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THE POPULATION OF ROME

BY WHITNEY J. OATES

ONE of the ever recurring difficulties which students of ancient civilization have to face is the want of statistical data in the sources of their study. In a way the reason for this is to be assigned to conventions of historical writing generally followed by those authors who set themselves the task of chronicling the events of their own times or of their past. Their primary end was at once to please and to teach, like the poets who achieved their purpose, in the words of Horace, *lectorem delectando pariterque monendo*. Consequently we find preserved in our ancient historians a combination of interesting, vivid incident and an elaboration of the moral implications of the events thus set down. Such historical writing enables the scholar to reconstruct accurately the broad trends of military and political movements, but it leaves the economist and statistician sadly at a loss. Thus it becomes the lot of the latter to put together painstakingly those meager bits of information that can be culled from any of the available sources.

The task of determining the population of Rome in antiquity falls definitely among these statistical problems. There have been various estimates made since the Renaissance which vary from half a million to fourteen millions of inhabitants. At the present time the work of Beloch¹ on population in antiquity is probably regarded in general as authoritative. His estimate for Rome is somewhere in the neighborhood of eight hundred thousand. There have been other attempts to deal with the problem since that time, notably those of Nissen² and Friedländer.³ This latter scholar is of the opinion that the population

¹ K. J. Beloch, *Die Bevölkerung der griechisch-römischen Welt* (Leipzig: Duncker & Humblot, 1886). The second section of chap. ix (pp. 392-412) deals specifically with the population of Rome.

² H. Nissen, *Italische Landeskunde* (Berlin: Weidmann, 1902), II, 99 ff. and 523 ff. Beloch answers Nissen in *Klio*, III (1903), 471-90.

³ L. Friedländer, *Roman Life and Manners under the Early Empire*, trans. A. B. Gough (London: Routledge, 1913), IV, 17-28. T. Rice Holmes (*The Roman Republic* [Oxford: Clarendon Press, 1923], I, 360-63), also treats the problem. He levels two

of Rome in the time of Augustus was somewhat over a million. My purpose is to review the evidence briefly, to examine the uses to which this evidence has been put by the above-mentioned scholars, and to attempt to come to a more satisfactory conclusion in regard to the problem.

Beloch maintains that there are three bases upon which, in the want of more accurate statistical data, one may successfully form an estimate of the population of ancient Rome. These are: (1) the area of the ancient city, (2) the figures extant as to the numbers of those who received the imperial donatives either of grain or of money, and (3) the information which we possess concerning the total annual grain supply for the city. Beloch argues that the area gives us information as to the maximum of population, whereas the number of recipients of imperial largess supplies us with a minimum, while the third serves as a check on what we have derived from the other two.

These three bases should be examined carefully.⁴ In the first place, the area of the ancient city can be determined only with a modicum of accuracy, as we may observe from the general disagreement among scholars on this point.⁵ However, even if we were able to discover the area, we should be faced with the difficult problem of population density. Modern analogies help us to a degree, but certainly population density is a variable of the first order. Beloch, for example, takes a density of 650 per hectare, largely on subjective grounds. This gives him his resultant figure of eight hundred thousand for the population, but there was really no sound reason for not taking either a greater or a lesser density. Therefore any calculation, involving, as this does, an element which varies at the will of the calculator, cannot have any great weight. Consequently, though the area does serve in a way to

penetrating criticisms against Beloch's calculations, and on the whole accepts the estimate of Friedländer. There will be no attempt here to reproduce the bibliography on this subject. In the works already cited one may find complete references to all the important contributions to this problem.

⁴ In the consideration of our problem one point must be kept firmly in mind, viz., that population continually varies. In this respect we can agree thoroughly with Friedländer (*op. cit.*, p. 27) when he criticizes Beloch for his assumption that the population of the imperial city virtually was constant from the days of Augustus to Diocletian. Therefore, in dealing with the sources we must use them strictly for determining the population of the city for the epoch to which they refer, in so far as this is possible.

⁵ Cf. Friedländer, *op. cit.*, pp. 23-24.

give us a maximum figure for the population, yet deductions made therefrom can in no way be final.

Beloch's second method deserves a similar analysis. The number of persons who received imperial donatives naturally does give us a minimum for the population of the city. The highest number ever mentioned in our sources who received such gifts is 320,000.⁶ The stock method by which scholars have proceeded to argue is to assume a ratio between male and female among the free-citizen class as well as between adult and minor. Here by perfectly arbitrary methods a certain number of women and children are added.⁷ Then they allow for a certain number of senators, of knights, and of soldiers stationed in the city. And after they have continued their computations thus far, they still have to deal with the number of slaves in the city. Beloch handles this problem in the following manner. Galen, in writing of Pergamum of the second century after Christ, indicates that in that city at that time there existed a ratio of two free men to every slave.⁸ Beloch makes his calculation accordingly, and this number of slaves is added to the total. It is needless to point out that the conditions in Pergamum of the second century after Christ have little or nothing to do with Rome. Hence we can see that in two places, (1) in the determination of the number of women and children and (2) in the determination of the number of slaves, any argument from the imperial dole lists stands convicted.

Turning to the third method whereby we may estimate the population of the city, we have data which do not admit of such varying treatment, i.e., the food supply of the city. The number of people who may live on a single unit of area may vary; the ratio of women and children to men, and the ratio of free to slave may vary, but the one thing which is constant, does *not* vary, is the *average food consumption of a human individual*. Therefore it seems beyond question that the

⁶ Cf., e.g., Augustus *Res gestae* 15.

⁷ According to Suetonius (*Augustus* 41), boys under ten years of age were included among the recipients of his donatives, which Beloch takes into account when arguing from Augustus' figure of 320,000.

⁸ v. 49 (Kühn). Cf. Seneca *De Clementia* I. 24. 1, where he records that the Senate contemplated giving a distinctive dress to the slaves, but hesitated to pass such a decree for fear that the slaves would thereby become conscious of their own strength and numbers. This passage would militate decidedly against accepting Galen's ratio in Pergamum of 2:1 for Rome.

only method whereby one may attack the problem of estimating the population is by way of the food supply for any given epoch.

The well-known passage from Aurelius Victor⁹ states that in the time of Augustus 20,000,000 *modii* of grain were brought from Egypt each year for the food supply of the city. With this statement is to be coupled a passage in Josephus to the effect that Africa supplied two-thirds of the annual grain supply to the city of Rome while Egypt supplied the remaining third.¹⁰ Thus we are able to determine that the grain supply of the city during the reign of Augustus was 60,000,000 *modii* per year.

At this point it may be well to indicate just what we mean by "the city." Clearly we are at a loss to determine accurately the number of square yards covered by Rome. Consequently when we speak of "the city" we must have in mind what we in modern times might refer to as the "metropolitan area." Certainly our sources, Aurelius Victor and Josephus, use the words *urbs* and τὸ κατὰ τὴν Ῥώμην πληθὺς, which we may only suppose to refer to the environs and to those who lived close or relatively close to the "Seven Hills," who depended on the markets, free or governmentally supervised, or on the dole, for their grain supply. In the want of accurate city limits it seems most reasonable to refer to a metropolitan area defined on such terms as we have used.

⁹ *Epitome* i. 5-6. Friedländer (*op. cit.*, p. 22) has adequately defended the reliability of Aurelius Victor as a source.

¹⁰ *Bellum Judaicum* ii. 383-86. Friedländer (*op. cit.*, p. 22) again furnishes convincing arguments for accepting as authoritative the data in these paragraphs of Josephus. It may be urged that by coupling the statement of Aurelius Victor, which refers to the time of Augustus, with that of Josephus, which looks to the reign of Vespasian, we are controverting the principle laid down above in n. 4. We say in answer that according to Friedländer the information contained in Josephus derives ultimately from the *breviarium totius imperii* of Augustus (cf. Suetonius *op. cit.* 101; Tacitus *Annales* i. 11). Therefore, since Augustus merely apportioned the grain supply for the city on a one-third-two-thirds basis to Egypt and Africa, respectively, the passage of Josephus may be applied to any time between the reigns of Augustus and Vespasian. As it happens, Aurelius Victor gives us the only information as to actual amount of grain needed for the city during those years. Therefore the passage in Tacitus *op. cit.* vi. 13, which states that the grain supply of the year A.D. 32 was greater than that under Augustus, would merely indicate that the population of the city had increased in the intervening years. It is interesting, in view of what we have to say concerning the uncertain meaning of *annona* (cf. below, p. 107), that Tacitus in referring to the increased grain supply of A.D. 32 does not use *annona* but *rei frumentariae copiam*.

If we agree that 60,000,000 *modii* a year is to be accepted as the proper figure for the annual grain supply of Rome, we next must determine the average food consumption per individual, in order to estimate the population. Fortunately we have several sources, which are scattered both in time and in provenience, to assist us in reaching our conclusions. Polybius¹¹ records that the Roman infantryman received an allowance of two-thirds of an Attic *medimnus* of wheat per month¹² in addition to his daily wage of 2 obols. Cato, in a famous passage¹³ dealing with the *familiae cibaria*, allows 4 *modii* per month for the workers on his farm, an amount which is raised to 4½ during the summer months, while the other more inactive members of his staff receive but 3. Further, we discover from a fragment of Sallust¹⁴ that by a certain *lex frumentaria* the dole allowance of grain was 5 *modii* per man, to which the speaker in Sallust refers scornfully as not much better than the *alimenta* of the prison. Seneca¹⁵ states that a slave receives 5 *modii*, while a note of Donatus¹⁶ to a passage in Terence fixes the monthly allowance of *servi* at 4 *modii*. Lastly, there are several references in Egyptian ostraka and papyri¹⁷ which indicate a monthly allowance of an *artaba* per man, i.e., approximately 4 *modii*.

From the foregoing evidence we may observe that the amount of grain allotted to a man did not vary considerably and that, though our figures range from 3 to 5 *modii* a month, the average seems clearly to be 4. If we use 4 *modii* a month as our average, we arrive at the estimate of 1,250,000 as the population of Rome for the reign of Augustus.

Inasmuch as we find that Beloch uses 3 *modii* a month per man as the average consumption,¹⁸ we must justify further our contention that 4 *modii* is a more accurate figure. Certainly with our evidence as

¹¹ vi. 39. 12-15.

¹⁴ *Historiae* iii. 48. 19.

¹² The equivalent of about 4 *modii*.

¹⁵ *Epistulae* lxxx. 7.

¹³ *De agri cultura* 56.

¹⁶ Note on Terence *Phormio* 43.

¹⁷ For the soldier's allowance, cf., e.g., U. Wilcken, *Griechische Ostraka* (Leipzig: Giesecke & Devrient, 1899), II, Nos. 1130, 1131, 1132, 1137, and 1140. All of these papyri date from the early years of the third century after Christ. For the laborer's allowance, cf. D. Comparetti and G. Vitelli, *Papiri Greco-Egizii* (Milano: Ulrico Hoepli, 1915), Vol. III, No. 322, Col. V. The papyrus probably is to be dated in the middle of the third century of our era.

¹⁸ *Op. cit.*, p. 412.

scanty as it is, we must proceed with caution and not allow any subjective element to creep into our calculations. One may reasonably argue that children and women do not eat as much as men, particularly those engaged in physical labor. It is on such a basis that Beloch chooses his figure of 3 *modii* as the average grain consumption. However, there are several points to be urged against this figure. In the first place, we have the orator in Sallust comparing the amount of 5 *modii* to the *alimenta* of the prison.¹⁹ Second, Cato allows his laborers 4 and 4½ *modii*, which would indicate, from the general parsimonious nature of the famous censor, that probably their allotted amount could have been increased with no great dissatisfaction on their part. And, lastly, the only instance of an allotment of 3 *modii* is that of Cato to his staff not actually engaged in active labor.²⁰ Therefore it seems clear that a man was perfectly capable of consuming, and normally would do so, 5 *modii* of grain a month. We can reasonably presume that a female would not need so much, and very likely a child still less. Hence if a man consumed 5 *modii* of grain a month, we may say that the average for females might very easily be 4 and that of children 3 *modii*. Such reasoning tends to confirm our conclusion that 4 *modii* a month per individual is the proper figure for average grain consumption, and not 3, as Beloch would have it.

There is another legitimate method whereby we may check our figures. Let us assume a city of 1,250,000 inhabitants. Let us further assume that 28 per cent of the population are children, as was approximately the case in New York City in 1920.²¹ Let us assume that the remaining adults in our hypothetical city are divided as to sex, so that the males constitute a group 17 per cent in excess of the females, as Friedländer suggests might have been the case in Rome in the epoch

¹⁹ We must add that the recipient of the dole allowance of grain may have had others besides himself to support, although this is not definitely known.

²⁰ We should cite here L. Mitteis, *Chrestomathie* (Leipzig: Teubner, 1912), p. 351, where he publishes a testamentary papyrus (dated A.D. 155) which gives to a widow as long as she remains unmarried an allowance of six-tenths of an *artaba* of wheat per month. This is the lowest figure which we have, and indicates that we are justified in assuming a lower food consumption by women than by men. There is no reason, however, on the basis of this papyrus to modify our average consumption figure for Rome. All we might say is that our average tends to be generous, and consequently our population estimate conservative.

²¹ U.S. Census of 1920, *Population*, II, 295, 304 ff.

of Augustus.²² If the population of our supposed city were thus divided, we should obtain the following figures:

Men.....	491,800
Women.....	408,200
Children.....	350,000

If the average grain consumption for the men is 5 *modii* per month, for women 4, and for children 3, the hypothetical city would consume in one year the following amount of grain:

Men.....	29,508,000 <i>modii</i>
Women.....	19,593,600
Children.....	12,600,000
Total.....	61,701,600

Thus we have a further confirmation for the average figure of 4 *modii* per month per individual, since the hypothetical city, reasonably divided in sex and age, with each division consuming grain at a different rate, would need 61,700,600 *modii* in one year, an amount very close, indeed, to the number of *modii* which was brought annually to Rome in the reign of Augustus, i.e., 60,000,000 *modii*.

Beloch, in arriving at his estimate for the population of the city on the basis of the food supply, has summarily rejected the evidence from Josephus and Aurelius Victor upon which we have built our argument.²³ Instead he has employed a figure found in the life of Septimius Severus in the *Scriptores historiae Augustae*.²⁴ The passage is as follows: "[sc. Severus] moriens septem annorum canonem, ita ut cottidiana septuaginta quinque milia modium expendi possent, reliquit." Beloch takes this to mean that the total food consumption of the city at that time was at the rate of 75,000 *modii* a day, or annually 27,375,000 *modii*. Allowing an annual consumption of 36 *modii* per individual, he estimates the population on this basis at approximately 760,000. In order to bolster up this position, Beloch takes a statement of the scholiast to Lucan, who says, "Roma volebat omni die LXXX millia modiorum annonae."²⁵ At a rate of 80,000 *modii* the annual amount would be 29,200,000 *modii*, a total sufficient for a population

²² *Op. cit.*, p. 18. Dio (liv. 16), supports to a certain extent this theory, though he merely asserts that of the nobility there were more males than females.

²³ *Op. cit.*, p. 411.

²⁴ 23. 2.

²⁵ Scholion to Lucan *Pharsalia* i. 319.

of 810,000 if one uses 36 *modii* a year as the average consumption per individual. Thus Beloch concludes on the basis of food consumption that the population of Rome was 760,000–810,000.

One may reasonably object to this argument. In the first place, Beloch has used two sources, one to check the other, which refer to widely different times. That is to say, the scholion to Lucan is dealing with Pompey's control of the *annona*, whereas the other source from the *Scriptores* is evidence for the situation some two and a half centuries later. The combining of two such sources is in violation of the *caveat* laid down above,²⁶ and, of course, would be valid only on the hypothesis that the population of Rome did not vary with the passage of years. Such a hypothesis, on the face of it, is untenable. Furthermore, the argument rests on the presumption that the *annona* of the scholion and the *canon* from the life of Severus both mean the total grain supply of Rome. In my opinion there is no warrant for such an assumption.

Let us first consider what information the scholiast to Lucan may give us. If our calculations as to average food consumption be correct, an *annona* of 80,000 *modii* a day would be sufficient for approximately 608,000 people. But what justification have we for accepting this as an estimate of the population of the city in Pompey's time? In the first place, the word *annona* varies in its significance. One could not feel safe in accepting it to mean the total grain supply. Second, the scholion has reference to a very confused epoch, namely, the turbulent days of the end of the republic, immediately prior to the civil war between Caesar and Pompey. Statistics having to do with that period are much less likely to be accurate than those which derive from the highly organized reign of Augustus, as is the case with our figures from Aurelius Victor and Josephus. Scholars cannot argue for the reliability of the scholiast to Lucan as Friedländer has, for example, for the worth of the combined testimony of Victor and Josephus.²⁷ Therefore we must conclude that, since the meaning of the word *annona* is uncertain, we cannot use the testimony of the scholiast to Lucan as evidence upon which to estimate the population of the city. If we accept it as reliable, our only fact would be that Pompey as *praefectus annonae* supervised a quantity of grain that would support about six hundred

²⁶ Cf. n. 4.

²⁷ Cf. n. 9.

thousand people for one year. There is no justification for holding that number to be the population of Rome at that time.

Our primary concern has been to determine the population of the city under Augustus, upon which, we must admit, the scholiast to Lucan bears but slightly. If we were able to illuminate the meaning of *annona*, this source might be useful, but under the circumstances we are forced to turn from the testimony of the scholiast to the information contained in the life of Septimius Severus. There is, I believe, a possibility of determining more accurately than at present the meaning of the word *canon*. If we can do that, we may be able to derive from this source in the *Scriptores* information as to the population of the imperial city at the time of Severus. It seems to be certain that one misuses the evidence at his disposal if he applies the testimony given for the end of the second century of our era to the early days of the principate.

We have argued to show that the population of Rome at the time of Augustus was 1,250,000, yet Beloch rejected out of hand the evidence upon which we have based our argument. The reasons why he did so are clear. In the first place, he assumed that there was no change in the population for three centuries. In the second place, he assumed that the writer of the life of Septimius Severus meant the total grain supply of the city when he wrote the word *canon*. An average grain allotment of 75,000 *modii* per day would account for a population of 60 per cent of 1,250,000.²⁸ For Beloch, on the hypothesis that the population did not change, there was only one way out of the dilemma, viz., that one of the sources be dropped, and consequently he disposes of Aurelius Victor and Josephus. However, if we take all our evidence at its face value, and at the same time do not set up the untenable proposition of any unvarying population, we are still faced with what appears to be a conflict of testimony.

As there is no reason apparent to impugn our figure of 1,250,000, we must accept it as our best possible information. Then, turning to the figure from the *Scriptores*, we have two possibilities of interpretation. The first is that the size of Rome diminished considerably from the times of Augustus to those of Septimius Severus, namely, from

²⁸ I.e., using Beloch's average consumption of 36 *modii* a year per individual.

1,250,000 to 570,000.²⁹ On the face of it, this seems impossible. Despite the fact that in the reign of Severus the most glorious days of the Empire were over, and that the city had suffered severely from disease and pestilence, we have no warrant to conclude that the city had decreased in size by over more than half. We are forced, therefore, to reject such an interpretation.

The other alternative which may afford us a solution to the problem is that the *canon* mentioned in the biography of Severus does not mean the total grain supply of the city but only some fraction thereof. The key to our difficulty lies in the word *canon* itself. Upon consulting the *Thesaurus*, one discovers that it is a late word, having several varieties of meaning over and above its ecclesiastical connotations. The word occurs in by far the majority of instances in the Theodosian and the Justinian *Codices*. A complete examination of these *Codices* reveals that, of the several meanings, a very common one, for example, is the amount due as fee or rent on a specific piece of land.³⁰ We need not go into this meaning or similar ones, but only into those cases which may serve to illuminate the use of *canon* in the life of Severus, i.e., into *canon* with direct reference to *frumentum*, of which there are but two.

Before we go into the question of the *canon frumentarius*, we should confirm our contention that *canon* as such does not mean the total grain supply of the city. Friedländer³¹ quotes in this connection C. Rodbertus concerning the *canon* of Severus, to the effect that it had nothing to do with the population. Friedländer reports Rodbertus' words as follows: "It [i.e., the *canon*] was not the general grain supply of Rome, but the regular budgetary figure of the State grain-quantum, which was kept in view and fixed at Rome for frumentarian requirements (market department, pauper department, institutions)." I would thoroughly agree with Rodbertus so far as he goes, and believe that it is possible to give a modicum of proof to his theory. Perhaps, as a result, the more exact nature of the *canon* may emerge.

This modicum of proof lies in a statement made by the scholiast to

²⁹ I.e., using 48 *modii* annually per individual as the average consumption.

³⁰ Cf., e.g., *Codex Theodosianus* v. 12. 2. 1-3; 14. 34. 2; 15. 17; vi. 3. 4. 2. These are only a few of the many instances of the word in this meaning.

³¹ *Op. cit.*, p. 26.

the *Verrine Orations* of Cicero, which constitutes an entirely new article of evidence on the problem. The passage in Cicero upon which the comment is made runs thus: "quando illa [i.e., Sicilia] frumentum quod deberet non ad diem dedit?"³² To this the scholiast adds the following remark: "omne genus pensitationis in hoc capite positum est: canonis, oblationis, indictionis." Scholars date the scholiast in the fifth century after Christ,³³ with some uncertainty, although there is no doubt that he wrote in later antiquity. Certainly the three words *canon*, *oblatio*, and *indictio* are late. At all events, from this passage of pseudo-Asconius we find that in the minds of his contemporaries the word *canon* connoted not a total grain supply, but only one part of it. Pseudo-Asconius, roughly a contemporary of the biographer of Severus, gives us a check on the meaning of the seven-year *canon* left by that emperor on his death. Therefore we may reasonably conclude that the *canon frumentarius* of Severus did not constitute the total grain supply of the city.

There is another point of evidence for the conclusion that the *canon* did not mean all the grain consumed by the city in one year. The writer of the life of Elagabalus³⁴ records that the *princeps* ordered the *canon* for one year to be given to the *meretrices*, the *lenones*, and the *exoleti* who were *intramurani*, while a like amount was promised to the *extramurani*. The biographer adds that owing to the foresight of Severus and Bassianus³⁵ a *canon frumentarius* for seven years was available, and hence such a gift could be made. Now whatever wild idea Elagabalus may have had, or however inaccurate his biographer may have been, or however prone to retail scandalous items in his writings, the fact remains that this passage is completely and absolutely incomprehensible if the *canon frumentarius* amounted to the total grain supply of the entire year for Rome. One must admit that the passage is saved from being total nonsense only by the theory that the *canon* involved represents only a part of that total.

If, then, the figure of 75,000 *modii* a day, or 27,375,000 *modii* a year, does not give us any foundation for estimating directly the population

³² *In Verrem: Actio II* ii. 2. 5.

³³ Cf. *W. S. Teuffels Geschichte der römischen Literatur*, ed. Kroll and Skutsch (Leipzig: Teubner, 1910), Vol. II⁶, par. 295. 3.

³⁴ 27. 7.

³⁵ O. Hirschfeld's emendation.

of the city, we must discard Beloch's calculations which rest on this source. However, we can say that 27,375,000 *modii* a year would support about 570,000 people. If, then, we could determine roughly what fraction of the total this *canon* represents, we should be able to gain an estimate of the population of Rome for the time of Severus. There is evidence, in my opinion, for hazarding a conjecture as to the nature of the *canon*, from which we may gain perhaps our desired conclusion.

First we must go back to Cicero's *Second Action against Verres*, where we are informed of the several categories of *frumentum* which went from the province of Sicily to Rome. Cicero refers³⁶ to three categories: (1) the *decumanum*, (2) the *alterum decumanum*, and (3) the *frumentum imperatum*. The *decumanum*, of course, was the regular tribute which the province sent to Rome. From this passage in Cicero we learn that each year during Verres' praetorship the government authorized him to purchase an additional amount of grain, equal to the *decumanum*, at a price of 3 sesterces per *modius*. This grain was called the *alterum decumanum*. In addition to these two classes of grain was the *frumentum imperatum*, which was to be purchased by the government at a price of $3\frac{1}{2}$ sesterces per *modius*. Cicero goes on to say that each year of Verres' incumbency, 11,800,000 sesterces were allotted for the purchase of grain, of which 2,800,000 went for the *frumentum imperatum* while the remaining 9,000,000 was devoted to the *alterum decumanum*. The accompanying tabulation, then, expresses the amounts of grain which should have come from Sicily each year:

<i>decumanum</i>	3,000,000 <i>modii</i>
<i>alterum decumanum</i>	3,000,000
<i>frumentum imperatum</i>	800,000
Total.....	<hr/> 6,800,000

Thus we can see that about 56 per cent of the grain brought from Sicily was purchased by the government—or was to have been, at any rate—during these years.

Although we are faced with a lack of evidence, we can at least be sure that not all of the grain which came to Rome was tribute in kind paid by the provinces. Take the 60,000,000 *modii*, the annual con-

³⁶ *Op. cit.* iii. 70. 163.

sumption of Rome during the time of Augustus. Some of that was doubtless tribute *frumentum*, but also some of it must have been purchased by the government at a low price, for the purpose of being redistributed in the city at a correspondingly reduced figure. Then also there must have been a certain amount of grain available in the open market, to be bought and sold at a price determined by general economic conditions. This latter amount could not have been very great, inasmuch as the problem of the grain supply for the city was always acute, as the elaborate system of government supervision adequately attests.

Of course, we cannot apply too directly evidence derived from the story of Verres' governorship of Sicily to the times of Septimius Severus and the later imperial *canon frumentarius*. However, there is evidence that in the Empire the government did buy grain in addition to what it received in tribute.³⁷ With the passage in Cicero and this latter evidence in mind, one is tempted to conjecture that the *canon frumentarius* may have reference to the grain which the government bought. This conjecture is not susceptible of clear proof, yet there is nothing, so far as I know, in the sources which would tend to controvert it, while there is much which can be explained on such a theory. One might argue, for example, that an emperor like Septimius Severus, in order to establish a sufficient grain reserve for a period of years, would not have to deal primarily with the tribute grain, but with that which would be needed to supplement the tribute grain, for which the government would have to appropriate money. The *canon* of Severus, explained in such terms, becomes much more understandable.³⁸

Let us return to the two passages dealing with the *canon frumentarius* which a search of the *Codices* disclosed. The section under the rubric "De canone frumentario urbis Romae" in the *Codex Theodosi-*

³⁷ Cf. e.g., *Monumentum Ancyranum* 15; *Scriptores historiae Augustae: Alexander Severus* 21. 9. For Egypt we have references to the *πυρὸς συναγοραστικός*. Cf. K. Thunell, *Sitologen-Papyri aus dem Berliner Museum* (Uppsala: Almqvist & Wiksells, 1924), p. 81.

³⁸ One should mention here the passage in the biography of Elagabalus (cf. n. 34). The gift of one year's *canon* to those relatively humble members of society, insane though it is, is more comprehensible on the theory that the imperial treasury or the government was footing the bill. For the emperor to play fast and loose with the free tribute of grain, merely to gratify a mad whim, does not contain even the remotest vestige of reason.

*anus*³⁹ contains one bit of evidence for the theory that the *canon* involved grain to be bought and sold. The first edict quoted directs the officials to sell to the bakers 200,000 *modii* of good quality at a reduced price. Also perhaps we can see another indication in favor of the theory in the section "De frumento urbis Constantinopolitanae," where occurs the phrase, *sed integer canon mancipibus consignetur*.⁴⁰ These two passages can be explained easily on the hypothesis that the *canon* was the grain with which the government had to deal in a purely business way, involving the problems of purchase and sale. Furthermore, though an *argumentum ex silentio* is dangerous, at least in cases where evidence is lacking, it can be legitimately adduced, and in our problem certainly no occurrence of the word *canon*, either in the *Codex* or elsewhere, furnishes any evidence to contradict our theory.⁴¹

If our theory be correct, we have in the figure given us by the biographer of Severus some evidence wherewith to estimate the population of Rome at the end of the second century of our era. It is clear that the *canon* represents a portion of the grain supply. If the *canon* were the *frumentum* purchased by the government, and if we suppose, for the sake of example, that the *canon* were about the same percentage of the whole as was the purchased grain of the whole amount from Sicily, viz., 56 per cent, the total supply of the city under Severus would be annually about 48,884,000 *modii*.⁴² This supply would be sufficient for a population of about 1,018,500 inhabitants. Of course this figure is based upon a hypothesis which cannot be demonstrated, yet the figure thus reached is very reasonable, since it represents a slight diminution in the population from the time of Augustus. We should expect such a decline, in view of the more unsettled economic conditions under Severus, and of the severe plagues which the city sustained, particularly the epidemic in the reign of Marcus Aurelius.

Our conclusions then would be: (1) that the population of the city

³⁹ xiv. 15.

⁴⁰ *Codex Theodosianus* xiv. 16. 2.

⁴¹ In my opinion it would be dangerous to argue from the scholion to the *Verrine Orations* quoted above (cf. p. 111) either as to the nature of the *canon* or as to what fraction of the total it constituted. Superficially, however, one cannot refrain from suggesting the following parallels: *canon* to *alterum decumanum*, *oblatio* to *decumanum*, and *indictio* to *frumentum imperatum*.

⁴² We are forced in this calculation to disregard the amount of grain which was available in the open market (cf. p. 113).

in the time of Augustus was approximately 1,250,000;⁴³ (2) that it may have increased slightly during the days of the earlier Julio-Claudians;⁴⁴ and (3) that it may very well have diminished somewhat by the time of Septimius Severus. But there is need of one further remark in order to put all of the foregoing argument in perspective. If we have been able in some way to fix the population of the city in the time of Augustus, we can appreciate far better a late source which records the visit of

⁴³ There are several other bits of evidence from which one might conclude that Rome was a city of considerable size, but which do not allow us to form any accurate estimate of the population.

1. C. Herschel (*The Two Books on the Water Supply of the City of Rome of Sextus Julius Frontinus* [Boston: Estes, 1899], pp. 240-41), estimates the water supply of Rome as 38,000,000 gallons a day on the average. He goes on to say that, supposing the population to be 1,000,000, 38 gallons per day per individual would be "still a very large figure, when use alone, not waste, is taken into account." Herschel has based his calculations, of course, on data obtained from Frontinus, which would apply strictly to Rome in A.D. 97. Herschel states further that his average 38,000,000 gallons could vary either up or down by 20,000,000 gallons, depending, of course, upon how many of the aqueducts were in operation. M. H. Morgan ("Remarks on the Water Supply of Ancient Rome," *TAPA*, XXXIII [1902], 30-37) contends that the exact water supply cannot be known accurately, because of the variable character of Frontinus' unit, the *quinaria*, but that Herschel's results are the best available. Morgan thinks that the average of 38,000,000 gallons is too low, that Herschel has deducted for leakage and theft from data in Frontinus which had already taken those factors into account, and that 84,000,000 gallons is a better average figure. At all events, it seems certain that the water supply of ancient Rome was sufficient for a city of well over a million. Morgan (p. 35) has a table giving per capita daily water consumption for several cities in the United States, which range from 80.7 to 211.9 gallons. More recent averages are from 18 to 20 gallons in a small English village to 128 gallons in some American cities. It is interesting to note that the average for Liverpool in 1927 was 34.7 gallons. (These latter figures are taken from the article on "Water Supply" in the *Encyclopaedia Britannica* [14th ed.])

2. The seating capacity of the Circus Maximus is another indication that the population of Rome was large. Estimates range from 140,000 to 385,000 (cf. S. B. Platner, *The Topography and Monuments of Ancient Rome* [2d ed.; Boston: Allyn & Bacon, 1911], p. 408). It would take a population of some proportions to justify the existence of so large a stadium.

3. If we were in possession of any evidence of the death-rate of the city, we would have another method whereby to check our population estimate. Our situation is all the more unfortunate since there can be little doubt that such records did exist, as the several references, e.g., to the temple of Libitina clearly indicate (cf. S. B. Platner and T. Ashby, *A Topographical Dictionary of Ancient Rome* [Oxford: Oxford University Press, 1929], p. 319). However, we do have two references to the number of people who died in plagues in the city. Suetonius (*Nero* 39) records that in the autumn of A.D. 65, 30,000 people were carried off by the pestilence. Jerome, in his *Chronicle*, under the year A.D. 77 makes the following statement: "lues ingens Romae facta ita ut per multos dies in efemeridem decem milia ferme mortuorum referrentur." (This plague in all probability is that of A.D. 79, which is referred to by Suetonius *Titus* 8 and Cassius Dio

[Footnote continued on page 116]

⁴⁴ Cf. n. 10.

Theodoric to Rome.⁴⁵ In it we find these words "donavit [sc. rex Theodoricus] populo Romano et pauperibus annonas singulis annis, centum viginti milia modios." This amount of grain would support for one year twenty-five hundred people. This probably does not represent the entire population, yet there is no doubt as to the enormous decrease in size of the former capital. In the final analysis the point seems to be that in Rome we have an example of what was generally happening throughout the ancient world, a gradual process of deurbanization. And indeed in this process we are able to see one of the great and fundamental differences between ancient culture and that which immediately followed it. The urbanized Roman Empire was transformed into the deurbanized Europe of the Middle Ages. The study of the population and population changes of Rome goes far to demonstrate this contention.

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lxvi. 23.) The death-rate of the plague of A.D. 65 then would be approximately 10,000 per month, while the epidemic of A.D. 79 must have been much more severe, although we have no information as to how long it raged. However, in either case a death-rate of such proportions could occur only in a city of great size. In this instance it is legitimate to compare these figures with those of London during the plague of 1664-65. Ancient Rome and seventeenth-century London are roughly comparable on the grounds of sanitary conditions, perhaps with an edge in favor of Rome. At any rate, in London in that fearful epidemic a total of 68,596 deaths were attributed to the disease for the year 1665. The population of the city at that time was 460,000. If the death-rate given by Jerome continued for seven days in Rome in A.D. 79, more fatalities would have occurred than the total for the whole year in the London plague. This situation can be explained only by assuming that Rome was a far more populous city than London in 1665. (The figures on the London epidemic were taken from the article on "Plague" in the *Encyclopaedia Britannica* [14th ed.])

⁴⁵ *Excerpta Valesiana* 67.