Classical Quarterly **34** (ii) 386–393 (1984) *Printed in Great Britain*

THE USE OF HISTORICAL DEMOGRAPHY IN ANCIENT HISTORY

The purpose of this paper is to assess the validity of some methods currently being used to interpret the demographic evidence from the ancient world. For example, it has been claimed that during the Hellenistic and Roman eras, birth rates were 40/1,000/year, death rates 36/1,000/year, and that 10% of healthy infants were killed, raising the death rate to 40/1,000/year; the claims rest on comparative material and anecdotes from literary sources.[1] This paper will question (I) the use of comparative material from modern primitive societies as 'evidence' for Greece and Rome, and (II) the value of anecdotes for elucidating ancient demographic structure and population policies.

I

It is wrong to disregard the distinction between the demographic structures of ancient cultures existing before the demographic transition and early modern and modern developing cultures existing during the transition. The demographic transition is an era in which the population of a society changes from general stability with high, nearly balanced levels of births and deaths, to growth as birth rates remain high but the death rate diminishes. The transition is completed when birth rates decline to the lower death rates and the population is once again nearly stable.[2] In Europe, the demographic transition began in the seventeenth century (perhaps somewhat earlier or later in a few regions) and was not completed until the early twentieth century. In many developing societies (the societies studied by many anthropologists) the transition has only begun in the nineteenth or early twentieth century and will not be completed for some time to come. Societies existing before the transition are called pre-transitional, those existing during the transition are called transitional, and those after, post-transitional.

Stability does not mean that birth rates and death rates are exactly in balance and that the rate of natural increase is exactly zero at any given time. There is often considerable variation in these rates over the short term (a generation or so), but over

[1] W. V. Harris, 'The Theoretical Possibility of Extensive Infanticide in the Graeco-Roman World', *CQ* 32 (1982), 114–16; cf. M. Golden, 'Demography and the Exposure of Girls at Athens', *Phoenix* 35 (1981), 316–31. Probably most infants who died from exposure were deformed and many of them would have died in infancy. Statements in Aristotle (*Pol.* 1335b), the Twelve Tables (quoted by Cicero, *Leg.* 3. 19), and the so-called 'Law of Romulus' (cited by Dion. Hal. 2. 15. 2), indicate that, in general, the practice of exposure was restricted to deformed infants. The exposure of such infants, given preindustrial conditions of mortality, would not have substantially raised the overall death rate of the population. The issue is, to what extent were healthy children fatally exposed? In a previous article (D. Engels, 'The Problem of Female Infanticide in the Greco-Roman World', *CPh* 75 [1980], 112–20) I showed that earlier scholars had established that the practice of infanticide was of negligible importance and that more recent attempts to show the contrary were not convincing. The recent scholarship I cited included the excellent and highly respected book, S. Pomeroy, *Goddesses, Whores, Wives, and Slaves: Women in Classical Antiquity* (New York, 1975), which incorporates the views of much recent research.

[2] For the demographic transition see e.g. G. F. De Jong, 'Patterns of Human Fertility and Mortality', in G. A. Harrison and A. J. Boyce, *The Structure of Human Populations* (Oxford, 1972), 39–51.

the long term (three or four generations) the rates are nearly in balance, and this is what is important. During a short period of population growth, higher rates of infanticide may be possible, but it does not seem possible to maintain high rates of infanticide, male or female, for several centuries without the population suffering serious loss.[3]

While high rates of infanticide in general and of female infanticide in particular may be possible in transitional societies, with large surpluses of births over deaths, they were not possible in pre-transitional societies except among small groups for short periods of time. In the Greco-Roman world, population was probably stable with high birth and death rates.[4] This is why the population structure of the Greco-Roman world ought to be compared with those of pre-transitional societies and not those of transitional ones. Fortunately, a large quantity of census data and other demographic evidence exists for two pre-transitional societies: Medieval and Renaissance Europe and Ming China. The evidence for Europe is especially valuable, since this population presents the closest social, economic, cultural, and demographic parallel to the Greco-Roman world (certainly much closer than the Yąnomamö Indians, on whom see below p. 393).

The demographic evidence for Medieval and Renaissance Europe has been subject to the most rigorous and critical examination by historical demographers to establish the general outlines of population structure. During this era, death rates and birth rates were in general equilibrium, and although short-term fluctuations occurred, the rate of natural increase was slow, seldom reaching 2/1,000/year.[5] Both birth rates and death rates were high; the birth rates approached the biological maximum for pre-transitional societies at 35–45/1,000/year.[6] Sex-ratios were generally in balance and infanticide comparatively rare. Since infanticide generally occurs among females, the balanced sex-ratio argues against the widespread use of the practice. In general,

[3] D. Engels, op. cit., 112 For the use of stable population models in historical demography see T. H. Hollingsworth, *Historical Demography* (Ithaca, 1969), 339–53. Cf. Aristotle, *Politics* 1265a: regulation of population would be unnecessary in the ideal state because known states maintain level population growth (ἀνομαλισθησομένην εἰς τὸ αὐτὸ πλῆθος).

[4] In this respect, the Greco-Roman population probably resembles that of other pre-transitional societies: K. Hopkins, 'On the Probable Age Structure of the Roman Population', *Population Studies* 19 (1966), 256; J. Durand, 'A Long-Range View of World Population Growth', *Annals of the American Academy of Political and Social Science* 369 (1967), 6; W. Petersen, 'A Demographer's View of Prehistoric Demography', *Current Anthropology* 16 (1975), 232; A. Coale, 'The History of the Human Population', *Scientific American* 231 (September, 1974), 43–4; and below notes 5–11.

[5] J. C. Russell, 'Population in Europe, 500–1500', in C. M. Cipolla, ed., *The Fontana Economic History of Europe* (London, 1972), 36. The four exceptions are France, the Low Countries, and Germany from A.D. 1000 to 1340 and the British Isles from A.D. 650 to 1000, which seem to have grown at a rate of 3/1,000/year. Nevertheless, the growth rate of these and other European countries averaged far less than 2/1,000/year throughout the era. Cf. E. A. Wrigley, *Population and History* (New York, 1969), 23, 111–13; J. D. Durand, 'Historical Estimates of World Population: An Evaluation', *Population and Development Review* 3. 3 (1977), 253–74.

[6] J. C. Russell, 'Late Ancient and Medieval Population', *Trans. Amer. Philosoph. Soc.* 48. 3 (1958), 19–21; Wrigley, op. cit. 54, 62. This is probably the maximum for women in pre-industrial societies. Certain modern groups such as the Hutterites can now attain a higher rate than their preindustrial counterparts because the rates of mortality among husbands and wives of childrearing age, specific mortality among women because of medical complications arising from childbirth, and perinatal mortality among infants, are higher in pre-industrial societies than in modern populations. For these reasons, John Durand informed me by personal communication in 1975 that for an ancient society to attain a birth rate as high as 50 per 1,000 per year may require the abandonment of the institutions of marriage and the family by that society.

it seems that sex-ratios were in balance during infancy (as baptismal records indicate), but from 14 to 40 the numbers of males increased (perhaps in part because of higher mortality rates among women of childbearing age because of complications arising from childbirth), and the ratios stabilized once again after that date.[7] Also, there seems to have been a higher proportion of males in country districts and a higher proportion of females in towns and cities.[8] Although infanticide and preferential female infanticide occurred in Medieval Europe, it occurred at a far lower rate than for transitional India and China.[9] Fertility was generally high, but at certain times in certain places, when families wanted to limit their size because of a large number of children or for other reasons, contraception, *coitus interruptus*, abortion, delayed marriage, and other similar methods were employed.[10]

A similar demographic structure can be observed for early Ming China (A.D. 1371–*c.* 1600), when relatively accurate census data for the country were compiled. The population grew slowly, usually less than 2·5/1,000/year, sex ratios were generally in balance, and there is no evidence for the extensive practice of infanticide as there is for transitional China.[11]

For the two pre-transitional societies for which we have good demographic data and which probably represent the closest parallels to the classical world, rates of natural increase were slow, birth and death rates were high and generally in balance, and deliberate infanticide was rare. If someone wishes to claim that Greco-Roman society, alone of these pre-transitional cultures, experienced a sustained surplus of births over deaths of 4/1,000/year for several centuries (without infanticide), a surplus not achieved in other pre-transitional societies (which rarely practised infanticide) until the seventeenth and eighteenth centuries A.D., they must demonstrate that unique factors were present which permitted this unprecedented and sustained surplus.[12]

[7] D. Herlihy, 'Life Expectancies for Women in Medieval Society', in R. T. Morewedge, ed., *The Role of Women in the Middle Ages* (Albany, 1975), 6–7; J. C. Russell, 'Population in Europe, 500–1500', in C. M. Cipolla, ed., *The Fontana Economic History of Europe* (London, 1972), 57–61 (although his evidence must be used with caution since it comes from tombstones); J. C. Russell, 'Late Ancient and Medieval Population', *Trans. Amer. Philosoph. Soc.* 48. 3 (1958), 13–17.

[8] R. Mols, *Introduction à la démographie historique des villes d'Europe du XIV au XVIII siècle*, Vol. 2 (Louvain, 1955), 183–222; Herlihy, op. cit., 12–13; Russell, *Late Ancient*, 16–17.

[9] E. R. Coleman, 'L'infanticide, dans le haut moyen âge', *Annales ESC* 29 (1974), 315–35; M. Dickemann, 'Female Infanticide, Reproductive Strategies, and Social Stratification: A Preliminary Model', in N. A. Chagnon and W. Irons, eds., *Evolutionary Biology and Human Social Behavior* (North Scituate, Mass., 1979), 360–1.

[10] E. A. Wrigley, op. cit. 47, 124–5; Dickemann, op. cit. 352, 356. Rates of infanticide seem to have increased in Europe during the demographic transition, as in China.

[11] Ping-ti Ho, *Studies on the Population of China, 1368–1953* (Cambridge, Mass., 1959), 3–35. Cf. E. Croll, *Feminism and Socialism in China* (Boston, 1975), 23–5; Dickemann, op. cit. 341–50.

[12] Harris, op. cit. 115 also believes that a population with a life expectancy at birth of *less* than 25 years might have a birth rate of 40/1,000/year and a death rate of 36/1,000/year. However, for these factors, it is best to consult a life table. For example, A. J. Coale and P. Demeny, *Regional Model Life Tables and Stable Populations* (Princeton, 1966), 27–8 give for a population with a life expectancy at birth of 20 years and a growth rate of 5/1,000/year a BR (birth rate) of 57 and a DR (death rate) of 52/1,000/year; and for a population with a life expectancy of 22·5 years and a growth rate of 5/1,000/year, a BR of 50·5 and a DR of 45·5. Other life tables yield similar figures. Furthermore, a young age of marriage for girls, about 14–15 years, would not necessarily be favourable to high fertility; even Aristotle knew that young adolescent girls have difficulty bearing children (*Pol.* 1335a4–6, 1335b11), and any handbook on demography (e.g. W. Petersen, *Population* [New York, 1975], 193) will discuss subfecundity in adolescent girls before the age of 17 or 18. Harris is correct in maintaining that 'no historian' would claim that any society would deliberately increase the BR only to increase the DR through

Furthermore, since the 'preventive checks' to population growth practised by modern primitive societies, such as the segregation of women after childbirth, polyandry, polygamy, and the taking of concubines along with one's legal wife, were not used by the Greeks, they do not contribute much to an understanding of Greek demography.[13] In the end, the attribution of alien practices to the Greek world promotes more confusion than clarity.[14]

Some anthropologists may have stated or implied that the demographic structure of transitional societies can be projected back to pre-transitional ones. But the procedure is not justified. William Petersen has observed that 'the crude birth rates of the major underdeveloped countries are around 40 (per 1,000)... Combined with death rates sometimes as low as around 10 – or if substantially higher still falling – this natality results in a population growth rate so rapid that plans to modernize the economy are endangered'.[15] It is remarkable to see the classical world being compared with such modern societies. Petersen further concludes that the application of ethnographic analogies to the preindustrial world is a hazardous procedure, especially concerning population:[16]

> The succession of culture stages the 19th century theorists postulated, with living peoples interpreted as "fossils" of types that had elsewhere disappeared, has few defenders today... In a demographic analysis, stretching the plausibilities of ethnographic analogy does not carry one very far, for typically, the record of contemporary primitives lacks solid statistics and analyses about population... We know more about kin structure than about family size, more about beliefs in the afterworld than about the causes of death or the expectation of life, more about the structure of roles than that of age categories.

Furthermore,

> Many peoples, out of a sense of privacy or taboo, are reluctant to discuss any family matters with a stranger. In a fertility survey in East Africa, for instance, 'a man who refused to give any information to the first two investigators finally gave the names of two children to the third... (He) later admitted to ten children but still concealed a second wife in another village'.

Perhaps the dangers inherent in such comparisons are best seen in the case of the Yąnomamö Indians of southern Venezuela and northern Brazil, with whom the

infanticide, in order to maintain a stable population (why not make it easy and just stop the killing?). (However, two paragraphs earlier [p. 115], he states that Roman girls deliberately married early to increase fertility, that is the BR, because the DR was so high from infanticide.)

[13] Polygyny was not practised by the Greeks nor was concubinage, that is the simultaneous taking of a concubine with one's legal wife: Pomeroy, op. cit. 70; A. R. W. Harrison, *The Law of Athens: Family and Property* (Oxford, 1968), 15–17. An exception might be the troubled time just after the Peloponnesian War in Athens, although this is doubtful. Positive checks are those that control existing populations – disease, malnutrition, and killing. Preventive checks are those that a population uses to prevent births, such as abortion and contraception. Infanticide, that is the killing of infants, is therefore a *positive* check for population growth. See W. S. Thompson and D. T. Lewis, *Population Problems* (New York, 1965), 18: 'Positive checks (are) all factors that operated chiefly as determiners of the *death rate*, i.e., as destroyers of life "already begun"... The second kind of check to the growth of population (was) called the preventive or "prudential" check because it operated to *reduce the birth rate*;... the postponement of marriage was and would remain the chief preventive check.'

[14] Thus Golden, op. cit. 328 rightly rejects a 'marriage squeeze', a surplus of girls of marriageable age, as an 'explanation' for a hypothetical high rate of female infanticide in classical Athens. But his contention (p. 329) that an oversupply of widows was a problem because 'a large number of such widows could even endanger the male domination of Athenian society' is unconvincing.

[15] W. Petersen, op. cit. 558.

[16] W. Petersen, 'A Demographer's view of Prehistoric Demography', *Current Anthropology* 16 (1975), 228–9, 234.

populations of Greece and Rome are now being compared. While earlier studies suggested that their rates of female infanticide were high, more thorough, recent research has demonstrated that these assumptions were probably incorrect.[17] The population of the Yąnomamö has been fundamentally transformed by the introduction of modern medicine, anti-malarial services, penicillin, and hospital care. All these practices have radically altered the Yąnomamö's death rates – their rate of natural increase now approaches 20/1,000/year – and they were not available to Greek and Roman populations.[18] The simplistic comparison of Greeks or Romans to Bengalis or other modern primitive or developing societies, the assumption that because something is done in Bangladesh, it must also have been done in Greece and Rome, is fast becoming a nuisance in the writing of classical social and economic history.

In conclusion, there are important demographic principles that prevent a simple comparison between the ancient Greeks and Romans and modern tribes. It is wrong to assume that modern primitive societies and pre-industrial societies have similar demographic structures. Significant differences between modern primitive societies and ancient societies in climate, geography, diet, social structure, economic development, value systems, and access to modern medical treatment and drugs (which are now available for even the most remote populations), have promoted fundamental differences in demographic structure that may affect family policies in vastly different ways.

II

It has recently been noted that 'it is hazardous to set the extent of any social practice by reference to scattered casual remarks in literary sources.'[19] Nevertheless, ancient anecdotes, generalizations, and specific cases are repeatedly used to show a high incidence of infant exposure (not infanticide), imbalanced sex-ratios, and bizarre ages at marriage, even though there are equally valid anecdotes, generalizations, and specific cases that show the opposite.[20] Unfortunately, while for other eras of history

[17] N. A. Chagnon, *et al.*, 'Sex-Ratio Variation among the Yąnomamö Indians', in Chagnon and Irons, op. cit. 319.

[18] Ibid. 296; J. Lizot, *The Yanomami in the Face of Ethnocide* (Copenhagen, 1976), 26–9.

[19] Golden, op. cit. 317. This is why we should reject the casual remark in Plato's *Theaetetus*, 149a–151c, 160e–161a. Here, Socrates compares an idea to a newborn baby and if the baby is found to be a mere image and not real, it is cast out. Few would conclude on the basis of this passage that healthy children born within marriage could be exposed. Golden also shows that there are as many scattered casual remarks in literary sources that suggest the age of marriage for men in Athens was 30, as there are that suggest the age was about 18: Dem. 40. 12–13; Lysias, frag. 24; Xen. *Sym.* 2. 3, 4. 23; Menander, *Samia* 60 (57). Furthermore, K. Hopkins, 'The Age of Roman Girls at Marriage', *Pop. Stud.* 18 (1965), 309–27 shows a modal age for pagan men at marriage of 17–20, and a median age of 24, and K. Hopkins, 'Brother-Sister Marriage in Roman Egypt', *Comp. Stud. in Soc. and Hist.* 22 (1980), 316–20, shows a late age of marriage for Egyptian girls. It seems clear that there was probably a wide variation in the ages of marriage in the classical world.

[20] For sex ratios cf. e.g. Plato, *Laws* 780d–781a: an Athenian criticizes the Spartans and the Cretans for failing to include women in their practice in dining in common. As a result, half (ἥμισυ) of the population is neglected. Aristotle, *Politics* 1260b12: women and children ought to be educated in regard to the constitution; 'for women are half (ἥμισυ μέρος) of the free population'. Aristotle, *Politics* 1269b5: 'For just as man and wife are part of a household, it is clear that the state is also divided nearly in half into its male and female population (ἐγγὺς τοῦ δίχα διῃρῆσθαι) so that in all constitutions in which the position of the women is badly regulated, one half of the state (τὸ ἥμισυ) must be deemed to have been neglected in framing the law.' Cf. Plato, *Laws* 805a; 806c; Aristotle, *Rhetoric* 1361a6. The observations of these great social thinkers ought to be accorded at least equal parity with the anecdote from the third-century

even relatively accurate census data are subject to rigorous and critical scrutiny for bias and error, in classical history all too often the most casual anecdotes are ingenuously accepted at face value.

First, anecdotes concerning the practice of infant exposure are examined in an attempt to show that rates of infant killing may have been high, even though 'exposure' and infanticide were often two different practices.[21] That many 'exposed' infants, foundlings, were taken and raised by others is clear from numerous sources.[22] The anecdotal evidence for the so-called law of exposure in classical Athens has been demolished by L. R. F. Germain.[23] In fact, as I. Biezunska-Malowist has ably demonstrated, the practice of 'exposure' was frequently only a device for evading laws prohibiting the sale of free children into slavery.[24] It has also been demonstrated by W. V. Harris that 'exposed' infants were a major source of slaves during the Roman era and that demand for these infants was high.[25] Indeed, Justin Martyr noted that Christians thought the practice of infant exposure was immoral, not because it caused the deaths of the infants, but because some were raised up as prostitutes.[26] If in general there was a high demand for 'exposed' infants to be raised as slaves, this demand must have been known to the suppliers, the parents of the unwanted infants. If in general 'exposed' infants (girls and boys) were a major source of slaves and the demand for them was high, they would be sold, not killed; if there was little or no demand, they would be killed and not sold.[27] It is unlikely that the parents of unwanted infants (who were often poor) were not aware of the demand for their infants (and hence their value) as slaves. Anyone who wishes to claim that many healthy children died through 'exposure' must first explain why they were killed when one could sell them at a good price, because the demand for them was high.

comic poet Poseidippus. I am grateful to Lawrence Bliquez for pointing out these passages to me. It must be noted, however, that there are problems in interpreting sex-ratio evidence. As Chagnon, *et al.*, op. cit. 306 f., and J. D. Tarver and C. Lee, 'Sex Ratio of Registered Live Births in the United States, 1942–63', *Demography* 5 (1968), 374–81, have shown, in some modern populations, younger mothers are more likely to bear sons and first pregnancies at all ages are more likely than later pregnancies to produce sons. Therefore, a society whose females marry young and experience high maternal mortality might have an imbalanced sex-ratio without any infanticide. Hence in such societies (which seem to include Greece and Rome), sex-ratios showing somewhat more males than females (if indeed these ratios can be demonstrated and not merely asserted) cannot be used as evidence for female infanticide.

[21] As Golden notes (op. cit. 330–1), no Greek source mentions the practice of infanticide. Roman sources (e.g. Tert. *Apol.* 9. 6–8) seem to mention the practice in connection with deformed infants.

[22] For classical Greece: L. R. F. Germain, 'Aspects du droit d'exposition en Grèce', *Rev. Hist. de droit fr. et étr.* 47 (1969), 177–97; for Greco-Roman Egypt: I. Biezunska-Malowist, 'Die Expositio von Kindern als Quelle der Sklavenbeschaffung im griechisch-römischen Ägypten', *Jahrbuch für Wirtschaftsgeschichte* (1971), part 2, 129–33; for the Roman Empire: Pliny, *Epist.* 10. 65, 66, 72.

[23] L. R. F. Germain, op. cit. 177–97. He concludes (p. 183) that there is no evidence for the practice of infant exposure in Athenian law from the classical era: 'Il n' y a donc à Athènes, à notre connaissance, aucune trace sûre de législation en la matière, à l'époque classique.'

[24] I. Biezunska-Malowist, op. cit. 129–33.

[25] W. V. Harris, 'Towards a Study of the Roman Slave Trade', *MAAR* 36 (1980), 121–4. In his second article, 'The Theoretical Possibility', op. cit., he takes a different view.

[26] *First Apology*, 27.

[27] Harris, 'Towards a Study', op. cit. 125, has convincingly shown that there were probably shortages of slaves (less supply than demand) in the first and second centuries A.D. K. Hopkins, *Conquerors and Slaves* (Cambridge, 1978), 158–63 notes that prices paid for slaves increased during the second and first centuries B.C., which also indicates a shortage in supply. Cf. G. E. M. de Ste. Croix, *The Class Struggle in the Ancient Greek World* (Ithaca, 1981), 226–59.

Nor do other ancient anecdotes from literary sources provide convincing evidence that rates of infanticide were high. Three sources in particular are frequently cited as 'evidence' for high rates of infanticide or female infanticide, but an analysis of the content reveals their inadequacy.

The first is the old chestnut in Polybius 36. 17:[28]

> In our own time the whole of Greece has been subject to a low birth rate and a general decrease of the population, owing to which cities have become deserted and the land has ceased to yield fruit, although there have neither been continuous wars nor epidemics... For as men had fallen into such a state of pretentiousness, avarice, and indolence that they did not wish to marry, or if they married to rear the children born to them, or at most as a rule but one or two of them, so as to leave these in affluence and bring them up to waste their substance, the evil rapidly and insensibly grew. For in cases where of one or two children the one was carried off by war and the other by sickness, it is evident that the houses must have been left unoccupied, and as in the case of swarms of bees, so by small degrees cities became resourceless and feeble.

What does this passage really mean? Greece is becoming depopulated because of childlessness (*ἀπαιδία*). Among the elite, this childlessness was the result of low marriage rates, a failure to raise all their children (*μήτ'...τὰ γινόμενα τέκνα τρέφειν*), or at most, one or two of them. As Polybius himself observed, if as a general rule a family raised only one or two children, the result might indeed be the extinction of that family within one generation. Even in modern, post-transitional societies, a birth rate of less than two per family is below replacement levels and would cause a rapid decline in population. In pre-transitional societies, where a woman must bear between five and six children to maintain a stable population, and only about one child in three survives to puberty, a birth rate of less than two would be catastrophic in one generation.[29] If this condition were projected to the whole of Greece and not only to the elite, the population's collapse would be dramatic. But of course this did not happen, either to the Greek aristocracy or to the population as a whole. Polybius' statement is an exaggeration used for rhetorical effect, and as Gomme recognized long ago, if it were taken literally, it could only refer to a small group for a brief period.[30]

Furthermore, what does the phrase *μήτ'...τὰ γινόμενα τέκνα τρέφειν* really mean? Does it mean that the children were killed? In view of the immense market for slaves in the second century B.C., is it not more probable that any unwanted infants were sold, especially since the parents were avaricious (*φιλοχρημοσύνην*)? In the end, does the passage say anything more than that some parents may have 'exposed' their children?

A second oft-quoted passage is Dio Cass. 54. 16. 2, where Augustus allowed all but senators to marry freedwomen since among the well-born (*εὐγενοῦς*) there were more men than women.[31] As in Medieval Europe, there may well have been more males than females in the population, especially those of marriageable age. However, this was the result of the higher mortality rate of women from 14 to 40 and not of female

[28] The translation is from Paton's Loeb text.

[29] A. J. Coale and P. Demeny, op. cit. 31, 72, 78; cf. A. J. Coale, 'The History of the Human Population', *Scientific American* 231 (Sept., 1974), 44–5.

[30] A. W. Gomme, *The Population of Athens in the Fifth and Fourth Centuries B.C.* (Oxford, 1933), 81. Gomme's critical attitude towards ancient anecdotal sources is in marked contrast to that of some modern scholars. It is also surprising that the immense Greek migration to the Hellenistic kingdoms is ignored as a cause for population decline in Hellenistic Greece.

[31] It is difficult to know precisely what the term *εὐγενοῦς* means in this context, but it is more likely to mean well-born or free-born than nobility, and presumably would include those with equestrian status. For the best discussion of the problem see P. A. Brunt, *Italian Manpower, 225 B.C. – A.D. 14* (Oxford, 1971), 558 f. For the difficulties in interpreting sex-ratio information see above nn. 7, 20.

infanticide. Furthermore, the imbalance may also reflect inheritance patterns in which more males than females inherited a higher status from their parents. Also, more single males than females may have acquired enough wealth through commerce or manufacturing to qualify for such a status. The passage need not mean that there was a high degree of female infanticide or even 'exposure' among the elite.

Finally, we come to the passage in Plut. *Mor.* 497E:[32]

> For when poor men do not rear their children it is because they fear that if they are educated less well than is befitting they will become servile and boorish and destitute of all the virtues...

It has been claimed that Helmbold's Loeb translation is inaccurate, and the passage should be translated, 'The poor do not raise children (and presumably continuing) fearing that if they are educated less well...'[33] If indeed the poor 'did not raise children', they would have disappeared as a class in one generation. Unless we think Plutarch was a complete fool, this cannot have been his meaning. This must mean that the participle *φοβούμενοι* is used circumstantially, denoting time, condition, or cause, and hence Helmbold's translation is quite accurate and sensible.[34] Once again, what does this passage show other than that some parents 'exposed' their children?

It is surprising that some recent discussions have ignored some of the least biased demographic data for the Roman world, the census lists from Roman Egypt. They show generally balanced sex-ratios and no evidence for infanticide.[35]

All the anecdotes, generalizations, and specific cases in ancient sources concerning infant 'exposure' tell us no more than that the practice existed; it is impossible to infer the rate of exposure. Nor do these sources reveal anything about the rate of infant deaths caused by exposure. Apparently, no ancient source mentions the practice of infanticide for the Greek world and no source from the classical era mentions the practice of infant exposure in classical Athens.[36] For every anecdote, generalization, or specific case that suggests sex-ratio imbalances or high rates of exposure (not infanticide), there are an equal number that suggest the opposite; equal legions of warring anecdotes can be marshalled for battle on both sides.

In conclusion, the hypothesis of a 10% rate of infanticide for healthy children in the Greco-Roman era cannot be demonstrated. It requires us to make the unwarranted assumption that, alone of pre-transitional societies, the Greco-Roman era experienced a sustained surplus of births over deaths for several centuries. The hypothesis makes little sense from an economic point of view considering the demand for (and consequently the value of) healthy, undeformed infants to be raised as slaves. Nor do ancient anecdotal sources support the view of a high rate of infanticide.

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[32] *οἱ μὲν γὰρ πένητες οὐ τρέφουσι τέκνα, φοβούμενοι μὴ χεῖρον ἢ προσήκει τραφέντα δουλοπρεπῆ καὶ ἀπαίδευτα καὶ τῶν καλῶν πάντων ἐνδεᾶ γένηται.*

[33] Harris, 'The Theoretical Possibility', op. cit. 116.

[34] Alternatively, one could translate 'The poor (or poor men) do not rear their children when they fear', the meaning is the same.

[35] M. Hombert and C. Préaux, 'Recherches sur le recensement dans l'Égypte romaine', *Papyrologica Lugduno-Batava* 5 (1952), 155–6, record the sex-ratio in the Arsinoite, Oxyrhynchite, and Prosopite nomes as 107 males per 100 females in the general population, a quite normal ratio. Cf. K. Hopkins, 'Brother-sister Marriage', op. cit. 316–20.

[36] Golden, op. cit. 330–1; Germain, op. cit. 183. I am grateful to Lawrence Bliquez, Vincent H. Whitney, Keith Hopkins, and the editors of *Classical Quarterly* for their useful help and advice. They are not responsible for the views expressed or any errors.