THE SIZE OF THE ROMAN POPULATION: BELOCH AND THE MEANING OF THE AUGUSTAN CENSUS FIGURES[1]

By ELIO LO CASCIO

The importance of Beloch's *Bevölkerung der griechisch-römischen Welt* and its influence on subsequent research in ancient demography can hardly be overstated. This book represents the key-stone of all modern investigation on size, structure, and, to a certain extent, dynamics of ancient populations. It was the first overall scientific treatment of the subject and it is still unparalleled in its scope. An attempt at its critical evaluation is not just an historiographical exercise: we must come to terms with Beloch's *Bevölkerung*, because its detailed treatment of most of the topics concerning the population of the ancient world is at the root of all modern debates and controversies.

As Beloch himself pointed out more than once, the strength of the *Bevölkerung* lies in its internal consistency, in the attempt to build from a sparse and rarely reliable source-material an overview of the demographic conditions of the ancient world in which 'tout se tient'. In this paper, I argue that the strength of the *Bevölkerung* is also its weakness: the whole construction rests on a simple argument from likelihood, which turns out to be, on a more thorough and demographically elaborate analysis, less than plausible. I will set out first the background of Beloch's intellectual formation and of his interest in ancient population (i), the development of his investigations leading to the composition of the *Bevölkerung* (ii), the tight conceptual links that bind together its structure (iii). Then I will look once again at what appears to be the key-stone of the *Bevölkerung*, Beloch's interpretation of the Augustan census figures, and at the way in which this interpretation seems to condition Beloch's appreciation of almost every piece of evidence on the size of ancient populations (iv). I will maintain that no philological argument can be taken to confirm Beloch's view and indeed that philological arguments militate strongly against it (v). After reviewing the use that has been made of the model life tables and model stable populations in historical demography and even by ancient historians in order to make reasonable assumptions on the age and sex composition of ancient populations (vi and vii), by employing them I will test the alleged demographic plausibility of Beloch's interpretation of the leap between the Republican and the Augustan census figures (viii). The acknowledgement of the implausibility of Beloch's solution seems to undermine the whole fabric of the *Bevölkerung* and the full range of its estimates of the size of ancient populations, but I argue that it would be wrong to abandon the field covered by Beloch and give up every attempt at evaluating the size of an ancient population (ix).

I

In his autobiography included in Steinberg's *Geschichtswissenschaft der Gegenwart in Selbstdarstellungen* (1926), Karl Julius Beloch, then seventy-two, recalls the years of his early education, in an unconventional or paradoxical way. He refers to his very early interest in history and geography; he says, however, that he could not stand Curtius, the 'Geschichte in Biographien', conceived as an instrument to encourage children's interest in history: 'I wanted to know how the whole process developed, and I could never become enthusiastic over the "heroes"'. It is not by chance that the other subject to which he refers as capable of interesting him, from the age of eight, is statistics: besides Mommsen's *Römische Geschichte*, his favourite

book was the work by Kolb, 'a population, financial and economic history of the nineteenth century'.[2]

History, geography, statistics: the foundations of Beloch's work on the *Bevölkerung* can be found, then, in his precocious interest in a specific way of conceiving the historical process and consequently historical investigation. This approach was to become popular among several prominent German historians at the end of the last century. In the context of an influential assessment of the role of Max Weber in the development of ancient history, Arnaldo Momigliano observed that there was, at the end of the last century, and specifically in the historical culture of Germany, such a significant impact of the social sciences on ancient history, as to result in a renewal of methods, instruments, and ends of historical investigation.[3] This impact can best be seen in the articles written by Meyer, Schulten, Weber, and Beloch (and afterwards Rostovtzeff) for the *Handwörterbuch der Staatswissenschaften*, published in several editions since 1896. There is no need to remark that it is precisely this choice of themes and approaches that makes these authors and their works still so influential.

Beloch spent his youth in Italy and was for a while a student of the University of Rome: he grew as a scholar far from the German university world, in isolation and without teachers (as he himself points out in his autobiography). Perhaps this can help to explain some features of his personality as it emerges from his writings: his urge not to be a conformist, his self-confidence, his often contemptuous attitude towards other scholars, especially his critics, above all his intolerance of the German philological tradition of 'Altertumswissenschaft'. These features of his personality, and not only his way of doing history, were soon to provoke the enmity of a German academic world dominated by Mommsen.

We might speculate whether this isolation can partly explain why he was less inclined, in comparison with Meyer and Weber, to the exact and systematic formulation of his conceptual tools, to theoretical debate. Meyer and Beloch were both modernistic or modernizing in their approach to the ancient economy, but Beloch's modernism was more crude, as Momigliano observed.[4] His specific interest in reconstructing the history of ancient populations was based on an uncertain theoretical foundation: the idea that there was a tight connection between the economy and the population. This idea was inspired by common sense (it is of interest that Malthus is not even mentioned in the *Bevölkerung*, unless I am mistaken). Historical demography was for him, as he himself says at the very beginning of the *Bevölkerung*, a 'branch of economic history'.[5] He did, however, see the connection in a very mechanical, deterministic way, as if it was between natural events or phenomena.[6] All this had an important consequence: the criteria followed by Beloch in his quantitative reconstructions, necessarily based largely on simple guestimates, are often rigid and crude, extremely schematic and oversimplified. Thus, in Beloch's view, population is always more dense in areas where industry and commerce are developed, than in those in which agriculture prevails, and it is more dense in the plains, where agriculture is more productive, than in the mountains: both are obvious conclusions. But what can one say if Beloch's reason for hypothesizing a more dense population in a particular area is simply the supposedly greater antiquity of its civilization? Thus, Gallia was less densely populated than Spain, because the Roman presence, that is, civilization, was less precocious.[7]

It is precisely this rigidity which explains the internal consistency of Beloch's reconstruction of the ancient populations. But it is this same rigidity which determines the subtle contradiction of this reconstruction with his modernizing view of the ancient economy.[8]

[2] S. Steinberg (ed.), *Geschichtswissenschaft der Gegenwart in Selbstdarstellungen* 2 (1926), 1–27, at 2f.; what Beloch says in his autobiography is at the basis of the biographies by K. Christ, *From Gibbon to Rostovtzeff* (1972), 248–85, and A. Momigliano, *Dizionario biografico degli Italiani* 8 (1966), s.v., now in an English translation by T. J. Cornell in G. W. Bowersock and T. J. Cornell (eds), *A. Momigliano, Studies in Modern Scholarship* (1994).

[3] A. Momigliano, 'Dopo Max Weber?', *ASNP*[3] 8 (1978), 1315–32, at 1324ff. = *Sesto contributo alla storia degli studi classici e del mondo antico* 1 (1980), 294–312, at 303ff.

[4] ibid.,1320 = 300. See now N. F. Parise in Polverini, op. cit. (n. 1), 107–11.

[5] Or even 'perhaps the most important branch': *Die Bevölkerung*, v.

[6] And that explains the famous, acerbic critique by B. Croce of Beloch's conception of history: 'Intorno alle condizioni presenti della storiografia in Italia, IV, La storiografia sociale e politica', *La critica* 27 (1929), 241–63, at 253 = *Storia della storiografia italiana nel secolo decimonono* (2nd edn, 1964), II, 246.

[7] *Die Bevölkerung*, 454f.

[8] A contradiction stressed by C. Ampolo in Polverini, op. cit. (n. 1), 85f.

II

The interest in reconstructing past populations, including those outside the chronological limits of the ancient world, can be discovered throughout Beloch's career. His second article was on the population of ancient Sicily and it was published in 1874, when he was twenty;[9] fifty years later, Beloch criticized it because the numerical data found in the ancient sources were there accepted 'kritiklos'.[10] Then followed the article on the Roman census figures, incorporated afterwards, with many additions and changes, in *Der Italische Bund*;[11] next the *Bevölkerung* and the special studies which accompanied it;[12] finally the studies on the population of Italy and Europe in the Middle Ages and in modern times, conceived also as confirming his views on ancient populations, starting with an article published in 1887, just one year after the *Bevölkerung*.[13] Beloch himself would have considered the works on medieval and modern population of Italy his outstanding scholarly achievements and as no less important than his *Griechische Geschichte*.[14] And it is true that his *Bevölkerungsgeschichte Italiens*, edited after his death by De Sanctis and Pareti, was to become for many decades the standard work of reference on the subject, even more than the *Bevölkerung*.[15] But for the ancient historian it is obviously the *Bevölkerung* which represents the most interesting work: a work which has not been replaced as a comprehensive collection and critical evaluation of all the numerical data transmitted in the literary sources.

In his autobiography, Beloch sees the *Bevölkerung* as the obvious and unplanned outcome of regional studies of history of population which he had undertaken to help him write other works, especially the one on the financial history of Athens, itself written as a support to the volume on Athenian policy: 'The problem of Attica's population had also to be treated, but that led to very comprehensive (*sehr weitgreifenden*) researches, and so my book on *Die Bevölkerung der griechisch-römischen Welt* originated, almost without my willing'.[16] And it could be said, in fact, that the *Bevölkerung* is the outcome, in its structure and in its contents, of two well-defined thematic nuclei: the researches on the population of Athens and the researches on the Roman census figures and the demographic conditions of the 'Italische Bund'.

But there is another element in the *Bevölkerung* which must be considered when explaining its structure and contents: Beloch's interest is in reconstructing the 'absolute numbers' of the ancient populations, the 'overview of the demographic conditions in the ancient world',[17] as it is summed up in the form of a table at the end of the volume: his interest is in singling out the data that a demographer would define as stock data, as opposed to the flow data. The reconstruction of the dynamics of ancient populations and of their determinants is considered by Beloch as the possible outcome of subsequent research, once the demographic development of the modern world had been explained. It is precisely in these terms that Beloch defined his objective: 'I must renounce here a deep analysis of the causes that in antiquity determined demographic change. This problem must be treated on a higher level; its solution will be possible only once the history of population of the last three or four centuries has been examined more closely' (and Beloch refers to 'the second part of these researches', that is, to his investigations in the demographic history of Italy and Europe).[18] The

[9] 'Sulla popolazione dell'antica Sicilia', *RFIC* 11 (1873–4), 545–62.
[10] Steinberg, op. cit. (n. 2), 6.
[11] 'Die römische Censusliste', *Rh. Mus.* N.F. 32 (1877), 227–48; *Der Italische Bund unter Roms Hegemonie* (1880), ch. IV.
[12] 'Nuove osservazioni sulla popolazione antica della Sicilia', *Arch. Stor. Sic.* N. S. 20 (1895), 63–70; 'Zur Bevölkerungsgeschichte des Altertums', *Jahrbücher für Nationalökonomie und Statistik* 68 (3. F., XIII) (1897), 321–43 (a reply to Seeck, who had criticized the methods and the conclusions of Beloch's *Bevölkerung*, in 'Die Statistik in der alten Geschichte', ibid., 161–76); 'Die Bevölkerung Galliens zur Zeit Caesars', *Rhein. Mus.* N.F. 54 (1899), 414–45.
[13] 'Una nuova storia della popolazione d'Italia', *Nuova Antologia* 22 (1887), vol. XCV (3 s. XI), 48–61; cf. 'La popolazione d'Italia nei secoli XVI, XVII e XVIII', *Bulletin de l'Institut international de statistique* 3 (1988),

1, 1–42; 'Die Bevölkerung Europas im Mittelalter', ibid., 3 (1900), 405–23; 'Die Bevölkerung Europas zur Zeit der Renaissance', ibid., 765–86.
[14] As it emerges from the picture that Beloch himself gave of his scientific achievements in his autobiography.
[15] *Bevölkerungsgeschichte Italiens* I (1937), ed. G. De Sanctis; II (1939), ed. G. De Sanctis; III (1961), ed. L. Pareti and W. Hagemann. To take just an example, Beloch's work is at the basis of the reconstruction of the history of the Italian population given by C. M. Cipolla, 'Four centuries of Italian demographic development', in D. V. Glass and D. E. Eversley (eds), *Population in History* (1965), 570–87.
[16] Steinberg, op. cit. (n. 2), 11.
[17] *Die Bevölkerung*, vi.
[18] *Die Bevölkerung*, 502. It must be pointed out that the book was conceived as the first of a series of *Historische Beiträge zur Bevölkerungslehre*.

Bevölkerung is conceived, from this point of view, as a necessary preliminary work of collection and critical evaluation of the numerical data found in ancient literature. The last chapter of the book, even if it has the title 'History of Population', is not a reconstruction of the demographic trends in the ancient world, but just a summary of the whole book.

<div align="center">III</div>

What then is the structure of the *Bevölkerung* and what are its contents? The book is a thorough analysis of the demographic conditions of the various regions of the Graeco-Roman world, with an approach that could be termed as synchronic, where the only diachronic element is the order in which the various regions are introduced, namely the chronological order of their progressive integration in the Graeco-Roman world. Obviously, the space given to the various areas is proportional to the quantity of available sources: Athens and Attica receive much more, in comparison with the other Greek regions, as does Sicily, in comparison with Magna Graecia, and the Greek world in comparison with the Latin West.

Beloch could not, of course, keep to this scheme of regional division throughout the book. Thus, the two first chapters are an introduction. The first chapter contains an analysis of the types of ancient sources where numerical data are found, an analysis of the methods that will be adopted and a brief history of modern investigation. In the second chapter there is the analysis of the probable age and sex distribution of the ancient populations: this analysis enables Beloch to extrapolate the estimates of whole populations from the data referring to just some groups (for example the adult males). After the chapter on Sicily the long chapter on the Roman census interrupts the treatment by regions. The justification is the qualitative and quantitative singularity of the documentary complex constituted by the census figures: as Beloch remarks, it is between Claudius' census and the Domesday Book that we can speak of 'the dark ages for the history of the development of European population'.[19] Still further outside the regional scheme are the two final chapters on urban population and the history of population.

The aim of the book then is the collection and critical evaluation of all the numerical data on population found in the ancient literary sources (and, to a much lesser extent, in the epigraphic ones). This collection and critical evaluation are designed to allow generalization from the data discovered, in order to reconstruct a whole set of absolute figures. It must be said at the outset that the techniques which were used by Beloch for extrapolating from partial data to total ones, or for turning available data into a basis for estimating data which are lacking, are the same as those still used (even though in a more refined way) by ancient historians. Beloch deduces the figures referring to a whole population from the indications found in the sources on the numerical strength of the armies, having estimated the percentage of adult males; an alternative procedure is to estimate the 'carrying capacity' of an area through, first, the 'Arealbestimmung', that is, the calculation of its extent (and it must be said that this exercise could constitute a serious problem in Beloch's day, because of the lack of reliable data for many countries of the Mediterranean basin); and then, through the calculation of the maximum level of population which could be supported by local production of foodstuffs, chiefly grain. Estimates of urban population are based on other sets of data: for instance, for the population of Rome, the number of grain recipients (though he did not think of making use of the data about the recipients of *caro porcina* in the late Roman Empire)[20] or the number of *insulae* and *domus* that is indicated in the fourth-century Regionaries; or, again, for Rome and dozens of other towns, the extent of the inhabited space as limited by town walls. Beloch's reconstruction is at the base of all subsequent work and scholarly debate.[21] Indeed, one can confidently say

[19] *Die Bevölkerung*, vf.

[20] S. Mazzarino, *Aspetti sociali del quarto secolo* (1951), ch. v, 1; A. Chastagnol, 'Le ravitaillement de Rome en viande au Ve siècle', *Rev. Hist.* 210 (1953), 13ff.; for a reappraisal of Mazzarino's calculations, see R. Hodges and D. Whitehouse, *Mohammed, Charlemagne and the Origins of Europe. Archaeology and the Pirenne Thesis* (1983), 48ff.; and E. Lo Cascio, *Quaderni catanesi di studi classici e medievali* II (1990) [*Studi in memoria di Santo Mazzarino* III], 67–92.

[21] Mostly the *Bevölkerung* is seen in a very favourable way, even if there are severe judgements: see the statement by P. D. Warden and R. S. Bagnall, 'The forty thousand citizens of Ephesus', *Class. Phil.* 83 (1988), 220–3, at 220, n. 1, according to whom Beloch's *Bevölkerung* 'though always cited, is more often a convenient target than a model'.

that the advances made in finding new devices for evaluating the absolute numbers have not been substantial since Beloch.[22] Certain criteria which were ignored by him, like the estimate of a town population from the flow of the aqueducts or from the number of people that an amphitheatre could contain, have not produced solid results.[23]

In the analysis of the ancient sources, Beloch is extremely critical, even hypercritical: and this is one of the reproaches most commonly directed against the *Bevölkerung* since its appearance. The reasons for this hypercritical attitude towards the ancient sources are in essence two: the first is Beloch's awareness that, by their very nature, numerical data were extremely liable to textual corruption; the second is that he was highly sceptical of the ability of the ancient writers to be objective or well informed. The hypercritical attitude does not, however, go so far as to make him reject the possibility of attaining estimates of orders of magnitude. Beloch severely criticizes 'the similarly blind and even more stupid scepticism according to which we could get no concrete idea such as to be expressed in figures'[24] (and the object of his criticism seems to be Robert von Pöhlmann's *Übervölkerung der antiken Großstädte*, which appeared in 1884). The effect of his hypercritical attitude is that he tends to accept the data of the ancient sources only when they are consistent with his general interpretation.

In this context we may note a statement of method which appears in the essay, in which he answers the criticisms directed at the *Bevölkerung* by Seeck. Commenting on his interpretation of a passage in Galen, which informs us, in a not unambiguous way, about the number of citizens and slaves in Pergamum, Beloch writes: 'I do not attribute any special importance to this passage; all my conclusions stand even if we completely dismiss it. It simply happens to be in agreement with my system'.[25] The reason for accepting, in this specific case, the piece of information given by an ancient source is therefore its being in agreement with the general interpretation proposed by Beloch. One could see in this statement a kind of anticipation of the 'compatibility theory of historical truth', advanced provocatively by Hopkins, as a justification of his own treatment of the literary evidence.[26]

But his hypercritical attitude also encourages Beloch to correct the data given by the ancient sources in order to make them conform to his general scheme: to manipulate the data, according to a criterion of general likelihood (or plausibility), which appeared to his critics too subjective and therefore arbitrary. This was one of the two fundamental criticisms made of the *Bevölkerung* when it came out. The other criticism, obviously connected with the first one, was that Beloch tended 'to cut to small pieces and to reduce, at all costs, the population of the ancient world' (as Santo Mazzarino put it).[27]

IV

It is certainly true that Beloch, following the lead of Hume's *Of the Populousness of the Ancient Nations*, tends to reconstruct the absolute numbers of ancient populations in a 'minimalist' or 'reductionist' way. I would suggest that one of the reasons, or perhaps the

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[22] It is not by chance that in the recent book by T. G. Parkin, *Demography and Roman Society* (1992), which gives an overview of contemporary research, just a page or so is devoted to the size of ancient populations and the means of establishing it: the few figures that Parkin gives (for Rome, Italy and the whole Empire) are presented as 'tentative estimates, which seem to represent the broad consensus of modern scholarly opinion... and which have remained largely unchanged since the appearance of Beloch's masterly work in 1886' (5).

[23] See the remarks by R. P. Duncan-Jones, 'Aqueduct capacity and city population', *Society for Libyan Studies, 9th Annual Report* (1977–78), 51, criticizing the suggestion of J. A. Lloyd and P. R. Lewis, 'Water supply and urban population in Roman Cyrenaica', *Society for Libyan Studies, 8th Annual Report* (1976–77), 35–40, at 36; idem, *The Economy of the Roman Empire* (2nd edn, 1985), 261; Ph. Leveau and J. L. Paillet, *L'alimentation en eau de Caesarea de Maurétanie et l'aqueduc de Cherchell* (1976), 15ff.; for the evidence provided by theatres

(and amphitheatres), see L. Gallo, 'La capienza dei teatri e il calcolo della popolazione: il caso di Atene', in *Studi Salernitani in memoria di Raffaele Cantarella* (1981), 271–89.

[24] 'Die Bevölkerung Galliens zur Zeit Caesars', op. cit. (n. 12), 443f.

[25] 'Zur Bevölkerungsgeschichte des Altertums', op. cit. (n. 12), 323f. on Galen, *de propriorum animi cuiuslibet affectuum dignotione et curatione* v.49 Kühn; see now R. P. Duncan-Jones, *The Economy of the Roman Empire* (1985), 259ff.; Warden and Bagnall, op. cit. (n. 20), 220–3.

[26] K. Hopkins, *Conquerors and Slaves* (1978), 2f., n. 4.

[27] *L'impero romano* (1956), 35f., n. 1. The most important interventions for or against Beloch's *Bevölkerung* around the turn of the century were collected in an Italian translation in V. Pareto (ed.), *Biblioteca di storia economica* IV (1909), as an appendix to the Italian translation of the *Bevölkerung* itself.

fundamental reason, for this minimalist attitude is that the whole fabric of the *Bevölkerung*
was based on his estimate of the free population of Italy at the end of the Republic and the
beginning of the Empire, which in turn depended on the interpretation that he gave in the
Bevölkerung, correcting what he himself had written before, of the meaning of the Republican
and Augustan census figures. One might think that the more obvious way of seeing the causal
relationship is the other way round, that is, that he corrected his interpretation of the Roman
census figures because he was by then convinced that the figures given by the ancient sources
were generally inflated. But there are good reasons for seeing his interpretation of the Roman
census figures as the key.

No one will deny that the core of the *Bevölkerung*, logically and functionally, is
represented by the chapter on the Roman census and the census figures, the only collection of
ancient data which could be studied serially. Beloch is aware that this complex of data is of
decisive importance for his general reconstruction. 'Tout se tient' in his analysis, and the value
of the *Bevölkerung*, according to Beloch himself, lies precisely in that internal consistency.[28]
But this consistency depends on the fact that every estimate is based, more or less directly, on
Beloch's estimate of the population of Italy. Perhaps the most explicit statement of the central
role played by the estimate of the population of Italy can be found in the article that Meyer
wrote in order to defend Beloch's reconstruction against Kornemann: 'if we must double the
population of Italy, following a different interpretation of the Roman census figures, we must
do the same with the whole population of the ancient world'.[29]

I do not think it necessary to give many examples. Suffice it to say that, for instance, his
way of calculating the population of Egypt, starting from a few pieces of information in
Diodorus, Josephus, and Philo (but rejecting as valueless the figures given by the last two),[30]
appears extremely weak. His preoccupation was to minimize Egyptian population in the first
century A.D., since to admit a larger one could be in conflict with his estimate for Italy: the
whole argument seems to rest on an implicit or explicit comparison of the population density of
the Italian peninsula with that of the Nile valley.[31] The same mechanism seems to be at work in
his evaluation of Caesar's evidence on the population of free Gaul at the time of the conquest:
his main concern is to avoid results which could be inconsistent with his estimates for
Narbonensis or Cisalpina.[32] Or take the treatment of the population of Rome. He goes so far as
to postulate that even people domiciled twenty or thirty miles from Rome did participate in the
grain distributions (including, therefore, the inhabitants of Ostia); or he assumes that the
number of women and children among the free population of Rome must have been small: he
does so because that was the only way to reach a population of Rome low enough, relative to the
population of the Italian peninsula, given the data provided by the ancient sources on the
number of the *accipientes* of the grain dole.[33] Or take his way of solving the problem of the
settlement patterns in Greece and in Italy: he thinks that the nucleated pattern that he

[28] Beloch himself speaks in his autobiography of a
'geschlossenes System': Steinberg, op. cit. (n. 2), 12.
[29] Ed. Meyer, 'Die Zahl der römischen Bürger unter
Augustus', *Jahrbücher für Nationalökonomie und Stat-
istik* 70 (3. F. xv) (1898), 59–65, commenting on E.
Kornemann, 'Die römischen Censuszahlen als statisti-
sches Material: zum Streit Seeck-Beloch', ibid., 69 (3. F
xIV) (1897), 291–6. The estimate of the whole population
of the Roman Empire as 54 million in the Augustan age,
which appears at the end of the volume, is based on the
estimate of the population of Italy; it is worth noticing that
Beloch himself in a subsequent essay posited the highest
level reached by the population of the Empire in
Caracalla's times at 100 million: 'Die Bevölkerung im
Altertum', *Zeitschrift für Sozialwissenschaft* 2 (1899),
618ff. (Italian trans. in *Biblioteca dell'economista*[5] xix
(*Scritti di statistica teorica e applicata*) (1908), 464 ss.).
[30] *Bevölkerung*, 254ff., on Diod. 1.31; cf. 1.80; Jos.,
Bell. II.385; Philo, *in Flaccum* 43. The reason given by
Beloch for his refusal to give credit to Philo is the alleged
desire by Philo to 'present the community of the Jews as
important as possible': *Bevölkerung*, 258. On the antise-
mitism of Beloch and its probable motives, see
Momigliano, op. cit. (n. 2), *Dizionario biografico*, 42f.
The plausibility of the piece of information given by
Josephus is stressed by, e.g., A. H. M. Jones, *Ancient*

Economic History (1948), 10; M. I. Finley, *The Ancient
Economy* (2nd edn, 1985), 31, 215 n. 49; and A. K.
Bowman, *Egypt after the Pharaohs* (1986), 17f., 90, 238;
see also D. Delia, 'The population of Roman Alexandria',
TAPhA 118 (1989), 275–92, at 282f. I am not convinced by
the arguments put forward by D. W. Rathbone, 'Villages,
land and population in Graeco-Roman Egypt', *PCPS* n.s.
36 (1990), 103–42, at 105ff. (followed by R. S. Bagnall
and B. W. Frier, *The Demography of Roman Egypt*
(1994), 53f.), in order to reject the value of Josephus'
testimony: see E. Lo Cascio, '*Civium capita*'. *Le cifre dei
censimenti e l'evoluzione demografica dell'età repubbli-
cana*, (forthcoming), ch. 1.2.
[31] That is why Beloch reached an estimate of Egyptian
population in Philo's times that has no basis whatsoever in
the ancient evidence, namely 5 million inhabitants, 'that is
180 per square km': *Bevölkerung*, 258; he seems, how-
ever, to have forgotten this conclusion when he wrote
p. 499, for in a discussion of the increase in the Greek
population of the East after Alexander, he apparently
accepted the validity of Josephus' datum: 'Egyptian popu-
lation rose, between 300 B.C. to A.D. 70, if our informa-
tion is correct, from 3 million to 8 million or so'.
[32] So J. F. Drinkwater, *Roman Gaul. The Three Prov-
inces* (1983), 169f.
[33] *Bevölkerung*, 400f.

discovered in contemporary Sicily can also be postulated in general for ancient Greece and for ancient Italy.[34] For example, he could conclude that fifth-century Athens (including the Piraeus), the biggest town in Greece, had 120,000 inhabitants and that Attica as a whole had a population of one quarter of a million, and that because more people lived in the countryside there than in other Greek regions. He gave the city state of Corinth 90,000 inhabitants of whom he located no fewer than 70,000 inside the walls.[35] This sort of conclusion is obviously consistent with his system: big urban centres can be adjusted to his low estimates of the population of a whole area only by assuming that people living sparsely, in farmsteads, were negligible.[36]

The core, then, of the whole interpretation is Beloch's estimate of the free population of Italy at the end of the Republic and the beginning of the Empire. This estimate is based on the particular meaning he attributed to the census figures. The problem which Beloch had to address is well known. We possess a whole set of figures indicating the results of the Republican censuses, referred to by what looks like an official formula: 'censa sunt civium capita tot'.[37] Nobody has doubted that these figures are, on the whole, reliable and significant (or at least the figures referring to the late third and second centuries B.C.), however little confidence one may have in some of the individual figures as such. We possess also in the *Res Gestae* the figures of the three censuses held by Augustus in 28 and 8 B.C. and in A.D. 14.[38] These figures are introduced in the *Res Gestae* with the same formula adopted by Livy and the annalistic tradition for the Republican census figures. But the three Augustan figures (respectively 4,063,000, 4,233,000 and 4,937,000) are of a different order of magnitude to the Republican figures. The figure for 28 is more than four times the figure of the last Republican census, that of 70–69 (910,000, according to Phlegon, *FGrHist* 257, fr. 12, 6; 900,000, according to Livy's *Per.* xcviii).

How this leap should be interpreted has always been a problem. Beloch thought it impossible to account for the enormous increase in the number of *civium capita*, unless one made the assumption that the criteria and the aims of counting the *civium capita*, and consequently the notion itself of *civium capita*, had been changed. He was convinced that it was impossible to explain the leap as no more than a consequence of the extension of the citizenship to Transpadana, of colonization, and of a natural increase of population: in the troubled last decades of the Republic such an increase must be considered extremely unlikely. He therefore put forward the hypothesis that, whereas the Republican figures refer to adult males, the Augustan ones refer to the whole citizen population, including women and children.

It is not my intention to give here an account of all the modern views on this problem or discuss them at length.[39] Suffice it to say that, whereas Brunt has endorsed Beloch's view, other English-speaking historians like Frank and Jones had different views, which seem to me much better founded.[40] As Kornemann had already done ten years after the publication of the *Bevölkerung*, both Frank and Jones pointed to a strong underregistration in the Republican

[34] *Bevölkerung*, 476, with n. 2.
[35] *Bevölkerung*, 477f. The estimates given now by D. Engels, *Roman Corinth. An Alternative Model for the Classical City* (1990), 84, are not far from these: 80,000 urban and 20,000 rural population; see, however, the critical remarks on the way in which Engels arrives at his estimates by C. R. Whittaker, *Land, City and Trade in the Roman Empire* (1993), ix, 5, and by R. P. Saller, *CPh* 86 (1991), 351–7, at 352f.
[36] Unless there is a marked increase in the levels of agricultural productivity, a genuine urban growth and a high degree of urbanization can be achieved only if rural population increases as well: see E. Boserup, *Population and Technology* (1981), ch. 6. It is certainly a mistake to see Greek and Roman 'normal' towns as simply 'agro-towns': see, for Roman Italy, the conclusion reached by P. D. A. Garnsey, 'Where did the Italian peasants live?', *PCPS* n.s. 25 (1979), 1–25.
[37] See the complete list of the figures and the almost complete list of the sources for them in A. Toynbee, *Hannibal's Legacy* (1965), i, 438ff.
[38] *R.G.* 8; a fragment of the *Fasti Ostienses* seems to give a different figure for the census of A.D. 14, but the most plausible explanation of the seeming diversity is that the

figure of the *F.O.* is the result of a mistranscription of the right figure by the stonecutter: see now C. Nicolet, 'Les Fastes d'Ostie et les recensements Augustéens', in *Epigrafia. Actes du colloque en mémoire de Attilio Degrassi* (1991), 119–31; for the different figures given for the censuses of 28 B.C. and A.D. 14, in the Armenian version of Eusebius, by Jerome, by Georgius Syncellus, and by Prosper Aquitanus, see *Bevölkerung*, 371, n. 1.
[39] A detailed treatment of the whole issue will be found in the first chapter of my forthcoming book *'Civium capita'. Le cifre dei censimenti e l'evoluzione demografica dell'età repubblicana*; see also E. Lo Cascio, 'La dinamica della popolazione in Italia da Augusto al III secolo', in *L'Italie d'Auguste à Dioclétien, Proceedings of the International Conference, École française de Rome, 25–28 March 1992* (forthcoming).
[40] *Italian Manpower* (1971), esp. the introduction and Part I, ch. IX, see also O. Th. Schulz, 'Die Zensus des ersten Prinzeps (Augustus)', *Mnemosyne*[3] 5 (1937), 161–92; T. Frank, 'Roman census statistics from 225 to 28 B.C.', *CPh* 19 (1924), 329–41; A. H. M. Jones, *Ancient Economic History* (1948), 4ff.; see also T. P. Wiseman, 'The census in the first century B.C.', *JRS* 59 (1969), 59–75, at 71ff.

censuses, and especially in the last one, as the key element in explaining the different order of
magnitude of the Republican census figures in comparison with the Augustan ones, even if
they differed slightly over the relative importance of different possible reasons for this
underregistration. Frank insisted more on a conscious policy of the Roman ruling class aimed
at 'keeping the new citizens from gaining a preponderating influence in Roman affairs' and on
the 'lack of interest shown by the Italians in the franchise', or at least in participation in
political life at Rome. Jones insisted on the practical difficulties of census-taking at Rome, at
least till the introduction, by Caesar, of a new decentralized procedure, involving the towns'
governments.[41] Beyond the increase in the number of *registered* people, Frank also considered
an actual increase in the citizen population to be plausible, notwithstanding the heavy toll
taken on the population of the Italian peninsula by the civil wars: this increase would have
been the result of a high rate of manumissions, of the enfranchisement of a thickly populated
area, like Transpadana, and of massive veteran settlements in the provinces.

What I want to stress here is the development of Beloch's thought on the problem of the
Augustan census figures, and for two reasons. The first is that this development is illustrative
of his methods; the second obvious reason is the crucial importance that his thesis about the
meaning of the Augustan censuses has in his general reconstruction of ancient population.
Beloch had already addressed the problem of the leap between the Republican and the
Augustan censuses in an article published nine years before the *Bevölkerung* and then in his
second book, *Der Italische Bund unter Roms Hegemonie*, of 1880.[42] In these works his
starting-point was already one of likelihood, of plausibility. That is, already in these works he
was convinced of the impossibility of explaining the leap, unless one thought that the meaning
of *civium capita* had changed. But the solution adopted there was different: Beloch thought
that, given the order of magnitude of the figures, the Augustan censuses must have referred to
all adult males (included the *capite censi*); but he thought also, independently of Mommsen,
so it appears, [43] that the Republican figures, at least from the middle of the third century, were
the figures of the only *cives* whose number it was necessary for the *res publica* to consider —
the *iuniores assidui*, the people that were called to serve in the legions.[44] The reasons for his
change of mind, as expressed in the *Bevölkerung*, are not entirely clear: the crucial reason
appears to have been that he was by now convinced of the impossibility of referring the
Republican figures to just a section of adult males, and not to all.[45] Once granted that the
Republican figures referred to all the adult males, unless one was ready to admit that the
number of *incensi* in 70 B.C., and even before, was very high, the only alternative left was to
believe that the Augustan figures must have included women and children.

What must be stressed, then, is that the whole fabric of the *Bevölkerung*, in its constant
attempt to reduce at all costs the absolute numbers of the ancient populations, was based on a
simple argument from likelihood, put forward in the place of another simple argument from
likelihood. The strength of Beloch's argument does not bear comparison with the importance
of the conclusion he based on it.

Moreover Beloch's last solution to the problem of the Augustan census figures, the one
adopted in the *Bevölkerung*, by giving a basis for or at least by reinforcing the 'minimalistic'
bias of his estimates of the size of the population of the ancient world, made it even less
consistent, as it was pointed out at the outset, with his modernizing approach to ancient
economic history. It is revealing that, in order to reinforce one argument from likelihood,

[41] As evidenced by the *Tabula Heracleensis*, *FIRA* I²
13, ll. 142ff. (on which see E. Lo Cascio, 'Le *professiones*
della *Tabula Heracleensis* e le procedure del *census* in età
cesariana', *Athenaeum* 78 (1990), 287–317, at 308ff.).

[42] See above, n. 11.

[43] See Mommsen, 'Das Verzeichniss der italischen
Wehrfähigen aus dem Jahre 529 der Stadt', *Hermes* 11
(1876), 49–60 (repr. in *Röm. Forschungen* 11, 382–406);
Beloch, op. cit. (n. 11), 'Die römische Censusliste',
245ff., put an 'Anhang' at the end of his paper, in order to
discuss Mommsen's article, which appeared, as Beloch
says, 'when the present work was already written in its
final form'.

[44] This is the solution advocated in the *Italische Bund*,
op. cit. (n. 11): the exclusion of *proletarii* and *seniores*
from the enumeration would date from the middle of the
third century, and from this same date *cives sine suffragio*

would have been included. In enumerating all the adult
males, Augustus, therefore, would have come back to the
older practice.

[45] To suppose that the Republican figures referred,
always, just to the *iuniores assidui* would have implied
much too high a density of population of the *ager
Romanus* in certain periods of Republican history; on the
other hand, Beloch gives up the hypothesis put forward in
the *Italische Bund*, op. cit. (n. 11), that only from the
middle of the third century onwards would the figures
have referred to the *iuniores assidui*, probably because for
this hypothesized change no plausible reason could be
offered. The other possible motive for his change of mind
could have been that Beloch was, by now, convinced that
the free population of Italy was declining in the last two
centuries of the Republic.

Beloch felt himself obliged to add another: a calculation based on the assumption that the Augustan figures referred to adult male citizens would result in a quite impossibly high total, seeing that the population of contemporary Italy was just twenty-five million in 1881 (Sicily and Sardinia excluded), and the population of Renaissance Italy was no more than nine million (and only four in the peninsula).[46]

This last argument does not show up in the defence of Beloch's solution by Meyer, and that is perfectly understandable: Meyer was programmatically as modernistic in his approach as Beloch, and in any case more theoretically minded than Beloch. Meyer was a strong defender and even propagator of Beloch's ideas when writing the entry *Die Bevölkerung des Altertums* for the *Handwörterbuch der Staatswissenschaften*.[47] However, the notion of a development of the medieval and modern world which would have reproduced the development of the ancient world also in terms of 'populousness', the assent to a 'cyclical' conception of the history of population in the Western world, would have been more acceptable to Meyer than Beloch's approach: for Meyer it would have been perfectly plausible to put the population of Augustan Italy at a level comparable to that, say, of seventeenth-/eighteenth-century Italy, i.e. twelve to thirteen million inhabitants, as calculated by Beloch himself. It is interesting that, in the essay in the *Handwörterbuch* and in a subsequent one defending Beloch from Kornemann's attack, Meyer confessed to having accepted Beloch's solution only after long hesitation.[48] In the essay by Meyer there is no hint, and for good reason, of Beloch's other argument from likelihood.[49] On the contrary, Meyer maintained that 'nothing could be more desirable than that Kornemann were right, and that the most obvious explanation were also the correct one'. The reason why Meyer could not but accept Beloch's solution was that, once it was maintained that the expression *civium capita* must refer, during the Republic, to all the adult males, there was, in his view, no other possibility of explaining the different order of magnitude of the Augustan figures than supposing that they referred to all the *cives*. Again, for all his modernistic approach, even Meyer felt obliged to accept Beloch's solution since no alternative explanation of the leap between Republican and Augustan figures seemed to be available.

<div style="text-align:center">V</div>

It must be admitted that, on the evidence we have, it is impossible to reach an assured conclusion on the meaning of the Augustan census figures by philological arguments alone.[50] However, while it is plainly attested that *civium capita* referred just to the adult males during the Republic (or even to specific groups of adult males, as some maintain),[51] there is no evidence whatsoever for the inclusion of women and children in the Augustan figures. Moreover the preservation of the traditional character of the census in the Augustan period seems to be confirmed by the continued association of the census with the *lustrum*, which is actually stressed in the account of the *Res Gestae*. This association would be meaningless if women and children had been included in the total of *civium capita*.[52] One can even invoke positive evidence for the identification of *civium capita* as adult males (a point oddly

[46] *Bevölkerung*, 438ff.

[47] In vol. II (1891), 443–56. Meyer had already declared his approval of Beloch's new interpretation of the *Republican* census figures as representing all adult males in his letter to Beloch of 23 October 1886, in which he thanked him for sending a copy of the *Bevölkerung*. In his reply of 30 October, Beloch wrote that he was pleased by Meyer's agreement on the 'Auffassung der römischen Censuszahlen als Summe sämmtlicher Bürger'; it is certainly interesting that, in fact, there is no word in Meyer's letter about Beloch's interpretation of the *Augustan* census figures (I should like to thank Leandro Polverini for letting me read these two letters).

[48] 'Ich habe mich lange gegen diese von Beloch gegebene Lösung gestraübt': *Bevölkerung*, 453 n. 1.

[49] The argument was reaffirmed, e.g., by G. Tibiletti, 'The "comitia" during the decline of the Roman Republic', *SDHI* 25 (1959), 126, n. 129; and repeated by

W. Jongman, *The Economy and Society of Pompeii* (1988), 66.

[50] On the proposal by Nicolet, op. cit. (n. 38), 128, to understand what Augustus says in the first edict from Cyrene as an implicit argument in favour of Beloch's solution see my comments in Lo Cascio, op. cit. (n. 39), 'La dinamica'.

[51] See especially the critical evaluation of modern views given by P. A. Brunt, *Italian Manpower* (1971), 15–25.

[52] Note the use of the Republican formula for a census which is conceived as a resumption of an old tradition (as is made clear by the sentence which closes ch. 8 of the *Res Gestae*: 'multa exempla maiorum exolescentia iam ex nostro saeculo'). Wiseman, op. cit. (n. 40), 71, stresses against G. Pieri, *L'histoire du cens jusqu'à la fin de la république romaine* (1968), 192ff., (rightly, in my opinion), the absolutely traditional character of at least the census of 28, in terms of aims and methods.

overlooked) in the Greek version of Eusebius' *Chronicon* preserved in Georgius Syncellus, which expressly refers the figure of A.D. 14 to the ἄνδρες;[53] the word ἄνδρες is similarly used by Suidas, s.v. Αὔγουστος Καῖσαρ. Of course, given the notorious problems of reconstructing what the original Greek of Eusebius was[54] and of identifying his sources for such pieces of information, one cannot give too much weight to this testimony: but it is equally true that there is not a shred of evidence that Syncellus and the Lexicon of Suidas were wrong in referring the figure they gave just to the ἄνδρες.

Nor is Beloch's explanation of why Augustus might have included women and children in the enumeration of *civium capita* at all convincing. According to Beloch the introduction of the provincial census for purposes of taxation brought with it the need to register also women, and children above a certain age. Once the more comprehensive criterion for registration (which it is argued was defined by Pliny's term *capita libera*, to indicate all the free inhabitants of some Spanish districts)[55] had been introduced into the provincial census, it would have been natural to change the nature of the citizen census as well.[56] Against this line of reasoning there are, however, decisive objections. The first is the very nature of provincial censuses: they had, in a way that citizen censuses in the late Republic and early Empire had not, a fiscal aim. If counting women and children as tax-payers could be understandable, counting women and children who were not tax-payers would have been not only an odd novelty, but also a useless one.[57] Secondly, the first provincial census was held, according to Dio, in Gaul in 27:[58] when Octavian took his first citizen census in 28, therefore, there had been no provincial census yet, nor, perhaps, even a plan for it. Thirdly, the inclusion of women and children in the registration did not automatically mean their inclusion in the enumeration: it is assumed that women and children were declared by the *sui iuris* at the Republican census, but no one has, for that reason, ever proposed that the late Republican figures included them.

As for the use of the expression *capita libera* in Pliny, it seems to me that much unnecessary ink has been wasted in the vain effort of proposing the most subtle theories about its occurrence, not only in the passage on the Spanish *conventus* in the third book of the *Naturalis Historia*, but also in Pliny's report of the result of the census at the time of Rome's sack by the Gauls.[59] In my view, it is perverse to take it to mean, specifically, all the *capita*, that is including women and children, as opposed to only the *capita* of adult males: the obvious meaning of *capita libera* is *capita* of free persons as opposed to *capita servorum*. This being so, *capita libera* might or might not include women and children as well as males, or *cives Romani* as well as *peregrini*. This is how *capita libera* is used, for example, in Livy and in the jurists:[60] and it is not by chance that the expression is often used, in Livy, to indicate *just adult males*, as is clearly shown by the context.[61]

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[53] Eus., *Chron.*, p. 146 Schoene (= Sync. 602, 17).
[54] See A. A. Mosshammer, *The Chronicle of Eusebius and Greek Chronographic Tradition* (1979), ch. 1. Neither the Armenian version nor Jerome seem to be of any use in this particular case.
[55] *N.H.* III.3.28.
[56] *Bevölkerung*, 374ff. Beloch's followers did not accept the connection beween the census of citizens and the provincial censuses: see Brunt, op. cit. (n. 51), 113f. The difference between the two kinds of census is vigorously argued by, e.g., H. Braunert, 'Der römische Provinzial-census und der Schätzungsbericht des Lukas-Evangelium', *Historia* 6 (1957), 192ff.
[57] To suppose that there could have been a shift in the aims of the census, with a purely demographic concern coming to the forefront, seems to me to attribute anachronistically modern preoccupations to the Roman government: certainly one cannot read the statement by Claudius about the function of his census as revealing this sort of purely statistical interest: *ILS* 212, ll. 65ff.: see Lo Cascio, op. cit. (n. 39), '*Civium capita*', 1. 2.
[58] Dio LIII.22.5.
[59] Plin., *N.H.* XXXIII.16. Already O. Clason, *Römische Geschichte seit der Verwüstung Roms durch die Gallier* I (1873), 54, maintained that the use of *capita libera* in this passage would show that the earliest census figures referred to the whole population, and not just to the adult

males; this hypothesis is restated by T. Frank, 'Roman census statistics from 509 to 225 B.C.', *AJPh* 51 (1930), 313–24, at 314, n. 5 (without any quotation of Clason); in this same sense, see now F. Coarelli, 'Demografia e territorio', in *Storia di Roma Einaudi*, I, *Roma in Italia* (1988), 317–39, at 320. Other theories about the use of the expression in this passage of Pliny and the reason for it have been put forward by A. Momigliano, 'Timeo, Fabio Pittore e il primo censimento di Servio Tullio', *Miscellanea di studi alessandrini in memoria di Augusto Rostagni* (1963), 180–7 = *Terzo contributo alla storia degli studi classici e del mondo antico* (1966), 649–56, at 652f.; P. Brunt, *Italian Manpower* (1971), 113; see also W. den Boer, 'Demography and Roman history: facts and impressions', *Mnemosyne*[4] 26 (1973), 29–46, at 42; E. Alfisi, 'Le fonti dei censimenti romani in Plutarco e Plinio', *Atti Cesdir* 6 (1974–75), 9–29, at 20ff.: all of them imply that *capita libera* must have included women and children. A different explanation of the occurrence of the expression in this passage of Pliny is advanced in Lo Cascio, op. cit. (n. 39), '*Civium capita*', 2.3.1.
[60] Livy, v.30.8; VI.12.5; XXII.57.11; XXIII.19.5; XXVI.47.1; XXVII.19. 2; XXIX.29.3; XXXI.21.18; 40.3; XL.38.6; XLII.41.11; XLV.24.11; Gaius 1.166 a; Ulpian XI.5; Digest XIV.2.2.2 (Paul.); XXVI.1.1 pr. (Paul. [Serv.]).
[61] See Livy VI.12.5; XXII.57.11; XXVII.19.2; XXXI.21.18.

Since philological arguments cannot be conclusive, an attempt to test the whole recon-struction by Beloch has to be made by testing precisely his argument from likelihood. Is it true that the argument, as it stands, is really cogent? In other words, is it true that the *only* plausible solution is the one adopted by Beloch (and afterwards endorsed by Brunt)? Moreover, is it true that this solution is *at all* plausible? What are the implications of supposing that the 4,063,000 *civium capita* in 28 B.C. were the whole citizen population, whereas the 910,000 in 70 B.C. were the adult males? What would have been the number of all citizens in 70, when the registered adult males were 910,000, and how would it have compared with the alleged *total* number of 4,063,000 in 28? Would this last number have been big enough to allow for the addition to the Roman citizen body brought about by the enfranchisement of Transpadani, by the seemingly high number of manumitted slaves, and by the enfranchisement of *peregrini* in the provinces between 70 and 28? Recent progress in demography and historical demography can allow us to test in a more refined way the seeming demographic plausibility of Beloch's conclusion: it can show what assumptions must be made in order to make it demographically plausible.

Demographers in the last decades, drawing on a large set of empirical data, have built sets of model life tables (and of model distributions of population by age), varied, in their more elaborate form, for the various areas of the world.[62] These model tables refer to stable populations, that is, populations with a steady birth-rate and death-rate and therefore with a steady rate of increase or decrease and a constant age distribution.[63] The immediate aim of these model tables is to allow an estimate of the demographic variables for all the populations for which information on the vital statistics is incomplete or inaccurate. The model tables allow one to infer from the knowledge of some parameters drawn from existing data an estimate of the level of the unknown parameters for all the populations which approach to stability. For example, by knowing the age distribution of a female population and by knowing life-expectancy at birth, it is possible to infer the birth-rate and consequently the rate of increase of the whole population. Or by knowing the age distribution of a population and its rate of increase, it is possible to infer birth-rate and death-rate. One can say that the most important achievement of the construction of the model tables is the possibility of passing from the 'stock data' (the ones which interested Beloch) to the 'flow data'.[64]

It must be stressed that the model stable populations based on model life tables are mathematical models of non-existent populations: the notion itself of a 'stable' population is an abstraction, since no 'real' population is in fact absolutely stable[65] and since no 'real' population is immune from migratory movements. Moreover, they are built on data relating to recent or contemporary populations,[66] whose comparability with the populations of the past in terms, to take just an example, of sex ratio, can be legitimately questioned.[67] When quantitative evidence is of dubious statistical value, the use of the model tables can allow one to test the quality of the data: their representativeness or the extent to which they are biased.

[62] 'Age and sex patterns of mortality: Model Life Tables for underdeveloped countries', United Nations, Depart-ment of Social and Economic Affairs, *Population Studies* 22 (1955); 'Methods for population projections by sex and age', ibid. 25 (1956); 'Model Life Tables for developing countries', ibid. 77 (1982); A. J. Coale and P. Demeny, *Regional Model Life Tables and Stable Populations* (2nd edn, 1983).

[63] On the theory of the stable population developed by Lotka at the beginning of this century, see M. Livi-Bacci, *Introduzione alla demografia* (1981), 372ff.; C. Newell, *Methods and Models in Demography* (1988), Part II.

[64] See the admirably lucid account of the use of life tables in historical demography by M. Livi-Bacci, 'Fonti e metodi per lo studio della demografia', in Comitato ita-liano per lo studio della demografia storica. *Le fonti della demografia storica in Italia* (1972), I, 2, 955–98, at 973ff. (= *Nuovi metodi della ricerca storica* (1975), 311–39, at 324ff.); and idem, 'Sull'applicazione delle tecniche di analisi basate sulla teoria della popolazione stabile agli studi di demografia storica', in *Atti della XXV riunione della Società italiana di Statistica* (1969), 917–32; idem, 'Una disciplina in rapido sviluppo: la demografia storica',

Quaderni storici 17 (1971), 279–98; see also T. H. Hol-lingsworth, *Historical Demography* (1969), 339–53; E. Van de Walle, 'De l'emploi des modèles en démographie historique', *Annales de démographie historique* (1972), 153–77.

[65] Or immune even from wide fluctuations in birth-rate and death-rate and in pretransitional populations from 'crisis mortality'. But this does not seem to legitimate a sceptical attitude towards the models based on the theory of the stable population, provided that the population under study is big enough and the analysis is a long-term one.

[66] Except for some of the data relating to European populations, which go back to the nineteenth century.

[67] The legitimacy of the use of the model tables in reconstructing pre-industrial populations has been ques-tioned, precisely on the grounds of the possible differ-ences between the age-specific mortality schedules assumed in the tables and the ones of pre-industrial populations: see, e.g., R. S. Schofield, in his review of Hollingsworth, op. cit. (n. 64), *Historical Method News-letter* 4 (1970), 14–16.

When quantitative evidence is totally lacking, the use of the model tables cannot allow positive statements to be made about the structure or the dynamics of a population. But their use can be the opposite, a negative one: they make it possible to *refute* hypotheses, by showing their demographic implausibility.[68] With this proviso, the model tables can be of value also for the ancient historian. And in fact they have been widely used by ancient historians, after the pioneering work by Hopkins,[69] as a sort of comparative tool in order to test the value of a specific kind of evidence, for example the data on mortality patterns that one can draw from tombstones or skeletal remains, or the demographic plausibility of specific assumptions about the spread of particular practices, for example infanticide.[70]

Since the ancient historian can confidently make at least one specific assumption about one specific variable, the level of mortality, the model tables offer the possibility of delimiting the sets of values of fertility and rates of increase which are consistent with that level of mortality, if the population in question is to survive. A specific level of mortality, in fact, determines the range of possible levels of fertility,[71] in so far as it determines the minimum level of fertility that is necessary for the population not to die out, the theoretical maximum being the biological one. A specific level of mortality also determines the possible range of the rates of increase of the population (r), in so far as it determines the maximum rate of increase that a population can achieve, if fertility is at its maximum level, the stationary condition being by definition the one in which fertility is at the minimum required for the population not to die out. This range of possible levels of fertility and of possible rates of increase also defines the range of possible age-structures of the population itself. Put otherwise, the model tables can be of use for the ancient historian not only in showing the impossibility of the association of two or more specific hypotheses on flow data, which by themselves and singularly taken could be demographically plausible, but more specifically in defining the range of values of fertility and of the rate of increase compatible with the levels of life-expectancy that can be assumed for the Graeco-Roman world: levels which must be comparable with those achieved by other 'pre-transitional' populations. To take an example: Hansen was able to show that the hypothesis made by Ruschenbusch, that a class of ephebes in fourth-century Athens was equal to 3 per cent of all the males above eighteen and that the year classes from twenty to thirty-nine were 54 per cent, is not compatible with another hypothesis made by Ruschenbusch: that there would have been a very rapid natural growth of the citizen population.[72] In fact, either the population as a whole had a life-expectancy at birth of more or less twenty-five years and was stationary or it was rapidly increasing and then its life-expectancy must have been much higher, say forty to forty-five years, if the rate of increase was two per cent. Since this level of life expectancy, in a pretransitional population, is too high, the second alternative can be excluded.[73]

VII

In a similar way, the model tables seem to offer a device to test the acceptability of Beloch's hypothesis: they allow us the possibility of forming a more refined estimate of the proportion of the Roman population consisting of adult males (over 17) on the most probable

[68] It must be stressed that structure and dynamics of a population depend first of all on biological features, which do not present themselves differently in the different populations, historical and contemporary, and which are as such measurable.

[69] See in particular 'On the probable age structure of the Roman population', *Population Studies* 20 (1966–67), 245–64.

[70] See now Parkin, op. cit. (n. 22), ch. 1, for the references and an analysis of the comparative value of the different types of evidence, which seems to be perhaps too pessimistic. The central role that the model tables can have in studying the demographic structure, and dynamics, of the ancient populations is revealed by the space that Parkin has devoted to a presentation of them in his ch. 2.

[71] As measured, in the model tables, by the Gross Reproduction Rate, *GRR*, that is, the number of daugh-

ters that a women can bear during her fertile age, in absence of mortality.

[72] M. H. Hansen, *Demography and Democracy. The Number of Athenian Citizens in the Fourth Century B.C.*, (1986), 12f., on E. Ruschenbusch, *ZPE* 35 (1979), 173–6, 177–80; 49 (1982), 267–81; 54 (1984), 253–69.

[73] Rates of increase of the order of 2–3 per cent are implausibly high in a pretransitional population, even for a limited span of time and a small group. It is hard to accept the conclusion drawn by R. Sallares, *The Ecology of the Ancient Greek World* (1991), 90, that at the start of the Late Geometric II period the Athenian population could have exhibited for a few years a rate of natural increase of about 3 per cent per annum. A similar objection can be addressed towards N. V. Sekunda, 'Athenian demography and military strength 338–322', *ABSA* 87 (1992), 311–55.

assumptions about its mortality and fertility patterns. There is, however, a difficulty: what was the numerical relationship between the two sexes? The Princeton Regional Model Tables presuppose for all the levels of mortality and for all the Regional types a preponderance of females, which is the result of their higher life-expectancy (or lower death-rate). It is a biological fact that, in every population, the sex-ratio at birth is slightly favourable to males: 105–107 male babies are born against 100 female babies. But this initial advantage is rapidly compensated and normally rather reversed in most of contemporary populations. However, a sex-ratio higher than one seems to have been quite normal in many past populations (and even in some Mediterranean populations of our century). Some Italian regions between the late Middle Ages and early modern times had a preponderance of males, others of females, as emerges from the data collected by Beloch:[74] and Delille has tried to reconstruct some sort of cyclical development of the sex ratio between the sixteenth and eighteenth centuries in some areas of the peninsula.[75] The Florentine Catasto of 1427, studied by Herlihy and Klapisch-Zuber, offers richer and much more varied evidence, which allows study of age-specific sex-ratio and sex-ratio according to economic condition: and it has been possible to show that in fifteenth-century Florence there was a preponderance of females between fifteen and twenty and between forty and sixty, but a more marked masculinity, among the rich people, in the adult age-classes.[76]

Do these conclusions hold good also for the Roman citizen population in the Augustan age? It is quite possible that the state of affairs that Herlihy and Klapisch-Zuber found in fifteenth-century Florence also obtained in Italy in the late Republican and Augustan age: that males outnumbered females, as in many other premodern societies.[77] The problem is rather complex, precisely because we do possess evidence which seems capable of being analysed quantitatively, but this evidence is so distorted by biases of various kinds as to render it useless more often than not. This has been shown, for instance, by numerous attempts by scholars since the end of the last century, and even quite recently, to extrapolate this kind of information from selected groups of funerary inscriptions.[78]

A much more reliable basis for estimating a typical sex-ratio in an ancient population seems to be offered by the Egyptian census returns, studied recently by Bagnall and Frier.[79] These documents cover a very long span of more than two centuries, between the first century and the middle of the third century A.D., but by their very nature and relative abundance they seem to call for statistical analysis and to promise reliable conclusions. However, when this material has been analysed to throw light on the problem of sex-ratio, its evidence has been revealed to display some quite peculiar anomalies. Taking the whole data base, the resulting sex-ratio is of 108.7 males for 100 females. When the data are disaggregated, one can see that, among the inhabitants of the metropoleis, the sex-ratio is much higher (145.6 to 100); among the inhabitants of the villages is lower (99.7).

By fairly sophisticated statistical procedures which take into account the biases of the documentation, Bagnall and Frier have produced two provisional life tables and age distributions, for females and for males, and compared them with the Princeton model life tables and age-distributions, in order to find to which of these the Egyptian ones could be said to 'fit' better. The result seems to be much more reliable for the female table than for the male one. The model age distribution with which the Egyptian one best matches is that characterized by a life expectancy at birth of 22.5, when combined with a rate of increase of 0.2 per cent. By assuming this same rate of increase for the male population, Bagnall and Frier found that among the model life tables consistent with the census returns the one which is characterized by the lowest possible life expectancy is the West Level 4, that is, with a life expectancy at birth of 25.26. The resulting sex-ratio would be 117.9 to 100, a very high sex-ratio indeed. But Bagnall and Frier acknowledge that the documentary basis in building the Egyptian male life

[74] *Bevolkerungsgeschichte Italiens*, I and II, *passim*.

[75] G. Delille, 'Un problème de démographie historique. Hommes et femmes face à la mort', *MEFRM* 86 (1974), 419–43.

[76] D. Herlihy and Ch. Klapisch-Zuber, *Tuscans and their Families. A Study of the Florentine Catasto of 1427* (English trans., 1985), ch. 5.

[77] For a balanced account of the problem of sex ratio in the Roman world see Parkin, op. cit. (n. 22), 98ff.

[78] See in particular A. R. Burn, '*Hic Breve Vivitur*. A study of the expectation of life in the Roman Empire', *Past & Present* 4 (1953), 2–31, at 10–13. The last attempt has been made by W. Suder, *A Study of the Age and Sex Structure of Population in the Western Provinces of the Roman Empire* (1990).

[79] R. S. Bagnall and B. W. Frier, *The Demography of Roman Egypt* (1994). I should like to thank Roger Bagnall and Bruce Frier for having allowed me to read their book in advance of publication.

table is much less reliable than that for the female one: only the data referring to the ages from fifteen to twenty and above appear to be credible and even these are probably biased by undercount of males of these ages. It is not without reason, then, that Bagnall and Frier, taking into account also the possibility of a higher incidence, in the case of males, of the phenomen of age-exaggeration, think it 'perhaps preferable'[80] to select the model life table West Level 3, with a life-expectancy at birth of 22.9. This is enough to lower the sex-ratio to 1.066, a value consistent with the one obtaining in the Asiatic countries today.[81]

The Egyptian data seem to be the best we can achieve to estimate the sex-ratio. But are these data legitimately extensible to late Republican and Augustan Italy? A piece of evidence which appeared to scholars to be useful is a passage in Dio, in which it is said that one of the reasons which induced Augustus to propose his marriage laws was the fact that among the εὐγενεῖς at Rome there were more males than females.[82] Brunt interpreted εὐγενεῖς as *ingenui* and maintained that the 'unnatural' prevalence of males would have been the result of a higher rate of female exposure and infanticide, and that the low proportion of females was one of the factors which would have prevented the population of Italy from reproducing itself.[83] However, I do not believe that the passage of Dio can be applied to the population at large. It must be observed that εὐγενεῖς, in this, as in the twenty-odd cases in which it occurs in Dio, does not mean *ingenui*, but rather well-born.[84] The use of this word with this meaning in this context is quite comprehensible: the only feature of the Augustan legislation that can be considered uncontroversial is that it was directed at the high orders, senators, equites and decuriones in the municipalities, the 'well-born' as opposed to the plebs.[85] It is quite possible that, among the wealthier levels of the Italian population, mechanisms were devised to prevent the excessive division of patrimonies and that these mechanisms worked to the disadvantage of females: sex-selective exposure, for example. But to draw from Dio's passage the conclusion that chances of survival in the Augustan age were worse for females and that their life-expectancy in Roman society as a whole was lower does not seem to be on the whole justified.

One can only speculate on the effect that manumissions could have had on the sex-ratio. It is normally supposed that manumissions were more common for male than for female slaves. But there is no means of guessing what this difference could have been in quantitative terms. Similarly, one can only guess what the influence, in the opposite direction, could have been of the wars and disorders of the last decades of the Republic. In short, we do not have any indication of what the sex-ratio could have been: higher or lower than one or more or less equal to one.

VIII

Given the uncertainties not only over the possible values of fertility and of the rate of increase, but also over the possible values of the sex-ratio, it seems methodologically sound, in trying to estimate the proportion of adult males in 70 and 28, to draw from the model stable populations a large range of possibilities. This is limited by the one assumption we are entitled to make: that life-expectancy at birth cannot have been higher than, say, 25 for males; and that, unless we are ready to admit that the sex-ratio was very favourable to females, life-expectancy at birth for females must have not been higher than 25 and is likely to have been a bit lower. The values that I selected are those of the model life table West, Level 2 for females (that is, with life-expectancy at birth of 22.5),[86] and those of the model life tables, West,

[80] ibid., 108 n. 49.

[81] See the foreword of A. J. Coale to P. M. Visaria, *The Sex Ratio of the Population of India* (1971).

[82] Cass. Dio LIV.16.2.

[83] *Italian Manpower* (1971), 151, 155, 558, 561.

[84] There are just two cases in which the word *might* mean *ingenuus*, but only because in the same passages there is a reference to freedmen: Cass. Dio LV.22.5 and 31.1. That εὐγενεῖς are not the 'nobility' is obvious, but that does not necessarily imply that the term means free-born.

[85] As is pointed out by Brunt himself: *Italian Manpower* (1971), 558–66. That is even truer if one accepts the

ingenious thesis put forward by A. Wallace-Hadrill, 'Family and inheritance in the Augustan marriage laws', *PCPS* 27 (1981), 58–80, according to which 'Augustus aimed to encourage the family in order to stabilise the transmission of property, and consequently of status, from generation to generation'; see also K. Hopkins, *Death and Renewal* (1983), 97f. On Augustus' marriage laws L. F. Raditsa, 'Augustus' Legislation concerning Marriage, Procreation, Love Affairs and Adultery', in *ANRW* 11.13 (1980), 178ff.; A. Mette-Dittmann, *Die Ehegesetze des Augustus* (1991).

[86] See above, on the Egyptian data.

Levels 2, 3, 4, for males (that is with life expectancy at birth of, respectively, 20.444, of 22.852, of 25.26). The resulting values of the sex-ratio are 0.958, 1.071, and 1.184, on the basis of a sex-ratio at birth of 1.055. Since we do not know whether the population was increasing, decreasing, or stationary, and since this is also a major field of debate, it seemed sound also to consider a large range of possible values of the rate of increase (r). And since these calculations are merely indicative of what is demographically plausible and what is not, the selected values of r are the ones according to which the different model distributions by age are calculated in the Princeton set: from −1 per cent, a decrease by which a population halves in sixty-nine years and declines more or less by 35 per cent in forty-two years (the number of years from 70 to 28 B.C.), to +0.5 per cent, an increase by which a population doubles in one hundred and thirty eight years and grows by more or less 23 per cent in forty-two years. Table 1 gives the possible percentages of the adult males in the whole population, according to these different assumptions. The value of *TFR* (the total fertility rate, that is, the number of live births that a woman can bear during her fertile age, in absence of mortality) for every value of r is also given in the table.

The resulting percentages range from a minimum of more or less 28 per cent to a maximum of more or less 38 per cent. What do these values imply? If we calculate the total population, according to these different percentages, in 70, when the registered adult males were 910,000, to which we must add, according to Brunt, 70,000 men under arms and therefore not registered,[87] we get a range from a maximum of 3,513,000 to a minimum of 2,580,000; in 28 the number of the *cives* of the old stock and their descendants must have been, according to the different hypotheses, from a maximum of *c*. 4,300,000 to a minimum of *c*. 1,700,000 (Table 2). Most of these values are simply impossible, if Beloch is right: if 4,063,000 were the *whole* citizen population in 28, there would have been no room for the people made citizens and not born citizens, and their descendants, between 70 and 28. According to the very conservative estimates of Brunt, the Transpadane adult males alone numbered 300,000, whereas the number of the other enfranchized adult male provincials in colonies and *municipia* would have been, according to Brunt, 110,000 and the number of enfranchized provincials serving in the army, 30,000: that is, the number of the new adult male citizens, *not including freedmen*, would have been *at least* 440,000.[88] Even allowing for a very high sex-ratio among them, the newly enfranchized citizens, not including freedmen, cannot have been, therefore, fewer than, say, 1,200,000–1,400,000. Only if the citizens of the old stock were *decreasing* at the rate of 0.5 per cent, would their number in 28, 2,500,000 to 2,200,000, have been low enough to leave room for the people made citizens after 70 and their descendants; and this is even more the case, if one assumes that the rate of decrease was 1 per cent and therefore the number of the citizens of the 'old stock' in 28 was just 2,000,000 to 1,700,000.[89]

If Beloch is right, then, one has to accept that between 70 and 28 the original population was decreasing at a rapid pace, the sex-ratio was high, and the number of the people made citizens was low: the higher the level of new enfranchisements posited, and the higher the ratio of females to males, the more marked the natural decrease of the original population must have been. Enfranchisements and manumissions thus represent a way of replacing the declining stock.

But a decrease, however low, or, for that matter, even a stationary situation have unacceptable implications. It would mean, in fact, that the free population of the Italian peninsula was collapsing. 30 per cent to 35 per cent of 4,063,000 gives 1,200,000 to 1,400,000 adult males. Now, according to Brunt, not less than 375,000 were in the provinces and 300,000 in Transpadana in 28 B.C.: between about a half and three fifths of the Roman citizens would have been outside the peninsula.[90] Can we consider this conclusion plausible? Can we really think that the proportion of the citizen population which was in the peninsula was so low?

I think we cannot, for the following reason. Beloch reckoned at 434 the towns in Italy in the Augustan age: no less than 380 of them were in the peninsula and in Cispadana. No one can

[87] *Italian Manpower* (1971), 97, table VIII.
[88] ibid., 117, 202, 242.
[89] Such a rate of decrease would imply, however, as said, an incredibly low total fertility rate.
[90] If one assumes that the number of adult males was less than 30 per cent, because the citizen population was not

declining, the proportion of the adult male citizens who were not in the peninsula becomes paradoxically higher. But, as shown, one cannot accept *both* the notion of an increasing citizen population *and* Beloch's explanation of the Augustan census figures.

TABLE 1. PERCENTAGE OF ADULT MALES (OVER 17) IN THE TOTAL POPULA-
TION (IF LIFE-EXPECTANCY AT BIRTH IS 22.5 FOR FEMALES AND 20.44 OR 22.85
OR 25.26 FOR MALES) AND TOTAL FERTILITY RATE (TFR) AT THE DIFFERENT
RATES OF NATURAL INCREASE (r).

$r = 0.5$		$TFR = 6.66$
sex ratio $= 0.96$:	27.9%	
sex ratio $= 1.07$:	30.2%	
sex ratio $= 1.18$:	32.3%	
$r = 0$		$TFR = 5.78$
	29.6	
	32	
	34.2	
$r = -0.5$		$TFR = 5.02$
	31.3	
	33.8	
	36.1	
$r = -1$		$TFR = 4.36$
	32.9	
	35.5	
	38	

TABLE 2. TOTAL POPULATION IN 70 B.C., IF THE ADULT MALES (OVER 17)
WERE 980,000*, ACCORDING TO THE VARIOUS ASSUMPTIONS, AND HYPO-
THETICAL TOTAL POPULATION OF THE 'OLD STOCK' IN 28 B.C. ACCORDING TO
THE DIFFERENT RATES OF NATURAL INCREASE.

	70	28
$r = 0.5$		
	3,513,000	4,326,000
	3,245,000	3,996,000
	3,034,000	3,736,000
$r = 0$		
	3,311,000	3,311,000
	3,062,000	3,062,000
	2,865,000	2,865,000
$r = -0.5$		
	3,131,000	2,537,000
	2,899,000	2,349,000
	2,715,000	2,200,000
$r = -1$		
	2,979,000	1,957,000
	2,761,000	1,814,000
	2,579,000	1,694,000

Civium capita in 28: 4,063,000.
Enfranchised provincials in colonies and *municipia* (adult males) and new
citizens serving in the army (according to Brunt) in 28: > 440,000.
* 910,000 + 70,000 under arms.

dispute the reality of an unprecedented urban development in the last centuries of the
Republic. If there was a collapse of the Italian population, then, it would have been the
collapse of the population of the countryside. And in fact this is what, for example, Hopkins,
following Beloch and Brunt, has supposed. According to his guestimates, the free rural
population would have decreased from 4,100,000 in 225 B.C., to 2,900,000 in 28:[91] since the
total free population of Italy is set by him at 4,000,000 in 28, to assume a higher population in
the countryside would have meant assigning an unrealistically low average to the free

[91] *Conquerors and Slaves* (1978), 68–9, table 1.2.

population of the 434 towns of Italy, given the existence of a 'millionaire' city like Rome. Hopkins, in fact, estimates the free inhabitants of Rome at 600,000 and the free inhabitants of the other Italian towns at 500,000, that is just a bit more than 1,000 on average.[92] He then adds 800,000 urban slaves, raising the total urban population to 1,900,000, whereas he puts at 1,200,000 the rural slaves and therefore at 4,100,000 the whole rural population. Now, even so low an estimate of the urban population, when compared with the estimate of the rural population, appears hardly plausible. It implies that the percentage of the urban dwellers in the total population is incredibly high; as Hopkins himself admits, by pre-industrial standards. As Boserup has observed, in a pre-industrial scenario, a significant urbanization of a particular territory is impossible, unless it is accompanied by the sustained growth of the rural population.[93] Of course, one can think of some of the smallest Italian towns either as agro-towns, or artificial foundations: small urban centres with just some public buildings and a sparse population in the countryside around. But most of them were not: they were actual urban centres with a population not engaged in agriculture; and it must be pointed out that in his guestimates what Hopkins calls the urban/rural split is in fact an agricultural/non-agricultural split. According to Hopkins' estimates, the non-agricultural population of Italy would have been 32 per cent of the total population, and the non-agricultural free population of Italy would have been 27.5 per cent of the total free population. Are these plausible proportions? I quote from a very recent contribution of Bairoch, reviewing two decades of research on urbanization in pre-industrial societies:[94] 'In the case of the larger geographical units with relatively adequate supplies this maximum [of urban population] was between 10%–15% of the population (based on towns larger than 5,000). If we take towns of 2,000 inhabitants as a measure better suited to the age, then the figures rise to 15–20%'. According to a very recent survey by the U.S. Bureau of the Census, on Residents of Farms and Rural Areas, in 1790 the percentage of rural population was 95 per cent and it was still as high as 90 per cent in 1830; in 1870 it was still more than 70 per cent.[95] It would be possible to quote, of course, much more comparative material.

Now, the urban population of Rome was fed in part by the provinces, but the same was not true of the non-agricultural population of the hundreds of Italian towns. Most of them must have drawn their subsistence from the Italian countryside, which cannot have been empty. And that in turn means that, unless we are ready to admit that the proportion of slaves engaged in agricultural production was very high indeed, much higher than the 1,200,000 accounted for by Hopkins, we have to suppose that the number of free rural inhabitants must have been much higher than that accounted for by Beloch's view of the Augustan census figures. Of course, one must also take into account that, if part of the population in towns was engaged in agricultural jobs, a substantial proportion of the population in the countryside was engaged in non-agricultural jobs or was engaged in them part-time; to quote the calculations made by Bairoch once more, 'the percentage of non-agricultural activities exceeded the proportional weighting of the urban population by 4 to 5 percentage points'.[96] That means that the guestimate by Hopkins, referring to non-agricultural population, not to urban population, is perhaps less far from a plausible maximum estimate for a pre-industrial scenario. But that means as well that we have to put the urban dwellers of Italy at an even lower level and the average free population of the 434 cities at even less than a thousand.

It seems to me, therefore, that Beloch's argument from plausibility is very weak indeed and his interpretation of the leap between the last Republican census figure and the Augustan ones does not propose the most plausible demographic scenario, but the least plausible. To be sure, the most formidable champion of Beloch's views, Brunt, fully appreciated the difficulty of the argument at this point and tried to overcome the difficulties highlighted, assuming that the percentage of citizens who failed to register was higher in 28 than in 70 B.C. According to Brunt, the percentage of the *incensi* would have risen from, say, a figure of 18 per cent in

[92] Even this average is, however, impossibly low, in view of the general conclusions that we are allowed to draw, for the Italian cities of the first centuries of the Empire, from the epigraphic evidence of gifts for feasts or distributions: see Duncan-Jones, op. cit. (n. 25), 259–77.

[93] Boserup, op. cit. (n. 36).

[94] P. Bairoch, 'Urbanization and the economy in pre-industrial societies: the findings of two decades of research', *The Journal of European Economic History* 18 (1989), 239–90, at 247.

[95] D. D. Dahmann and L. T. Dacquel, *Residents of Farms and Rural Areas: 1990*, Current Population Reports, Series P-20: Population Characteristics No. 457 (1992).

[96] Bairoch, op. cit. (n. 94), 266.

70 B.C. to a figure of 25 per cent in the Augustan age.[97] This supposition, however, is exposed to attack: in the light of the evidence pointed out by Nicolet in his recent *L'inventaire du monde*, the efficiency of the arrangements for conducting the census in the Augustan age was actually increasing.[98] And above all, the main reason for Brunt to believe that the number of the *incensi* was higher in 28 is his assumption that women and children were by now being counted as well: the risk of circular reasoning is patent.[99]

                                           IX

        Since the strongest argument (or indeed the only one) in favour of Beloch's interpretation of the Augustan census figures was its alleged demographic plausibility, once it is shown that it is precisely in terms of demographic plausibility that this interpretation cannot be accepted, I think we can confidently abandon it. But, as I have shown, the whole fabric of the *Bevölkerung* stands in fact on this section on the Roman census and on this interpretation of the census figures: what, then, of the value of the *Bevölkerung* as a whole for contemporary research, if its main foundations collapse? The use made of the book since it appeared has been very often to provide comfortable and apparently plausible estimates of the size of ancient populations, to be cited often without any discussion in general works on various topics, chiefly of social and economic history. While recognizing the value of the *Bevölkerung* as a collection of data on population sizes which has 'yet to be superseded',[100] contemporary research on ancient populations has, however, followed different paths, in so far as it has become more and more involved in investigations of the structure and dynamics of ancient populations, rather than of their size. This shift can be seen in part as a result of a change of interest of historical demography as a whole: from 'macrodemographic' problems to 'microdemographic' ones. Estimating the size of an ancient population is thought of as an almost impossible exercise, given the uncertainties in the source material. It is considered much more interesting and indeed more rewarding to try to extract from our sources information on what the normal patterns of mortality or fertility were, or the age at marriage for women and men, or the extent of exposure and infanticide, or the customs of breast-feeding and their effect on fertility. Put otherwise, the increasing interest in what we can call the variables of flow seems to render Beloch's *Bevölkerung* even more obsolete.[101]
        But, in my view, there are two reasons for not abandoning the field covered by Beloch. The first is that such numerical evidence as we have on ancient populations is largely related to size of population: it provides 'stock data'. Unless we are prepared to jettison as worthless all the snippets of information that the ancient sources provide, it is this sort of data that we will have to handle. The second reason is that demography does provide the ancient historian with sophisticated techniques which enable him to test the reliability of at least some of the figures found in the sources and occasionally even to get some sort of estimates of flow data from stock data. If one is not wholly convinced that the character of the sources reduces every attempt at quantification in ancient history into a mere 'number game', if one believes that it is possible to achieve more than simple 'demographic impressions' of the ancient world,[102] it is upon the sort of evidence collected and discussed by Beloch that it is necessary, 'faute de mieux', to lean. After all, as Brunt observed, quoting D. V. Glass at the beginning of his *Italian Manpower*, a rough estimate is better than no estimate at all.[103]

University "Federico II" of Naples

[97] *Italian Manpower* (1971), 97, table VIII, 117; and the Postscript to the reprint of 1987, 717.
[98] C. Nicolet, *L'inventaire du monde* (1988), ch. 6 (English trans. *Space, Geography, and Politics in the Early Roman Empire* (1991)).
[99] On Brunt's other assumption, that infants below one year were not registered at the Augustan censuses, see Lo Cascio, op. cit. (n. 39).
[100] Sallares, op. cit. (n. 73), 48.

[101] See above, n. 22, on the space devoted by Parkin to the data on the size of Roman population.
[102] 'Demographic impressions of the Roman world' is the title given by Parkin to Part Three of his book, op. cit. (n. 22).
[103] *Italian Manpower* (1971), 3.