The Population of Western Palestine in the Roman-Byzantine Period

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Introduction

In a previous paper dealing with the population of Jerusalem in antiquity (Broshi 1978) my arguments were based on two suppositions. As the present article is based on the same suppositions, we shall review them here in brief.[1]

1. The data on population to be found in ancient literary sources is almost invariably untrustworthy. This applies not only to the Bible but also to the Greco-Roman historians. Most of the figures given are typological (e.g. "sixty myriads," "forty thousand") and are often grossly exaggerated.

2. The maximum population of an ancient walled (or densely populated) city can be estimated by applying a coefficient of 400-500 persons per hectare (i.e., 160-200 per acre or 40-50 per dunam; cf. Shiloh, forthcoming, 1980). This coefficient has been arrived at independently by various scholars, and it also represents the density of contemporary settlement in various "old cities" (Damascus, Aleppo, Tripoli of Lebanon, Jerusalem in 1918). It ought to be stressed that this figure represents the maximum density in built-up areas.

We shall discuss here three points concerning the population of Palestine in the Roman-Byzantine period, when the country reached a peak density of population, attained again only in the 20th century: (1) the population of the Negev; (2) the urban population; and (3) the population of the entire country computed according to maximal grain-producing capacity of the land.

I. The Population of the Negev

We define the Negev as the southern region of Palestine, south of the Beersheba and Arad Plains.[2] This is indeed an atypical region, through most of history a desolate wilderness occupied by a sparse nomadic population. Climatic conditions and the constant peril of hostile elements living in the deserts to the south and east, make the Negev basically an "unecumenic," i.e., uninhabitable region. Only the efforts of a strong (and interested) centralized authority could assure regular settlement there. Only in two historical periods was the Negev settled, albeit sparsely, by a sedentary population: during the Israelite period (Iron II) and in the Roman-Byzantine period. (On earlier settlement in MB I, see Cohen and Dever in this issue.)

We have chosen the Negev for discussion because it is the only region in Western Palestine in the Roman-Byzantine period where the population can be estimated with a reasonable degree of accuracy. Six towns existed in the Negev,[3] along with a number of hamlets and farms, and their remains are far better preserved than any of the towns of the northern parts of the country. Thus our main reason for selecting the Negev is methodological: population estimates have been offered by many scholars, and it would be worthwhile to review those estimates using the tools of our own method.

The first scholar to venture a population estimate was Edward Robinson, the pioneer of Palestinography. Already in 1838 he estimated the population of Ruheibeh (Rehovot in the Negev) at 12,000-15,000 and that of Elusa (Halusa, Halasah) at 15,000-20,000 (Robinson 1841: 290-97). Huntington estimated the population of Elusa at 10,000 (1911: 127). Glueck repeated Robinson's high estimate of 20,000 (1959: 258-59). Byatt, regarding Glueck's figure as proven fact (although Glueck never explained, or even defended, it), used it as support in computing the population of Jerusalem (1973). Avi-Yonah, the only scholar to devote a special study to the population of Negev, was of the opinion that it numbered 80,000-100,000 in all (1964).

We believe that these figures are all far too high, as can be demonstrated on the basis of the area of

the several towns in relationship to the population (see below) and on climatic considerations in the Negev. It is commonly agreed that the climate of the Negev has not essentially changed over the last 2,000 years (cf. Meyerson 1962: 218). It can readily be demonstrated that the available water could not sustain such a large population as that suggested by the aforementioned scholars. Baly (1935: 179) showed that if every drop of water falling upon Shivta (*Sbeita*) were collected—an impossibility, of course—a population of 10,000 (a figure then commonly accepted) would have been provided daily with a mere third of a gallon (about 1.5 litres) per capita. There is not a single spring or well in the immediate vicinity of Shivta, and water was obtained solely from cisterns of various types. It is clear that the limited quantities of water available at Shivta could not have supported a large settlement, together with its livestock and such installations as bath-houses.

Kedar, following Baly, has proposed (1975a: 189) a scheme tabulating distribution of residential space, farming land, and water for populations of 5,000, 10,000, and 20,000 respectively. Taking the low figure of 5,000, each inhabitant would have had 8 sq. m. of living space, a mere 0.1 hectare of cultivated land, and only three litres of water per day—hardly sufficient to support even such a small community.

But even the doubts raised by Baly and Kedar seem too modest. Mayerson has pointed out (1967: 39-43) that any computation must be based upon *minimal* figures for water supply, that is, for a drought year. Though food could be brought in during such dry spells, this could not be the case for any significant quantities of water. Two successive years of extreme drought indeed befell the Negev in the early 1960s. Following 1960/61 (an average year), of 102 mm. of rainfall at Shivta, 1961/62 and 1962/63 yielded only 50.6 and 29.5 mm., respectively. Thus in the latter rainfall year no more than 3,450 cu. m. of rain fell at Shivta, of which only some 2,000 cu. m. could be captured and stored. Such a quantity, distributed amongst a population of 5,000, would just provide a liter a day per person—a tenth of the normal daily requirement.[4]

The basis for any computation, where the built-up area can be determined, must rest upon the above-proposed coefficient, and even then the results are maximal. The data for the six cities of the Negev are as follows:

1. Kurnub (Mampsis). Of some 4 hectares in area,[5] a large proportion is occupied by public buildings, and we cannot be too far off the mark if we reduce the total remaining for living space in the Byzantine town by a quarter (Lawrence and Woolley 1915: 123). Thus, 400 persons per each of the three hectares yield a total population of 1,200.

2. ᶜAvdat (Oboda, ᶜAbdeh). This town differs from the other cities of the Negev (and, for that matter, from all other towns in Palestine) in that the common dwelling units were comprised of caves with appended rooms built at their entrances. On the slopes of the city, some 400 troglodyte units have been counted (Kedar 1967: 106). Assuming that an average of six persons inhabited each such unit,[6] the population living on the slopes would have numbered about 2,400; this, together with the sparse number dwelling on the plateau, would yield a total population of about 3,000.

3. Shivta (*Sbeita*). On the face of the matter, this town—the best preserved of the cities of the Negev—should be the easiest when it comes to estimating population. It is the only town in this region to have been revealed in its entirety; not only is its exact area known (11.5 hectares), but even the number of rooms is documented (1,230) (Negev 1971: 524). Thus the calculation of its population should be simple: the area of the built-up residential zones (the total, less the public areas of about 1.5 hectares) multiplied by our coefficient of 400 yields a maximum population of 4,000. However, in keeping with the reservations noted above concerning the sparse water supply, it is doubtful whether we can consider even half this number, and the population should not be estimated at more than 2,000.

4. Reḥovot in the Negev (*Ruḥeibeh*). The exploration of this town is still in its early stages. In the estimate of Y. Tsafrir, head of the archaeological expedition working there, the town's area is about 12 hectares.[7] Subtracting about 2 hectares for public areas, we can estimate the population roughly at 4,000.

5. Niṣṣana (Nessana, ᶜAuja el-Ḥafir). The upper city here was almost entirely public in nature, most of the population having dwelt in the lower city. Unfortunately, this lower city was largely destroyed by Turkish building activities early in the present century. On the basis of the plan prepared by Musil before its destruction (1908:86), we can estimate the area of the residential zones at 15-18 hectares. Both Musil and Lawrence and Woolley (1915: 119) held that the town had been sparsely populated, and thus the residential part can be reckoned at about

10 hectares at most (Negev 1976: 90), with an estimated population of no more than 4,000.

6. Halusa (Elusa, Halasah). The area of this town is about 35 hectares.[8] Since this was the major city of the Negev, it surely had many public buildings and areas, and the residential zones probably did not exceed 25 hectares. Thus we can estimate its population at a maximum of 10,000.

In the following table we compare Avi-Yonah's population estimates (1964: 120) with our own.

| City | Avi-Yonah | | Broshi |
	Maximum	Minimum	
Kurnub	8,000	8,000	1,500
Avdat	8,000	8,000	3,000
Shivta	10,000	8,000	2,000
Rehovot	15,000	3,000	4,000
Nissana	10,000	10,000	4,000
Halusa	20,000	15,000	10,000
Total	71,000	52,000	24,500

Table 1. Population estimates.

Beside this urban population in the six cities, the Negev had a rural population scattered in villages and farms. Recently A. Negev (1977b) has discussed the many names of settlements mentioned in the papyri found at Nissana. Only upon completion of the archaeological survey of the Negev will there by sufficient data on the number, size, and distribution of the settlemtns there, enabling us to estimate the true extent of this rural population. In any event, the settlements mentioned in the papyri, the location of which are as yet unclear, were apparently quite small (mostly farms), and it would seem that their total number was not especially large. Furthermore, to the number of inhabitants in the Negev we must append the total of the Beduin population (Negev 1977b: 131), though we have no actual means of estimating its size. On the one hand, the number of Beduin may have been relatively large, facilitated by a symbiosis with the urban population of the Negev and the coastal strip to the west.[9] On the other hand, we can reckon the Beduin population as small, considering by analogy the fact that the number of Beduin living in this region on the eve of the establishment of the State of Israel was not large (Muhsam 1966: 35) and that most of the locations of water and the best of the arable lands were held by the townsfolk. Undoubtedly, many of the occupations traditional to the Beduin in later times—caravaneering and caravan "guarding", animal husbandry, and the like—were partly in the hands of the city dwellers as well.
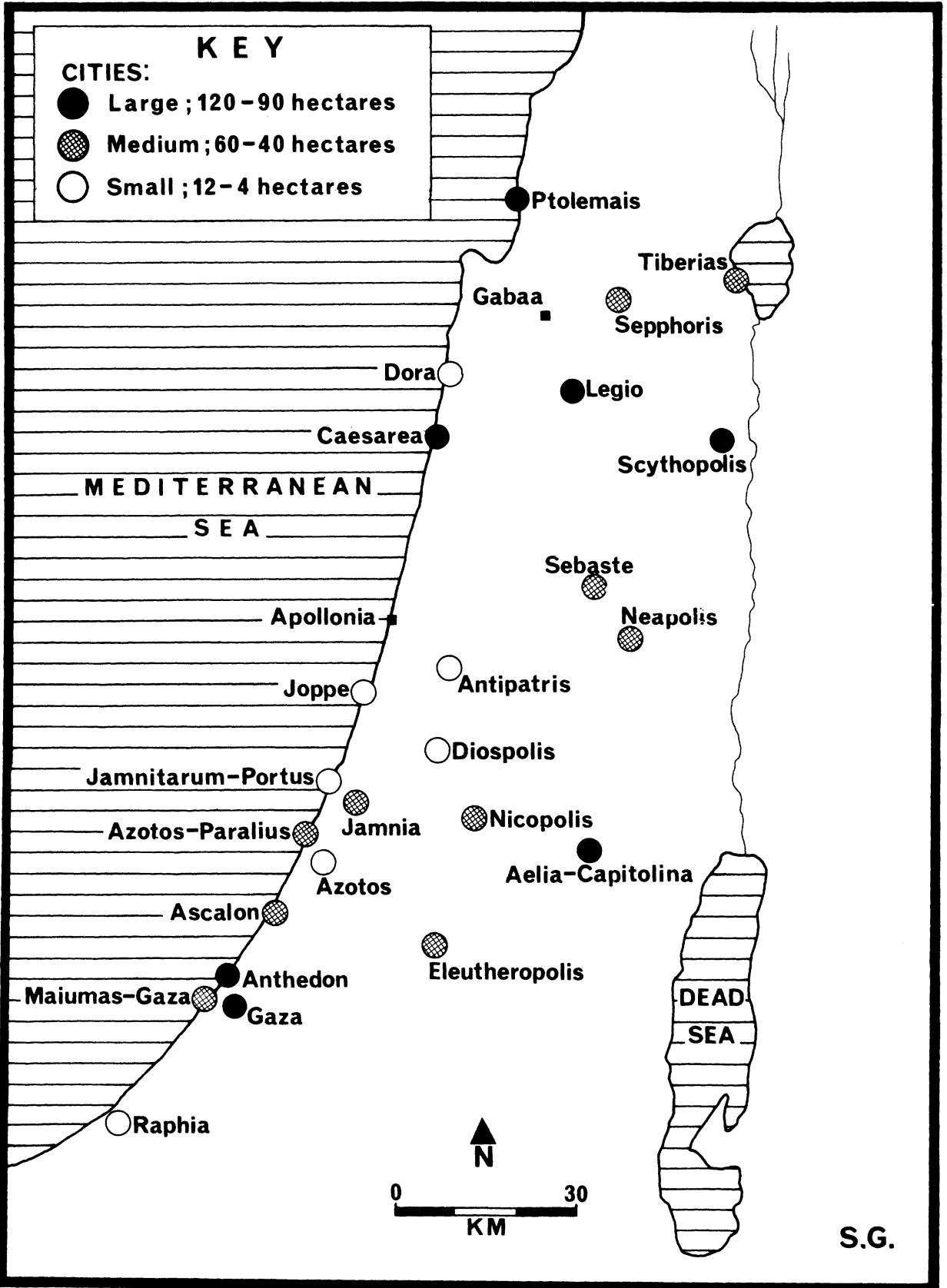
We can thus sum up our opinion: the total population of the Negev in the Roman-Byzantine period did not exceed 30,000.[10]

II. The Urban Population of Palestine

In Late Roman and Byzantine times, there were some 25 cities in Western Palestine (excluding the Negev, the towns of which did not enjoy municipal status, except perhaps, for a short time, Halusa; cf. fig. 1). This is a relatively high density, considering that in an area of about 15,000 sq. km. there was a city to an average of every 600 sq. km. Though this abundance of towns did not stem solely from economic factors but rather from political circumstances, these were generally true cities—in the full sense of the term *polis*. These settlements had most of the typical features of the ancient city. From the archaeological remains and from the ancient literary sources we know that most of the essential urban institutions were present: fortifications, cult (temples, synagogues, churches), education and culture (schools), entertainment and sports (theatres, stadiums and racecourses) and public amenities (regular water supply, bath-houses.)[11] Almost all these cities issued coins at one time or another in this period, an indication of a degree of autonomy.[12]

The above table shows that the cities of Western Palestine can be placed into three groups, according to size: small (4-15 hectares), 9 cities; medium (30-60 hectares), 10 cities; and large (90-120 hectares), 7 cities. This is a most significant division which, in my opinion, determines the rank and character of these cities (Pounds 1969). Upon seeking to reckon the area of the cities, it was found that figures for only one have been published— Jerusalem—and that for four others (Ascalon, Caesarea, Scythopolis, and Sebaste) the area could be calculated from published plans.[14] It should be noted that the figures given below are no more than estimations; only future research, based upon further excavations, will be able to supply firm data. For our present purposes, these figures are sufficient, for it is the overall area of the cities that is significant here, and it would seem that, to the extent that there are errors, they balance out in the final analysis. Concerning two of the cities—both apparently small—no data were available, but our estimates are based on their group average (9 hectares).

We have noted above the great density of the cities of Palestine, which are very high in comparison with other provinces of the Roman Empire, i.e.,

KEY

CITIES:
- ● Large ; 120 - 90 hectares
- ▦ Medium ; 60 - 40 hectares
- ○ Small ; 12 - 4 hectares

Ptolemais

Tiberias

Gabaa

Sepphoris

Dora

Legio

Caesarea

Scythopolis

MEDITERRANEAN SEA

Sebaste

Neapolis

Apollonia

Antipatris

Joppe

Diospolis

Jamnitarum-Portus

Nicopolis

Azotos-Paralius   Jamnia

Azotos

Aelia-Capitolina

Ascalon

Eleutheropolis

Maiumas-Gaza   Anthedon

DEAD SEA

Gaza

Raphia

N

0   30
KM

S.G.

Town	Area (hectares)	Source of estimate
Aelia Capitolina (Jerusalem)	120	M. Broshi (1978).
Anthedon	90	I. Goldrat
Antipatris	12	M. Kochavi
Apollonia	9 ?	Estimate, based on group average
Ascalon	52	J. Garstang (1922: 112)
Azotos	12 ?	M. Dothan
Azotos Paralius	40	R. Gophna
Caesarea	95	M. Avi-Yonah (1973: 373-74)
Diocaesarea (Sepphoris)	60	A. Siegelmann
Diospolis (Lydda)	10	R. Gophna
Dora	8	M. Prausnitz
Eleutheropolis (Beth-guvrin)	30	A. Kloner
Gabaa	9 ?	Estimate, based on group average
Gaza	90	I. Goldrat
Jamnia	50	R. Gophna
Jamnitarum-Portus	10	R. Gophna
Joppe	4	J. Kaplan
Legio	100	M. Gichon
Maiumas Gaza	30	Goldrat
Neapolis (Shechem)	30	Z. Safrai
Nicopolis (Emmaus)	40	I. Hirschfeld
Ptolemais (Acre)	100	M. Prausnitz
Raphia	12	E. Oren
Scythopolis (Beth-shan)	110	C. R. Conder & H. H. Kitchener (1882: vol. 2: 105).
Sebaste (Samaria)	77	J. W. Crowfoot et al. (1942: pl. 1).
Tiberias	40	G. Foerster
Total	1240	

Table 2. Area of Late Roman-Byzantine towns, in hectares.[13]

tenfold the figure for Gaul, and even greater for Britain (Pounds 1969: 149, 151; Wacher 1975: 23). This is not a network of urban settlements with the primary function of centers of rule and specific services, technical and cultural, serving their respective hinterlands. Rather, these cities arose out of particular political and cultural circumstances, not always out of economic and administrative factors.[15] Thus we can posit that a large portion of the population of these cities in other provinces would have been within a rural framework. And from this we can deduce that a significant proportion of the population of Palestine was urban—no less than a third.[16]

The maximal size of the urban population of Palestine at the end of the Byzantine period can be reckoned by multiplying the coefficient 400 (= persons per hectare) by the total combined are of the cities (1,100 hectares), after deducting a quarter to allow for public and open spaces, i.e., $400 \times 3/4 \times 1240 = 372,000$. If our supposition that the urban population represented but a third of the total, then the overall population of Palestine in its Byzantine heyday reached the million mark, at most.

III. Various Estimations of the Population of
    Palestine in the Roman-Byzantine Period.

This is a subject which has certainly not been
neglected by scholars. Recently, Byatt (1973)
collected 18 estimates of the population of Palestine
during the 1st century A.D. They range from
6,000,000 (Conder) or more than 5,000,000 Jews
(Juster), down to less than a million of which less
than half were Jews (McCown). Such a broad range
indicates that there exist serious faults in both the
available data and in the methods of reckoning
applied to them.

The most recent studies of this subject by Baron
(1971: 871) and by Avi-Yonah (1973: 871) adopt a
midway figure, that is, a population of about
2,500,000. This more or less coincides with Beloch's
classical estimation (1886:429-30).

Since Avi-Yonah was not only the most recent
scholar to treat the subject, but also the only one to
state his case in full, we should carefully examine
his method. He arrived at his conclusions by
following two courses—both, in our opinion
fallacious.

A. Josephus Flavius mentions that 60,000 Jewish
warriors were mustered in Galilee for the war
against Rome (*JW* 2. 583), and thus the total
population of Galilee was about 750,000. Josephus
further relates that under Herod the Great Galilee
yielded a fifth of the total official revenue (*JW* 2.
95), and thus the above estimate can be multiplied
by a factor of five, giving a total population of
2,5000,000. Even ignoring the inconsistencies and
contradictions of Josephus' figures[17] (not to speak
of Avi-Yonah's slip in arithmetic)[18] we see here a
major fault in methodology, i.e., reliance upon
Josephus' figure of 60,000 warriors. This is a stereo-
typic, typological number *par excellence*—a
classical example of an unreliable datum. It calls
forth biblical associations, for instance the 60
myriads of warriors amongst those leaving Egypt
(Num 1: 45-46).

B. In an alternate manner of reckoning, Avi-
Yonah sought to determine the population of
Palestine on the basis of the number of settlements
in the Hellenistic-Roman period. There were four
times as many settlements in Palestine in that
period as in 1900, when there were 700,000
inhabitants, yielding a total for the Roman period
of about 2,800,000. At first glance this reckoning
seems quite logical, but actually it is based upon a
misleading assumption: that the proportion be-
tween the number of *settlements* in the Roman

period and the number in modern times is parallel
to the proportion between the size of population in
antiquity and its size in modern times. In fact, this is
not the case. In a quiet period such as that of the
Pax Romana in Palestine, the number of smaller
settlements increases, while in disturbed times, such
as under the Ottomans, the population tends to
concentrate in fewer, larger settlements. D. Amiran
has shown (1948) how the village of Dura, in the
Hebron hills, possesses a large area (240 sq. km.) in
which there are 99 ruined settlement sites. This
village had 7,255 inhabitants in 1931, but we
certainly cannot multiply this number by the
dozens of ruined settlements on its land if we wish
to retain any degree of credibility. This concentra-
tion of population in larger, but fewer settlements
was typical of the Hebron district up till recently,
and it is well known in the other parts of the country
as well. For example, the village of Ṭubas (Nablus
district) in 1931 possessed 307 sq. km. of land.
Thus, in our opinion, Avi-Yonah's method lacks
validity. Moreover, his claim that the number of
settlements in the Roman-Byzantine period was
four times bigger than in 1900 is an unsubstantiated
guess, most probably incorrect.

Another method of reckoning has been proposed:
analogy not with the number of settlements, but
with the size of the population at the beginning of
the present century (Harnack 1915: 10) or in 1931
(McCown: 1947). Despite the fact that McCown's
results seem satisfactory, we cannot accept the
method, for the correlation between ancient and
modern populations is an entirely unexplored
realm.

IV. Grain-growing Capacity as a Means for
    Estimating Population in Palestine

It should be quite possible to obtain an estimate
of the population on the basis of a factor which has
remained constant till the last generation, the grain-
growing capacity of Palestine.[19] This method rests
upon three basic assumptions: (1.) the annual per
capita consumption can be calculated since it is
quite a regular constant; (2.) the grain-growing
capacity of the country can be reckoned; (3.) in
antiquity the economy of Palestine was self-
sufficient as far as grains were concerned. Assuming
these three propositions to be true, it should be
possible to determine the size of the population
which could be maintained, thereby obtaining a
reasonably accurate estimate of the maximal
population in Palestine in the Roman-Byzantine
period.

We possess fairly precise data concerning grain consumption in this part of the world. Jardé (1928: 128-135) reckoned that the average annual per capita consumption in ancient Athens was 192 Kg. Kerkeosiris, a village in Egypt, had an average per capita wheat consumption of 180 Kg. (Crawford 1971: 129-30). In the Roman period, a laborer would receive about 280 Kg. of wheat per annum (Jones 1974: 146-47), which, according to Jardé's method would give an average per capita figure of 190 Kg.[20] In special circumstances, a laborer, as well as certain ranks in the army, would receive wheat rations larger than usual, but generally soldiers and slaves engaged in light labour got about 320 Kg. per annum, which would yield a per capita average of about 200 Kg. (Kromayer and Veith 1928: 280, 328). This generally resembles the average annual consumption in wheat-consuming countries in modern times: in Greece at the start of the present century it was 180 Kg. per capita;[21] and the grain-consumption in two Arab villages in Galilee in 1930 was 190 Kg. and 237 Kg., respectively (Abramowitch and Gelfet 1944: 36). The Beduin of the Negev and in Sinai show a similar average (Bailey and Peled 1975: 6). Thus, both from the data concerning antiquity and from that concerning modern times, a reasonable average of 200 Kg. emerges as the annual per capita consumption of grain. It ought to be remembered that this is a *minimal* consumption, any decrease of which would result in corresponding malnutrition. It ought to be taken into consideration also that some grain was used for animal fodder. In our opinion, 250 Kg. should be considered as the overall minimal average.

Until modern times the economy of Palestine was almost self-sufficient in food; import and export of wheat, inasmuch as they did exist, were of minor significance. Considering the high cost of transportation in antiquity, bulk handling was most uneconomical. Only such parasitic cities as Rome or later Constantinople, or the richer port cities such as Delos,[22] relied upon imported wheat. Instances of grain importation find mention in the epigraphic and literary sources precisely because of their rarity.[23] The rare instances of imports during years of death, undertaken by Herod and by Queen Helene of Adiabene, are especially noted by Josephus (*Ant,* 15. 307, 309; 26. 51). There was a certain export of wheat from Palestine,[24] but also undoubtedly of insignificant amounts.[25]

The grain-growing capacity of Palestine is well represented by the 1940-1942 average. These war years saw peak harvests, following upon the poor years of the 1930's disturbances, and there was no supplementary importation at this time. In these years there was a considerable rise in prices so that almost all the arable land was sown. The 1940-1942 average annual yield of grain (wheat, barley, durra, and maize) was 266,411 tons.[26] This average was sufficient to maintain about a million persons.[27]

V. Conclusion.

We have sought here to demonstrate in two alternate, independent ways that the population of Palestine in antiquity did not exceed a million persons. It can also be shown, moreover, that this was more or less the size of the population in the peak period—the late Byzantine period, around A.D. 600.

NOTES

[1]To the material gathered in Broshi (1978) I wish to add two points: (a) In a detailed and well-balanced study Jacoby (1961: 81-109) ascribes different densities to the various quarters of the ancient city of Byzantium and estimates that in A.D. 541 the overall density of the city (a considerable proportion of which was taken up by public and open spaces) was 250 persons per hectare. (b) At Apamea-on-the-Orontes an inscription was found dating to A.D. 6, relating that the city's population was 117,000 (Dessau 1892: no. 2683). There is no reason to suspect the reliability of this "odd" number. As the area of the city is known also (Balty 1973: 29), its average density was 468 persons per hectare. There is only one marring uncertainty, albeit multifaceted, whether this number refers to the free population in the territory of Apamea or to the overall population of the city proper, excluding slaves. In Balty 1973 (54) the population of the city is estimated at 500,000, which is, of course, an impossible figure.

[2]For the biblical definition of the Negev, see Meshel (1977: 136-42).

[3]These towns were devoid of municipal status, unlike those dealt with in the next chapter. Kurnub and Halutze, though, may have enjoyed this status in the latter part of the Byzantine period.

[4]Evenari, Shanan, and Tadmor (1971: 148-50) estimate for annual water consumption of 1,500 liters per capita and with the consumption of livestock 3,000 liters a head, i.e., a daily consumption of ca. 10 liters. This, of course, is a bare minimum not taking into consideration such "luxuries" as baths.

[5]Negev (1977a: 723; the scale is incorrect; and cf. the plan on p. 731).

[6]Hombert and Préaux (1952: 154-55) believe that the average household numbered six; but see the reservations of Russel (1958: 54). Modern analogies point to five persons per house (Mills 1933). We reckon for Avdat six persons per household

(supposing a slave should be added to each).

[7]Y. Tsafrir, oral communication.

[8]Mayerson (1967: 41) tries to gauge the size of Nessana's population: according to Papyrus 76 (probably from A.D. 689) the population reached 1,500 at most; according to Papyrus 69 (also dating to the Early Arab period) Nessana's cereal yields were sufficient for the consumption of 1,000 persons. If both his and our estimates are correct, a population decrease during the 7th century A.D. is indicated.

[9]Prof. E. Marks, personal communication.

[10]It is worthwhile to note that three distinguished researchers of the Negev have expressed minimalist views similar to ours: Mayerson (1967: n. 13); Kedar (1957b: 180-82); and Negev (1967: 243).

[11]The author intends to publish a paper on the cities of Palestine shortly.

[12]Of the 21 eligible cities (i.e., those that enjoyed municipal status prior to the mid 3rd century A.D., when the cities stopped minting coins), 18 issued coins. The three cities which did not mint coins (for reasons unknown to us) were Azotus, Jamnia, and Appollonia.

[13]If we go by late Byzantine sources, like the Synecdemus of Hierocles and Georgius Cyprius, we will arrive at a somewhat larger list (Jones 1937: 502-9). It seems, though, that these sources are quite lax in their definition of a city. The figures quoted above refer to the cities at their maximum expansion during the Roman-Byzantine period. At no time were all the cities occupied fully. Antipatris ceased to exist probably in A.D. 451, exactly at the time when Jerusalem was surrounded by a wall and witnessed a substantial population increase. We estimate that by the end of the Byzantine period, ca. A.D. 600, the inhabited area of the cities of Palestine totalled some 1,100 hectares.

[14]The present work could not have been carried out had the author not received the kind assistance of 16 colleagues who placed plans and data at his disposal, and in several cases the results are based on data so received.

[15]Even scholars who believe that there is a regularity in the spacing of cities (governed by economic and administrative factors) will find difficulties in explaining the distribution of cities in Palestine (Holder and Hassal 1971: 391-407). A short study of the map of Palestine in these periods clearly shows that in some regions, such as the Peraea (Jewish Transjordan) and the Galilee (also predominantly Jewish), very few cities existed, while the rest of the country was quite densely covered with cities. This can be explained by religious and cultural factors.

[16]This view was shared also by M. Avi-Yonah (1964: 121).

[17]Antipas had an annual revenue from his territories, Galilee and Peraea, of 200 talents; Philip's province yielded a revenue

of 100 talents, while Archelaus' ethnarchy brought 400 talents—a total of 700 talents, the share of Galilee and Peraea being two-sevenths (JW 2.95). On the other hand, Josephus relates (Ant 17.320) that Judea's revenue was 600 talents, which would make the share of the Galilee and Peraea two-ninths. The main difficulty is that the Galilee and Peraea were lumped together, and there is no telling the exact proportion of Galilee alone. There are other reasons why Josephus' data cannot be used in the manner suggested by Avi-Yonah. The figures given for the Galilee on warriors are also conflicting; in one place (JW 2.585) they number 60,000, while in another (2.576) they number over 100,000. Furthermore these are typological numbers par excellence and should not be taken too seriously.

[18]The reckoning is 5 × 750,000 = 3,750,000 (not 2,500,000).

[19]I wish to thank Prof. S. Avitsur for suggesting to me the use of this method; cf. also Beloch (1886: 32-33).

[20]According to Jardé (1928: 133) a family of five consumes 3 1/4 times the amount consumed by the father alone, giving an average of 2/3 of this amount.

[21]Cf. Jardé (1928: 135), Beloch (1886: 32-33), Maier (1953-54: 327-28); see also Ashtor (1970: 17-18) and Braudel (1974: 87-97).

[22]Jones (1940: 260-61). On the import of corn to Rome and Constantinople, cf. Jones (1964: 695-701).

[23]Jones (1940). For the great significance of the high cost of transportation, the case of Antioch during the famine of A.D. 362-363 can serve as a good example. While the city was suffering acute hunger, an abundance of grain was available only 50 miles away. It was the "transportation barrier" which caused the dearth. "Hoarding and speculation played their part, no doubt, but the frequent phenomenon of famine amid nearby glut cannot be attributed to greed" (Finley 1975: 127). S. C. Humphreys (1969: 194) is right in stressing the fact that most of what is described as trade gain in antiquity refers rather to tax or tribute.

[24]The Zeno Papyri mention export of wheat to Egypt; cf. Tcherikover (1959: 68). Wheat was exported also to Tyre and Sidon (Ezek 27:17; Acts 12:20).

[25]If the data in Josephus is reliable, the wheat exported through Joppa in A.D. 44 amounted to 182 tons (20,665 modii; Ant 14.206).

[26]S. Avitsur (1977: 66). From 1943 onward, the official statistics show a sharp decline in grain production, to about half of the average of the three preceding years. This is to be explained by the falsification of statistics caused by the introduction of wartime "Food Control."

[27]In an annual consumption (including animal fodder) of 250 kg.

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