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Epigraphy and demography: birth, marriage, family, and death

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Abstract: In recent years, the adoption of key concepts and models of modern population studies has greatly advanced our understanding of the demography of the Greco-Roman world. Epigraphic evidence has made a vital contribution to this development: statistical analysis of tens of thousands of tombstone inscriptions has generated new insights into mortality regimes, marriage practices, and family structures in various parts of the ancient Mediterranean. In conjunction with papyrological material, these data permit us to identify regional differences and facilitate long-term comparisons with more recent historical populations. After a brief survey of the principal sources of demographic information about the classical world, this paper focuses on the use of inscriptions in the study of population size, mortality, fertility, nuptiality, sex ratios, family formation, and household organization.

Approaching ancient demography

Since the 1980s, the demographic study of the Greco-Roman world has experienced a revival that has been driven by the use of concepts, models, and comparative evidence derived from the population history of the more recent past.[1] It was not the discovery of significant amounts of new data but new approaches to existing evidence that have made this progress possible. Demography critically relies on numbers: in the words of two prominent historical demographers, 'demography without numbers is waffle'.[2] This is necessarily true for *all* historical periods: qualitative impressions, derived from literary texts or individual inscriptions or papyri or skeletons or archaeological sites, cannot provide a reliable picture of general conditions and trends. And since demography is by definition concerned with the physiological and relational properties of large collectives, general conditions and trends are precisely what we need to know about.

Owing to this ineluctable need for quantification, certain categories of ancient source material are more suitable for demographic analysis than others. Elite literature, still the principal conduit of modern engagement with the ancient world, is in many ways the least helpful body of evidence at our disposal. It contributes little beyond sporadic references to population numbers, which are valuable only in as much they are based on empirical observation and not made up out of whole cloth or shaped by rhetoric conventions of numerical stylization.[3] Its various genres are a poor guide to structural features such as mortality, fertility, and mobility, and tell us more about ideals and anxieties than about demographic realities.[4] Archaeology provides massive amounts of data that are susceptible to formal measurement and statistical analysis, most notably skeletons and the scatter distributions revealed by field surveys. However, properly demographic study of this material is fraught with difficulties that have proven hard or sometimes impossible to overcome: as a consequence, skeletal paleodemography and demographic readings of the results of field surveys continue to be subject to intense controversy, and I for one tend to be rather pessimistic about their ultimate potential.[5]

When it comes to ancient demography, documentary evidence takes center stage. Our present focus on epigraphy notwithstanding, it must be stressed that it is papyrology that has made the single most substantial contribution to our understanding of early populations. Students of historical populations rely on lists of people within the context of their families and households

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[1] Parkin 1992, Corvisier and Suder 2000, and Frier 2000 provide general overviews. Earlier scholarship is listed in the bibliographies of Suder 1990 and 1991 and Corvisier and Suder 1996. Golden 2000 and (more comprehensively) Scheidel 2001b survey and critique recent developments in the field. Scheidel in progress a will provide an up-to-date account of Greek and Roman demography. For now, see Scheidel 2007a and in press a.

[2] Schofield and Coleman 1986: 4.

[3] Source coverage is best for classical Athens and Republican Rome: see Hansen 1985, 2006a, 2006b and Brunt 1987 for what can be achieved with this material. On monetary number stylization, see Duncan-Jones 1982: 238-256, Scheidel 1996b, and Duncan-Jones 1997: comparable patterns are amply attested with regard to population numbers, which still await proper analysis.

[4] Concern about demographic decline is a good example: Gallo 1980; Grassl 1982: 56-58. For the ways in which demographic reality curbed Roman *patria potestas*, see Saller 1994 and Scheidel 2008. Medieval demographers deal with a similarly unpromising textual tradition: Biller 2000. Only early Chinese literature offers better data: Bielenstein 1987.

[5] On skeleton-based 'paleodemography', see most recently Hoppa and Vaupel (eds.) 2002 and Chamberlain 2006. For critiques, see Parkin 1992: 41-58 and the numerous references in Scheidel 2001b: 19 n.66. On the demographic potential of field surveys, see esp. Sbonias 1999a, b; Osborne 2004; Witcher 2005; Scheidel forthcoming a (very skeptical); Pelgrom in progress. For an experimental attempt to use numismatic hoard data for demographic purposes, see Turchin *et al.* in progress.

to reconstruct demographic features: the Florentine *catasto* of 1427 and the English parish registers are among the most famous examples.[6] Greco-Roman Egypt is the only part of the ancient world that provides the same *type* of evidence: uniquely among ancient sources, surviving census documents, tax lists, and birth and death certificates from this region – in fact mostly from a few districts in Middle Egypt – record the kind of quantifiable information that is the lifeblood of all historical demography. Pride of place belongs to the approximately 300 census returns from the first three centuries AD that enabled Roger Bagnall and Bruce Frier to reconstruct the basic patterns of mortality, fertility, mobility and family life in that period in a way that is not feasible for any other western Eurasian population prior to the late Middle Ages.[7] While Bagnall and Frier's interpretations leave ample room for disagreement and revision,[8] it is precisely the fact that these data sustain statistical arguments that underscores their enormous value: ancient demography would be much poorer without them. More recently, Willy Clarysse and Dorothy Thompson further expanded our time horizon in their publication and detailed analysis of a series of tax records from the Ptolemaic period that shed new light on family and household sizes and structures as well as sex ratios.[9] Other records allow us to gauge the size of particular cities and villages in the Greco-Roman period and on occasion even to extrapolate to the level of whole districts, while dated birth certificates may reflect the seasonal distribution of reproduction.[10]

The number of published Greek and Roman inscriptions exceeds that of papyri by an entire order of magnitude, running in the hundreds of thousands. More importantly, the majority of them are epitaphs, recording the names of countless individuals, sometimes with their ages and more often than not with explicit reference to one or more members of their families: parents, siblings, spouses, offspring, and other relatives. Cumulatively, they form a giant database of information that is intrinsically pertinent to population studies. At the same time, however, the cultural conventions of funerary commemoration, as well as ignorance, introduce biases that differ from those found in documents that were specifically designed for demographic purposes, such as census returns, and tend to be more substantial and pervasive.[11] This means that while inscriptions hold great promise for historical demography, they also pose particularly challenging problems of interpretation.

For the purpose of this survey, there is little point in separating inscriptions along linguistic boundaries. This is not to say that demographic conditions were the same across the Greco-Roman world: in fact, we must allow for considerable differences both between and within different regions.[12] Thus, if we sought to understand the demography of a specific area beyond probabilistic generalizations about the characteristics of pre-modern populations, we would have to limit our investigation to features that can be explored with the help of locally available evidence. If, however, as in this case here, we are interested in epigraphy's overall contribution to demographic research, a more eclectic approach is required: while it will not and cannot yield a

[6] Herlihy and Klapisch-Zuber 1978 and 1985; Wrigley and Schofield 1981; Wrigley *et al.* 1997.

[7] Bagnall and Frier 1994, superseding Hombert and Preaux 1952. Additional evidence of somewhat lesser quality was published in Bagnall, Frier and Rutherford 1997. For early medieval Chinese census returns, cf. Liao 2001. For Japan, cf. Farris 1995: 18-49. Medieval Arabic papyri hold further promise.

[8] Scheidel 2001a: 118-180.

[9] Clarysse and Thompson 2006, esp. vol. 2, 226-317.

[10] Cities and villages: Rathbone 1990 and Tacoma 2006: 21-68. Birth certificates: Shaw 2001: 88-89. Death certificates, by contrast, cannot be used to establish seasonal mortality patterns: see Scheidel 1999b.

[11] For selective preferences, see below, n.46; and cf. in general Morris 1992: 156-173. For age-awareness, see Duncan-Jones 1990: 79-92 and Scheidel 1996a: 53-91. For manipulations of census information, see Scheidel 1996c and 2001a: 142-162.

[12] Historical demographic study of the more recent past appreciates the co-existence of broad trends and micro-variation, a situation that surely obtained in antiquity as well but cannot normally be expected to be visible to modern observers. Much the same is true of ecological conditions that shape mortality, fertility, and migration: see, e.g., Sallares 2002, and generally Scheidel 2001c for the scale of variation.

legitimate composite picture of 'Greek' or 'Roman' demography, it gives us a rough idea of the potential and limitations of this particular type of evidence.

Population number and distribution

As we will see, inscriptions contribute much more to some areas of demography than to others. When it comes to questions of population numbers, epigraphy has very little to offer. An isolated text such as *CIL* III 6687 = *ILS* 2683, which reports that the auxiliary prefect Q. Aemilius Secundus, having been instructed by by Syrian governor P. Sulpicius Quirinius (the 'Cyrenius' of Gospel fame: *NT* Luke 2.1-2) to conduct a census in the city state of Apamea on the Orontes, counted 117,000 citizens (*milium homin(um) civium CXVII*) in or around AD 6 is of limited use to us. While it seems clear that this figure refers to the entire territory of Apamea and not just its urban center, and while in the absence of obvious number stylization (beyond rounding to the nearest thousand) there is no good reason to consider this figure fictitious, the identity of these 117,000 *homines cives* remains controversial. As Mommsen pointed out, the use of the term *homines* suggests the inclusion of men, women and children rather than adult men only; however, the emphasis on *cives* leaves room for the exclusion not only of slaves, temporary residents and nomads but also of regular residents whose status fell short of full citizenship.[13] In a recent detailed discussion of the probable meaning of this record that draws on archaeological evidence for urban and rural population densities in this area, David Kennedy dismisses the possibility that the majority of actual residents were excluded from this count, and prefers a total that does not much exceed the reported tally.[14] It deserves attention that this conclusion is ultimately based on probabilistic reasoning that is extraneous to the epigraphic document: by itself, the text cannot tell us for certain how many people lived in Roman Apamea. This, in turn, undermines any extrapolations from the size of the local population to that of the province of Syria or the entire Levant. For that, all we have got is Pompey's boast that he had conquered 12,183,000 people in his eastern campaigns, a figure that happens to resemble Ottoman census counts for the former Asian provinces of the Roman empire in the 1870s, and therefore need not be entirely imaginary (even if we cannot tell how his agents could have empirically determined anything like a correct figure).[15]

The *Monumentum Ancyranum* famously records the results of three citizen censuses held under Augustus, of 4,063,000 *civium Romanorum capita* in 28 BC, 4,233,000 in 8 BC, and 4,937,000 in AD 14.[16] Despite the apparent clarity of these tallies, their meaning continues to be hotly debated: they may have covered only adult male citizens, as the previous census had (supposedly) done during the Republic; or all Roman citizens; or just possibly merely all citizens who were *sui iuris*.[17] These uncertainties translate to population estimates for Roman Italy that differ by a factor of three, and have serious repercussions for our understanding of ancient demographic conditions overall.[18] Once again, seemingly precise numerical records fail to provide conclusive answers to our questions. Comparable figures have only survived in a literary text, the Elder Pliny's references to the number of *libera capita* in three Hispanic *conventus* in the

[13] T. Mommsen in *EE* IV p.537 and *CIL* III 6687 p.1223. Cumont 1934: 189 argued for the presence of several hundred thousand non-'citizen' residents.
[14] Kennedy 2006: 113-122.
[15] Plin. *NH* 7.97-96, with Kron 2005: 485-486. This figure also matches modern estimates for the Asian provinces that are not derived from the Elder Pliny: see Frier 2000: 814.
[16] *RGDA* 8. The *Fasti Ostienses* give 4,100,900 for AD 14.
[17] The literature is large and keeps on growing: see esp. Beloch 1886: 370-378; Brunt 1987: 113-120; Lo Cascio 1994; Kron 2005: 444-458; Hin in progress.
[18] Scheidel forthcoming explores the logical implications of competing readings.

first century AD (*NH* 3.28). Beatrice Le Teuff has just completed a study of all known census officials of the Principate: dozens of registration events are documented, and while the aforementioned tally for Apamea is unlikely to have been the only one ever recorded in stone, the results of these labors appear to be forever lost.[19]

A number of Roman cities have produced inscriptions that record the number of inhabitants who were entitled to receive cash handouts or partake of public banquets. In almost all of these cases, however, the precise identity of these individuals remains unclear: this largesse may have been limited to urban residents or extended into the population of the surrounding territory, and may or may not have excluded certain types of residents.[20]

An indirect method for estimating the size of an ancient population has been proposed for late classical Athens. Ten surviving rosters from between 334/3 and 324/3 BC list all the ephebes from a particular *phyle* who served in a given year. The totals range from *c.*30 to *c.*65, for a mean and median of *c.*46-47.[21] If we assume that all citizens had to serve as ephebes, an annual cohort of 450-500 eighteen- to nineteen-year-olds would translate to not more than 15,000 adult male citizens, which falls short of the chief competing estimates of *c.*21,000 and *c.*30,000 advocated in recent scholarship.[22] However, once we infer from this that service in the *ephebeia* was not an indispensable precondition of Athenian citizenship, we have to fall back on probabilistic arguments about the proportion of young men who did not serve (due to physical incapacity or other reasons) to bring the documented number of ephebes in line with a particular estimate of the size of the entire citizenry. Under these circumstances, the epigraphic data cannot *directly* support any particular modern reconstruction.

From a demographic point of view, the *stelai* listing the names of the citizens of Eretria from the early third century BC suffer from a similar shortcoming: only two out of six *phylai* are comprehensively covered by the extant inscriptions, and, more importantly, tentative extrapolation from these subtotals to the original total suggests that a substantial proportion of all Eretrian citizens had been omitted from these records altogether.[23] Thus, for all their impressive scale (listing as they do 1,384 members of the first two *phylai*), these documents fail to give us a proper idea of overall population numbers.

These examples show that Greek and Roman inscriptions contribute very little information on population size.[24] As we move on to questions of distribution and transfers, the situation remains equally bleak. Modern attempts to determine the share of particular status groups in a given population from their numerical representation in the epigraphic record are invariably doomed to failure. Representational biases are a key element of the 'epigraphic habit' of ancient societies and make it impossible to derive realistic distributional patterns from attested frequencies in epigraphic corpora. It has long been accepted that the members of certain groups

[19] Le Teuff 2007. She is now working on a comprehensive study of the census in the Roman empire.

[20] Duncan-Jones 1982: 259-277 is the most detailed attempt to exploit these texts for demographic analysis. Cf. also Warden and Bagnall 1988, on Ephesus.

[21] Hansen 2006b: 34 summarizes the evidence.

[22] Hansen 2006b: 19-60 is the most recent discussion (favoring 30,000), with full bibliography. The attempt of Sekunda 1992 to match 466 ephebes to a citizen total of 21,000 is demographically impossible: cf. also Hansen 1994.

[23] Hansen 2006b: 61-88, focusing on *IG* XII.9 245-246 (first and second *phylai*).

[24] In a sense, even the most prominent specimen – the *Monumentum Ancyranum* – furnishes evidence that merely corroborates the census total of 5,984,072 for AD 47 related by Tac. *Ann.* 11.25. None of the other texts mentioned in this section provide what can be considered a straightforward total for a given community.

were more likely to set up inscriptions than others: the extreme overrepresentation of freed slaves in texts from the western parts of the Roman world is merely the most conspicuous example.[25]

The epigraphic representation of the sexes likewise appears to have been subject to significant distortions. In Greek and Roman epitaphs, men of all ages were generally more likely to be recorded than women. A substantial survey of Athenian tombstone inscriptions found references to 1,364 men, 744 women, and 69 persons of indeterminate sex from the fourth century BC, for an overall sex ratio of 183.[26] This imbalance is too large to reflect reality: a population from which 45 per cent of all women had been removed (through exposure or infanticide) would not have been viable in the long term.[27] The same holds for the much more numerous Roman material. The largest sample, for the city of Rome itself, documents 6,008 men and 3,972 women, for a sex ratio of 151 (or 134 if soldiers are excluded) – 163 in the first and second centuries and 126 in the third century AD. Lest this skewing be attributed to male immigration to the capital, it should be noted – to pick just two examples out of many – that similarly elevated sex ratios of 131 and 147 emerge from 1,596 and 616 (almost entirely civilian) texts from the Quattuor Coloniae and Thugga in North Africa, respectively.[28] An epigraphic survey of large parts of Roman Italy (covering *regiones* II-IX and XI) found an extraordinarily high sex ratio of 251 for 3,571 children of families that appear with children of only one sex. Families recorded with children of both sexes likewise show high sex ratios overall, and the sex ratio for 2,244 parents is 133.[29] Differential valuation of the sexes is the most economical explanation for this consistent imbalance.

Several epigraphic lists of living individuals reveal a comparable trend. Apparently more than 1,000 mercenaries, many of them from Crete, were enfranchised by their employer, the city of Miletus, in two decrees dating from 228/7 and 223/2 BC, and their names inscribed on the walls of the Delphinion, the local sanctuary of Apollon. Further immigrants were added on later occasions. Some of these new citizens appear as single individuals and others as heads of families. Owing to the fragmentary preservation of the texts, fewer than 1,000 names are fully or partially legible.[30] Recorded children are overwhelmingly male: 158 males versus 40 females, for a sex ratio of 395.[31] At the same time, however, male children who are classified as minors are far more strongly overrepresented than mature offspring: the sex ratios are 430 for the former (n=138) and 260 for the latter (n=36).[32] In families where both parents are recorded, the respective ratios are 391 (n=54) and 125 (n=9).[33] It is striking that recorded sex ratios drop very substantially with age.[34] This trend is mirrored by the urban census returns from Roman Egypt,

[25] See already Maier 1953/4: 336-351, and most recently Mouritsen 2005. Imbalances in the representation of the two sexes and different age cohorts reinforce this impression: see below, in this and the following sections.

[26] Vestergard *et al.* 1992: 5-6. The sex ratio states the number of men per 100 women.

[27] Cf. Chapman 1980.

[28] Clauss 1973: 415-417 tab.X.

[29] Gallivan and Wilkins 1997: 260 tab.10.3 (children of one sex), 243 (children of both sexes), 264 tab.10.6 (parents). McWilliam 2001: 80 tab.5.1 reports a sex ratio of 177 for 782 children under 14 in a sample of 13,587 inscriptions from different parts of Italy.

[30] The texts were published by Rehm (ed.) 1914; supplemented by Günther 1988. A comparable but much shorter list has survived at Ilion, also from the Hellenistic period: Frisch 1975 no.64.

[31] Based on the data in Brulé 1990: 257. For children recorded as parts of families, the sex ratio is similarly high (viz., 360): Brulé 1992: 68.

[32] Based on Brulé 1990: 257. For the terminology of age groups in these texts, see Pomeroy 1983: 213; Brulé 1990: 243.

[33] Based on my own survey of the material in Rehm (ed.) 1914 and Günther 1988. If all male children of indeterminate age are assumed to be mature, the sex ratio for all mature children rises to 275 (n=15).

[34] If these inscriptions had faithfully reported actual family composition, the share of mature sons would have had to have been higher than that for male minors: daughters married earlier than sons and would

where the reported sex ratio falls from 350 for ages 0-4 (n=36) to 176 for ages 5-9 (n=47), 143 for ages 10-19 (n=68), and 98 for ages 20-39 (n=113).[35] The sex ratio of children recorded in epitaphs from various parts of Roman Italy also tends to decline with increasing age.[36] Thus, instead of blaming extreme sex imbalances on rampant femicide,[37] it would seem to make more sense to explain such patterns in terms of a culture of indifference to very young daughters that gradually diminished as they approached the age of marriage. Equivalent tendencies are well-documented in other societies.[38]

Extravagantly male-biased sex ratios in inscriptions such as the alimentary table of Veleia, according to which 264 boys but only 36 girls received financial support (for a notional sex ratio of 733), and *CIL* XIV 3649, a roster of *circitores* (who looked after the aqueducts of Rome) that is only fragmentarily preserved in a manuscript and records 24 sons and 5 daughters of 21 members (10 of whom are not assigned any children at all), are impossible to relate to any conceivable actual demographic conditions.[39] By contrast, the less prominent predominance of men in lists of Roman slaves, whilst demographically implausible, is at least not inherently fantastic and would merit closer study.[40]

References to human mobility are also shaped by commemorative preferences: there is no way of telling how the proportion of epigraphically attested individuals who are said to have relocated from one town or region to another relates to the corresponding proportion of the general population, or even how the epigraphic representation of specific areas of provenance compares to the actual relative weight of different sources of migration.[41] For a very rough idea of the overall scale and shape of human mobility in the ancient world, we need to rely on literary texts (which tell us a fair amount about Roman colonization programs, for example) or try our hand at parametric modeling.[42]

Mortality

Epigraphic sources are of much greater importance for our understanding of the structural features of ancient populations. As a fundamental determinant of population structure and human well-being, mortality occupies a pivotal position in demographic research. Modern estimates of ancient levels of mortality, and hence average life expectancy, primarily rest on two elements: the notion that early civilizations must have experienced high mortality comparable to that documented for more recent historical populations, such as eighteenth-century Europe or nineteenth- and early twentieth-century Egypt, India, or China; and isolated samples of putatively representative data from the Roman period, above all the census returns of Roman Egypt. All these sources point to a mean life expectancy at birth that may have ranged from the low 20s to

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have left their parental households at a younger age, thereby raising the sex ratio for older children. However, we can only guess if newly enfranchised citizens were supposed to declare married daughters.

[35] Data from Scheidel 2001a: 256-257. The argument by Bagnall 1997 cannot properly account for this pattern. For earlier discussion, see Scheidel 1996c: 34-48.

[36] See McWilliam 2001: 83 tab.5.3.

[37] *Contra* Pomeroy 1983 and Brulé 1992. For critiques, see the references in Scheidel 1996c: 43-44; and in future Scheidel in progress b.

[38] E.g., Scheidel 1996c: 40-41 and 2001a: 150, with references.

[39] This will be discussed in Scheidel in progress b. Cf. already Duncan-Jones 1982: 301.

[40] Treggiari 1975 a and b; and see also Weaver 1972: 172. Cf. Scheidel 2005: 71-73 on the problem of servile sex ratios.

[41] Wierschowski 1995 and 2001 are the most substantial studies of this material. Cf. Scheidel 2001b: 48 n.191 for the limits of this approach.

[42] For the latter, see now Scheidel 2003b, 2004a, and 2005.

somewhere in the 30s, depending on the local disease environment.[43] The presence of former city magistrates in the *album* of Canusium, a roster of the *ordo decurionum* of an Apulian town in AD 223 (*CIL* IX 338), is consistent with this view, as are the recorded life-spans of Roman emperors who are thought to have died of natural causes.[44]

At the same time, despite their enormous number, the tens of thousands of epitaphs from the western half of the Roman empire that record the ages of the deceased fail to shed light on the question of average life expectancy. Generations of scholars assembled ever-larger samples of inscriptions with age-at-death information, peaking in János Szilagyi's monumental collection of some 43,000 references published in the 1960s.[45] The resultant statistics merely reveal the average age of death of those individuals who happened to be commemorated in stone: far from generating demographically representative samples of actual populations, commemorative practices were shaped by a variety of factors such as geographical provenance, class, religion, language, gender, and, most crucially, age.[46] Because of these manifold distortions, age distributions derived from epigraphic samples do not normally match any demographically credible pattern, except very occasionally by chance.[47] All this has been conclusively demonstrated so many times that one can only marvel at continuing attempts to marshal this material for demographic reconstructions: the best that can be said about them is that they finally appear to have slowed to a trickle.[48]

While tombstone inscriptions cannot tell us about average life expectancy or age-specific mortality patterns,[49] some of them provide unique and invaluable information on the seasonal distribution of deaths. The seasonality of mortality is a function of disease environments that may vary quite considerably at the local and regional levels: different diseases affect humans at different times of the year. Therefore, the seasonal incidence of funerary commemoration is suggestive of the nature of the principal causes of death in a given population, or even in specific age cohorts. Given the lack of any direct evidence for the relative weight of different causes of death in ancient societies, dated commemorations offer much-needed proxy data that afford us at

[43] Frier 2000: 788; Scheidel 2001a: 118-162 and 2001c. For model life tables, see Coale and Demeny 1983, with modifications proposed by Preston, McDaniel and Gruska 1993 and Woods 2007, and the general critique in Scheidel 2001c: 3-14. Cf. below, at n.81.

[44] Scheidel 1999a: 255-266.

[45] In six articles that appeared in *AArchHung* 13 (1961) to 19 (1967). (Despite its lack of demographic value, this database provides an excellent tool for the study of Roman age-awareness: see Duncan-Jones 1990: 79-92.) For 'demographic' analyses of Roman epitaphs, cf. also, e.g., Burn 1953; Nordberg 1963.

[46] Clauss 1973 offers the most detailed demonstration of these biases; see also Parkin 1992: 5-19. Egyptian epitaphs suffer from the same problems: Boyaval 1976 (and cf. 1975). For language as a variable, see Ery 1969: 60 (Greek inscriptions from the city of Rome imply a mean life expectancy at birth of 51 years, as opposed to a mean of 23 years for Latin epitaphs from the capital). For the (moderate) influence of religious affiliation, see Shaw 1991.

[47] Hopkins 1966 is the classic analysis, restated in Hopkins 1987. To his credit, Beloch 1886: 47-52 already noted serious problems with the use of epitaphs for the purpose of reconstructing Roman age distributions, although he did seek to salvage a small part of the material. For coincidental matches, see Hopkins 1966: 257-258, and esp. Parkin 1992: 166 n.51 and Scheidel 2001b: 17-19 on the attempt by Frier 1982: 235-238 (reiterated in Frier 2000: 791-792) to use one local sample of Roman North African inscriptions for demographic purposes.

[48] Suder 1990; Sgarlata 1991; Mihailescu-Bîrliba 2004: 25-52; Paine and Storey 2006.

[49] In Scheidel 1996a: 117-132, I sought to derive the average life expectancy of Roman legionaries and imperial guardsmen from the number of soldiers recorded on various discharge rosters. This method cannot account for attrition during service from other causes and (at best) allows only very crude guesstimates. For health conditions in the Roman imperial army, see now Scheidel 2007b.

least the occasional glimpse of the underlying regimes of morbidity and mortality.[50] Moreover, these data permit us to compare ancient conditions with more recent seasonality patterns and to draw inferences about intervening changes in the configuration and severity of local or regional disease environments.

Unfortunately for the demographer, only a relatively small percentage of all surviving epitaphs record the date or at least the month of death. A strong preoccupation with the afterlife seems to have been a necessary precondition for this practice: it was mostly (though not entirely) limited to Roman (and later Coptic) Egypt and to late antique Christian communities. By far the largest sample of pertinent data comes from the catacombs of Rome of the late fourth through sixth centuries AD. Utilizing increasingly large numbers of references, successive studies were able to reconstruct a very clear profile of seasonal mortality in that period (Fig. 1).[51]

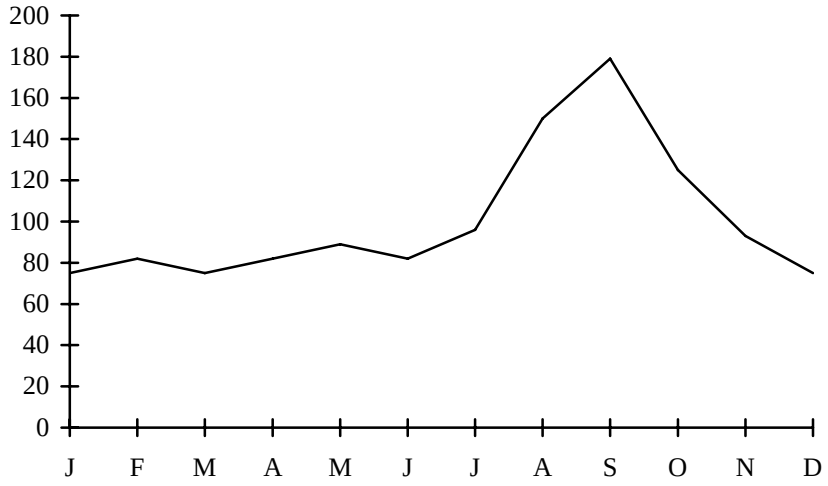

Fig. 1 Seasonal mortality index for late antique Rome (n=3,938)

This is not the place to consider the probable causes of the attested pattern.[52] Suffice it to say that from the Roman period until the nineteenth century, the late summer and early fall were known as a time of severe malaria outbreaks, which coincided and interacted with the manifold gastro-intestinal diseases that were typical of the hot months.[53] In the Roman material, the profiles are virtually identical for both sexes and very similar for infants, young children, and young and middle-aged adults. Only the elderly experienced separate mortality surges in the colder and wetter parts of the year, in keeping with cross-cultural trends for these cohorts.[54]

[50] For the use of seasonality data in early modern demography, see, e.g., Landers 1993: 203-241. For the problems of identifying causes of death in pre-modern contexts, see Alter and Carmichael 1996 and (eds.) 1997.

[51] Fig. 1 reproduces Shaw 1996: 115 fig.5. In keeping with the law of diminishing returns, enlargements of the original sample did not significantly alter the shape of the profile: compare Nordberg 1963: 55-57 = Scheidel 1996a: 139 fig.4.1 (n=2,125) with Shaw 1996: 115 fig.5 (n=3,938).

[52] For discussion, see Scheidel 1994, 1996a: 139-153, and 2003a.

[53] Sallares 2002: 201-234.

[54] Shaw 1996: 117-121 figs.8-13.

Comparisons with conditions in nineteenth-century Italy are more revealing. Whereas in terms of timing and degree of variation, the seasonality profiles for children aged 2 to 9 were broadly similar in both late antique Rome and Italy in 1869 (with only a slightly later and marginally higher mortality peak in the former), the picture is very different for young and middle-aged adults: in the months of August and especially September, such residents of late antique Rome were up to twice as likely to die than in other months, whereas their counterparts in 1869 Italy experienced only an almost imperceptible uptick in deaths at that time of the year.[55] This would seem to indicate that the disease regime of late antique Rome presented what is usually the most resilient segment of the population with exceptionally serious health hazards.[56] Adjusted for the discrepancy between the pre-Julian Roman calendar and the lunar year, the dates of death or burial gleaned from 125 presumably late Republican burial vases from the city of Rome show an even stronger mortality surge in the early fall.[57]

This impression is reinforced by similarly dramatic seasonal mortality peaks in epigraphic samples from Roman and Coptic Egypt and Nubia. These data reflect substantially different ecological conditions, with strongly elevated mortality in the spring in the Nile Valley and a concentration of deaths in the late fall and early winter on the (less well documented) fringes of the Delta (Fig. 2).[58]

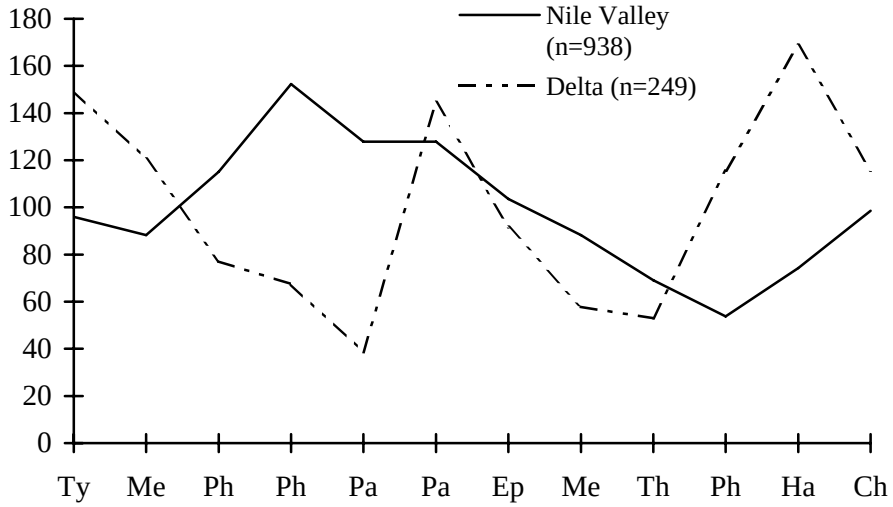

Fig. 2 Seasonal mortality indices for Roman and Coptic Egypt and Nubia

[55] Scheidel 2001c: 17 fig.10.

[56] The vulnerability of recent immigrants from healthier locales may well have been a contributing factor: Scheidel 2003a: 175-176. For the severity of 'archaic' mortality regimes in general, see briefly Scheidel 2001c: 8-11.

[57] Shaw 2006: 93-101

[58] Scheidel 2001a: 4-10 and 16-25. For matching trends (for Middle Egypt) on mummy labels, see Scheidel 1998 and 2001a: 10-16. Note that in Fig. 2, the secondary summer peak in the data from Lower Egypt is in its entirety caused by the deaths of minors, while adults only experienced excess mortality in the fall and winter months (Scheidel 2001: 26-29, esp. 29 figs.1.19-20).

Although these profiles are more difficult to link to specific diseases than in the case of Rome, the perils of spring are consistently noted in traveller's reports from the early modern period: more infectious diseases are known to have been active in that season than in any other time of the year.[59] A smaller sample of dated deaths from late antique inscriptions from the province of Palaestina Tertia shows a similar distribution to that for the Nile Valley.[60]

A number of local or regional profiles have been compiled from late Roman epitaphs from various parts of the empire: however, they are mostly too dispersed to provide reliable insights into actual mortality patterns. One reasonably well-attested site is Altava in Mauretania Caesariensis, which suffered elevated mortality in the fall. Otherwise, usable local evidence is confined to the major urban centers of Alexandria and Carthage. If these fairly small samples are to be trusted, neither one of these cities experienced a particularly deadly season: all we get is noise (Fig. 3).[61]

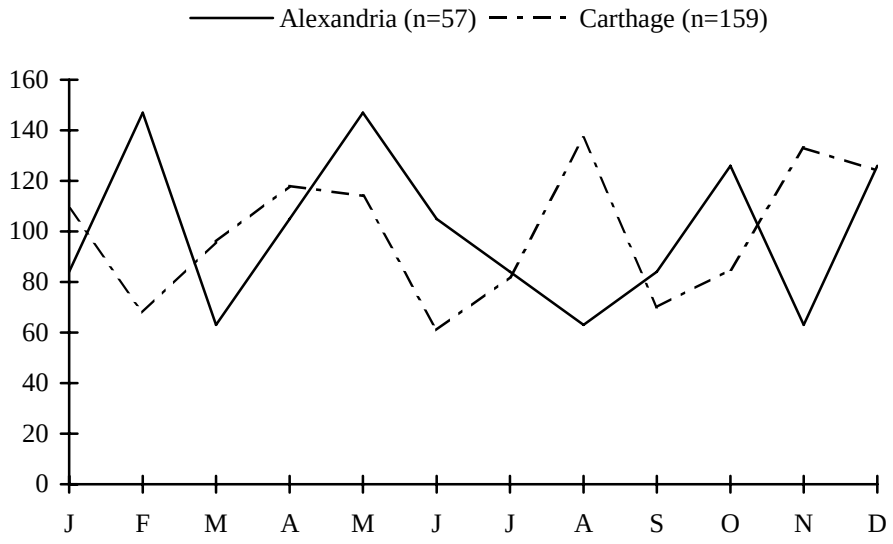

Fig. 3 Seasonal mortality indices for Roman Alexandria and Carthage

This indicates that high concentrations of population did not necessarily endogenously sustain severe disease regimes that generated massive seasonal mortality crises: rather, the disease environment, and thus seasonality, may have been primarily determined by local ecological conditions.[62] Whatever the correct explanation of these features, it would clearly be impossible to explore ancient mortality regimes without the help of dated epitaphs. After many false starts that had scholars looking for demographic information in the wrong places, focusing on the recorded ages at death, a new emphasis on the timing of death has finally enabled epigraphy to make a vital contribution to our understanding of ancient mortality.

[59] Scheidel 2001a: 51-117, esp. 110 tab.1.19.
[60] Scheidel 2001a: 37 fig.1.24, based on Patlagean 1977: 92-94.
[61] Scheidel 1996a: 157-163 and 2001a: 20-22.
[62] Coastal settings may have been more salubrious: note the absence of pronounced seasonal mortality variation in early modern Naples (Scheidel 1996a: 162 fig.4.32).

Fertility

Ancient fertility rates are empirically unknown. There can be doubt that in the long term, birth rates must have broadly matched death rates, given that sustained significant divergences would eventually have caused ancient populations either to disappear or to expand to modern levels. Beyond this trivial observation, more specific insights are hard to come by. With the help of the information contained in census returns, Frier was able to reconstruct the age-specific fertility distribution for women in Roman (Middle) Egypt, which indicates the prevalence of a 'natural fertility' regime, that is, the absence of deliberate parity-dependent family limitation.[63] Fertility *rates*, however, need to be inferred from probable levels of mean life expectancy.[64] Notwithstanding sporadic claims to the contrary, inscriptions do not and cannot contribute direct information on this issue. Parent-child ratios on epitaphs do not tell us about the number of children ever born to a particular woman, let alone the average scale of fertility.[65] Lothar Wierschowski tried to circumvent this problem by focusing on the average number of attested children per family in epitaphs from three Gallic communities in different periods in order to trace *relative* fertility change over time.[66] Unfortunately, this experiment yields demographically implausible results,[67] which would seem to suggest that temporal variation in attestation may have been caused by shifts in commemorative fashion rather than changing collective reproductive behavior.

As Brent Shaw has been able to show, inscriptions shed some light on the seasonal distribution of births and thus on seasonal patterns of procreative activity. In 1,447 epitaphs from late antique Rome, both the date of death and the length of life are recorded with sufficient precision (i.e., at least down to a specific month) to calculate the month of birth. The resultant profile shows a peak in the early winter months (Fig. 4), a trend which is broadly in line with a concentration of births in the fall and winter in a sample of 225 cases from Roman Italy outside Rome and more generally with birthing curves from most pre-modern Mediterranean countries.[68] These findings point to long-term continuity in that region.

[63] Frier 1994 and 2000: 800-802.
[64] Bagnall and Frier 1994: 138-139, with Scheidel 2001a: 176.
[65] See Scheidel 2001b: 32 n.130 on Lassère 1977: 494-495. Cf. also Scheidel 2001b: 39-40 n.160 for further criticism. For an attempt to measure the average reproductive performance of Roman emperors, see Scheidel 1999a: 269-272.
[66] Wierschowski 1994: 374-375.
[67] Scheidel 2001b: 40 n.161. The number of children recorded in familial inscriptions is generally small: cf. Gallivan and Wilkins 1997: 241-242, 258-259 tabs.10.1-2.
[68] Shaw 2001, esp. 92-103. Fig. 4 is derived from Shaw 2001: 107 fig.6. (The reference to 1,247 cases in that figure appears to be an error.) For Roman Italy outside Rome, see ibid. 108 fig.7, and for modern Italian examples, ibid. 105-106 figs.2-3 and 108 fig.8.

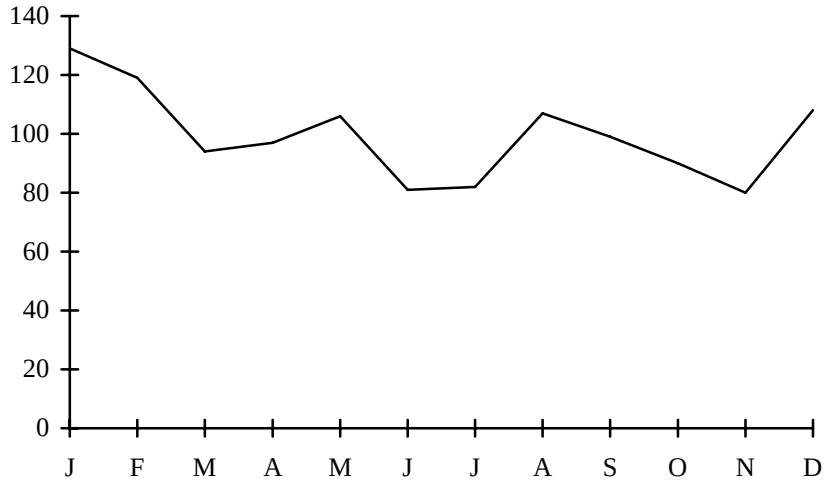

Fig. 4 Seasonal birthing index for late antique Rome (n=1,447)

Nuptiality

Epigraphic documentation has made made very significant contributions to our understanding of the demographic parameters of marriage customs in the Roman world.[69] Literary sources tend to convey the impression that Roman women and men married early, the former in their mid-teens and the latter by the end of their teens.[70] However, these accounts invariably refer to aristocratic practice, raising the question of whether these norms extended into the general population. At first sight, the limited number of inscriptions (n=501) that record both the length of marriage and age at death – and thus permit us to calculate the age at marriage – do not deviate very widely from the elite sources, indicating a median age at first marriage of 15 years for women and 23 for men in pre-Christian texts and of 17 for women and 26 for men among Christians.[71] However, Richard Saller and Brent Shaw, interpreting age-shifts in the identity of commemorators as proxy evidence for changes in marital status, arrived at somewhat different results. In most samples, on average, spouses replaced parents as commemorators for men who died around age 30 and for women who died around age 20 (Figs. 5-6).[72]

[69] I am not aware of comparable Greek data.
[70] Lelis, Percy and Verstraete 2003: 103-125 is the most comprehensive collection of pertinent data.
[71] Hopkins 1965: 321 tab.1; cf. Scheidel in press b: figs.1-2. Aubin 2000 questions the reality of apparent differences between Christian and non-Christian marriage ages.
[72] Source: Saller 1994: 28-31.

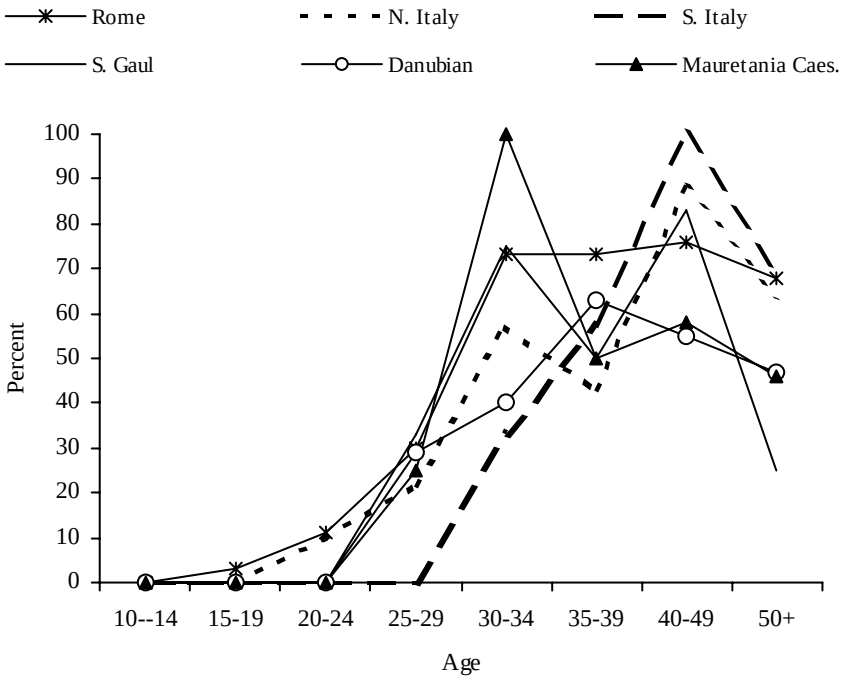

Fig. 5 Proportion of men commemorated by their wives, according to age at death

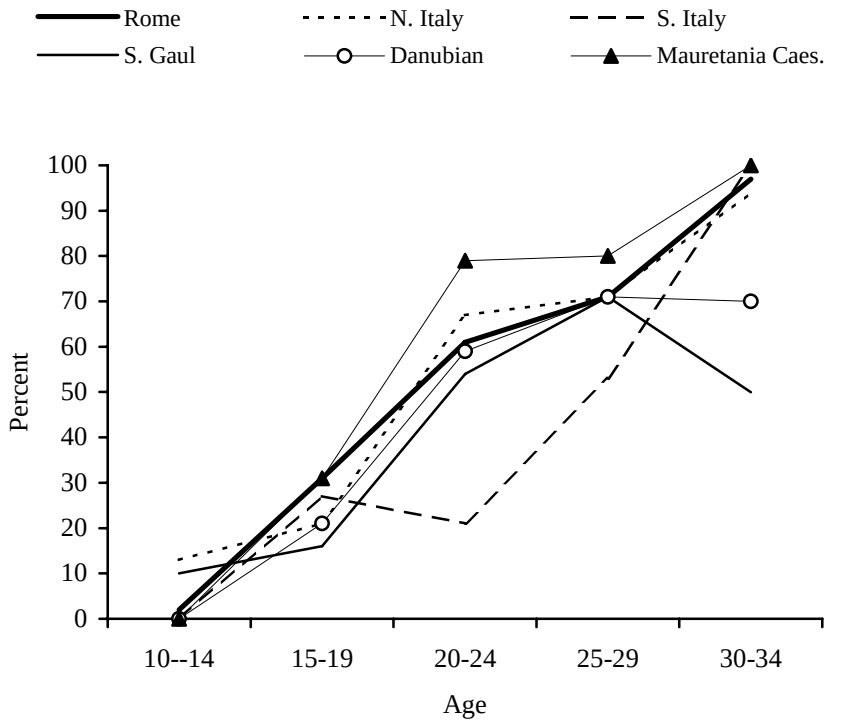

Fig. 6 Proportion of women commemorated by their husbands, according to age at death

Saller and Shaw took this to suggest that men and women had commonly married in their late twenties and late teens, respectively, roughly in keeping with the so-called 'Mediterranean' marriage pattern found in later historical periods.[73] This method has the advantage that it allows us to draw on a much larger body of evidence,[74] whereas the fact that it does not yield explicit evidence for the age of marriage is its most obvious weakness: the putative relationship between commemorative shifts and marital status can only be assumed but not directly documented. Even so, a recent attempt to explain observed commemorative shifts with reference to different factors failed to provide a credible alternative model: as I have argued elsewhere, the idea that spouses took over as men's commemorators as fathers (who are otherwise thought to have commemorated even married sons) died off is inconsistent with probable demographic conditions and cannot be reconciled with the attested age-specific pattern of commemorative change.[75]

At the same time, it is important to bear in mind that these epitaphs chiefly originate from urban environments and therefore present only a relatively small minority of the population of the 'Latin' half of the empire. The results of the Tuscan census of 1427 ought to discourage us from regarding urban marriage data as necessarily representative of society as a whole: in the late medieval city of Florence, the mean marriage ages for men and women were 34.4 and 17.6 or 20.8 years, respectively, compared to 23.4 years for men and 17 or 19.3 years for women in the small villages of its hinterland.[76] Thus, while women's age at first marriage was fairly constant across the Florentine territory, any attempt to extrapolate a 'typical' age of marriage for men from the metropolitan data alone would grossly misrepresent the experience of the majority of the population and greatly exaggerate the actual average age gap between spouses. While we may take solace in the fact that comparably dramatic urban-rural differences seem to be rare, we cannot tell for sure how reliably Roman epitaphs – however interpreted – capture the experience of many millions of rural couples.

Funerary dedications for Roman soldiers exhibit a rather different pattern. Unlike male civilians, even in their thirties and forties only about one-third of recorded active members of the military were commemorated by (de-facto) wives. The incidence of commemoration by spouses that did not exceed that by the birth family until the late thirties, arguably indicating correspondingly late (de-facto) marriage for those soldiers who did enter stable unions.[77]

In a survey of 1,677 inscriptions from the western half of the Roman world which record the duration of marriages that had been terminated by the death of a spouse, Shaw was able to highlight striking differences between non-Christian and early Christian commemoration practices. While non-Christian epitaphs produce an erratic pattern in which relatively long marriages outnumber shorter ones and the mean duration of all unions reaches 21 years, the similarly sized collection of Christian texts shows a gradual decline in the survival rate of marriages with increasing spousal age and yields a mean duration of only 14 years which is readily compatible with comparative evidence from the high-mortality regime of early modern France (Fig. 7).[78]

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[73] Saller 1987; Shaw 1987; Saller 1994: 25-41.

[74] The tabulations in Saller 1994: 28-31 tab.2.2.a-h are based on 2,886 recorded commemorators.

[75] Scheidel in press b, *contra* Lelis, Percy and Verstraete 2003: 73-90. Specifically, this thesis logically predicts a much larger proportion of spousal commemorations for men aged 20-29 than can be observed in the evidence. The nature of the evidence does not allow us to distinguish statistically between the rival assumptions that marriage or the presence of living offspring caused women to be commemorated by spouses rather than parents (ibid.).

[76] Herlihy and Klapisch-Zuber 1985: 203-211, esp. 210.

[77] Phang 2001: 164-176, esp. 168 (fig.). Cf. also briefly Scheidel 2007b: fig.1.

[78] Shaw 2002, esp. 223 tab.7 for a tabulation of the data used in my Fig. 7.

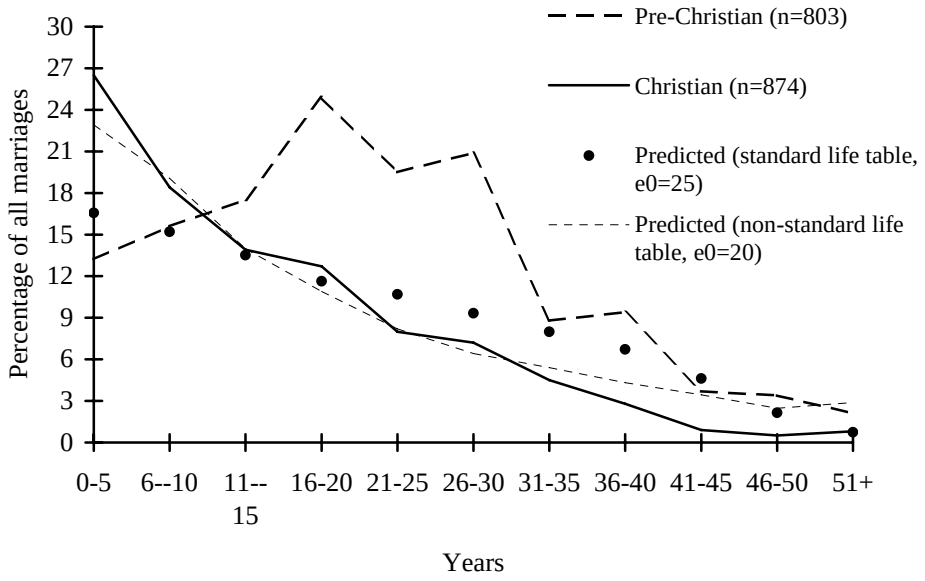

Fig. 7 Length of marriage in inscriptions from the western half of the Roman empire, and predicted length of marriage if mortality was the only attrition factor[79]

Shaw – rightly, in my view – dismisses the representative value of the non-Christian records due to their apparent tendency to emphasize long-lived unions.[80] On the other hand, it is at least possible that the Christian evidence is demographically more dependable. While these records imply far higher attrition rates than predicted by conventional model life tables, their distribution is broadly consistent with a new high-mortality life table that may well provide a better approximation of the most exposed (i.e., urban) elements of early populations.[81] Thus, given the predominantly urban and often more specifically metropolitan provenance of these data, we cannot dismiss them out of hand, although the possibility of a coincidental match must always be borne in mind. Potential confounding variables include divorce – which would have raised the cohort-specific rate of marital termination beyond mortality-induced levels – as well as the theoretical possibility of commemorative preferences favoring younger spouses. This issue would repay further investigation.

Inscriptions also shed light on the seasonal distribution of nuptials in Roman society. Utilizing the same body of Christian epitaphs from late antiquity that also yields information on the seasonality of births and deaths (see above), Shaw identified a number of instances in which both the date of death and the length of marriage had been recorded down to at least a precise

[79] Source: see above, n.78, and below, n.81.

[80] Shaw 2002: 225-227. I must note that Shaw's eliminating of all recorded durations of unions ending in multiples of 5 from 20 years onwards (i.e., all references to durations of 20, 25, 30… years) in non-Christian documents in order to control for age-rounding (ibid. 228 tab.8) does not make any sense in this context: the resultant adjusted mean duration of 12 years is consequently meaningless (*contra* ibid. 229).

[81] The predictions in fig. 7 are derived from Coale and Demeny 1983: 57 (Model West Females Mortality Level 3, stationary population, e_0=25) and Woods 2007: 379 tab.2 (South Europe high mortality model life table, stationary population, e_0=20), based on the simplifying assumption that all women married at age 20 and all men at age 30 (cf. the discussion earlier in this section).

number of months. According to these texts, in both Rome and Italy, December was the most popular month for marriage (Fig. 8).[82]

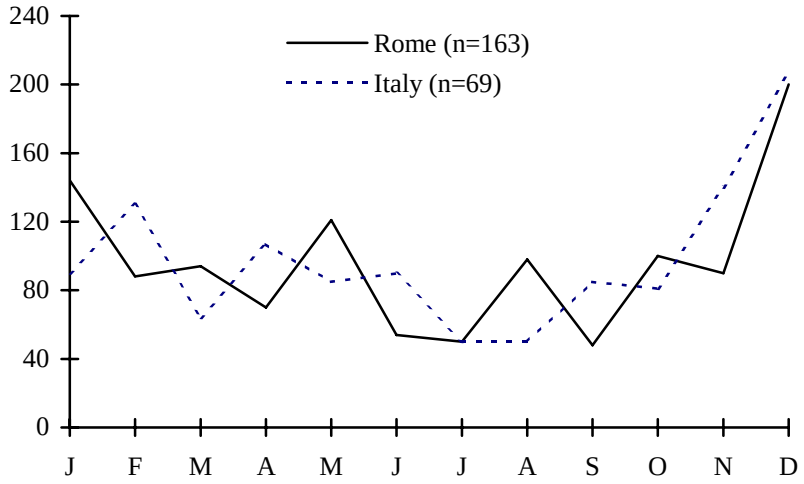

Fig. 8 Seasonal marriage index for late antique Rome and Italy

Finally, inscriptions have been instrumental in revising our reading of one of the most puzzling demographic features of the ancient world, brother-sister marriage in Roman Egypt. 22, or one-sixth, of the 136 sufficiently well documented marriages in the Roman-period census returns (mostly from Middle Egypt) united individuals identified as full siblings.[83] As seemingly frequent monogamous unions between full brothers and sisters are otherwise unknown in any other historical society, this institution has attracted a fair amount of scholarly attention. Nevertheless, all existing attempts to explain this custom are equally unpersuasive.[84] In a new study, Sabine Hübner argues that these unions did not involve biological siblings at all but were contracted between biological and adopted children. This novel interpretation, which is not directly based on evidence from Roman Egypt, owes much to the observation that several funerary inscriptions from Roman Macedonia and Asia Minor mention unions of this kind.[85] In this case, epigraphy has opened up a new way of reading papyrological data.

[82] Shaw 1997: 69-71, esp. 71 figs.4-5. In this regard, the Roman evidence broadly resembles but not quite matches the strong preference for marriage in January and February in pre-1900 Italy, which was a function of agrarian rythms: ibid. 66 figs.2-3 and 72-75, esp. 73 figs.6-7.
[83] For the evidence, see Bagnall and Frier 1994: 127, with later additions.
[84] See esp. Hopkins 1980; Shaw 1992; Scheidel 1996a: 9-51. For possible ways of reconciling this custom with innate incest avoidance, cf. Scheidel 2004b.
[85] Hübner 2007, with reference to *SEG* XXX 596; *TAM* II 1-3.148; *SEG* VI 137 (with 139); *MAMA* I 232; *RECAM* II 303. Roman-period law codes and comparative evidence from more recent cultures documents similar practices of adoption-*cum*-marriage (ibid.).

Family structure

In a seminal study published in 1984, Saller and Shaw collated evidence from some 25,000 epitaphs from the western provinces of the Roman empire in a large-scale attempt to 'measure variations in family and non-familial relationships within different regional and social contexts'. They found that in these inscriptions, commemorative links between members of the nuclear family – spouses/parents and children/siblings – generally greatly outnumbered those that involved other relationships, such as extended kin, friends, or dependents. In other words, the vast majority of individuals who were commemorated on stone received these dedications from members of their nuclear family: in 19 civilian samples that record a total of 5,957 commemorative relationships, between 72 and 91 per cent of them involved parents, spouses, children, and siblings; the overall rate is 85 per cent. By contrast, little more than 4 per cent of all dedications were set up by extended kin.[86] This suggests that for most social groups, the nuclear family was the focal point of three principal social principal bonds, namely family duty, affection, and heirship.[87] Only some socially isolated elements of the Roman military deviated from this pattern.[88] In addition, Shaw used early Christian inscriptions to demonstrate continuity between early and late imperial commemorative preferences: almost 96 per cent of 1,816 dedications in a sample of Christian epitaphs occurred within the nuclear family.[89] These findings provided a much-needed corrective to sweeping claims that the nuclear or conjugal family had not become a prominent feature until late antiquity or indeed (much) later.[90] Recent studies have focused more strongly on regional variation.[91]

It is important, however, to be clear about the limitations of this particular approach. These surveys strictly speaking merely lend support to the notion that nuclear-family relationships mattered more to dedicants than other types of associations, and more specifically that the *pater familias* did not claim a monopoly on the formal commemoration of individuals under his legal control. In 1996, Dale Martin criticized Saller and Shaw's technique of measuring relationships between pairs of people in a way that cannot account for the presence of extended (i.e., three-generational or lateral) relationships even when they are in fact recorded, and proposed to focus on the characteristics of entire inscriptions rather than on dyadic links.[92] This critique has yet to be fully taken into account by students of the Roman family.[93] However, when Jonathan Edmondson recently applied both methods to two epigraphic samples from Lusitania, he obtained virtually identical results: in both cases, the nuclear family dominated the record.[94]

While nuclear relationships can be shown to have taken precedence over other social ties, these epitaphs do not provide direct evidence for household structure: extended kin may have

[86] Saller and Shaw 1984: 147-151 tabs.1-19. It catches the eye that (albeit mostly privileged) slave populations conform to the same pattern: ibid. 151 tabs.17-19.
[87] Saller and Shaw 1984: 127.
[88] See Saller and Shaw 1984: 133, 139-145, 152-155 tabs.20-32, and in general Phang 2001.
[89] Shaw 1984: 497 tabs.7-14.
[90] While historical demographers had already exploded the myth of a dominance of the extended family in pre-modern western Europe, the Roman imperial evidence was essential in refuting Jack Goody's idea that the conjugal only took off with the spread of Christianity (Goody 1983).
[91] For regional patterns, see esp. Martin 1996 (Asia Minor), Gallivan and Wilkins 1997 (Italy), and Edmondson 2005 (Lusitania). See also below, at the end of this section.
[92] Martin 1996: 42-47.
[93] The counter-critique by Rawson 1997 does not properly address Martin's key point.
[94] Edmondson 2005: 215-217, esp. 216 tab.7.9, with 193 tab.7.1. Among 243 inscriptions with discernible commemorative relationships from Augusta Emerita, 80 per cent mention only members of the nuclear family, whereas 77 per cent of 306 relationships in the same sample are between members of the nuclear family. The percentages are essentially the same for the *Civitas Igaeditanorum* (81 per cent of 77 inscriptions and 78 per cent of 125 relationships are just 'nuclear').

been present in an unknowable proportion of all households or may otherwise have played an important role in people's lives. Unfortunately, empirical data on household composition are limited to Greco-Roman Egypt, where we encounter a substantial range of levels of complexity – from solitary households to those formed by conjugal, extended, or multiple families – and significant differences between urban and rural settings.[95] The latter finding once again serves as a reminder that family relations in the vast and potentially diverse rural population of the western half of the empire that did not embrace the 'epigraphic habit' of the Principate in the same way as urban residents remain outside our field of vision.[96]

Most of the epigraphically documented familial ties in the eastern Mediterranean still await detailed examination and comparative analysis. Whereas epitaphs from late archaic and classical Athens resemble the western Roman material in emphasizing attachment within the nuclear family,[97] funerary evidence from Asia Minor and the Levant points in a different direction. 41 per cent of 890 inscriptions from western Asia Minor in which commemorative relations can be ascertained include persons outside the immediate family: local rates range from 27 per cent in Bithynia (n=124, mostly from Nicomedia) to 75 per cent at Olympus in Lycia (n=205).[98] I agree that this may suggest 'a broader emphasis on maintaining links and emotional ties with more distant kin'.[99] It is more difficult to classify epitaphs from Palmyra and Nabataean Hegra.[100] At the latter site, while only one out of 18 inscriptions with discernible ties specifies an extended relationship, commemorations between siblings account for 27 per cent of all relations (n=30), a share several times as large as that found in western Roman sources. This might suggest extended family relations, perhaps even households comprised of co-resident siblings. Most epitaphs at Palmyra lack dedicators, but very few multiple-named inscriptions without dedicators refer to extended kin (6 per cent, n=84). At the same time, the high incidence of attested cousin-marriage may reflect a greater importance of extended family relations in Palmyrene society. These are just a few tantalizing glimpses of rich cultural diversity: one can only hope that the material from the Greco-Roman East will finally receive the attention it deserves.

Outlook

Over the last quarter of a century, epigraphic evidence has given us the means to address a whole range of new questions originating from the demographic study of the more recent past. For the first time, this has made it possible to situate the demographic experience of ancient societies within a much broader comparative framework. But where do we go from here? As is well known, prediction is very difficult, especially about the future… Written information about ancient demography is painfully limited, and it is clear that many key questions will never be answered with its help. I believe that future progress in this field will primarily come from non-textual sources, spurred on by advances in the physical and life sciences. For now, the most promising areas of investigation appear to be those related to physiological well-being – revolving around analysis of the nutritional status of skeletal remains – and to human mobility, where genetics has already begun to make a major contribution. At the same time, open questions concerning population size, mortality and fertility regimes, and family structure are unlikely to

[95] Bagnall and Frier 1994: 57-74, esp. 67 tab.3.2, with Bagnall, Frier and Rutherford 1997: 94-99, esp. 96 tab.6.1. See also Clarysse and Thompson 2006: 246-293, esp. 248-249 tabs.7.8-9 and 255 tab.7.12.
[96] Note, for instance, that in societies with urban nuclear family regimes, stem families may have been more common among farmers: cf. the references in Shaw 1984: 486 n.55 and Anderson 1995: 10-22.
[97] Humphreys 1980, esp. 104-105, 116 n.48.
[98] Martin 1996: 47-60, esp. 59 tab.2 (where the numbers do not match those at 48 tab.1).
[99] As suggested by Edmondson 2005: 216-217.
[100] For the following, I rely on Dandrow 2001, who draws on Healey 1993 and Sadurska and Bounni 1994.

receive better answers from these lines of inquiry. It is quite possible that in these areas at least we have already come close to exhausting our resources. I would love to be proven terribly wrong; but I won't be holding my breath.

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