poleis are still attested as fortified or referred to as fortified in written sources, we can assume that, in C4, almost all poleis had a defense circuit, at least one that enclosed the acropolis but usually one that enclosed the entire town.[58] So in this respect the projection appears to be legitimate. The breakdown by size is a different matter. Large cities with walls enclosing more than 100 hectares may be better represented among the 232 poleis than small cities with an urban center covering fewer than 10 hectares, or vice versa.

Instead of the rough summing up of all walled poleis, we must connect the information we have about measurable defense circuits with the information we have about the size of the territory of these poleis, and here I will use the five categories applied in the Copenhagen inventory of poleis: (1) 25 square kilometers maximum, (2) 25–100 square kilometers, (3) 100–200 square kilometers, (4) 200–500 square kilometers, and (5) 500 kilometers minimum.

Of the 1,035 poleis it is possible to place 636 in one or, at least, in one of two of these five categories. (For a full survey, see *CPCInv.* 70–73 with the index on pp. 1319–27.) For the present investigation I shall use the following slightly simplified version:[59]

58. *CPCInv.,* 137, with nn. 8–9 and pp. 1368–75.

59. See *CPCInv.,* 71, and index pp. 1319–27. I have kept the most important of the double categories, namely, poleis with a territory size 1 or 2 (less than 100 square kilometers). Thirty-eight poleis with a territory size 2 or 3 (25–200 square kilometers) have been divided equally between 2 and 3. Eleven poleis with a territory size 3 or 4 (100–500 square kilometers) of which 10 seem to belong in 3 (100–200 square kilometers) rather than in 4 (200–500 square kilometers), namely, Elateia, Ilion, Klazomenai, Kyparissos, Pellene, Priene, Pydna, Sestos, Teos, and Thourioi. The hinterland of Pantikapaion was probably size 3, but including all the dependent poleis it was, of course, size 5. Of six poleis with territory size 4 or 5 (more than 200 square kilometers), I have little doubt that four belong in category 5 (Ainos, Gela, Megalopolis, and Messene), whereas 2 were probably category 4 (Knidos and Barke).

Table 1.4

TERRITORY	ATTESTED POLEIS	PERCENTAGE
1	93	15
1 or 2	109	17
2	198	31
3	100	16
4	69	11
5	67	10
Total	636	100

The size of the territory is known or, at least, roughly estimated for 194 of the 232 poleis that have sufficient remains of their defense circuits to allow us to measure the area enclosed by the walls (see Appendix 3). The relation between the size of the territory and the size of the urban center is as follows:

Table 1.5

TERRITORY	POLEIS	TOTAL AREA (IN HECTARES)	AVERAGE (IN HECTARES)
1	13	100	8
1 or 2	17	351	21
2	56	1,514	27
3	33	1,601	49
4	37	3,810	103
5	38	6,918	182
?	38	1,332	
Total		232	15,626

We have 636 poleis for which we can calculate the size of the territory and 232 poleis for which we know the size of the urban center. For 194 poleis we possess both types of information. But what about all the other poleis? Is it legitimate to extrapolate from the evidence set out above and calculate first the urban population and then the total population of the Hellenic world?

Both the 636 poleis and the 232 poleis are spread out over the entire area inhabited by the Greeks in the archaic and classical periods: France, Sicily, Italy, western Greece, the Peloponnese, central Greece, Thessaly, the Aegean Islands, Makedonia, Thrace, the Pontic region, Asia Minor, and Libya. Geographically, they cover all the poleis that once existed in the Greek world,[60] but it must be kept in mind that the colonial regions are underrepresented (see pages 31–32).

It is also problematic to treat the evidence as synchronic, but, in my opinion, it is admissible. Some walls are archaic, some were built in C5, but most of the information we have concerns C4. Many of the defense circuits were built or repaired in that century, and many walls of the archaic or early classical period were still in use in the late classical period. If we focus on C4 it should be possible to present a synchronic picture. The principal problem is Sicily. Many of the large poleis were destroyed by the Carthagenians in C5l. But most of them were resettled in the following century, and new poleis emerged in C4.[61] In the age of Timoleon, Sicily may have been as populous as the island was in the second half of the fifth century.[62] For this investigation I shall treat the Sicilian poleis as they were in C5l and the rest of the Hellenic world as it was in C4s.

The Hellenic city-state culture comprised some 1,500 poleis but not at the same time. Some early poleis had disappeared for good already in the archaic period, and other poleis were founded, both

60. There are, of course, regional differences: Phokis had many small poleis. Italia had few but mostly very large poleis. A large number of circuits are found in Epeiros, whereas no circuits of the archaic and classical periods are attested in Elis and Achaia.

61. Megara never recovered after Gelon's conquest in ca. 484, but a part of the old city was reoccupied in C4s; see Talbert 1974, 149. Of the poleis destroyed in C5l, Himera and Naxos disappeared for good, but Akragas, Gela, Hippana, Leontinoi, and Selinous were resettled. Adranon, Tauromenion, and Tyndaris were poleis founded in C4. In Magna Graecia, Poseidonia and Siris had disappeared by 400, but Sybaris had been refounded as Thourioi.

62. Seibert 1982/1983, 54–56. Compare Beloch 1922, 304.

in the homeland and abroad. Of the 1,035 poleis included in the Copenhagen inventory, 862 were certainly or presumably in existence circa 400.[63] On the other hand, there are many poleis that have not left sufficient traces in our sources to become an entry in the inventory. If we assume that the number of poleis in C4 totaled around 1,000, we cannot be far out in our reckoning, and on this assumption we can construct the following table:

Table 1.6

TERRITORY	ATTESTED POLEIS	PERCENTAGE	ALL POLEIS
1	93	15	150
1 or 2	109	17	170
2	198	31	310
3	100	16	160
4	69	11	110
5	67	10	100
Total	636	100	1,000

If, within each category, we multiply the average size of the urban space (see table 1.5) by the calculated number of poleis in that category (see table 1.6), the areas enclosed by walls add up to the following totals:

Table 1.7

TERRITORY	POLEIS	TOTAL AREA (IN HECTARES)
1	150	1,200
1 or 2	170	3,570
2	310	8,370
3	160	7,840
4	110	11,330
5	100	18,200
Total	1,000	50,510[64]

63. *CPCInv.,* 53–54, with index pp. 1328–37.

64. This total is much more plausible than the crude projection that gave a total of 67,360 hectares (see p. 17).

How much of this space was used for habitation? City walls often enclosed much more space than needed to accommodate the urban population. Some space was taken up by streets and squares. Some space was used for temples, theaters, sports centers, town halls, and other public buildings, and especially in large cities much space was left open to serve as a refuge for the rural population in case the territory of the polis was invaded by a hostile army. In the next chapter I shall treat this problem in more detail and with full documentation.[65] I can reveal that my rough estimate is that, on average, half the space enclosed by the walls of a city was open space or space used for streets, squares, and public buildings. That is indeed a rather pessimistic view, at least for all the small and midsize poleis, whereas for the largest cities the inhabited space may have covered even less than half the urban space. In Kyrene, for example, the walls enclosed 750 hectares, but archaeologists estimate that only some 250 hectares seem to have been used for habitation.[66] In cities like Athens the built-up area constituted more than half of the urban area,[67] but, to be on the safe side, I have for all cities in category 5 set the ratio between habitation space and public space at one to two instead of the one to one used for cities in categories 1–4 (see table 1.8).

Finally, we must assess the number of inhabitants per hectare of inhabited space. Again I take what in the eyes of most historians and archaeologists is a minimalistic view, and for all cities I assume that the built-up quarters of a polis accommodated an average of 150 inhabitants per hectare.[68] This is another issue that will be treated in more detail in the next chapter.

65. See pp. 34–47 infra.

66. Laronde 1999, 82.

67. The walls of Athens enclosed about 215 hectares of which 120 hectares (56 percent) are supposed to be inhabited space (Travlos 1960, 71).

68. Hansen 1997a, 2004; see also p. 61 infra. For very small poleis (of 10 hectares maximum) the presumption is that, on average, the habitation area

The next step is to combine these two estimates: half the area used for habitation in small and midsize poleis but only one-third in the large poleis, and one hectare of inhabited space could accommodate no more than 150 persons.

Table 1.8

TERRITORY	POLEIS	TOTAL AREA (IN HECTARES)	URBAN POPULATION
1	150	1,200	90,000 (50 percent x 150)
1 or 2	170	3,570	267,750
2	310	8,370	627,750
3	160	7,840	588,000
4	110	11,330	849,750
5	100	18,200	910,000 (33.3 percent x 150)
Total	1,000	50,510	3,333,250

The final step is to relate the urban population to the population settled in the territory. Here I rely on those surveys that not only map out a settlement pattern but also attempt to assess the population settled in the surveyed area. As pointed out in my previous article, these surveys seem to agree that a majority of the population lived behind the walls in small and midsize poleis, whereas a majority lived in the hinterland in the large poleis, namely, those with a territory of 500 or more square kilometers.[69] For this final calculation I assume the following distribution between town and hinterland: For poleis categories 1–3 (territory up to 200 square kilometers), I assume that two-thirds of the population lived in the urban center. For poleis category 4 (territory of 200–500 square kilometers), I

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constituted more than half of the intramural space (see p. 22 supra and pp. 46 and 60 infra). But for this calculation I assume 50 percent habitation space for all poleis with a territory size 1, even the smallest. If I had assumed 67 percent habitation for the smallest poleis, the result would be approximately 95,000 in table 1.8 instead of 90,000.

69. Hansen 2004, 11–16; see Chapter 3.

assume that the population was equally divided between town and hinterland. Finally, for poleis category 5 (500 square kilometers minimum), I assume that two-thirds were settled in the hinterland.[70] On these assumptions the average population of a polis in each of the five categories is shown in table 1.9:

Table 1.9

TERRITORY	URBAN CENTER	HINTERLAND	TOTAL
1	600	300	900
1 or 2	1,575	790	2,365
2	2,025	1,010	3,035
3	3,675	1,840	5,515
4	7,725	7,725	15,450
5	9,100	18,200	27,300

Furthermore, the total population of the Hellenic world was as follows:

Table 1.10

	TERRITORY	URBAN CENTER	HINTERLAND	TOTAL
	1	90,000	45,000	135,000
	1 or 2	267,750	133,875	401,625
	2	627,750	313,875	941,625
	3	588,000	294,000	882,000
	4	849,750	849,750	1,699,500
	5	910,000	1,820,000	2,730,000
Total		3,333,250	3,456,500	6,789,750

Thus, my first overall conclusion is that if we apply this method consistently to the entire Greek world, there were close to 7 million ancient Greeks in C4s. But some variations in the settlement pattern must be taken into account. I have treated the Greek world in C4m as a world of poleis, a world in which the

70. Hansen 2004, 16.

total population was settled in around 1,000 poleis, each consisting of an urban center and a hinterland. In every region (Arkadia, Achaia, Phokis, Thessaly, and so on) every person belonged to a polis in which he or she was either a citizen, a foreigner, or a slave. There were undoubtedly some people living in the mountains who fall outside this pattern,[71] but the probability is that they do not matter in a demographic investigation of this kind. In C4s such a settlement pattern prevailed in the Greek homeland up to and including Akarnania, Aitolia, and Thessaly. Thessaly was a region subdivided into poleis since—at least—the late archaic period, and in C4 there were more poleis in Thessaly than in any other Greek region.[72] Poleis grew up in Akarnania and Aitolia in the course of the classical period so that, in the age of Alexander, the settlement pattern of both regions had become similar to that of the rest of southern and central Greece.[73] Settlement in poleis goes for the Aegean Islands too and for the west coast of Asia Minor (the Troad, Aiolis, and Ionia).

In the northern part of the Greek homeland, however, and in the colonial world the settlement pattern and the political organization of the regions were different. In the regions of Epeiros and Makedonia, there were some poleis, some of them Greek colonies, but the majority of the population was either settled in villages or dispersed.

Politically, Epeiros was organized into tribal communities.[74] By applying my method to Epeiros, I reach a total population of about 50,000 (see Appendix 5), but according to Corvisier, Epeiros had a population of approximately 425,000.[75] The

71. See, for example, the discussion of transhumance in Roy 1999, 349–56.

72. Xen. *Hell.* 6.1.19; see also Decourt, Nielsen, and Helly 2004, 678; and Corvisier 1991, 255.

73. Aitolien: Funke 1997, 170–71; Akarnanien: Gehrke and Wirbelauer 2004, 351–52.

74. Davies 2000; Funke, Moustakis, and Hochschulz 2004, 338–39.

75. Corvisier 1991, 275–92; Corvisier and Suder 2000, 32.

evidence is very impressionistic, and here even the shotgun method may fail to produce a satisfactory result, but if Corvisier's calculations are, roughly, correct, the conclusion seems to be that no more than about 12 percent of the Epeirotes were settled in poleis in C4.

Until the reign of Philip II, poleis were found only in lower Makedonia,[76] and there were some Greek colonies along the coast. Upper Makedonia was settled in villages.[77] Under Philip II "Makedonia was systematically divided into self-governing cities, each with its civic territory."[78] It would, however, be overly optimistic to think that this new organization had been fully implemented when Philip died in 336, and accordingly for Makedonia a calculation of the population extrapolated from what we can guess about the population of a score of small urban centers is bound to produce a seriously misleading result, even more so than the result obtained for Epeiros. In fact, it cannot be done. Beloch assessed the population of lower Makedonia at 200,000, that of upper Makedonia at 100,000.[79] Corvisier has somewhat higher figures.[80] Both assessments are, at best, guesstimates.

The population of the colonial world too was different from the pattern in the Greek homeland. Most of the Greek colonies were small Hellenic islands separated by large stretches of land inhabited by an indigenous population. In Sicily, for example, there was a substantial inland population of Elymians, Sikanians, and Sikels in addition to the Hellenic population in the poleis, of which most were situated along the coasts. But since the purpose of this investigation is to assess the number of ancient Greeks, the indigenous population of the various

76. Hatzopoulos 1996, 464–66.
77. Hatzopoulos 1996, 81, 482.
78. Hatzopoulos 2004, 794.
79. Beloch 1886, 202–13, 506.
80. Corvisier 1991, 257–74; Corvisier and Suder 2000, 32.

regions is excluded from my calculations, except when it had been Hellenized in C4 and now lived in what had become Greek poleis. Close to half the Sicilian poleis, most of them fairly small, were in fact indigenous communities that in C4s had become sufficiently Hellenized to count as Hellenic poleis.[81] Therefore, the method I use can be applied to Sicily and to most of the other colonial regions as well: Spain, France, southern Italy, Illyria, Thrace, the Pontic, the Hellespont, Karia, Lykia, the southern coast of Asia Minor, Syria, Egypt, and Libya.[82]

So, the really problematic regions are Epeiros and Makedonia. For these my estimates are definitely much too low, and to reach the total number of Greeks—including Epeirotes and Makedonians—another half million or more have to be added to the result I have obtained.

To conclude, if we include Epeiros and Makedonia, the total population of the Greek world comes to 7.5 million, and that is a minimum figure as can be checked by applying an alternative method. For a number of individual poleis we do possess some information about the size of the population. In most cases the source is an army figure reported by a classical historian, mostly Herodotos, Thucydides, or Xenophon. Following the guidelines indicated in note 18, we can transform such a figure into a population figure and get an idea of the total number of citizens. Adding a roughly estimated number of foreigners and slaves, we reach a total that cannot be far wrong. Here again, the presumption is that the actual population approached the maximum rather than the minimum.[83] In Appendix 1 I list a number of such cases, and—except in one case—the totals are much higher than the totals reached by using the actual size of the

81. Fischer-Hansen 2002; Fischer-Hansen, Nielsen, and Ampolo 2004.

82. Hansen in *CPCInv.,* 150–53.

83. All such calculations are made on the assumption that the polis in question had deployed its entire field army. If part of the army was kept in reserve, we shall reach higher numbers.

intramural area of the poleis in question, and they are very much higher that the averages I have used to reach a total of close to 7 million (see tables 1.9 and 1.10). So a total of between 7.5 and 10 million is much more realistic than the minimum of around 7.5 million. To go further than that would probably be to aim too high with the shotgun. It is indeed worth noting that my findings support the conclusion reached by Beloch in 1922.[84]

These findings are of the utmost importance for our understanding of Greek history, so, summing up, let me repeat that to reach them I have had to make four assumptions: (1) that it is admissible to extrapolate from the 232 attested walled cities and the 636 assessed territories to the altogether 1,000 poleis that constituted the Hellenic city-state culture in C4; (2) that the percentages 50 percent versus 33 percent inhabited space inside the walls of small to midsize versus large poleis, respectively, stand up to scrutiny; (3) that the average of 150 persons per hectare inhabited space is realistic or, rather, minimalistic; and (4) that the urban population constituted around two-thirds of the total population in small poleis (200 square kilometers maximum), half in midsize poleis (200–500 square kilometers), and one-third in large poleis (more than 500 square kilometers).

Because published landscape surveys are still few and far between, the most problematic assumption is the relation between the urban and the rural populations. Most ancient historians assume that the great majority of the population was settled in the hinterland, dispersed, or in small villages and that the urban population constituted only a small fraction of the total population.[85] The Polis Centre's investigations indicate that in small and midsize poleis the majority of the population lived in the urban center and only a minority in the hinterland.[86]

84. Beloch states: "Das sind im ganzen rund 8 Millionen. In Alexanders Zeit mögen es gegen 9 Millionen gewesen sein" (1922, 308). See n. 18 supra.

85. See pp. 64–65 infra.

86. Hansen 2004, 11–16.

Now, for the sake of argument, let us accept the view advocated by many ancient historians and assume that the urban population constituted no more than 10 percent of the total population, as suggested by Peregrine Horden and Nicholas Purcell in *The Corrupting Sea: A Study of Mediterranean History* (2000, 92). In that case the population settled in the hinterland of all the poleis was more than 30 million persons, and we get a total population of 35 million ancient Greeks—provided, of course, that the other assumptions stand up to scrutiny, as I think they do. I have indeed used the shotgun method, but I think I have made generous allowances for open areas inside the walls and preferred a rather low estimate of persons per hectare of inhabited space. So the urban population may actually have been somewhat larger than the 3.5 million persons suggested above.

To have a total of 35 million ancient Greeks in C4 is out of the question. Our investigations thus show, in any case, that the degree of urbanization of ancient Greece must have been much higher than assumed by Horden and Purcell and many others. There can be little doubt that in small and midsize poleis the majority of the population lived behind the walls, but many of them were farmers who walked to their fields every morning and back again to town in the evening. They were Weberian *Ackerbürger.*[87]

Another startling result of this investigation is the distribution of this total of at least 7.5 million ancient Greeks. We claim that the typical polis, the *Normalpolis* in German terminology, had a small territory, often of less than 100 square kilometers, and a population that numbered a few thousand inhabitants altogether. That is indeed true: the Polis Centre's investigations have shown that about 80 percent of all poleis had a territory of at most 200 square kilometers.[88]

87. See Hansen 2004, 16–18.
88. *CPCInv.,* 71, 1319–27.

On the other hand, the present investigation, based on the Polis Centre's inventory, shows that these 80 percent of all poleis seem to have accommodated no more than 35 percent of the entire population.[89] Next, some 10 percent of all poleis had a territory of 200–500 square kilometers, and they seem to have accommodated about 25 percent of the entire population. Finally, some 10 percent of all poleis, around 100 altogether, had a territory of more than 500 square kilometers, and they may have accommodated about 40 percent of the entire population.

Poleis with a territory of more than 500 square kilometers had an urban center that, on average, covered close to 200 hectares with an urban population of, on average, 9,000 and a total population of around 27,000, of whom some 7,500 would be adult males.[90] In C4 there seem to have been about 100 such poleis, and about half of them seem to have had an adult male citizen population of 10,000 persons or more. So if we measure the typical polis by size of population rather than by size of territory, the conclusion is that the typical large polis either was or was close to being a *myriandros polis,* a polis with 10,000 adult male citizens.[91] Thus, the *myriandros polis* was not an exceptionally large ideal polis, it was the normal large polis that counted for, I guess, something like 5–10 percent of all poleis inhabited by about one-third of all the ancient Greeks.

As my last shot from the shotgun, I will show what happens if we break down the totals into poleis in the Greek homeland against poleis founded as colonies outside the Greek homeland plus indigenous communities in the colonial areas that by the

89. See table 1.10: 135,000 + 401,625 + 941,625 + 882,000 = 2,360,250.

90. Adults between 18 and 80 or older constituted around 57.4 percent of the total population; see Hansen 1985, 12.

91. Arist. pol. 1267b30–31 (utopian polis); *SEG* 9 1.6 (Kyrene); Diod 11.49.1–2 (Aitna); Diod. 12.59.5 (Herakleia in Oiteia). See Schaefer 1961.

late classical period had become Hellenized so that they now counted as Hellenic poleis. I shall here define the Greek homeland in C4l as being mainland Greece from Epeiros to Makedonia, the islands in the Aegean including Crete and Rhodes, plus the west coast of Asia Minor from the Troad to Ionia.[92]

On this definition of the Greek homeland, we can see that 40 percent of all poleis were colonies or Hellenized communities lying outside the Greek homeland.[93] If for the 636 poleis with a known size of territory we calculate the population following the same method as above, we get a minimum population of 4 million in the homeland versus 3 million in the colonies and Hellenized communities (see Appendix 2). But we must take into account that the colonies are underrepresented among these 636 poleis: no less than 449 (71 percent) lay in the Greek homeland, whereas 187 (29 percent) were colonies and Hellenized communities outside the Greek homeland.[94] Therefore, since the colonies were, on average, larger than the poleis in the Greek homeland,[95] it can be presumed that the colonies would count for a larger percentage of

92. Hansen in *CPCInv.,* 7, 151, and index pp. 1390–96.

93. Of the 1,035 communities listed in the inventory as poleis, 408 were colonies or Hellenized communities lying in the regions from Spain to the Adriatic (85), from Thrace to the Hellespont (220), and from Karia to Libya (103), whereas 621 were situated in the Greek homeland, namely, the regions from Epeiros to Makedonia (459), from the Troad to Ionia (105), plus the islands of Crete and Rhodos (57). The last 6 communities are unlocated.

94. For the regions from Spain to Adria we have some information about the size of the territory for 35 out of 85 poleis (45 percent). For the other regions outside the Greek homeland the figures are 107 out of 220 (49 percent; Thrace to the Hellespont) and 42 out of 103 (41 percent; Karia to Libya). For the Greek homeland the figures are 335 out of 459 (73 percent; Epeiros to Makedonia), 62 out of 105 (59 percent; the Troad to Ionia), and 52 out of 57 (91 percent; Crete and Rhodes). See Appendix 2, infra pp. 97–99.

95. There were 43 out of 408 colonies (11 percent) that had a territory size 5, whereas no more than 24 poleis in the Greek homeland out of 621 (4 percent) had a territory size 5.

the total population if we had all the evidence at our disposal.[96] Conversely, the populations of Epeiros and Makedonia are grossly underrepresented in an investigation based on walled urban centers (see pages 25–27 and Appendix 5). Thus, on balance, it seems fair to say that in C4s probably as many as 40 percent of all the ancient Greeks lived outside the Greek homeland, in colonies or Hellenized communities.

A cautious total of 7.5 million ancient Greeks and a more likely total of 8–10 million is indeed much higher than the roughly 3 million suggested by Beloch, Ruschenbusch, or Corvisier. The principal reason for the gap between the two totals is, of course, that earlier studies focused on the Greek mainland plus some islands, whereas my calculation includes all the colonial regions and, for the Greek homeland, I follow the ancient Greeks in taking the west coast of Asia Minor and the Dodecanese islands as part of Hellas. Of the 7.5 to 10 million suggested by my use of the shotgun method based on urban centers, I presume that 4.5 to 6 million people lived in the homeland as I define it.[97] If we focus on the Greek mainland

96. As can be demonstrated by a different way of calculating the population of the poleis listed in Appendix 2, one that favors the colonies at the expense of the homeland: the group Spain-Adriatic comprises 3 poleis size 1 (2,700 inhabitants; see table 1.9); 1 polis size 1–2 (2,365 inhabitants); 7 poleis size 2 (21,245 inhabitants); 6 poleis size 3 (33,090 inhabitants); 13 poleis size 4 (200,850 inhabitants); and 8 poleis size 5 (218,400 inhabitants). Thus, the population of the 38 poleis with known size of territory totals 478,650, which corresponds to a total of 1,070,660 in all the 85 poleis in this group. Similar calculations for the other 5 groups give (in rounded figures): 2,360,000 for Epeiros-Makedonia, 1,925,000 for Thrace-Hellespont, 815,000 for the Troad–Ionia, 330,000 for Crete-Rhodos, and 1,130,000 for Karia-Libya. According to this calculation the population of the colonial regions came to 4,125,000 (54 percent) as against 3,505,000 (46 percent) in the homeland. The total is 7,630,000.

97. The minimum figure of 4.5 million is the 4 million (3,942,050) calculated on the basis of the urban centers (see Appendix 2, p. 99), plus a half million in Epeiros and Makedonia where my method does not work (see Appendix 4).

including Akarnania, Thessaly, and the Ionian and Aegean islands, but excluding Epeiros and Makedonia, I get totals that are much closer to those of my predecessors. Following Beloch's 1886 calculations, Corvisier reaches a total of 2.4 million (including 460,000 for Thessaly). My total is 2.6 million,[98] but that is the minimum figure. A much more realistic figure would be 3 to 3.5 million.[99]

Thus defined, ancient Greece is almost identical with Greece as it was after the peace with Turkey in 1880; at the census conducted in 1889 the population of Greece came to 2,188,000 people. Furthermore, that was the maximum number the country could sustain. It was precisely in the 1880s that import of grain began to be a necessity.[100] It follows that the population in C4 was probably between 140 percent and 160 percent of what it was in the late nineteenth century. If it is true that land use and yields were roughly the same in the nineteenth century A.D. as they had been in the fourth century B.C., the inference is that, in the late classical period, about 1 million of the Greeks, and perhaps more, had to live on imported grain that they bought at market.

An acceptance of the demographic picture I have drawn here must lead to a rejection of the view of the ancient economy advanced by Moses Finley and still argued by his

98. On p. 98 the total for Epeiros-Makedonia is 2,699,060, but from this figure we must subtract about 100,000 (the population of Epeiros and Makedonia calculated on the basis of the [few] urban centers with their hinterland; see Appendix 5).

99. In my calculation the population of every polis with a territory of more than 500 square kilometers (size 5) is estimated at 27,300 persons (see table 1.9). That may fit poleis such as Tanagra, Kleitor, Messene, Chalkis, Eretria, and Histiaia/Oreos, but it is much too small a figure for Korkyra, Thebes, Corinth, Megalopolis, Argos, and Athens. There is no attestation of a polis size 5 for which the population can be assumed to have been smaller than 27,300. See also Appendix 1.

100. Sallares 1991, 75.

followers. This "new orthodoxy," as it has been called, was aptly summarized in 1983 by Keith Hopkins:

> The new orthodoxy stresses the cellular self-sufficiency of the ancient economy; each farm, each district, each region grew and made nearly all that it needed. The main basis of wealth was agriculture. The vast majority of the population in most areas of the ancient world was primarily occupied with growing food. To be sure there were exceptions (such as classical Athens and the city of Rome), but they were exceptions and should be treated as such. Most small towns were the residence of local large-landowners, centers of government and of religious cult; they also provided market-places for the exchange of local produce and a convenient location for local craftsmen making goods predominantly for local consumption. The scale of inter-regional trade was very small. Overland transport was too expensive, except for the cartage of luxury goods. And even by sea, trade constituted only a very small proportion of gross product.[101]

My estimate of the size of the population of classical Greece entails that long-distance trade in grain must have been of vital importance not only to Athens but also to a large number of poleis. Much of this grain came from the colonies. The ancient economy may to a large extent have been an agrarian economy. I do not doubt that, but it was certainly not a subsistence economy.[102] This basic view makes it much easier to understand how the Greek polis world could maintain its coherence throughout antiquity, and why so many poleis had so many free foreigners among their inhabitants.

101. Hopkins 1983, xi.
102. Hansen 2004.

II

The Population of Walled Poleis

To use the intramural area of a walled city as a means to calculate the urban population presupposes that one can come up with satisfactory answers to three questions: How much of the intramural space was used for habitation? What was the average number of houses per hectare? How big was the average household?

As always, the evidence at our disposal is inadequate. Not one single Greek polis has been excavated in its entirety.[1] Therefore, the first two questions cannot be answered precisely in any single case. As to the third question, there is not one single Greek city for which a family reconstitution can be conducted in the way it has been done for a number of early modern European cities.[2] Finally, in addition to the members of the family, the ancient Greek household might include one or more slaves, and whether the average household had at least one slave is still a hotly debated question.

1. Morgan and Coulton 1997, 87. Olynthos is still "the single settlement which is the source of our most extensive and detailed information about Greek houses" (Nevett, 1999 53; see also Cahill 2002). The most important and impressive surveys of the evidence we have for ancient Greek urbanization are Hoepfner and Schwandner 1994; and Hoepfner 1999, 123–608.

2. Hollingsworth 1969, 181–95; Imhof 1977, 97–112.

But we still have the shotgun method: in some cases a large part of a city has been excavated so that we can assess the extent of the area used for habitation and conjecture the total number of houses as well. Obvious examples are Olynthos and Priene. And by using the few well-excavated cities as models, we can suggest rough estimates for cities that have been sporadically excavated or just surveyed. Again, by combining computer-generated demographic models with what we know about the ancient Greek family and household we can suggest a minimum and a maximum average size of family and household.

Another problem is that both regional and chronological variations must be taken into account. Small but densely settled poleis dominated in Phokis and Lokris, whereas hypertrophic cities with large open areas inside the walls were found in Epeiros and Akarnania.[3] In many colonies the first settlers lived in small huts, whereas larger and larger houses are found during the classical and Hellenistic periods.[4] Also, the average size of a family was different in periods of population growth from what it was in periods of decline. And the average size of households varied from polis to polis in accordance with the size of the slave

3. Kirsten 1956, 57–60; Winter 1971, 111–15; Martin 1974, 37, 194–95; Muggia 1997, 14.

4. The earliest houses in Megara Hyblaia are very simple, and some of them cover 10 square meters or less (De Angelis 2003, 17–39). Similar houses are found in Syracuse, but the density of population is higher (Fischer-Hansen 1996, 335). In Akragas the earliest houses (Marconi 1929, 42–44, figs. 17–19) seem to have covered around 200 square meters each (Hoepfner and Schwandner 1994, 6), but in the Hellenistic period there were also impressive mansions each covering an area of more than 1,000 square meters (Hoepfner and Schwandner 1994, 5). In the Pontic regions the first settlers lived in dugouts, and the beginning of stone architecture dates from the third quarter of C6 (Tsetskhladze 1997, 46–47). Ian Morris (2005, 107–10) has built a database of ancient Greek houses. It comprises some 300 examples and covers the period of roughly 800–300 B.C. It shows that the average house (median) had a floorage of 51 square meters in C8, 67 square meters in C6, 106 square meters in C5, and 240 square meters in C4.

population.[5] It is my aim in this study to cover the entire Greek world but to focus on C4 and thereby to eliminate or at least reduce some of the variables. The clearest account is obtained by addressing the three questions one by one, and I shall begin with the proportion of intramural space used for habitation.

The Percentage of Intramural Space Used for Habitation

The area enclosed by the walls was divided into public space and private space. Public space was space owned by the polis, and it included sacred space used for sanctuaries.[6] Instead of a dichotomy into public and private space, some sources prefer a tripartition into sacred, public, and private spaces, thus subdividing the space owned by the polis into sacred and secular spaces.[7]

Public space was the space used for walls, streets, marketplace, harbor, and sanctuaries, as well as secular public buildings such as *bouleuterion, prytaneion, archeia,* stoas, and the like.[8] In the archaic and classical periods *gymnasia, stadia,* and hippodromes were usually situated outside the walls.[9] The total extent of public space can be roughly estimated for a few poleis whose intramural area has been thoroughly investigated, such as Thasos, Olynthos, and Priene.[10] There are indeed variations,

5. Gallant 1991, 30–33; see 54 and 56 infra.

6. Martin 1983; Lewis 1990; Lalonde et al. 1991, 149–51; Hansen 1997a, 13.

7. *IG* V.2 6A.37–42 (Tegea); Arist. pol. 1267b33–34 (Hippodamos's utopian polis). Alternatively, a primary distinction between private and public space is supplemented with a subdivision of public space into sacred and profane (see Arist. pol. 1330a9–16; and Hansen 1997a, 13).

8. Müller-Wiener 1988, 138–75; Hansen and Fischer-Hansen 1994; Hansen 1997a, 12–17; Hölscher 1998; *CPCInv.,* 138–43.

9. Aen. Tact. 23.6; *I.Cret.* IV 64 (Gortyn); Heraclid. Cret. 1 (Athen); Xen. *Hell.* 3.2.27 (Elis); Xen. *Hell.* 5.2.25 (Theben). The sports centers were probably situated outside the walls in Olynthos (Hoepfner and Schwandner 1994, 79–80), but inside the walls in Priene (200).

10. Thasos: Grandjean and Salviat 2000; Priene: Hoepfner and Schwandner

but in every case it is only a small part of the area that was made public and used for public monuments.

In addition to the public space used for streets, squares, sanctuaries, and other public buildings, however, there was in many cities a sometimes sizable empty space held free of habitation. The extent and purpose of this open space are of crucial importance for any attempt to use the size of urban centers as a basis for calculations of the size of ancient populations. Since the space is empty it has not attracted much attention among archaeologists. One notable exception is Anna Muggia who has devoted a whole monograph to the problem.[11] Of ancient historians it is mostly those interested in military history who have studied the phenomenon.[12] In calculations of urban populations the empty space has been taken into account in studies of individual poleis,[13] but so far, apart from Muggia's monograph, there has been no comparative study focused on the demographic aspect of the problem. What I can do here is to give a preliminary overview of what in future I hope to address in more detail.

First, we must ask why the ancient Greeks took the trouble to build walls that were much longer than necessary to protect the urban center itself. Historians have suggested two different explanations, one focusing on military architecture and one emphasizing logistic considerations as well. Many poleis were situated on a slope or on the top of an eminence. In such cases,

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1994, 199–208; Olynthos: Hoepfner and Schwandner 1994, 78–82; Cahill 2002, 32–33. As stated above, however, not one single polis has been excavated in its entirety.

11. Muggia 1997. Muggia discusses and develops an idea suggested by Nenci (1979, 465–66). For the open intramural space Nenci coined the term *zona di rispetto* (466), which Muggia changed into *area di rispetto* (13, 124), abbreviated *A.d.R.* (125).

12. Winter 1971, 111–14; Garlan 1974, 82; Martin 1974, 192–94; Hanson 1983, 67.

13. For example, Athens (Travlos 1960, 71); Kyrene (Laronde 1999, 82); and Syracuse (Drögemüller 1969, 96–114).

"natural features were employed wherever possible to reinforce the defensive line, even if this meant including large tracts that would never be occupied by buildings. The approaches to the walls were thus so difficult that a very few defenders would suffice in any given sector."[14] The open areas inside the walls served no purpose, and they were avoided if the walls could conveniently be built closer to the habitation area. The circuit followed the contours of the landscape, and if the area enclosed by the walls included uninhabitable areas, such parts had to be left open. Kassopa in Epeiros and Priene in Ionia are typical examples.[15] This explanation is typically adduced by students of military architecture.

But many cities built in the plain or on a plateau had large open areas inside the wall just like those situated on the top of a hill or the slope of a mountain; in such cases, the circuit did not become easier to defend if built farther away from the urban center. On the contrary, larger forces were required to defend the much longer wall. Typical examples are Thebes in Boiotia[16] and Megalopolis in Arkadia.[17] But the open area could be used for cultivation or public monuments or for temporary human habitation—and was sometimes used for permanent habitation in later phases when the population of the city had grown. In such poleis the open intramural area was intentionally included and must have served some specific purpose. According to whether the open area was meant to serve the rural or the urban population there are two alternative theories about what this purpose was.

14. Winter 1971, 113. In other cases the walls enclosed marshy lowlands that again had to be left uninhabited. One example is Koresia on Keos (Cherry, Davis, and Mantzourani 1991, 78).

15. Kassopa: (Hoepfner and Schwandner 1994, 120–23); Priene: (201 with figs. 183 and 216).

16. Symeonoglou 1985, 117–22.

17. Nielsen 2002, 574.

When a polis was invaded by a hostile army the rural population had to be moved from the countryside into the urban center and, during the invasion, to be accommodated behind the walls. The best-known case is Athens during the Peloponnesian War as described by Thucydides at 2.17.1.[18] If this was the principal purpose of the open area, poleis with a large rural population can be expected to have had a large intramural area to serve as a refuge during a war, whereas in small poleis the great majority of the population was settled in the urban center so there was no need for a large open space inside the walls to serve as refuge for the relatively small part of the population settled in the hinterland.[19] Megalopolis may serve as an example of the first type, Plataiai of the second.[20]

The other explanation is that in a war and in particular during a siege, the population settled in the urban center needed supplies, not only fresh water but also food. If open land inside the walls was available, some of the necessary supplies could be produced even during a siege. In the intramural space grain could be grown and sheep and cattle herded. Phleious is an example: Xenophon tells us that the acropolis was mostly uninhabited and used for growing grain (*Hell.* 7.2.8). If this was the main purpose, even fairly small poleis might have wanted to have an *area di rispetto.*

To these two explanations of the *area di rispetto* a third can be added: when a new wall was built around a polis it could be taken into account that the city would continue to grow and that therefore a piece of open land had to be included and set aside for future habitation. This seems to be what happened in

18. Alternatively, a large open space behind the walls could be used to accommodate an allied army (see Xen. *An.* 7.1.24 [Byzantion]; and Xen. *Hell.* 7.5.8 [Tegea]).

19. This is the theory and typology suggested by Nenci (1979, 465–66) and further investigated by Muggia (1997, 16–21, passim).

20. For Plataiai, see Hansen 2004, 15.

Rhodos in C4l. The southern part of the intramural area was open space in C4, where north-south-going parallel streets had been constructed but not the east-west-going part of the street system. Transverse streets and habitation appear not earlier than in C3, after the siege of 305.[21]

As is apparent, the explanations outlined above are different but not necessarily mutually exclusive. Furthermore, in an investigation focused on the size of urban populations the specific purpose of having an open space behind the circuit does not matter. The important problem is, in each case, to know the *extent* of the open space in order to be able to assess the extent of the remaining space that was used for habitation. This information can be obtained only for cities that have been extensively excavated or at least surveyed. And they are few and far between.

Muggia's investigation is based on fifteen poleis, namely, thirteen colonies in Italy and Sicily supplemented, for comparison, with one colony from the Black Sea region (Chersonesos) and one polis from the Greek homeland (Halieis). Some of these poleis must be struck off the list because there is no solid evidence, and the figures reported by Muggia are guesswork based on analogies with better-known cities.[22] However, other examples can be adduced instead, and I bring here a list of twenty-nine poleis. Some of these cities have been carefully investigated; for others, the estimated habitation space is at least a qualified guess based on scattered investigation of small parts of the intramural space. The cities are listed according to

21. Filimonos 1989; Hoepfner 1999, 398–99.

22. What Muggia states about Chersonesos (1997, 108–10) is based on Chtcheglov (1992, 29–30), a vague description based on a priori assumptions, not on solid evidence. For a much more solid recent account, see Bujskikh and Zolotarev (2002), who refrain from calculating the extent of the habitation area. For Gela (75–76) it is simply impossible to calculate the *area di rispetto* since the northern and central part of Gela is covered by the modern city. In Herakleia Minoa the habitation quarters are late Hellenistic and Roman, and we cannot assess the extent of the town in the classical period (see De Miro 1980, 716–21).

descending percentage of intramural space used for habitation. The first numeral indicates the total intramural space; the second indicates the assessed habitation area (in hectares).[23]

TABLE 2.1

Dystos	5–5?	90–100?[24]
Horraon	5.5–5.5?	90–100?[25]
Olynthos	35–31?	89[26]
Halieis	18–15	83[27]
Hermion	22.5–17	76[28]
Himera	32–24+	75–90[29]
Kasmenai	60–45+	75+[30]
Kerkinitis	5.3–3.7	70[31]
Korkyra	115–65	57[32]
Athens	215–120	56[33]
Poseidonia	125–70	56[34]
Herakleia	140–78	56[35]
Akragas	450–250	55[36]
Pyxous	11–6	55[37]
Neapolis	72–38	53[38]
Halikarnassos	198–100	50[39]
Hipponion	80–40	50[40]
Tanagra	30–15	50[41]
Selinous	100–50	50[42]
Kamarina	150–72	48[43]
Kassopa	31–16	48[44]
Kroton	620–270	44[45]
Megara Hyblaia	61–25	41[46]
Priene	37–15	41[47]
Sybaris	515?–200?	39[48]
Peiraieus	300–115	38[49]
Kyrene	750–250	33[50]
Taras	530–150?	28[51]
Syrakousai	1,600–325	20[52]

23. I would like to thank Tobias Fischer-Hansen for valuable information about the percentage of the intramural area used for habitation in some of the Sicilian cities.

24. Hoepfner 1999, 353–67: traces of houses all over the town.

25. Hoepfner 1999, 386–89: traces of houses all over the town.

26. According to the reconstruction by Hoepfner and Schwandner 1994, 71–94. With figure 55, the settlement on the South Hill covered 7 hectares, that on the North and East Spur Hills covered 29 hectares, and the (unfortified) *proasteion* on the east side covered approximately 13–14 hectares minimum. According to Cahill (2002, 30–32), the settlement on the South Hill covered 7 hectares, that on the North and East Spur Hills covered 28 hectares, and the Villa Section (the *proasteion*) covered 16 hectares minimum. According to both reconstructions, very little space was taken up by public buildings or left as open areas (see Cahill 2002, 32–33). By and large, Cahill seems to be in agreement with Hoepfner and Schwandner (fig. 55) who indicate a total public space of about 4 hectares. There is no evidence that the Villa Section became included in the walled area. I follow Hoepfner and Schwandner in believing that it was a proper *proasteion* (see p. 46 infra). So I suggest a total intramural area of 35 hectares (7 hectares + 28 hectares) of which 4 hectares were kept free of habitation.

The number of houses is another debated issue. Hoepfner and Schwandner (1994, 72) assume that a total of 500 new houses were built on the North Hill, but their reconstruction in figure 55 has 600 houses—595 to be precise. Cahill, too, estimates a total of 500 new houses (309–10n50) occupying around 24 hectares (21 houses per hectare including not only streets, but also the broader avenues and some open spaces near the walls).

27. Jameson, Runnals, and van Andel 1994, 549–51.

28. Jameson, Runnels and van Andel 1994, 549–51.

29. Himera (*CPCInv.,* no. 24) consisted of an upper city on the plateau (about 32 hectares) and a lower city north of the plateau (around 50 hectares). Muggia (1997, 86) wants to include the Piano del Tamburino west of the plateau, but there is no evidence of habitation here. The plateau was protected by a stone and earth rampart to the south, and to the north there was a mud-brick wall of, perhaps, C5e. If we want to assess the *area di rispetto* in Himera we must focus on the upper city enclosed by the rampart and the mud-brick wall. In this context the lower city is better seen as a large *proasteion,* like the one found outside the walls of Olynthos (supra n. 26). Excavations on the plateau have revealed that almost all the northern and central parts were used for habitation, that is, about three-quarters of the "intramural" area. There was a sanctuary of Athena to the northeast and perhaps an agora to the north covering about 3 hectares altogether. It is not yet known whether a large part of the southern tip was held free of habitation. Thus, the built-up area covered at least 75 percent and perhaps more than 90 percent of the plateau, and some 5–20 percent were left for an *area di rispetto* in the southern part of the city (see Allegro 1999, 276).

30. Di Vita 1990, 350.

31. Kutajsov 1990, 125, 140.

32. Spetsieri-Choremi 1997, 2, and information from Kalliopi Baika.

At the one end of the spectrum is Syracuse with a built-up area of just 20 percent of the intramural space and an enormous open space stretching westward to Epipolai. At the other end of the spectrum are cities like Olynthos, which did not have much free space inside the circuit and very few public buildings and open spaces.[53] On the contrary, a sizable grid-planned suburb

33. Travlos 1960, 71.

34. According to Muggia (1997, 94, 115), the intramural area covered 122 hectares of which 48 were used for habitation. New investigations indicate that the figures were 125 and 70, respectively (see Fischer-Hansen in *CPCInv.,* no. 66, p. 288).

35. Muggia 1997, 106.

36. In Akragas the walls enclosed 450 hectares and—including space for sanctuaries and agora and the like—the habitation area seems to have covered some 255 hectares in the Hellenistic period (De Miro 1988, Tav. XIX). On the assumption that it had the same extent in the classical period, the built-up area comes to some 55 percent of the intramural area. Muggia (1997, 99) conjectures only 170 hectares, which probably is too pessimistic an assessment.

37. *CPCInv.,* no. 67, p. 290.

38. Muggia 1997, 103–04 (38 hectares used for habitation, acropolis of 8 hectares held free of habitation).

39. Letter from Poul Pedersen. There is no evidence for the 145 hectares "Bauland" assumed by Hoepfner 1999, 318.

40. Aumüller 1994, 248, fig. 1.

41. Roller 1987, 222–23.

42. De Angelis 2003, 141–43, 149.

43. Muggia 1997, 97.

44. Hoepfner and Schwandner 1994, 120–21 (excluding the southwest extension). Fig. 96 indicates that agora and public buildings take up about 1.5 hectares.

45. Muggia 1997, 65.

46. De Angelis 2003, 33, 38.

47. Hoepfner and Schwandner 1994, 190, 208–9. Fig. 179 indicates that agora and public buildings take up around 3 hectares.

48. Muggia 1997, 61.

49. Hoepfner and Schwandner 1994, 22–50.

50. Laronde 1999, 82.

51. Muggia 1997, 71.

52. Muggia 1997, 58 with n. 10. The 325 hectares constitute the maximum habitation area in the late classical and Hellenistic periods (Drögemüller 1969, 113–14).

53. Nevett 1999, 55; Cahill 2002, 32–33.

was built just south of the wall for all the inhabitants who could not be accommodated inside the walls. The median is 50 percent and the mean 56 percent, but as usual means are deceptive and the cities must be organized into different groups according to size and location. The largest cities had the proportionally largest open areas inside the walls, whereas midsize and small poleis usually had a smaller open area or no open area at all. Furthermore, there are regional differences: the large open area, the *area di rispetto* as it has been called, is common in the colonies and especially in the western colonies. In the Greek homeland the large poleis with large open areas are those synoecised in the late classical and early Hellenistic periods (Megalopolis, Messene, and Demetrias) and those in western Greece that grew up rather late (Oiniadai and Stratos).

The opposite of having an open area inside the walls was to have a suburb outside the walls. The Greek term is *proasteion,* a word that originally denoted an open space,[54] but later a suburban habitation,[55] sometimes of considerable size. Suburbs are attested archaeologically in Gela and Himera on Sicily,[56] in Psophis in Arkadia,[57] in Taurian Chersonesos,[58] and, above all, in Olynthos.[59] Literary and epigraphical references to *proasteia* (in the sense of suburb) concern the following poleis: Apollonia (Xen. *Hell.* 5.3.1); Athens (Thuc. 2.34.5; Isoc. 16.13); Eleusis (*IG* II^2 1191.19–20); Hyampolis (Xen. *Hell.* 6.4.27); Megara (Thuc. 4.69.2); Mykonos (*Syll.*^{3} 1215.25–28);[60] Naupaktos (Thuc.

54. The open space seems, at least once, to have been inside the circuit, so that προάστιον is used to denote the *area di rispetto;* compare Herodotos's description of the siege of Samos at 3.54.1 and Audring's interpretation (1989, 21).

55. Audring 1989, 15.

56. Gela: Fiorentina 1994, 731; Himera, *città bassa:* Allegro 1999, 274.

57. *CPCInv.,* no. 294, p. 529.

58. C4s–C3, Muggia, 109.

59. Hoepfner and Schwandner 1994, 92, but see supra n. 26.

60. C3–C2. τὴν οἰκίαν τὴν ἐμ προαστίωι.

3.102.2); Skione (Thuc. 4.130.1); Tanagra (Schwyzer 462A7);[61] and Torone (Thuc. 5.2.4).

In the case of Olynthos, there is no doubt that the suburb was built because there was no free space left inside the walls and that the growing urban population had to be accommodated in a *proasteion.* The suburb of Olynthos was grid planned like the city itself, and according to the reconstruction suggested by Wolfram Hoepfner and Ernst-Ludwig Schwandner it comprised at least 250 houses.[62] In the other cases too, the existence of a *proasteion* is an indication that there was no more free space left for habitation inside the walls, but it does not preclude the existence of an *area di rispetto.* Athens had *proasteia* outside the walls, suburbs set on fire by the democrats in Peiraieus during the civil war in 404/3 (Isoc. 16.13), but we know that in C4m there were still large open areas inside the walls of Athens (Xen. *Vect.* 2.6) as there had been a century before (Thuc. 2.16.1). This *area di rispetto* must have been public space, deliberately kept free, so that no houses could be built except by special permission.

At present it is difficult to say more about *proasteia.* The population of a *proasteion* ought to be included in any estimate of the urban population of a polis. A large number of poleis may have had habitation in suburbs in addition to habitation behind the walls, but the available evidence is too scarce to take into account in a shotgun estimate of the urban population of Greek poleis.

Thus, disregarding possible *proasteia,* I shall adopt the following method: for very small poleis (of 10 hectares maximum), the presumption is that, on average, the habitation area constituted around two-thirds of the intramural space; for small and midsize poleis (10–150 hectares), about half the intramural space was for domestic use. But for the very large cities, that is,

61. προϝαστίδας of προϝαστίς is translated "resident in a suburb" by *LSJ* s.v. For a different interpretation of "sublime" ? [*sic*], see Roller 1989, no. 87, pp. 100, 103. For the date of the inscription, see Vottero 2001, 33.

62. Hoepfner and Schwandner 1994, 72.

poleis with circuits enclosing more than 150 hectares, we have to assume that two-thirds of the intramural space was taken up by the *area di rispetto* and only one-third used for habitation.[63]

The Average Number of Houses per Hectare

The second issue concerns the size of the houses and how densely they were built. In the archaic and classical poleis houses were, by and large, of moderate size, and mansions or palaces—public as well as private—belong in the Hellenistic period.[64] In grid-planned poleis in particular the houses seem to have had the same dimensions and lay wall to wall. Larger houses emerged only in the course of time and sometimes by uniting two adjacent houses.[65] Gardens were placed outside the city wall, and there is no evidence of town houses separated by gardens.[66] Workshops were normally part of habitation, and the close-knit

63. I admit that drawing the line between an *area di rispetto* of 50 percent and 67 percent at 150 hectares sometimes leads to implausible results. For instance, Mantinea had an intramural area of 124 hectares corresponding to a built-up area of 62 hectares and a population of about 9,300 people (62 x 150). Kamarina had an intramural area of 150 hectares corresponding to a built-up area of 50 hectares and a population of approximately 7,500 people (50 x 150). But, using the shotgun method, such occasional discrepancies are unavoidable, and they occur in all similar calculations (see, for example, Jameson, Runnels, and van Andel 1994, 249, 549–50, who assume that a settlement of 4 hectares counts as a village and has a population of 4 x 125 = 500 persons, whereas one of 5 hectares counts as a town and has a population of 5 x 250 = 1,250 persons).

64. Walter-Karydi 1998. In C4 Rhodos there may have been a quarter with only three houses per insula, each covering an area of about 415 square meters (Hoepfner 1999, 304).

65. Olynthos is a typical example; see Hoepfner and Schwandner 1994, 108–10; and Nevett 1999, 75.

66. Hoepfner and Schwandner 1994, 94; Carroll-Spillecke 1989, 40–42. As an exception Carroll-Spillecke mentions that Dikaiogenes had a garden lying next to his house ἐν ἄστει (Isae. 5.11) but later in the speech (5.26) we are told that this garden was in Kerameikos, and thus—presumably—outside the city wall.

mixture of habitation and workshops characterizes Greek cities, as shown in numerous urban excavations as well as in epigraphic and literary sources.[67] Many shops and booths were apparently placed in the agora or in the harbor. They took up public space rather than private space and were rented from the polis.[68]

Thus, there are two principal variables to take into account: How big were the houses used for habitation? And how much space was taken up by streets between the houses? In discussing the first issue, here again both chronological and regional variations must be taken into account. Archaic houses were smaller than classical houses, and classical houses were smaller than Hellenistic houses.[69] Furthermore, in the archaic period the homes of the first colonists, for example, were very small and built of cheap materials.[70] Often they were huts or dugouts rather than proper houses.[71] In the Greek homeland, too, houses came in different sizes and were of different types. In C6 Miletos in Ionia must have looked radically different from its colony Pantikapaion on the Crimea. But when we get down to C4 many of these differences had faded away. In the colonies as well as in the homeland the typical home was now a rectangular, sometimes almost quadrangular, house of the *prostas* or *pastas* type, occasionally with a full peristyle.[72] The grid-planned city had become common all over the Greek world. The houses were of equal size and arranged in blocks of six to twelve to the *insula*.[73]

67. Fischer-Hansen 2000, 91–92; Zimmer 1999 in Hoepfner 1999, 561–75.

68. Wycherley 1957, no. 615 = *IG* II^2 1013.9, C2l.

69. Kiderlen 1995, 43–95; Walter-Karydi 1998, 5–25. The earlier houses in Akragas seem, on average, to have covered about 204 square meters, whereas many Hellenistic houses were built on plots of more than 1,000 square meters (Hoepfner and Schwandner 1994, 5–6).

70. For example, in Megara Hyblaia, see De Angelis 2003, 17–39.

71. Tsetskhladze 1997, 46–49 (Olbia); Marconi 1929, 41–43, figs. 17–19 (Akragas).

72. Nevett 1999, 21–29.

73. Hoepfner and Schwandner 1994.

For the late classical period it is not misleading to apply the shotgun method in order to calculate the average size of a Greek house or, rather, to suggest a maximum and a minimum size of a typical house. The houses I list below are, I believe, representative, and they are here grouped according to size (in square meters) and listed in ascending order:

TABLE 2.2

Olbia	80–120 (Vinogradov and Kryzickij 1995, 35)
Kerkinitis	85–130 (small irregular) (Kutajsov 1990, 111)
Kolophon	100–200 (small irregular) (Hoepfner 1999, 285–90)
Sybaris	136 (Muggia 1997, 60)
Kasmenai	156 (Hoepfner and Schwandner 1994, 9)
Athens	about >100–<200[74]
Halieis	about 175 (Jameson 1994, 549)
Chersonesos	156–159 (Bujskikh and Zolotarev 2002)[75]
Thasos	125 (one house); 200 (two houses) (Nevett 1999, 91–94)
Herakleia	200 maximum (inference from Muggia 1997, 106)
Abdera	200 (Hoepfner and Schwandner 1994, 185; Hoepfner 1999, 334)
Kamarina	204 (Muggia 1997, 97)
Priene	207 (Hoepfner and Schwandner 1994, 208–11)
Metapontion	215 (Carter 1990, 406n2)[76]
Selinous	220 (De Angelis 2003, 148–49)
Kassopa	225 (Hoepfner and Schwandner 1994, 146)
Taras	238? (Muggia 1997, 71)
Peiraieus	240 (Hoepfner and Schwandner 1994, 30; Hoepfner 1999, 218)
Himera	256 (Hoepfner and Schwandner 1994, 16; Hoepfner 1999, 202)
Miletos	260 (Hoepfner and Schwandner 1994, 21)
Horraon	270 (Hoepfner 1999, 389)
Kroton	289 (Muggia 1997, 64)
Olynthos	294 (Hoepfner 1999, 266)

74. An excavated block of six houses at the north foot of the Akropolis covers 550 square meters. The two smallest houses have areas of 50 and 70 square meters. The average is 92 square meters. Three houses from the Areopagos

In Olynthos the houses are exceptionally large, those in Kolophon and Olbia exceptionally small. If we want to apply an average size to poleis for which we have no precise information we cannot go far wrong if we assume a range from 175 to 250 square meters.[77]

The remaining problem is to investigate the habitation density, and here we must distinguish between on the one hand the older type of city with crooked irregular streets and no town plan and on the other hand the grid-planned polis with uniform houses organized into blocks of, mostly, six to twelve houses each. For the first type we have no evidence at all, not even from the best known of all cities, namely, Olynthos: the irregular and randomly placed houses of C5f in the southern part of the city were apparently smaller than the C5–C4 terrace houses in the grid-planned part of the city.[78] In the old city Hoepfner and Schwandner assume a total of about 100 houses in an area of roughly 5 hectares.[79] But that is no more than a guess, and a rather pessimistic one at that. For partially or fully

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cover 150, 425, and 225 square meters. Two houses near the Great Drain have areas of 225 and 130 square meters (Nevett 1999, 86–91).

75. Some houses were four times as large and covered ca. 600 square meters (Bujskikh and Zolotarev 2002, 282).

76. Muggia (1997, 90) assumes 323 square meters.

77. According to Morris (2005, 108; see supra n. 4), houses built around 450 had an average floorage of 100 square meters, houses built a hundred years later had one of 240 square meters. The focus of my investigation is C4m, but many houses built in C5 were still in use and an average floorage of 240 square meters is to be expected only in cities founded or completely rebuilt in C4.

78. Hoepfner and Schwandner 1994, 74–76; Cahill 2002, 27, 34, 38.

79. Hoepfner and Schwandner 1994, 72: 500 houses in the "Neustadt" and a total of 6,000 inhabitants. Since the authors assume an average of 10 persons per household, they must assume that there were approximately 100 houses in the "Altstadt." Cahill (2002, 38) estimates a built-up area of 7 hectares and a density of 150 persons per hectare, equaling a total population of 1,050 persons. With an average of 5.5 persons per house (308–9n43) the result is a total of 190 houses.

planned poleis the evidence is somewhat better, and the principal sites are as follows:

Table 2.3

Halieis	244 houses on 4.9 hectares = 50 houses per hectare
Himera	8 houses on 0.24 hectare = 33 houses per hectare[80]
Peiraieus	8 houses on 0.24 hectare = 33 houses per hectare
Priene	480 houses on 15 hectares = 32 houses per hectare
Megara Hyblaia	55 houses on 1.75 hectares = 31 houses per hectare
Kassopa	500 houses on 16 hectares = 31 houses per hectare
Olynthos (new city)	10 houses on 0.38 hectare = 26 houses per hectare[81]

In addition to the houses we must calculate the space used for streets between the houses, and here again all the evidence we have concerns grid-planned cities. In Olynthos, 26 houses per hectare take up 7,644 square meters. In Kassopa, 31 houses per hectare take up 6,975 square meters. And in Priene, 32 houses per hectare take up 6,624 square meters. The houses seem to take up about two-thirds of the built-up area, leaving around one-third to streets between the houses. If we adopt two to one as an average relation between houses and open space between houses, we get 38 houses per hectare if the average house covers 175 square meters, 33 houses per hectare if the average house covers 200 square meters, and 27 houses per hectare if the average house covers 250 square meters. In this preliminary investigation I shall have to narrow the field and assume an average of 30–33 houses per hectare, including streets but excluding public buildings and open spaces.

80. An insula of 8 houses takes up 37 x 66 meters (inclusive of streets) = 2,440 square meters = 32 houses per hectare.

81. Cahill 2002, 308–9n43.

The Average Size of a Household

The "atom" of the polis in the political sense was the citizen (polites), but as a social organization the basic unit of the polis was the household. Each house (οἰκία) was the home of a household (οἶκος). The connection between house and household was so strong that both terms could be used in the other sense, that is, οἰκία in the sense of household and οἶκος in the sense of house. Only the neuter form, οἰκίον, invariably denotes the building and never the household. But who belonged to an ancient Greek household, and how big was it? Without any serious discussion of this crucial problem it is taken for granted in almost all archaeological surveys that the average *oikos* had five members: a married couple, two children, and an extra hand, usually a slave.[82] There are, however, alternatives: F. De Angelis prefers an average of only four,[83] whereas Stephen Hodkinson and Hilary Hodkinson opt for an average of five to seven.[84] Wolfram Hoepfner and Ernst-Ludwig Schwandner believe that a normal Greek *oikos* had no less than ten members.[85] In 1997 I suggested seven or eight as the factor to be used when we calculate the population of a polis on the basis of the number of houses enclosed by the walls.[86] As usual, an average is a

82. Household of 5: Cherry, Davis, and Mantzourani 1991, 237, 337 (4 plus a slave); Jameson, Runnels, and van Andel 1994, 549–50; Osborne 1996, 68 (life cycle of family with, on average, 4.5 members); Catling 2002, 206 ("family," 5 people per farmstead); Bintliff and Snodgrass 1985, 142 (4 plus one slave); Osborne 2004, 167–68, 170 (5 persons per household referred to as an unsubstantiated assumption).

83. De Angelis 2003, 41, 149. De Angelis points out, however, that "different results would be obtained simply by adding one or two more members to each household" (149).

84. Hodkinson and Hodkinson 1981, 286 (household size of 4–5, plus 1–2 slaves).

85. Hoepfner and Schwandner 1994, 190, with n. 434; Muggia 1997, 42, 63, 64 et alibi; Hoepfner 1999, 150 et alibi.

86. Hansen 1997a, 74n154. As will be apparent from the following sections, I now think that eight is aiming too high. Seven might perhaps be right, but,

dangerous tool and must be used with due caution. A number of factors are involved, and they must be discussed before we settle for one of the numbers or for a range that will provide us with minima and maxima rather than a simple total.

First, a household is a social unit whose composition and size are subject to constant change. Its life cycle lasts one generation. Its core is a married couple who, in a stationary population, must have two children who survive to adult age, get married, and produce the next generation. For shorter periods the household may comprise other family members too, and the working force of the family may be supplemented with "one or more extra hands," in ancient society typically of servile status.

In Greek history it is Tom Gallant who first incorporated the life cycle of the household into his calculation of the size of the average *oikos*.[87] He subdivides a generation of twenty-four years into eight periods of three years each and shows illuminatingly how the household grows and dwindles again in the course of its life cycle. During the first two or three triennia a surviving parent may live with the married couple; during the last the household may be reduced to a widow and, for example, two sons, one already of age, the other still a minor.[88] Gallant is well aware that this rough model allows for numerous variations. He refers to several attested examples of larger kin groups and stresses that just over four persons represents the minimum number of individuals per household.[89]

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to be on the safe side, I prefer in this study to assume an average size of the Greek household of five to six.

87. Gallant 1991, 11–33.

88. Gallant 1991, 27–30.

89. Gallant 1991, 23–24 cites Peter Laslett for the view "that all of the 35 groups drawn from many parts of the world had mean household sizes of between 4 and 5." Gallant then discusses the careful studies of the Greek written sources conducted by Raepset 1973, Wevers 1969, Isager 1981–82, and Gould 1980, and concludes that "if we paint the "missing women" into the picture, then the average number of corresident kin in Greek households starts to approach the upper end of Laslett's scale." And to these we must add the nonkin members of the household.

In addition to collaterals and other coresident kinfolk—not taken into account in the model—there were coresident nonkin and "for the Greek world this means primarily slaves."[90] In his balanced treatment of this topic Gallant steers a middle course between the maximalists, represented by M. H. Jameson (1977–1978), and the minimalists, represented by E. M. Wood (1983).

I find Gallant's study extremely valuable but would like to suggest some modifications. First, a generation of twenty-four years is too short. In almost all societies the average length of a female generation is twenty-nine years.[91] The length of a male generation is more flexible and is difficult to establish historically.[92] The best evidence we possess is probably David Henige's comparative study of 660 pedigrees from all continents and all ages, and it testifies to an average ranging from twenty-six to thirty-two years.[93] An examination of the two Spartan royal houses from the late archaic until the Hellenistic periods shows that the average length of a generation was thirty-two years in the Agiad dynasty and twenty-eight in the Eurypontid dynasty.[94] In I. Kirchner's *Prosopographia Attica* all the stemmata are reconstructed on the assumption that a generation was thirty-three years.[95] Since very few Athenian pedigrees cover more than four generations, three generations to a century works reasonably well as a rule of thumb but is, if anything, a little too long.

90. Gallant 1991, 30.

91. "Mean length of generation: the average age of mothers at the birth of their daughters . . . In spite of the wide variety of fertility and mortality patterns observed in human populations the mean length of generation varies little, mostly within a small range around 29 years. In theory, and occasionally in practice, analogous measures for the male population are calculable" (Wilson 1985, 87).

92. Hollingsworth (1967, 376) assumes 32 years for medieval England.

93. Henige 1974, 125.

94. Agiads from Anaxandrides to Kleomenes III and Eurypontids from Leotychides to Agis IV.

95. Kirchner 1901–3, 2, 14, passim.

I work from the presumption that the population of a Greek polis had a life expectancy at birth of approximately twenty-five years and a maximum natural growth rate of 0.5 percent.[96] In such a population the gross reproduction rate is more than five just to keep the population stationary and close to six if the growth rate has to be continued.[97] Thus, on average, each woman must give birth to five or six live-born children. One or two will die within the first year and yet another before the age of ten. Only two or three will come of age, and no more than two—or rather just over two—will get married and procreate the next generation. In classical Hellas children usually stayed in their parents' household until they got married,[98] that is, until the daughters were in their late teens and the sons in their late twenties.[99] One son might even stay in his paternal home with his wife after their marriage.[100] For the better part of the length of a generation there would be three or four children in the household.

In ancient Greece to take care of one's parents in old age was a legal obligation; negligence, called *kakosis goneon,* was considered a crime and punished with permanent loss of all rights *(atimia).*[101] In addition to a prohibition against beating one's parents, maltreatment comprised various aspects of negligence: the children, that is, the sons, were obliged to accommodate

96. Hansen 1985, 11–13. The model I use is the Princeton model life tables by Coale and Demeny (1966), Model West mortality level 4 and growth rate 5.00 (an annual increase of 0.5 percent). A growth rate of 5.00 is, if anything, too high. It might be more realistic to prefer a stationary population, especially for studies that cover longer periods. Scheidel (2003) has a long and judicial discussion of the problem and suggests (123) a long-term growth rate between 0.25 percent and 0.45 percent per year.

97. Sallares 1991, 193.

98. Golden 1990, 109–10; Gallant 1991, 21–22, 27–30.

99. Gallant 1991, 17–19; Sallares 1991, 148–51.

100. Dem. 25.88; Golden 1990, 109; Gallant 1991, 21.

101. Andoc. 1.74; Xen. *Mem.* 2.2.13; Dem. 24.60; Aeschin. 1.28. See Lipsius 1905–1915, 343–44.

their parents, to provide them with food, and when they died to arrange their burial and perform the annual rites at their grave.[102] The forensic speeches show that the duty of the children to take care of their old parents was taken seriously and that, consequently, the three-generation family was fairly common.[103] Given the disparity in years between man and wife, it was often the mother who survived longest and stayed in her son's house.[104]

Orphans constituted another demographically important group that increased the average size of an ancient Greek household. More than half the men aged thirty would have died before they turned sixty.[105] Accordingly, the number of orphaned minors was enormous compared with the conditions in a modern society. Until the orphans came of age they would have to stay with their stepfather,[106] uncle,[107] or elder brother, and, as a result, in many families man and wife would have to accommodate and feed orphaned relatives in addition to their own children. Also, apart from a surviving mother, many households must have included some other adult female relatives such as aunts, widowed or unmarried sisters, and divorced, widowed, or unmarried daughters.[108]

Finally, to the kinfolk in the household must be added the coresident nonkin members. Public slaves and the numerous mining slaves do not matter in this context. They did not

102. Lys. 13.91; Aeschin. 1.28; Xen. *Mem.* 2.2.13; Dem. 24.107. The three main aspects—*trophe, oikesis,* and *taphe*—are listed together at Aeschin. 1.13.

103. Gallant 1991, 22–30; Sallares 1991, 196.

104. Duly emphasised by both Gallant 1991, 26–27; and Sallares 1991, 140–41, 196.

105. Coale and Demeny 1966, 5: model west, mortality level 4. Preferring mortality level 3, Corvisier and Suder (2000, 19) present an even lower survival rate.

106. Isae. 7.7, 9.27.

107. Lys. 3.6–7, 32.4–8; Isae. 1.12.

108. Xen. *Mem.* 2.7.2; Lysias 3.6.

belong to a household. But we must not forget that one of the most common words for slave in ancient Greek is *oiketes,*[109] and, in my opinion, there can be no doubt that a demographically significant number of households included one or more slaves.[110] I hesitate to follow those who assume that, on average, each household included one slave.[111] Instead, I shall assume that, on average, every second household possessed a slave.[112]

The above considerations can be supplemented with attempts to quantify the information about family sizes attested in written sources, of which some relate to the classical period, others to the Hellenistic and Roman periods. The best classical sources we have for the size of a Greek family are the forensic speeches. An investigation conducted by Georges Raepsaet (1973) attempts to reconstruct families mentioned in the speeches of Lysias (2.15 children per family), Isaios (1.84 children),[113] and Demosthenes (2.38 children). The mean is 2.14 children per family, and thus, including the parents, a family had, on average, 4.14 members. But Raepsaet notes too that there are 65 girls only as against 190 boys in his material. Compensating for the missing females, he argues that there probably was a minimum of 3.12 children per family. Furthermore, as pointed out by Robert Sallares, there is no mention whatsoever of infant mortality in the speeches (both sexes)[114] and, let me add, virtually no mention of child

109. Kästner 1981, 298–300.

110. Gallant 1991, 33.

111. See supra n. 82. On the basis of slaves mentioned in Aristophanes' comedies, Garlan (1988, 61) infers that "average" peasants who made up the social backbone of Periclean democracy, owned on average at least three slaves.

112. Let me add that some slaves were "living apart" (χωρὶς οἰκοῦντες), that is, they were not members of the household of a citizen or a metic but had their own household (Aeschin. 1.97; Dem. 4.36). Sometimes the term denotes a manumitted slave (Dem. 47.72).

113. According to Isager's careful study (1981–1982, 89), the average is 2.2 children per family.

114. Sallares 1991, 135.

mortality either. The overall conclusion seems to be that, including coresident collaterals (mostly orphans), the average family had at least 5 members, and to reach the average size of the household we must add nonkin members (mostly slaves). However—as noted by all scholars who have used the forensic speeches for demographic purposes—all this information concerns the upper and upper-middle classes of citizens, and it remains a moot point to what extent it can be extrapolated to cover the entire population.[115]

By far, the best ancient evidence we have for the size of families and households is the Egyptian census returns of the Roman imperial period. They have been carefully studied by Roger Bagnall and Bruce Frier (1994), and they have forcefully defended their value as a source. From a sample of 167 families Bagnall and Frier conclude that the average family size is unlikely to exceed about 5 persons, and they suggest a figure somewhere between 4.3 and 5. They admit that this figure may seem smaller than anticipated, and given that the gross reproduction rate was close to 6 children per woman, we are left with a dilemma: either the census reports are not as complete as believed by Bagnall and Frier, or, if they are, we must infer that the population attested in the census reports was declining.[116] One important factor points to the second alternative: in Egypt marriage between full brothers and sisters was common, and with the passage of time that must have resulted in the inability of the population to maintain its size. Thus, this valuable

115. Many historians have made too much of the supposed difference between rich and poor in life expectancy. We possess reliable genealogies for royal and ducal families in Europe in the early modern period. They show that for members of the upper class life expectancy at birth was a little better than for the common people, but not much (Hollingsworth 1967, 221–22, 343–44). By analogy we may infer that life expectancy among upper-class Athenians did not differ much from that of the average Athenian citizen.

116. Bagnall and Frier 1994, 68, 138–39.

material from Roman Egypt cannot be extrapolated and used as evidence for the size of families in ancient societies in general.[117]

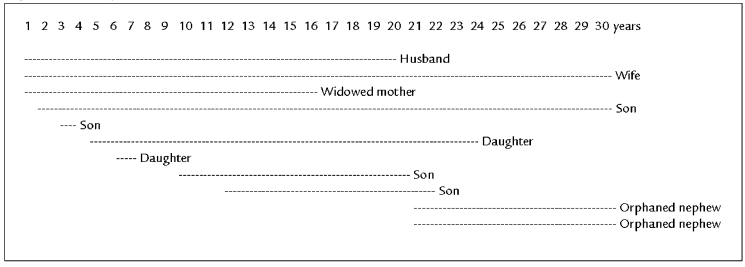
To conclude: I have mentioned different groups of persons that, in my opinion, are not taken sufficiently into account in treatments of the family size in the classical period. Most important is the gross reproduction rate of 5–6 children per woman in order to keep the population going. But surviving parents and orphaned relatives were also groups that were demographically significant, and the overall conclusion is that an average of 4 kinfolk per household is too small. Gallant's model includes surviving parents but assumes a total of 3 children per family and has no room for orphans or other collaterals. In my opinion, an average of 5 persons per family is a minimum, and 6 may be a more realistic figure. As an alternative to Gallant's model I suggest here, exempli gratia, a model that incorporates the longer generation, the higher gross reproduction rate, and the coresiding collaterals.

I assume a generation of thirty years instead of just twenty-four. At the beginning we have a married couple: the husband is thirty, the wife eighteen, and they live with his mother. The husband dies after twenty years at the age of fifty. The wife outlives her husband and is still alive thirty years later. His mother dies after sixteen years. The married couple have their first son a year after the wedding, and this son stays alive. The next son is born two years later but dies within the first year. Then a daughter is born. She survives and is married off at the age of eighteen. Another daughter dies within the first year, but two more children are born, and they live to the ages of ten and eight. The oldest son succeeds to the father when he dies at the age of fifty. The son is now the master of the household, and a year later the kin group is increased by two orphaned children, both cousins of the son. The size of this family wavers between

117. Golden 2000, 29.

3 and 7 persons, and the average is 5. Adding half a slave we get a household size of 5.5 persons. So 5 persons per household is a minimum, 6 seems to be a more realistic mean, whereas 7 is probably on the high side. To assume an average household of 10 is, in my opinion, to overshoot the mark.

Fig. 1. Model family



Summing Up

I have now, I hope, substantiated the variables that I used in the previous chapter in my calculation of the total number of Greeks based on an assessment of the population of the poleis in the urban sense, that is, the urban centers of the Greek city-states. First, in very small poleis (up to 10 hectares) the habitation space constituted, on average, around two-thirds of the intramural space, in midsize poleis (up to 150 hectares) roughly half the intramural space was used for habitation,[118] whereas in large poleis the built-up area constituted no more than one-third of the area enclosed by the walls. Second, there were on average some 30 to 33 houses on one hectare of

118. In the previous chapter, to avoid unnecessary complications, I assumed an average habitation area of 50 percent for all small and midsize poleis and did not incorporate a separate calculation for the very small poleis with an intramural area of less than 10 hectares (see supra p. 22 with n. 68).

inhabited space. And third, each house was, on average, inhabited by a household of 5 or 6 persons.

It follows that the number of inhabitants ranges from around 150 per hectare (5 x 30) to 200 per hectare (6 x 33). A small polis with an intramural area of 10 hectares will have had some 1,000–1,300 inhabitants, a medium-size polis of roughly 40 hectares will have had some 3,000–4,000 inhabitants, and only a large polis of 125 or more hectares will have reached a five-digit population figure, and upward.

To calculate the population of a city by multiplying the number of hectares inside the walls by an average number of persons per hectare is a method that has often been criticized,[119] and mostly when the result of such a calculation reaches unbelievably high population figures. The reason is that some historians base their calculations on an inflated number of persons in a household, say 10;[120] do not account for the often considerable *area di rispetto;*[121] or assume an average population density of, for instance, 300 inhabitants per hectare.[122]

My calculations are based on a household size of 5, and an average of 30 houses per hectare, which gives 150 persons per hectare. Furthermore, I assume that the habitation area covered two-thirds of the intramural space in the very small poleis, half in small and midsize poleis, and one-third in only the very large poleis. Accordingly, the totals I get must be minima, and to reach more realistic figures one must add another 25 percent or perhaps even 33 percent.

Can these figures be put into a broader perspective? It is always revealing to compare evidence of ancient societies with what we know about later periods for which we often possess better sources. Not that the later evidence can be used as proof of

119. Forsén and Forsén 2003, 269 with n. 154.
120. Hoepfner and Schwandner 1994; Muggia 1997; Hoepfner 1999.
121. Corvisier 1991, 231, 239–50, see Appendix 6.
122. Dakaris 1971, 43.

what ancient societies were like, but the later and better-documented evidence can often show whether our findings for ancient society are within the range of what is possible. So how does my shot from the shotgun fit what we know about European medieval and early modern cities? In the 1950s an enormous amount of evidence was collected and analyzed by the Belgian scholar Roger Mols (1954–1956), and his work was continued by the Swiss scholar Paul Bairoch (1985; English ed. 1988) whose general conclusion is worth quoting in this context:

> The admirable review of the Existing literature of Mols (1954–56) (which has not, alas, been brought up to date) permits me to establish for Europe from 1550 to 1800 an average density of urban population on the order of 175–190 inhabitants per hectare, with (not extreme) maxima on the order of 350–400 and minima of 70–90 inhabitants per hectare. On the basis of the no-less-admirable synthesis of Russell (1958) (which, unfortunately, has not been brought up to date either), the following indications may be formulated. For Europe from the 14th century to the 16th century (especially after the great plagues), the average density was some 110–115 inhabitants per hectare, with minima of 60–80 and maxima of 250–300 people per hectare. (The corresponding figure for the period before the outbreak of the plague, a period, however, for which the data are less numerous, was 140–160 per hectare.)[123]

Bairoch's conclusion calls for two comments. First, like the Greek poleis, medieval and early modern cities were mostly walled and often had large open areas inside the walls.[124] It must therefore be stressed that the above figures given by Mols and

123. Bairoch 1988, 23.
124. Mols 1955, 57; Hubert 2004, 114.

Bairoch are inhabitants per hectare of inhabited space,[125] not per hectare enclosed by the city walls. Thus, they match my figures.

Whereas Roger Mols's work has been widely accepted and is still the most authoritative account of the problem, Josiah Russell's contribution is much more controversial, as noted by Tom Hollingsworth:

> On the matter of the relationship between area and population in an old city, Russell has also put forward a definite view while others have sat quiet: 110 persons per hectare, he claims,[126] would be the average, and any evidence leading to a much higher result can be rejected as false. This, too, will cause more controversy yet. Russell's chief virtue, in fact, is that he gives others something to refute. All his figures may be altered eventually, but the debt to him will remain.[127]

125. Mols 1955, 52–56.
126. Russell 1958, 63.
127. Hollingsworth 1969, 58.

III

The Proportion of the Population Settled in the Hinterland

In the previous chapter I treated the urban population of the Hellenic poleis, namely, the number of persons settled in the polis center behind its defense circuit by contrast with the population settled in the hinterland, either dispersed in isolated farmsteads or nucleated in villages. To assess the total number of ancient Greeks on the basis of the number that lived behind the polis walls, one must know the proportion of urban population to rural population.

In the first chapter I claimed that in small and midsize cities, approximately two-thirds of the population lived behind the city walls. In large cities about half the inhabitants had their homes in the urban center, and it was only in the largest poleis that a majority of the population was permanently settled in the hinterland.

There is a glaring discrepancy between this view and the views held by a majority of ancient historians, in particular the Anglophone ancient historians who have been brought up on the views of Moses Finley and his phalanx of followers. They are still convinced that, basically, the ancient economy must have been an agrarian subsistence economy with a restricted capacity

to sustain large populations. I will adduce three quotes that illustrate what seems—at least among historians—to be the prevailing view of the settlement pattern in classical Hellas: Finley stated that "the majority of the population always lived in the countryside."[1] Paul Cartledge holds that "the ancient Greek World was massively and unalterably rural. The overwhelming majority of its inhabitants lived in and off the country, as farmers."[2] And in his introduction to a collection of articles about trade in the ancient economy, Keith Hopkins states: "The new orthodoxy stresses the cellular self-sufficiency of the ancient economy; each farm, each district, each region grew and made nearly all that it needed. . . . Most small towns were the residence of local large-landowners, centres of government and of religious cult."[3]

Such views are closely connected with the belief that the ancient Greek poleis were what Werner Sombart and after him Weber and Finley and Finley's followers called *Konsumptionsstädte*.[4] The most recent critical analysis of the concept of the consumption

1. Finley 1987–89, 304–5. But Finley was also the historian who emphasized the high degree of urbanization in the ancient Greek polis world (see, for example, 1981, 20).

2. Cartledge 1998, 13, reprinted in Scheidel and von Reden 2002, 20. See also Brun 1999, 19: "Les prospections archéologiques ont l'énorme avantage de prendre en compte l'ensemble du territoire, et surtout l'espace rurale, dont on sait bien qu'il accueillait, dans la majorité des cités, le plus grand nombre d'habitants—et de citoyens."

3. Hopkins 1983, 11. For a full quote of the passage, see p. 34 supra.

4. Sombart 1902, 2:198–205, 223 (2d ed. 1916, 1:142–54). "Eine *Konsumtionsstadt* nenne ich diejenige Stadt die ihren Lebensunterhalt (soweit sie ihn von ausserhalb bezieht, also das Überschussprodukt der landwirtschaftlichen Arbeit) nicht mit eigenen Produkten bezahlt, weil sie es nicht nötig hat. Sie bezieht vielmehr diesen Lebensunterhalt auf Grund irgendeines Rechtstitels (Steuern, Rente oder dergleichen) ohne Gegenwerte leisten zu müssen. . . . Die originären, primären Städtebildner sind somit die Konsumenten, die abgeleiteten sekundären (tertiären usw.) die Produzenten. Die Konsumenten sind in diesem Falle die selbtständigen, . . . während die Produzenten die Abhängigen sind, deres Existenzmöglichkeit durch die grösse des Anteils bestimmt wird, den die Konsumentenklasse ihnen von ihrem Konsumtionsfonds gewähren will." Sombart's definition is aptly summarized in Horden and Purcell 2002, 95.

city is that of Peregrine Horden and Nicholas Purcell in their monumental monograph, *The Corrupting Sea.* Horden and Purcell open their section about the consumption city with Werner Sombart's famous definition of that concept followed by a comment:

> "By a consumption city," Werner Sombart famously wrote in *Der moderne Kapitalismus* (1916–27) 1.142–43, "I mean one which pays for its maintenance . . . not with its own products, because it does not need to. It derives its maintenance rather on the basis of a legal claim, such as taxes or rents, without having to deliver return values" (Trans. Finley [1981] 13).—In an obvious sense all cities are centres of consumption: civilization (in the strict sense) is possible only where the urban few can live on the surplus produced by the rural many.[5]

Sombart's model, correctly summarized by Horden and Purcell, is based on three assumptions: there is an opposition between an urban and a rural population, the urban population constitutes only a small part of the total population, and both in numbers and in influence the core of the urban population consists of consumers.

In my recent article about the applicability of Sombart's concept to the Greek polis, I have argued that none of these three assumptions stands up to scrutiny in an ancient Greek context. In this context I shall summarize and update my arguments against the second assumption: the urban population constitutes only a small part of the total population.[6] It is the rapidly growing number of archaeological surveys that, for the first time ever, has made it possible to assess the size of the rural population

5. Horden and Purcell 2002, 105.

6. The following section (to p. 71) is a condensed and updated version of Hansen 2004, 11–16.

and the proportion of rural population to urban population.[7] One major result of these surveys has been to underscore the importance of the towns and to provide evidence suggesting that a majority of the population of a Greek polis lived in the urban center, that is, the polis in the sense of town. Let me here list the seven principal surveys that have focused on the demographic aspect of the attested settlement pattern.

The island of Keos was divided between four poleis of which the smallest was Koresia with a territory of around 15 square kilometers. The hinterland of Koresia is one of the best-investigated territories of a Greek polis. It was surveyed in 1983–1984 by a Greek-American team headed by J. F. Cherry, J. L. Davis, and E. Mantzourani.[8] The survey showed that, in the classical period, a maximum of 40 percent of the population lived in the countryside, whereas at least 60 percent of the residents of the polis (and perhaps as many as 90 percent) must have lived in the town behind its defense circuit.[9]

There were two poleis in southern Argolis: Halieis and Hermion. Halieis had a territory of about 75 square kilometers and Hermion one of around 275 square kilometers.[10] Of all the carefully investigated regions of classical Greece, the southern Argolid has one of the highest densities of second- and third-order settlements. Some 15 percent of the territory of both poleis (44 square kilometers) has been surveyed intensively from 1972 to 1982 by a team from Stanford University, and a larger area was surveyed extensively (Jameson, Runnels, and van Andel 1994, 224). The area surveyed by the team was settled in two poleis

7. For a survey of the surveys, see Alcock 1994, 250; Alcock and Cherry 2004; and Corvisier 2004.

8. Cherry, Davis, and Mantzourani 1991, 2, 235–36.

9. Cherry, Davis, and Mantzourani believed that some 75–90 percent of the population lived in the urban center (1991, 237). Reinterpreting the material, Whitelaw suggested that about 40 percent were permanently settled in the hinterland (1998, 232 with nn. 34–35).

10. Jameson, Runnels, and van Andel 1994, 18.

(Halieis and Hermion), half a score of villages and hamlets, and close to one hundred small sites, most of them probably farmsteads (ibid., 545). Still, according to the calculations resulting from the survey, the estimate was that two-thirds of the population lived within the walls of the two poleis, whereas one-third lived in the other sites, some in villages and hamlets, and some in farmsteads. The urban population of the two poleis is estimated at about 4,250 (Hermion) and 3,750 (Halieis) (ibid., 550–51, 562). The population of the ten villages and hamlets and the hundred or so small sites is estimated at approximately 4,500 persons (ibid., 545). Thus, the ratio between the population in the poleis and that in the territories is roughly two to one.

Asea in Arkadia is a polis resembling Halieis and Hermion in having a part—but a minority only—of its population settled in villages, hamlets, and isolated farmsteads. From the Asea Valley Survey, directed by Dr. Jeannette Forsén of the University of Göteborg, she and Björn Forsén infer that perhaps some 80 percent of the population lived in the town of Asea, whereas the remaining 20 percent lived in the hinterland (about 60 square kilometers), settled in two or three villages or hamlets, and in some twenty isolated farmsteads.[11]

One of the most isolated and least urbanized parts of northern Peloponnese is the volcanic peninsula of Methana, which covers about 50 square kilometers. In 1984–1987 about one-fifth of the peninsula was surveyed intensively, while the rest of the penetrable part of the peninsula was searched extensively for sites (Mee and Forbes 1997). A table of all classical sites (ibid., 63) shows that two "towns," Megalochori (MS10, 8 hectares) and Oga (MS67, 6 hectares), and one "village," A. Nikolaos (MS60, 1.8 hectares), covered more than half the space used for

11. Forsén and Forsén 1997, 172–76. In the publication of the survey Björn Forsén discusses population fluctuations of the archaic, classical, and Hellenistic periods without committing himself to percentages (2003, 269–71).

habitation, whereas the remaining sites (around 14 hectares) testified to remains of small hamlets and isolated farmsteads. Many of the smaller sites were not fit for permanent habitation, and the authors conclude, convincingly in my opinion, that "these data suggest that only a small proportion of the population worked the land from permanent bases outside the major centres of population (MS10, MS67, MS60)" (ibid., 67).[12] Even disregarding the "village" of A. Nikolaos, we can infer from the survey that the majority of the population lived in the two small urban centers. Methana was a polis, and its urban center was at Megalochori. Oga and A. Nikolaos were probably second-order settlements lying in the territory of Methana.[13]

The island of Melos was formed by volcanic activity like the peninsula of Methana. A survey has revealed numerous nucleated settlements of the archaic period, but in C5 and C4 the great majority of the population lived in the urban center: the polis of Melos, which in C4 had a habitation area inside the walls of approximately 19 hectares.[14]

A survey of the territory of Metapontion was conducted by J. C. Carter and a team from the University of Texas. The territory covered around 200 square kilometers and was dotted with isolated farmsteads (Carter 1990). Carter concludes that there would have been as many as 870 farm units operating between

12. The same conclusion is reached in Foxhall 2004, 266–67.

13. *CPCInv.,* no. 352.

14. According to Wagstaff and Cherry (1982, 252–53), the population in roughly 480–323 B.C. was around 2,000–3,000. A clear primate center at ancient Melos was probably around 15 hectares in size, and there is little evidence of differentiation below the primate center; the remains testify to a concentration of civic, judicial, and religious functions. In C4 there were fewer small settlements than previously and increased importance of primate center at ancient Melos (see 144–45). According to Snodgrass (1987–1989, 60): "The *astu* of Melos itself grew appreciably at this time [C5–C4], to reach its maximum area of 19 hectares." The population of 2,000–3,000 is a guesstimate. My guesstimate of the urban population is 1,425 minimum (150 x 19 x 50 percent) or 1,900 maximum (200 x 19 x 50 percent) (see supra p. 61).

350 and 300, corresponding to a rural population of between 4,500 and 9,000 depending on the number assumed for the family, including servants and slaves (either 5 or 10 persons) (ibid., 410). For the city he assumes a maximum of around 2,500 habitations in the peak period, corresponding to a maximum urban population of between 12,500 and 25,000 (ibid., 406n2). However, Carter hypothesizes a maximum: 104 blocks of 24 houses. According to Muggia (1997, 90), the aerial photos indicate that there were around 75 blocks of 20 houses. A total of 1,500 houses and a household size of 5 or 6 persons corresponds to an urban population of 7,500–9,000 persons. No matter whether one prefers the minimum or the maximum figure, the conclusion is that the ratio between the urban and the rural population was about two to one, namely, roughly 870 households settled in the territory against 1,500 or so in the urban center.[15]

Finally, there is the Laconia survey that covered around 70 square kilometers of the countryside north of Sparta.[16] The only nucleated settlement of any consequence was a village covering some 3 hectares and identified as ancient Sellasia.[17] Analyzing the evidence, Richard Catling assumes that of the population living in the area covered by the survey, about two-thirds were settled in farmsteads, villas, or hamlets and that Sellasia itself had no more than about 300 inhabitants, that is, about one-third of the population of the surveyed area. But this is calculated on the basis of a population density of 100 per hectare. Catling envisages that a higher population density in Sellasia is possible and that the village accommodated a higher proportion of the total population in the late classical period.[18] Furthermore, Sellasia was probably a tiny perioikic

15. Carter (2006, 210) suggests 2000 families in the polis and 1000 in the Chora.

16. Cavanagh et al. 1995–2002.

17. Site A 118, see Catling 2002, 181, 205–11.

18. Catling 2002, 205–7.

polis.[19] It is most unlikely that it possessed a territory of 70 square kilometers. It probably belonged to the category of very small poleis with a maximum territory of 25 square kilometers.[20] So even in this case it can be presumed that a majority of the population of this tiny perioikic polis lived in the nucleated center, whereas only a minority was settled in the hinterland. Since the frontiers of the territory of Sellasia are unknown, we cannot decide the issue.

I conclude that all the surveys point in the same direction: a majority of the ancient Greeks lived in the polis center and a minority in its hinterland. Instead of the rural many versus the urban few, we get the urban many versus the rural few.[21] But can the evidence of the surveys be trusted? In a recent article Robin Osborne (2004) has questioned many of the assumptions made in the analysis of the surveys and, accordingly, the reliability of the demographic inferences made by the archaeologists in their interpretation of their data. Some of the uncertainties pointed out by Osborne do not affect what the surveys show about the relation between urban and rural populations. If the aim is to name numbers, it is crucial to know whether the average size of a household was 5 persons (as assumed in practically all surveys) or 4, 7, or even 10.[22] But if only the same size of household is applied in all calculations, the established ratio between the urban and the rural populations is not affected by this uncertainty (see, for instance, the discussion of Metapontion above).

Similarly, the different surveys make different assumptions about the density of population in nucleated centers. Thus, there is a gap between the 150 persons per hectare assumed in the Keos survey and the 250 assumed in the southern Argolid

19. *CPCInv.,* no. 343.

20. See supra p. 18.

21. Hansen 2004, 10–16, 32. See also Osborne 1987, 95.

22. See supra p. 52. Osborne (2004, 170) correctly notes that "survey itself cannot even show that the assumption that 'family farms' were on average the residences of five people is justified."

survey.[23] But in this case the difference is due to the nature of the evidence. The 250 persons per hectare in the southern Argolid survey is based on what we know about the number of houses in, especially, Halieis (see page 51), whereas the 150 per hectare assumed in the Keos survey is a (conservative) guesstimate since no houses of the classical period have been identified in what remains of the urban center of Koresia. A different issue is whether one should accept the assumption made in the southern Argolid survey that the population density in the villages was only half of what it was in the poleis.[24]

A third crucial problem concerns the interpretation of all the small sites of, typically, from 0.05 to 0.50 hectare. Is such a site evidence of a farmstead inhabited year-round by a household or of buildings that were only seasonally settled by farmers who lived in a nearby village or town? As Osborne notes, "Some of us will continue to wonder whether what the southern Argolid survey found in such profusion were not farms but seasonal shelters, a mark not of changes of residence but of intensity of land-exploitation."[25] Analyzing the Methana survey, Lin Foxhall reaches the same conclusion.[26] If Osborne and Foxhall are right, as seems very likely, the inference is that the balance between urban and rural populations has to be shifted even further in favor of the urban population.

23. 150 per hectare: Cherry, Davis, and Mantzourani 1991, 280; 250 per hectare: Jameson, Runnels, and van Andel 1994, 550. See also Osborne 2004, 166, 168.

24. Jameson, Runnels, and van Andel 1994, 550. To assume 250 persons per hectare in the two poleis of Hermion and Halieis is probably to aim high with the shotgun, but again to assume 125 per hectare for every site over 1 hectare (544–45) is a very high estimate too (Osborne 2004, 167–68). If both figures are lowered, the ratio is retained.

25. Osborne 2004, 170.

26. Foxhall (2004, 267) concludes: "The low level of material remains on many of these sites suggests that most of the small rural sites documented were not occupied for very long at any one time, and it is likely that not all were occupied simultaneously."

There are several further uncertainties about the different methods applied in the surveys and the different assumptions made in the interpretation of the material found in the surveys. But here as in all other fields where we ancient historians try to quantify the evidence, we must remember that we cannot expect precision. We have to use the shotgun method with its considerable gap between maximum and minimum, and with this reservation I am convinced that the surveys have provided us with valuable evidence about the settlement pattern of the ancient Greeks. Many, perhaps even most, of the Greeks of the archaic and classical periods must have been farmers who lived in the urban center but every morning walked to their fields in the hinterland and walked back again to their houses every evening. They were not consumers who lived on the surplus produced by the rural population. They were Weberian *Ackerbürger.*[27] Since almost all were settled in the city, there was no opposition between people settled in the town versus people settled in the hinterland.

One possible objection to the view that the ancient Greeks lived in their urban centers is the analogy with later periods. Comparative studies of medieval and early modern European populations show that, for Europe as a whole, the urban population constituted no more than about 10 percent of the total population. According to Bairoch the percentage rose from just under 10 percent in around 1000 to just over 12 percent in around 1700. But this pessimistic picture emerges because Bairoch does not accept a town as "urban" unless it had a population of 5,000 or more, and that is a stiff requirement. A little later, Bairoch admits himself that in a historical context "a limit of 2,000 or even 1,000 would be more appropriate."[28] A threshold of some 1,000 inhabitants is indeed what most ancient historians and

27. For the concept of *Ackerbürger,* see Hansen 2004, 16–21.
28. Bairoch 1988, 137, 136, 138.

archaeologists accept as the minimum size of a town.[29] It is impossible to present an alternative assessment of European urbanization based on a limit of 1,000 inhabitants, but it would be dramatically different from Bairoch's 10–12 percent living in towns of more than 5,000 people.

Again, if we take local variations into account, we find that the average of 10–12 percent is due to very low percentages in eastern and northern Europe, whereas much higher percentages are found in what is commonly called the OECB, an abbreviation of the Old European Cities Belt. It refers to the historical cities in Belgium, the Netherlands, the German Rhine region, Switzerland, and northern Italy. Thus, in Belgium the degree of urbanization (using the 5,000 people threshold) was approximately 30 percent in around 1300.[30] In the OECB the cities in question enjoyed a much higher degree of autonomy than in the rest of Europe, and it is here we find the medieval and early modern European city-state cultures.

If we concentrate on the regions that in antiquity were broken up into city-states, we find that, in some cases at least, nucleated settlement seems to have persisted right up to the modern period, even long after the city-states had been transformed into urban centers of larger states. One example is Sicily in the nineteenth century. In 1871 the island had a population of 2,584,099: 176,004 lived dispersed in isolated farmsteads, 270,843 lived in nucleated settlements of up to 2,000 inhabitants each, and 2,137,252 lived in towns with more than 2,000 inhabitants; of the latter, 1,377,819 lived in towns of more than 8,000 inhabitants. Thus, 30 percent of the Sicilian population lived in small towns (2,000–8,000 inhabitants) and 53 percent in large towns or cities.[31] Yet the

29. Kolb 1984, 15; Jameson, Runnels, and van Andel 1994, 249 (towns are settlements of 5 hectares minimum) and 550 (population density of 250 per hectare); Horden and Purcell 2000, 93.

30. Bairoch 1988, 179.

31. Beloch 1886, 476n2.

overwhelming majority of the population were farmers who lived in the urban centers but worked in their fields outside the city wall.

I do not know of similar overviews of the nineteenth-century settlement pattern in mainland Greece, but it is common knowledge that nucleated settlement in (small) towns prevailed in many parts of Greece, a view that has been confirmed by controlled studies carried out as late as the mid-twentieth century.[32]

There is an unbridgeable gulf between the information listed above and the views stated in the major modern account of the ecology of the preindustrial Mediterranean, Horden and Purcell's monograph, *The Corrupting Sea.* In their chapter about larger settlements they state: "Our estimate of the characteristic urban population of the preindustrial Mediterranean—3, 5, 10 per cent: a figure of that order—will naturally depend on the kinds of settlement that we are prepared to count as towns and the number of them that we thus identify. But what is a town?" On the following page the authors point out that many of the Mediterranean nucleated centers "sheltered no more than one or two thousand people—'small towns' on certain definitions but towns none the less."[33] I fully subscribe to the view that nucleated centers of 2,000 or 1,000 inhabitants were indeed towns, but it follows that in many regions the majority of the population must have lived in towns, and not just 3 or 5 or, at most, 10 percent.

Finally, let me repeat something I said in the first chapter. What happens if, for the sake of argument, we assume that no more than 10 percent of the ancient Greeks lived in towns and cities? If it is true, as I think it is, that 3.5 million people is a cautious assessment of the urban population, it follows that the rural population totaled more than 30 million. But to have a

32. Wagstaff and Auguston 1982.
33. Horden and Purcell 2000, 92–93.

total of 35 million ancient Greeks in C4 is out of the question. So our investigations show that an urban population of 3.5 million sets a rather narrow limit for the possible size of the rural population.

IV

The Carrying Capacity of the Ancient Greek Polis World

The carrying capacity of a region is "the maximum number of persons sustainable by a given territory under specific conditions, e.g. at a given standard of living."[1] The carrying capacity of a region is often measured as a given number of persons per square kilometer.

In demographic studies of ancient societies the focus is on agricultural produce. In ancient Greece the staple food was grain,[2] and the two cereals grown everywhere were wheat and barley.[3] It is commonly assumed that grain constituted roughly three-quarters of a person's total consumption.[4] A hardworking adult man required a daily ration of one *choinix* of wheat[5] (which equals 655 grams per day, or 239 kilograms per year),[6] and twice

1. Wilson 1985, 24.
2. The fundamental study is still Foxhall and Forbes 1982.
3. Garnsey 1999, 17–21.
4. Foxhall and Forbes 1982, 49, 71; Garnsey 1999, 19. But this is just a conjecture.
5. Hdt. 7.187.2; *IG* XII.7 515.73; see Foxhall and Forbes 1982, 86–89.
6. The *editio princeps* of the Athenian grain-tax law of 374–373 has, for the first time ever, provided us with the weight and volume ratios of wheat and

as much if the grain he received was barley.[7] Women and children would get half rations.[8] Barley was the dominant cereal, and the ordinary diet must have consisted of a combination of barley and wheat, and perhaps in the ratio of three or four to one.[9] If we can estimate the percentage of arable land in a region and the normal yield per cultivated hectare, we can calculate the annual production of grain and the maximum number of persons who could be sustained by the grain grown in the region.[10]

The use of the concept of carrying capacity in studies of the demography of classical Greece is based on a number of assumptions. With a few possible exceptions—such as Attika,[11] Corinthia, and the island of Aigina—the economy of a region was, basically, a subsistence economy: not only the individual poleis but also the region as a whole were self-sufficient in foodstuffs.[12]

Consequently, no import of grain was needed (except perhaps in very bad years), and there was no export of either grain or other foodstuffs.[13] Most poleis were economically autarkic. Trade was local trade between town and hinterland. There was very little long-distance trade, except for a few luxury goods.[14]

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barley. One *choinix* of (dried) barley weighed 545 grams and one *choinix* of (dried) wheat 655 grams (see *SEG* 48 96.21–5; and Stroud 1998, 54–56).

7. Thuc. 4.16.1; Michel 714.15 (Amorgos C1); compare Foxhall and Forbes 1982, 72.

8. Women: *IG* XI.2 161A.83 (Delos, C3); children: *IG* XII.7 515.73 (Amorgos, C2).

9. Three to one: Sallares 1991, 79; four to one: Garnsey 1988, 102.

10. Foxhall and Forbes 1982.

11. Nevertheless, accepting a very low population figure combined with a very high carrying capacity, both Osborne (1987, 46) and Garnsey (1988, 104) have argued that Athens was self-sufficient in grain, at least in C4. The massive evidence of grain being imported into Athens is reviewed, once again, by Whitby (1998) who points out too that this evidence matches the higher population figures advocated in Hansen 1985 and 1988.

12. Gallant 1991, 98–101; Davies 1998, 237–39.

13. The sizable export-import of wine is usually passed over in silence in studies of ancient carrying capacities.

14. Hopkins 1983, 11, quoted p. 34 supra.

Like all other populations, the population of Greece was never static but subject to considerable contractions followed by an often rapid recovery until the population reached its peak, that is, the carrying capacity of the region.[15]

As a whole, the first millennium B.C. down to C4l B.C. was a period of population growth. There were, of course, cycles within this long span of more than six hundred years, but in the course of C4 the population of mainland Greece approached the saturation point, and in most regions it reached its peak in the late classical–early Hellenistic period.[16]

The nineteenth century A.D. was another period of rapid population growth, and in many regions the carrying capacity was reached once again late in that century. The import of grain and other foodstuffs into Greece gathered momentum only in the late nineteenth century and was still insignificant in the 1880s.[17]

Last, the "specific conditions"—precipitation, fertility of the soil, methods of production, and yields of crops—had not changed significantly between C4 and the nineteenth century A.D. The standard of living had probably not changed much either. Thus, in Greece the extent and use of arable land were probably in the late nineteenth century what they had been in C4l. In both periods the carrying capacity had been reached, and in both cases much of the natural population growth was disposed of by emigration.[18]

If we make all these assumptions, it follows that the size of the population of Greece in C4 must have been close to the population figure of the late nineteenth century, which we know from the census of, for example, 1889. If there was any difference between the carrying capacity of Greece in classical

15. Sallares 1991, 65, 72–73.
16. Scheidel 2003.
17. Sallares 1991, 75.
18. Sallares 1991, 51, 75, 80.

antiquity and in the nineteenth century, it was probably in the modern period that a higher level was reached. Thus, the population of mainland Greece in the age of Alexander the Great is unlikely to have exceeded the population of Greece in the reign of King George I and was presumably of the same order of magnitude, that is, around 3 million people.[19]

Our lack of sources, both for the total population of Greece in the classical period and for individual regions as well, can therefore be remedied by looking up the figure given for that region in the population census of 1889 and by taking that figure to be the carrying capacity of the region both in the late nineteenth century and in C4l.[20]

The concept or rather concepts of carrying capacity and their possible use in ancient demography are thoroughly and illuminatingly discussed by R. Sallares.[21] As an example he selects Attika. Discussing all the main variables,[22] he suggests that the grain grown in Attika was enough to sustain a population of at least 55,000 and perhaps as many as 97,000. Attika covered 2,400 square kilometers, and its carrying capacity was then 23–40 persons per square kilometer. As his overall conclusion he states that "the congruence of these estimates of possible population density in C4 with the population densities attained in modern Greece towards the end of the nineteenth century AD cannot be overemphasised."[23] This statement resumes what Sallares in the previous section concluded about the total population of mainland Greece in the classical period: "The population of Greece in the latter half of the fourth century BC was closer to 2×10^6 than to 2×10^5 or to 2×10^7. This order of magnitude is certainly

19. Ruschenbusch 1983, 172; 1984a, 55–57.
20. Sallares 1991, 51, 75, 80.
21. Sallares 1991, 73–84.
22. Sallares 1991, 79–80.
23. Sallares 1991, 80.

similar to the size of the population of Greece towards the end of the nineteenth century AD."[24]

Attika is, admittedly, the region for which we have the most evidence and therefore an obvious example to discuss.[25] On the other hand, the region is exceptional because more than any other polis Athens had to supplement the grain produced in Attika with imports from abroad, whereas a regional subsistence economy is one of the assumptions made by historians who assume that the population of Greece in the nineteenth century A.D. and in C4 were of the same order of magnitude. In both periods, the population had reached the saturation point and imports were unnecessary except, perhaps, in very bad years.

The Aegean Islands are believed to constitute such a region, and the nineteenth-century population figures have been used as evidence for the size of population in the classical period by, especially, Eberhard Ruschenbusch. In a number of articles published in the 1980s he investigated the relation between size of population and amount of money paid as *phoros* by members of the Delian League.[26] On the assumption that a *phoros* of one talent corresponds to 800 citizens and 3,200 inhabitants, Ruschenbusch compared the census figures of the late nineteenth century with the figures he got by converting *phoros* into inhabitants. The method was applied to a number of poleis in the Islands district of the Delian League. In some cases the two population figures are almost identical, but in other cases there are conspicuous differences:

24. Sallares 1991, 51. In 1889 the population of Greece totaled 2,188,000 (Greece had acquired Thessaly in 1880 but did not win Epeiros, Macedonia, and Thrace until 1913).

25. In my opinion the most judicious and balanced account is that of A. Moreno in his Oxford thesis of 2003.

26. See supra pp. 7–10.

Table 4.1

ISLAND	SQUARE KILOMETERS	TALENTS (TAL.) DRACHMAS (DR.)
Amorgos	123	1 tal. = 3,200 inhabitants, 3,394 in 1889
Anaphe	40	1,000 dr. = 530 inhabitants, 658 in 1889
Andros	374	6 tal. = 19,200 inhabitants, 18,148 in 1889
Ikos	64	1,500 dr. = 800 inhabitants, 497 in 1889
Naxos	417	6 tal., 4,000 dr. = 21,330 inhabitants, 14,572 in 1889
Skiathos	48	1,000 dr. = 530 inhabitants, 2,804 in 1889

Let me add that the rule of thumb—one talent equals 3,200 inhabitants—is, to a large extent, calculated on the basis of the population figures known from the census conducted in the late nineteenth century, especially those of 1876, 1889, and 1896.

A more sophisticated use of the method is applied by Björn Forsén in a study of the relative sizes of Tegea, Orchomenos, and Mantinea and again in the chapter of the Asea survey that deals with the ancient population.[27]

Table 4.2

CITY	POPULATION IN C5–C4	CARRYING CAPACITY IN CENSUS OF 1896
Tegea	16,000–20,000	24,189 in 1896
Orchomenos	6,000–8,000	5,397 in 1896
Mantinea	14,000–18,000	13,200 in 1896
Total	36,000–46,000	42,786[28]

Considering that we have to use the shotgun method, the ancient figures fit the nineteenth-century figures and Forsén may have bagged his rabbit. But in this particular context my problem is that the ancient figures have not been obtained independently but with a view to the nineteenth-century figures. Let me adduce Mantinea as an example.

27. Forsén 2000, 44–54; 2003, 269–71.
28. Forsén 2000, 46–49.

We possess three pieces of evidence about the population of Mantinea: in 480 the Mantineans sent 500 hoplites to Themopylai (Hdt. 7.202), in 420 they sent a force of 1,000 men to help the Eleans against the Spartans (Thuc. 5.50.3), and in around 400 we are told by Lysias that there were altogether less than 3,000 Mantineans (34.7). There can be no doubt that the 500 hoplites sent to Thermopylai and the 1,000 soldiers sent to Olympia constituted only a part of the Mantineans' military force. The number of Mantineans reported by Lysias is open to a number of interpretations: Lysias does not tell us whether they were the hoplites in the field army, the citizens of military age fit for military service, or all the adult male citizens. According to which interpretation we choose, we get population figures ranging from fewer than 10,000 to almost 30,000.[29] Forsén argues in favor of a population figure in the range of 15,000 by adducing various forms of indirect evidence: the size of the urban center, the possible number of hoplite estates in the territory of Mantinea, and an estimate of the amount of foodstuffs that could be produced in the territory of Mantinea in C4. To a large extent it is a comparison with the population of the territory of Mantinea in the nineteenth century that induces Forsén to prefer an interpretation of the fewer than 3,000 adult male Mantineans that gives a total population of no more than 14,000–18,000. If the nineteenth-century figure had been considerably higher or lower than around 16,000, Forsén might have preferred an interpretation of Lysias that led to a higher or lower population figure. There is nothing wrong with that. My point is only that the ancient population of Mantinea has not been calculated by Forsén independently of the nineteenth-century figure and then compared with that figure. The nineteenth-century figure is an important piece in the jigsaw puzzle he puts together in order to calculate the ancient population.

29. For seven different calculations of the population of Mantinea, all compatible with Lysias's text, see Hansen 2004, 42–43.

I conclude that both Ruschenbusch and Forsén have had to use the nineteenth-century figures as evidence for the size of the ancient population because in both cases the ancient sources are too scarce to allow us to calculate the size of the population on the basis of that evidence alone. But in order to assess the validity of comparisons made between nineteenth-century A.D. population figures and those of C4, we must apply the method to a region for which the C4 population figure can be established on the basis of the ancient sources alone. There are only two regions for which the sources we have suffice to assess the minimum population in C4e: Attika and Boiotia. Attika was exceptional both in antiquity and in the late nineteenth century, so we must focus on Boiotia.

We know that in 395 the Boiotian federal army was composed of 1,000 *hoplitai* and 100 *hippeis* from each of eleven conscription districts (Hell. Oxy. 19.4). The number of light armed troops provided by each district is not mentioned in our source. This piece of information enables us to make a rough calculation of the population of ancient Boiotia, but we have to make a number of assumptions: (1) the 11,000 *hoplitai* and 1,100 *hippeis* were effectives and not just a paper force; (2) they comprised the year classes from twenty to forty-nine; (3) the 12,100 men, foot and horse, constituted only half the Boiotian army—to the *hoplitai* and *hippeis* must be added an equal number of light armed soldiers (compare the battle of Delion in which 10,500 light armed soldiers fought alongside 8,000 *hoplitai* and *hippeis* [Thuc. 4.93.3]); (4) at least 20 percent of all citizens aged twenty to forty-nine must have been unfit for military service or exempted for other reasons; and (5) the demographic structure of ancient Boiotia conformed to the model population listed in the *Princeton Tables,* Model West, mortality level 4, growth rate 0.5 percent.

On the basis of these assumptions the calculation of the Boiotian population is as follows: an army of 24,200 effectives

between twenty and forty-nine plus 25 percent unfit for military service corresponds to an adult male population of about 41,500 citizens; including women and children, the total citizen population comes to 145,000 persons altogether.[30] But this is a minimum figure. It is unlikely that the federal army comprised every single citizen of military age who was fit for military service. Thus, the total number of citizens may have been closer to 200,000 than to 150,000, and if we add some 50,000 metics and slaves the Boiotian population in 395 may even have amounted to 250,000 persons altogether.

In 1985 John Bintliff suggested a somewhat lower figure based on a different calculation.[31] Like me, he took the Boiotian army to have included as many light armed as hoplites, and to the 11,000 hoplites and 1,100 men cavalry he added 11,000 light armed. To these 23,100 citizens in the army he added 10,000 to man the Boiotian navy. Thus, he reached "an approximate total of 33,100 under arms in the later 5th century" and then suggested the following calculation of the total population: "If we use a multiplier of five to reach the figure of total population (allowing, on average, an equal number of men and women, two children per family and a slave for each household), we obtain a total of 165,500 or, if slaves are eliminated altogether, 132,400."[32]

Bintliff's army figure is higher than mine because, in addition to the 11,000 light armed, he assumes that there were a further

30. Taking 24,200 effectives plus 25 percent unfit (6,050) equals 30,250. In the model population chosen for this investigation, the males aged twenty to forty-nine constitute 42 percent of all males who, then, must have totaled 72,240, and, adding the same number of female citizens, we get a total of 144,050 citizens altogether.

31. Bintliff 1985, 141–43. In later publications Bintliff has changed his views on the relation between the urban and the rural populations, but he still refers to the 1985 article for his views on the total population of Boiotia.

32. Bintliff may be right in assuming that metics served in the army both as hoplites and as light armed (Bintliff and Snodgrass 1985, 142–43). Accordingly, there is no need to add a number of metics when the army figure is converted into a population figure.

10,000 to man the fleet. It does take around 10,000 hands to man a fleet of fifty triremes, but I doubt that all were Boiotians, and I suspect that the roughly 12,000 citizens below hoplite status were used both to man the fleet and to serve in the army as light armed. On the other hand, Bintliff converts army figures into population figures on the assumption that each and every person aged twenty to forty-nine served in the army or navy. I do not believe in a 100 percent call-up and argue that those who fought in the field army or in the navy can have constituted a maximum of 80 percent of the adult male citizen population of military age (twenty to forty-nine). I do not believe either that the federal army comprised the armed forces of the member poleis to the last man. Furthermore, Bintliff converts the army figure into a population figure by assuming that each soldier (aged twenty to forty-nine) was the head of a household of five persons (four family members and one slave). Thereby, he disregards households headed by citizens aged fifty to eighty or more. According to the model population I use, citizens aged fifty or more constituted about 20 percent of all adult male citizens. Furthermore, an average household of five persons is too pessimistic a guesstimate. As I argued in the previous chapter, an almost stationary population with a life expectancy at birth of around twenty-five years has a gross reproduction rate of five to six children per woman. Most of these died before they came of age, and, on average, only two or three reached adulthood, but the household must in most years have comprised three children, sometimes even four children, in addition to their parents. Moreover, the substantial mortality among men in their thirties and forties must have entailed a high number of orphaned children who had to live in their stepfather's house until they came of age. An average household of six seems more realistic than one of five; five is probably the minimum.

When all these differences are taken into account, the result is that Bintliff reaches what in my opinion is too low a total,

that is, 165,000 instead of my approximately 200,000 or perhaps even more. However, both Bintliff and I have to rely on the shotgun method, and our calculations are not far apart. Basically, we agree about the relative sizes of the urban and the rural populations. I shall not here go into further detail about the differences but conclude that in C4e the population of Boiotia must have totaled at least 165,000, and at its peak it may have surpassed 200,000 persons.

How does a population of 165,000–200,000 Boiotians in C4 compare with later figures? There are two periods during which the saturation point was reached once again, namely, the late sixteenth and the late nineteenth centuries.

During the reign of Sultan Bayezid I (1389–1402) the Ottoman administration started to register the population and agricultural produce of the various provinces of the empire. The registers, called *tahrirs,* were drawn up town by town, village by village, and household by household. All males older than thirteen were registered, as were widows if they were heads of households. The registration was, of course, for taxation purposes, and Muslim and Christian households were registered separately. On the basis of these registers it is possible to assess the total number of households and the size of the households. The *tahrirs* were repeated every generation or so until the end of the sixteenth century. As in the rest of Europe, the sixteenth century in the Ottoman Empire was a period of growth both in wealth and in population, and the saturation point seems to have been reached in the last decades of that century. In the seventeenth century the population dropped again to much lower figures.

It is the indefatigable Professor Machiel Kiel who, so far, has devoted some fifteen years of his scholarly life to the study of these registers.[33] He has published a number of detailed studies

33. Kiel 1992, 1997, 1999.

of the population of various parts of Attika and Boiotia, and he has kindly provided me with his calculation of the population of all of Boiotia as recorded in the *tahrir* of 1570: Levadia had 784 households in the city and 3,415 households in 54 villages; Thebes had 1,497 households in the city and 4,587 households in 105 villages. The grand total is 10,283 households, and that is probably a maximum since ancient Boiotia was smaller than the two Ottoman districts taken together. The registration of the individual households indicates that, for this period, a size of approximately five persons per household cannot be far off. So in 1570 the population of what corresponds to ancient Boiotia may have surpassed 50,000.[34] However, the Ottoman *kazas* of Levadia and Thebes included parts of Phokis and Attika. By removing the villages likely to be outside ancient Boiotia, Bintliff reached the following somewhat lower figures for ancient Boiotia: in Levadia, 11,015 persons, of whom 3,760 lived in the town of Livadia; in Thebes, 26,975 persons, of whom 7,485 lived in the town of Thebes; the total was 37,990.[35]

In 1889 Boiotia was still split up into two eparchies: Levadia with 23,000 inhabitants and Thebes with 25,500 inhabitants.[36] Moreover, the two eparchies still covered a larger area than ancient Boiotia. Levadia included the eastern part of ancient Phokis, whereas the border between the eparchies of Thebes and Attika roughly followed the ancient line.[37] In 1889 the population of ancient Boiotia was around 40,000–42,000 persons.

So three peaks of population in Boiotia are attested in the sources we have: one in C4l (150,000 minimum), one in the late sixteenth century (about 40,000),[38] and the third one in the late

34. Letter of September 2000.
35. Letter of May 2004.
36. Philippson 1951, 449, 514; Sauerwein 1991, 267, 269.
37. Philippson 1951, 430–31 (eastern Phokis), 546 (Oropos part of the eparchy of Attika).
38. See also Sbonias 1999, 225.

nineteenth century (also about 40,000). In all three periods the population is believed to have reached the carrying capacity of the region. The two later population figures are not very different from one another, but both are far below the population in C4, which seems to have been at least four times higher than it was in the sixteenth and nineteenth centuries. The ensuing conclusion can be formulated as a dilemma: either the carrying capacity of Boiotia was much higher in C4 B.C. than in the sixteenth or nineteenth century A.D., or the Boiotian poleis in C4 had to import part of the foodstuffs they needed. The right answer is probably a combination of both factors.

There is no evidence whatsoever of export of grain from Boiotia.[39] On the contrary, some sources testify to imports. After two successive crop failures Thebes had to import grain from Thessaly (Hell. 5.4.56), and during the grain crisis of 330–326 Tanagra received 10,000 *medimnoi* from Kyrene, in spite of the fact that almost all Tanagraians were farmers (Heracl. Cret. 9, *GGM* 1.101). We know also that the Anthedonians were fishermen who constantly were short of grain because of the barren territory of the small city (Heracl. Cret. 23–24, *GGM* 1.104). It seems that Boiotia was self-sufficient in good years only, and even then some cities may have had to import some grain. In Hellas only two regions are attested in our sources as exporters of grain, Thessaly and Euboia (Jardé 1925, 194).

On the other hand, it is unlikely that Boiotia, like Attika, had to import large quantities of grain even in normal years. The region must at least in good years have produced most of the foodstuffs consumed by the Boiotians, and such a view conforms with the sources we have. Boiotia and Attika were of a size: Attika

39. Noted by Jardé (1925, 193) who also points out that in Aristophanes' *Acharnians* (860–968) the Boiotian who comes to Dikaiopolis' market has many different goods to sell, in particular eels from Lake Kopais, but grain is not among the commodities he has to offer.

covered around 2,400 square kilometers, ancient Boiotia about 2,580. But in a calculation of the carrying capacity of Boiotia, we must keep in mind that Lake Kopais precluded the cultivation of at least 200 square kilometers.[40] Thus, Boiotia was coextensive with Attika but a much more fertile region:[41] not just one-third—as in Attika—but probably half of Boiotia was cultivable.[42] More wheat was grown in Boiotia than in Attika, and the nutrition value of the crops surpassed what an Athenian farmer could hope for.[43] The presumption is that, in the classical period, the fertile soil of Boiotia may have sustained at least half as many persons as the poor soil of Attika. According to Sallares, Attika could produce enough grain to feed a population of 55,000–97,000.[44] The maximum is the more likely figure. In his analysis of the same material Peter Garnsey concludes that in normal years, no less that 120,000–150,000 could be sustained by the grain grown in Attika.[45] That, however, is overoptimistic. The new Athenian grain law shows that a liter of wheat or barley weighed considerably less than assumed by Garnsey.[46] In a forthcoming study, Alfonso Moreno suggests a more likely maximum of ca. 100,000 people.[47] If we assume that the fertile

40. It was 350 square kilometers according to Jardé 1925, 71; and Lauffer 1986, 136.

41. Thuc. 1.2.3; Strabo 9.2.1. Theban barley is praised by Archestratos of Gela (fr. 5), and Orchomenos had sprouting grains of barley on its coins (Kraay 1976, no. 345).

42. Bintliff and Snodgrass 1985, 142; Bintliff 1997, 236.

43. Boiotian athletes could do with less than three half *choinikes* of wheat, while the Athenian athletes needed five (Thphr. *HP* 8.4.5).

44. Sallares 1991, 79–80.

45. Garnsey 1988, 101–6; 1998, 183–200. Compare Osborne's even more optimistic calculations (1987, 46).

46. According to Garnsey (1998, 193), one liter of wheat weighed 772 grams and one liter of barley 643 grams. According to the Athenian grain-tax law, one liter of dried wheat weighed 600 grams and one liter of dried barley 500 grams (*SEG* 48 96.21–5), 1 liter = 0.9 *choinix*, cf.n.6 supra.

47. See n. 25 above.

soil of Boiotia could sustain at least 50 percent more people than Attika, the grain grown in Boiotia would suffice to feed ca. 150,000 people and the rest of the grain needed would have to be imported.

I conclude that the carrying capacity of Boiotia in C4 may have been four to five times what it was in the late sixteenth century A.D. and again in the late nineteenth century A.D. Some of the assumptions made above must be wrong. The inevitable conclusion is that population figures of the late nineteenth century cannot be used as a yardstick for the size of the population in the classical period, and the view that the population of Greece in classical antiquity cannot have surpassed the population of Greece in the late nineteenth century must be turned upside down: what we know about the population of C4 Boiotia indicates that at least some regions of Greece were more densely populated in the classical period than in any other period up to the twentieth century.

Appendix 1

Some Test Cases

All my calculations are based on averages that—when they can be checked—almost always are demonstrably too pessimistic, as can be shown by a number of test cases.

The intramural space of Athens and Piraeus covered ca. 512 ha. Now, 512 : 3 = 171 ha x 150 persons per ha = 25,650 inhabitants in the urban center + 51,320 settled in Attika outside Athens-Piraeus = total population of 76,970. A total of ca. 75,000 is about half the pessimistic estimate of ca. 150,000 (Osborne 1987, 46) and about one-third of my more optimistic estimate of ca. 200,000-250,000 in C4s (Hansen 1988, 12).

Similarly for Boiotia: the intramural area of Thebes was ca. 350 ha, of which the built-up area is assumed to have covered one-third = ca. 117 ha. Now, 117 x 150 = 17,550 + twice as many settled in the hinterland = a total population of 52,650. The intramural area of all the other Boiotian poleis covered ca. 650 ha altogether. Now, 650 : 2 x 150 = 48,750 + half as many settled in the hinterland = 24,375 = a total population of 73,175. Combining Thebes with all the other poleis we get a Boiotian population of 125,825, that is, ca. 40,000 less than Bintliff's cautious estimate of a total Boiotian population of ca. 165,000 (see page 85).

A study of one of the Boiotian poleis leads to the same conclusion. The walls of Orchomenos (territory size 3) enclosed ca. 90 ha. Now, 90 : 2 = 45 x 150 = 6,750 settled in the city plus half

as many = 3,375 in the hinterland. The total is 10,125, which is an unbelievably small population. The Oxyrhynchos historian tells us that Orchomenos and—probably—Hyettos provided two out of eleven boiotarchs and a force of 2,000 hoplites and 200 horsemen to the federal army (Hell. Oxyrh. 19.3). We should therefore for these two poleis expect a citizen population of some 17,500–22,000 if we base our calculation on the army figure and a total population—including foreigners and slaves—of at least 22,000. If the eleven districts were organized in accordance with size of population, the total population of the two poleis should be ca. 30,000. Hyettos was a small polis with a territory of less than 100 km^2 (territory size 2) and an urban center of ca. 26 ha. Applying the shotgun method we get a total population of close to 3,000. The combined population of Orchomenos and Hyettos as calculated by the shotgun method comes to ca. 13,000, whereas from the status of the two poleis in the Boiotian federation we should expect a total of 20,000–30,000.

In the classical period the walls of Argos (territory size 5) enclosed more than 200 ha, namely, 208 ha according to the reconstruction suggested by Lang (1996, 174-75 with fig. 34). Now, 208 : 3 = 69 x 150 = 10,350 living behind the walls and 20,700 living in the hinterland = a total population of 31,050. But at the battle of Nemea in 394, the Argive contingent numbered 7,000 hoplites (Xen. Hell. 4.2.17), which correponds to between ca. 56,000 and 70,000 citizens of both sexes and all ages. Adding an unknown number of foreigners and slaves we have to presume a minimum population of 70,000.

Megara (territory size 4) had a defense circuit that enclosed an area of 140 ha. Now, 140 : 2 = 70 x 150 = 10,500 plus the same number settled in the hinterland = a total of 21,000. At the battle of Plataiai in 479 Megara provided 3,000 hoplites (Hdt. 9.28.6), corresponding to a citizen population of between 24,000 and 30,000 and a total population of ca. 30,000 or more. There is no indication that Megara suffered a severe population

decline between C5f and C4s, but that can, of course, not be ruled out.

The intramural space of Eretria (territory size 5) covered 81.5 ha. Now, 81.5 : 3 = 27 ha x 150 persons per ha = 4,050 inhabitants in the urban center + 8,100 settled in the territory = total population of 12,150. The early Hellenistic rosters of citizens (*IG* XII.9.245-49) points to an adult male citizen population of at least 4,000,[1] corresponding to 7,000 male citizens of all ages and a total citizen population of 14,000. Adding free foreigners and slaves we reach ca. 15,500 as an absolute minimum. We can reach a less misleading but still surprisingly low total if, in this case, we assume that half the intramural area was used for habitation and that two-thirds lived in the territory (of ca. 1,500 km^2), that is, 81.5 : 2 = 41 x 150 = 6,150 + 12,300 = 18,450.

The intramural space of Ambrakia (territory size 4) covered 130 ha. Now, 130 : 2 = 65 ha x 150 persons per ha = 9,750 inhabitants in the urban center + the same number settled in the territory = total population of 19,500. But according to Thucydides (3.105.1), Ambrakia could muster 3,000 hoplites, corresponding to a total population of ca. 24,000-30,000 citizens and probably 30,000 or more inhabitants.

The walls of Korkyra (territory size 5)[2] enclosed an area of 115 ha min., of which ca. 65 ha (57 percent) were inhabited space. Now, 65 x 150 persons per ha = 9,750 persons. Adding 19,500

1. Approximately 15,500 persons settled in a territory of about 1,500 square kilometers is a suspiciously low figure, equaling some 10 persons per square kilometer in one of the best agricultural regions of Hellas. In a forthcoming study I shall argue that the roughly 4,000 persons recorded in the rosters must have been citizens who fulfilled a certain census requirement. On this assumption the population of Eretria was much larger that the 15,500 suggested in the text, see Hansen (2006, 80–82).

2. Recent investigations of the shipsheds (information obtained in March 2006 from Kalliopi Baika) have confirmed the view of Spitsieri-Choremi (1997, 12) that the walls of Korkyra date from the classical period. This information postdates *CPCInv.,* and Korkyra is therefore not included among the 232 walled poleis.

settled in the countryside, we get a total population of 29,250. If we use the shotgun method without regard for what we know about the habitation area of Korkyra, we get 115 : 2 = 57.5 x 150 = 8,625 living in the city + 17,250 settled in the hinterland = 25,875 people altogether. The Korkyraians could man 60 triremes during the Persian War (Hdt. 7.168.4) and 110 (Thuc. 1.47.1) to 120 (Thuc. 1.25.4 and 29.4) just before the Peloponnesian War. The crews of 120 triremes add up to 24,000. If we assume that no more than 50 percent of these were Korkyraians (citizens, metics, and slaves) aged 20-49, we get a total male population of ca. 29,000 and a total population of 55,000 min. (supposing that many of the rowers were slaves [Thuc. 1.55.1] and that considerably more than 50 percent of all slaves were male). Beloch's estimate of the population of Korkyra is ca. 70,000 (1886, 191–92).

Aigina is an island of 85 km^2 (territory size 2). The only ancient settlement of any consequence was the polis with walls of C5f enclosing an area of ca. 52 ha.[3] If the habitation quarters covered ca. 26 ha, we get an urban population of close to 4,000, to which we must add ca. 2,000 settled in the hinterland. But a total population of ca. 6,000 is much too small to man the 45-50 triremes launched by the Aiginetans during the Persian invasion of 480.[4]

In other cases, however, my application of the shotgun method leads to what seems to be a realistic figure, perhaps even a little on the high side: See, for example, the population of Mantinea (territory size 4). An intramural space of 125 ha : 2 = 62.5 x 150 persons per ha = 9,375 inhabitants in the town + the same number settled in the territory gives a total population of ca. 18,750 (see pages 47, 82–83).

3. T. Figueira in *CPCInv.,* no. 358.

4. Hdt. 8.46.1 (30 triremes at Salamis plus an unknown number to defend the island); Paus. 2.29.5 (the Aiginetan squadron outnumbered the Corinthian squadron of 40 triremes). Figueira (1981, 22–52) estimates the population of Aigina at 35,000–45,000, which equals a density of population of 412 to 530 persons per square kilometer, which I find impossible. For a total population of ca. 20,000, see Hansen (2006, 8–12).

Appendix 2

Population of the Greek Homeland versus the Population of Colonies and Hellenized Communities

For this investigation I subdivided the total evidence into six groups: (1) the regions from Spain to the Adriatic; (2) the Greek mainland from Epeiros to Makedonia; (3) the regions from Thrace to the Hellespont, that is, Thrace, the Pontic and Propontic regions, and the Hellespont; (4) the west coast of Asia Minor from the Troad to Ionia; (5) Crete and Rhodos; and (6) the southwestern part of Asia Minor, Cyprus, Syria, Egypt, and Libya. Numbers (2), (4), and (5) constitute what I call the Greek homeland; (1), (3), and (6) are colonies and Hellenized communities outside the Greek homeland.

Within each group is recorded the number of poleis with known territory and—for each category—the percentage of all known poleis in that category (see table 1.4) and the estimated population (calculated from table 1.10). Thus, of all the poleis from Spain to the Adriatic, 3 are known to have had a territory size 1 = 3 percent of all the 93 attested poleis with a territory size 1, and the total population of these 3 poleis is estimated at 4,050 persons, that is, 3 percent of all the 135,000 (see table 1.10) who lived in poleis size 1. In the headline the number of poleis with a known intramural area (38) is set against the total number of poleis in the group (85).

Spain-Adriatic (38 : 85 = 45 percent)

1	3 = 3 percent	4,050
1-2	1 = 1 percent	4,020
2	7 = 3 percent	37,660
3	6 = 6 percent	52,920
4	13 = 19 percent	322,910
5	8 = 12 percent	327,600
Total	38	749,160

Epeiros-Makedonia (335 : 459 = 73 percent)

1	49 = 53 percent	71,550
1-2	61 = 56 percent	224,900
2	132 = 67 percent	630,870
3	48 = 48 percent	423,360
4	30 = 44 percent	747,780
5	15 = 22 percent	600,600
Total	335	2,699,060

Thrace-Hellespont (107 : 220 = 49 percent)

1	17 = 18 percent	24,300
1-2	14 = 13 percent	52,210
2	24 = 12 percent	112,990
3	25 = 25 percent	220,500
4	5 = 7 percent	118,970
5	22 = 33 percent	900,900
Total	107	1,429,870

The Troad–Ionia (62 : 105 = 59 percent)

1	8 = 9 percent	12,150
1-2	18 = 16 percent	64,260
2	11 = 6 percent	56,500
3	7 = 7 percent	61,740
4	11 = 16 percent	271,920
5	7 = 11 percent	300,300
Total	62	766,870

Crete and Rhodos (52 : 57 = 91 percent)

1	10 = 11 percent	14,850
1-2		
2	21 = 11 percent	103,580
3	12 = 12 percent	105,840
4	7 = 10 percent	169,950
5	2 = 3 percent	81,900
Total	52	476,120

Karia-Libya (42 : 103 = 41 percent)

1	6 = 6 percent	8,100
1-2	15 = 14 percent	56,220
2	3 = 1 percent	9,420
3	2 = 2 percent	17,640
4	3 = 4 percent	67,980
5	13 = 19 percent	518,700
Total	42	678,060

Poleis in the Greek homeland:

Epeiros-Makedonia	2,699,060	
The Troad–Ionia	766,870	
Crete and Rhodos	476,120	
Total	3,942,050	(= 58 percent)

Colonies and Hellenized poleis outside the Greek homeland:

Spain-Adriatic	749,160	
Thrace-Hellespont	1,429,870	
Karia-Libya	678,060	
Total	2,857,090	(= 42 percent)

Appendix 3

Walled Poleis Organized according to Size of Territory

Intramural area in hectares (numbers refer to *CPCInv.*)[1]

Size of Territory 1	
Bionnos (no. 952)	1.5
Derion (no. 117)	15
Dystos (no. 369)	5
Echinos (no. 118)	ca. 7
Eutresis (no. 205)	13–20
Koresia (no. 493)	18
Myania (no. 164)	8
Myrmekeion (no. 703)	6
Pedasa (no. 923)	ca. 2.5
Pharos (no. 84)	1.6–6
Rhitten (no. 988)	11.5
Siphai (no. 218)	3
Tolophon (no. 167)	3

1. In addition to the information recorded in *CPCInv.,* I have obtained additional information about the intramural area of some poleis from Dr. Judith Bartel (Akarnania), Professor John Camp (Phokis), Mr. Tobias Fischer-Hansen (Aegean Islands), Professor Björn Forsén (Oresthasion in Arkadia), Dr. Rune Frederiksen (some archaic poleis), and Dr. Vladimir Stolba at the Centre for Black Sea Studies at Aarhus (the Black Sea region).

Size of Territory 1 or 2

Abai (no. 169)	16
Amphikaia (no. 172)	5
Bargylia (no. 879)	20+
Batiai (no. 88)	10.1
Boucheta (no. 90)	3.5
Chalkis (no. 145)	20+
Daulis (no. 176)	5
Hyampolis (no. 182)	5.6
Kindye (no. 902)	9
Larymna (no. 383)	6.5
Methone (no. 454)	33
Myndos (no. 914)	ca. 45
Neapolis (no. 63)	75
Oresthasion (no. 287)	15 (habit)
Phanoteus (no. 190)	6+
Torone (no. 110)	58
Trapezous (no. 303)	18

Size of Territory 2

Agrinion (no. 142)	20+
Aigina (no. 358)	52
Alyzeia (no. 112)	27
Anaktorion (no. 114)	ca. 55
Anthedon (no. 200)	30
Arisba (no. 795)	ca. 8
Asea (no. 267)	ca. 30
Astakos (no. 116)	6.5
Atrax (no. 395)	64
Chaironeia (no. 201)	23?
Chaleion (no. 159)	8
Chorsiai (no. 202)	1.7–4.5
Dreros (no. 956)	28
Drymos (no. 178)	20+
Elyros (no. 959)	20+
Emporion (no. 2)	5
Euhesperides (no. 1026)	21

Gyrton (no. 397)	ca. 20
Halai (no. 380)	12–13
Haliartos (no. 206)	30–42
Halieis (no. 349)	18, 15 (habit)
Hyele (no. 54)	64
Hyettos (no. 207)	fortified, Akrop. 26 ha habit
Iasos (no. 891)	ca. 26
Ithaka (no. 122)	12
Kalydon (no. 148)	ca. 25
Karkinitis (no. 698)	5+
Koroneia (no. 210)	94
Koronta (no. 124)	ca. 9
Kranioi (no. 125)	10+
Kythnos (no. 501)	ca. 25
Lamia (no. 431)	80
Lamponeia (no. 783)	27
Lato (no. 971)	20+ (habit)
Limnaia (no. 127)	16
Massalia (no. 3)	40
Medeon (no. 186)	3
Medma (no. 60)	ca. 30-35 ha habit
Methana (no. 352)	1, 8 (habit)
Methydrion (no. 283)	11
Minoa (no. 473)	ca. 20
Neapolis (no. 634)	12.5
Neon/Tithorea (no. 187)	14.5
Nisyros (no. 508)	10
Pagasai (no. 407)	6-7
Pelinna(ion) (no. 409)	56
Pherai (no. 414)	82–120
Phoitiai (no. 134)	ca. 28
Same (no. 136)	10+
Stiris (no. 193)	ca. 7
Stratos (no. 138)	ca. 80
Sy/Theangela (no. 931)	25
Teithronion (no. 194)	ca. 8
Telos (no. 524)	10
Torybeia (no. 140)	31
Zone (no. 651)	50

Size of Territory 3	
Alea (no. 265)	28
Aptara (no. 947)	63
Gonnos (no. 463)	6
Hephaistia (no. 503)	31.6
Hipponion (no. 53)	80 ha (40 ha habit)
Ios (no. 484)	5–9
Issa (no. 81)	9.8
Itanos (no. 965)	40
Kaulonia (no. 55)	35–45
Klazomenai (no. 847)	ca. 40
Kopai (no. 209)	23?
Lokroi (no. 59)	240
Melos (no. 505)	19
Myrina (no. 502)	ca. 25
Oiniadai (no. 130)	59
Oisyme (no. 635)	3.5
Orchomenos (no. 213)	90.5?
Orchomenos (no. 286)	20
Pantikapaion (no. 705)	10 (habit)
Paros (no. 509)	ca. 50
Phigaleia (no. 292)	195
Phleious (no. 355)	60
Phokaia (no. 859)	50
Plataiai (no. 216)	C5: 10, C4: 80.5
Polyrhen (no. 983)	ca. 30 (habit)
Priene (no. 861)	37
Pydna (no. 544)	25
Samothrake (no. 515)	ca. 20
Stymphalos (no. 296)	40+
Taucheira (no. 1029)	40
Tenos (no. 525)	ca. 10
Teos (no. 868)	ca. 80
Thisbai (no. 223)	48.5

Size of Territory 4

Ambrakia (no. 113)	130	
Andros (no. 475)	100+	
Antissa (no. 794)	18?	
Assos (no. 769)	55	
Dion (no. 534)	42	
Eresos (no. 796)	ca. 5	
Herakleia (no. 52)	140	(habit)
Hermion (no. 350)	22.5, 17	(habit)
Kamarina (no. 28)	150[2]	
Knidos (no. 903)	ca. 66	
Kolophon (no. 848)	80+	
Kos (no. 497)	ca. 112	
Kroton (no. 56)	620	
Kyme (no. 57)	80	
Leontinoi (no. 33)	40	
Mantinea (no. 281)	124	
Megara (no. 36)	60	
Megara (no. 225)	140	
Metapontion (no. 61)	ca. 140	
Methymna (no. 797)	ca. 30	
Mytilene (no. 798)	140	
Naxos (no. 41)	35	
Naxos (no. 507)	20+	
Neandreia (no. 785)	8	
Phanagoria (no. 706)	75	
Pheneos (no. 291)	20	
Poseidonia (no. 66)	125	(habit)
Psophis (no. 294)	80 ha	+*proasteion*
Pyrrha (no. 799)	9.5	
Sikyon (no. 228)	175	
Skyros (no. 521)	4.5	
Taras (no. 71)	530	
Tegea (no. 297)	190	
Thasos (no. 526)	70	
Thebai (no. 444)	40	
Thespiai (no. 222)	78.5?	
Zankle/Mess. (no. 51)	50-60	(habit)

2. It was 180 hectares according to Hoepfner and Schwandner 1994, 12.

Size of Territory 5

Abdera (no. 640)	112	
Akragas (no. 9)	450	
Amathous (no. 1012)	18	
Apollonia (no. 77)	110	
Argos (no. 347)	200+	
Athenai (no. 361)	Athens 211, Peiraieus 300	
Chalkis (no. 365)	12.5	
Chersonesos (no. 695)	29[3]	
Eretria (no. 370)	81.5	
Erythrai (no. 845)	135	
Gela (no. 17)	200	(habit)
Halikarnassos (no. 886)	ca. 220	
Himera (no. 24)	82	
Idalion (no. 613)	40	
Istros (no. 685)	60	
Kallatis (no. 686)	10	
Kassopa (no. 100)	30	
Kebren (no. 780)	ca. 90	
Kleitor (no. 276)	58	
Korinthos (no. 227)	600–700	
Kyrene (no. 1028)	750	
Maroneia (no. 646)	ca. 425	
Megale polis (no. 282)	350	
Messene (no. 318)	290	
Miletos (no. 854)	ca. 130	
Olbia/Bory. (no. 690)	44–47	(habit)
Olynthos (no. 588)	35	
Paphos (no. 1019)	45	
Perinthos (no. 678)	75	
Rhegion (no. 68)	70	
Rhodos (no. 1000)	300	
Salamis (no. 1020)	85	
Samos (no. 864)	103	
Selinous (no. 44)	100	
Sybaris (no. 70)	ca. 500	
Syrakousai (no. 47)	150	(habit)
Tanagra (no. 220)	30	
Thebai (no. 221)	350	

3. Marĉenko (1997, 64).

Size of Territory Unknown

Adranon (no. 6)	60
Akrai (no. 10)	35
Alabanda (no. 870)	75
Alinda (no. 871)	20+
Amantia (no. 86)	20
Amos (no. 872)	10+
Amphipolis (no. 553)	250
Aphrodisias (no. 1005)	15
Byllis (no. 92)	28
Edessa (no. 535)	23
Elateia (no. 94)	12.7
Elea (no. 95)	10
Eurymenai (no. 97)	34.4
Gitana (no. 98)	28
Heloron (no. 18)	9
Herakleia Minoa (no. 20)	60–70 (habit)
Hippana (no. 25)	30
Horraon (no. 99)	7.2
Kallion (no. 147)	25
Kaunos (no. 898)	190
Latmos (no. 910)	ca. 90
Lissos (no. 82)	22
Nikaia (no. 101)	18
Olympa (no. 102)	15
Orikos (no. 103)	ca. 5 (habit)
Pandosia (no. 104)	13.1
Passaron (no. 105)	13.7
Pergamon (no. 828)	18
Phanote (no. 106)	5.3
Phaselis (no. 942)	ca. 20
Pyxous (no. 67)	11 (6 ha habit)
Siris (no. 69)	21 (habit)
Smyrna (no. 867)	6
Spina (no. 85)	6+
Stagiros (no. 613)	7.5
Tauromenion (no. 48)	ca. 65
Tekmon (no. 109)	34.4
Tyndaris (no. 49)	4

Appendix 4

Walled Poleis Geographically Organized

	Intramural area (in hectares)	Size of territory
SPAIN OR FRANCE		
Emporion	5	2
Massalia	40	2
SIKELIA		
Adranon	60	?
Akragas	450	5
Akrai	35	?
Gela	200	5
Heloron	9	?
Herakleia Minoa	60–70	?
Himera	82	5
Hippana	30	?
Kamarina	150	4
Leontinoi	40	4
Megara	60	4
Naxos	35	4
Selinous	100	5
Syrakousai	150 (habit)	5
Tauromenion	ca. 65	?
Tyndaris	14	?
Zankle	50–60	4

ITALIA AND KAMPANIA		
Herakleia	140 (habit)	4
Hipponion	80, 40 (habit)	3
Hyele	64	2
Kaulonia	35–45	3
Kroton	620	4
Kyme	80	4
Lokroi	140	3
Medma	30–45 (habit)	2
Metapontion	ca. 140	4
Neapolis	75	1 or 2
Poseidonia	125 (habit)	4
Pyxous	11, 6 (habit)	?
Rhegion	70	5
Siris	21 (habit)	?
Sybaris	ca. 500	5
Taras	530	4

THE ADRIATIC		
Apollonia	110	5
Issa	9.8	3
Lissos	22	?
Pharos	1.6–6	1
Spina	6+	?

EPEIROS		
Amantia	20	?
Batiai	10.1	1 or 2
Boucheta	3.5	1 or 2
Byllis	28	?
Elateia	12.7	?
Elea	10	?
Eurymenai	34.4	?
Gitana	28	?
Horraon	7.2	?
Kassopa	30	5
Nikaia	18	?

Olympa	15	?
Orikos	ca. 5 (habit)	?
Pandosia	13.1	?
Passaron	13.7	?
Phanote	5.3	?
Tekmon	34.4	?
Torone	58	1 or 2

AKARNANIA

Alyzeia	27	2
Ambrakia	130	4
Anaktorion	ca. 55	2
Astakos	6.5	2
Derion	15	1
Echinos	ca. 7	1
Ithaka	12	2
Koronta	ca. 9	2
Kranioi	10+	2
Limnaia	16	2
Oiniadai	59	3
Phoitiai	ca. 28	2
Same	10+	2
Stratos	ca. 80	2
Torybeia	31	2

AITOLIA

Agrinion	20+	2
Chalkis	20+	1 or 2
Kallion	25	?
Kalydon	ca. 25	2

WEST LOKRIS

Chaleion	8	2
Myania	8	1
Tolophon	3	1

PHOKIS		
Abai	16	1 or 2
Amphikaia	5	1 or 2
Daulis	5	1 or 2
Drymos	20+	2
Hyampolis	5.6	1 or 2
Medeon	3	2
Neon/Tithorea	14.5	2
Phanoteus	6+	1 or 2
Stiris	ca. 7	2
Teithronion	ca. 8	2

BOIOTIA		
Anthedon	30	2
Chaironeia	23?	2
Chorsiai	1.7–4.5	2
Eutresis	13–20	1
Haliartos	30–42	2
Hyettos	26 (habit)	2
Kopai	23?	3
Koroneia	94	2
Orchomenos	90.5?	3
Plataiai	80.5	3
Siphai	3	1
Tanagra	30	5
Thebai	350	5
Thespiai	78.5?	4
Thisbai	48.5	3

MEGARIS, KORINTHIA, SIKYON		
Korinthos	600–700	5
Megara	140	4
Sikyon	175	4

ARKADIA		
Alea	28	3
Asea	ca. 30	2
Kleitor	58	5
Mantinea	124	4
Megalopolis	350	5
Methydrion	11	2
Orchomenos	20	3
Oresthasion	15 (habit)	1 or 2
Pheneos	20	4
Phigaleia	195	3
Psophis	80	4
Stymphalos	40+	3
Tegea	190	4
Trapezous	18	1 or 2
MESSENIA		
Messene	290	5
ARGOLIS		
Argos	200+	5
Halieis	18, 15 (habit)	2
Hermion	22.5, 17 (habit)	4
Methana	8 (habit)	2
Phleious	60	3
SARONIC GULF		
Aigina	ca. 52	2
ATTIKA		
Athenai		6
Athenai	211	
Peiraieus	300	

EUBOIA		
Chalkis	12.5	5
Dystos	5	1
Eretria	81.5	5
EAST LOKRIS		
Halai	12–13	2
Larymna	6.5	1 or 2
THESSALIA		
Atrax	64	2
Gyrton	ca. 20	2
Pagasai	6–7	2
Pelinna(ion)	56	2
Pherai	82–100	2
MALIS		
Lamia	80	2
ACHAIA PHTHIOTIS		
Thebai	40	4
MAGNESIA		
Methone?	33	1 or 2
PERRHAIBIA		
Gonnos	6	3
ISLANDS		
Andros	100+	4
Ios	5–9	3

Koresia	18	1
Kos	ca. 112	4
Kythnos	ca. 25	2
Hephaistia	31.6	3
Melos	19	3
Minoa	ca. 20	2
Myrina	ca. 25	3
Naxos	20+	4
Nisyros	10	2
Paros	ca. 50	3
Samothrake	ca. 20	3
Skyros	4.5	4
Telos	10	2
Tenos	ca. 10	3
Thasos	70	4
MAKEDONIA		
Dion	42	4
Edessa	23	?
Pydna	25	3
BISALTIA		
Amphipolis	250	?
CHALKIDIKE		
Olynthos	35	5
Stagiros	7.5	?
THRACE, STRYMON TO NESTOS		
Neapolis	12.5	2
Oisyma	3.5	3

THRACE, NESTOS TO HEBROS		
Abdera	112	5
Maroneia	ca. 425	5
Zone	50	2

PROPONTIC THRACE		
Perinthos	75	5

PONTOS, THE WEST COAST		
Istros	60	5
Kallatis	10	5
Olbia	44–47	5

PONTOS, SKYTHIA		
Chersonesos	29	5
Karkinitis	5+	2
Myrmekion	6	1
Pantikapaion	10 (habit)	3
Phanagoria	75	4

THE TROAD		
Assos	55	4
Kebren	ca. 90	5
Lamponeia	27	2
Neandreia	8	4

LESBOS		
Antissa	18?	4
Arisba	ca. 8	2
Eresos	ca. 5	4
Methymna	ca. 30	4
Mytilene	140	4
Pyrrha	9.5	4

AIOLIS		
Pergamon	18	?

IONIA		
Erythrai	135	5
Klazomenai	ca. 40	3
Kolophon	80+	4
Miletos	ca. 130	5
Phokaia	50	3
Priene	37	3
Samos	103	5
Smyrna	6	2
Teos	ca. 80	3

KARIA		
Alabanda	75	?
Alinda	20+	?
Amos	10+	?
Bargylia	20+	1 or 2
Halikarnassos	ca. 220	5
Iasos	ca. 26	2
Kaunos	190	?
Kindye	9	1 or 2
Knidos	ca. 66	4
Latmos	ca. 90	?
Myndos	ca. 45	1 or 2
Pedasa	2.5	1
Sy/Theangela	25	2

KRETA		
Aptera	63	3
Bionnos	1.5	1
Dreros	28	2
Elyros	20+	2
Itanos	40	3

Lato	20+ (habit)	2
Polyrhen	ca. 30 (habit)	3
Rhitten	11.5	1
RHODOS		
Rhodos	300	5
LYKIA		
Phaselis	ca. 20	?
KILIKIA		
Aphrodisias	15	?
KYPROS		
Amathous	18	5
Idalion	40	5
Paphos	45	5
Salamis	85	5
LIBYA		
Eūhesperides	21	2
Kyrene	750	5
Taucheira	40	3

Appendix 5

The Population of Walled Poleis in Epeiros and Makedonia

In C4 Epeiros, twenty-four poleis have been located; of these, twenty-two were fortified, and for no less than eighteen poleis enough is preserved of the city walls to assess the area enclosed by the defense circuit (see Appendix 4).

The urban space of these eighteen poleis adds up to 346.3 ha. Assuming 50 percent habitation space and 150 persons per ha, the urban population comes to 25,972, or, in rounded figures, 26,000 people. If we presume that the remaining six poleis were of the same size, the urban population for all the located poleis comes to ca. 34,500. We know next to nothing about the size of the territories of these eighteen poleis. Apart from Kassopa, none of them seems to have had a territory of more than 500 km^2. If we assume that, on average, two-thirds of the population was settled in the urban center, the total population of the poleis with hinterlands adds up to 51,750. If instead we assume that only half the population was urban, the result is 68,800, and this is an implausibly low figure. Epeiros covered ca. 15,000–20,000 km^2,[1] and with a population density of 20 per km^2 we get a total population of between 300,000 and 400,000 people.[2]

1. Corvisier 1991, 276–77.

2. Corvisier assumes an average density of population of 27.5 and a total population of about 425,000 (Corvisier and Suder 2000, 34).

Our information about walled poleis in Makedonia is restricted to three centers: Dion, Pydna, and Edessa, of which the two first were Greek colonies on the coast. A calculation like that for Epeiros above gives ca. 51,000, a number even more misleading than that for Epeiros. Makedonia covered ca. 32,000 km^2. Corvisier and Suder assume a density of 21 per km^2 and suggest a total population of 660,000.

Appendix 6

Corvisier's Calculation of the Urban Population of Thessaly

For his calculation of the Thessalian population, Corvisier uses (1) an estimate of the carrying capacity of the region; (2) information about army figures; and (3) information about the number and sizes of the Thessalian towns (1991, 229–31). (For a different interpretation of (2), see Helly 1995, 280–86.) My concern is that with (3), Corvisier assumes that the population was settled either in towns or in villages. He has not taken into account that part of the population may have been settled in isolated farmsteads. Furthermore, he estimates that no more than around 10-12 percent lived in villages (1991, 255). It follows that, in his opinion, the urban population constituted close to 90 percent of the total population. That is, I think, an exaggeration. My view is that in small poleis some two-thirds of the population lived in the urban center, whereas in the large poleis the majority was settled in the hinterland, either dispersed or in villages (see Chapter 3). Corvisier's information about the identification and size of individual towns is often based on Stählin's now outdated book of 1924. A comparison between his lists of towns (ibid., 239–50) and those provided by Decourt, Nielsen, and Helly for the Copenhagen Polis Centre's inventory of poleis (*CPCInv.,* 676–731) reveals that our knowledge of the Thessalian townscape has been revolutionized during the past decade. Corvisier's investigation is very

valuable but must be revised and updated in light of all the new evidence provided by the Lyon team of scholars. Finally, when Corvisier calculates the urban population he multiplies the entire intramural space (measured in ha) by 150 (the supposed number of persons per ha in towns of more than 50 ha) or 200 (for towns of 5-50 ha) or 250 (for settlements of less than 5 ha) (see 1991, 231). He does not take into account that a large part of the intramural space was used for public buildings or simply left open (see Chapter 2).

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INDEX OF SOURCES

I. Literary Sources

II. Inscriptions

INDEX OF NAMES