On Biblical Censuses

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Abstract: This paper surveys the literature on the major censuses recorded in the Old Testament, those taken by Moses and that taken by David. It also reviews the Biblical origins and ramifications of the superstition against being counted in a census.

Key words: Census; Old Testament.

1. Introduction

In his inspiring paper, "The Census as a National Ceremony," Kruskal (1984) points out that "the modern census has ancient roots that go back to old biblical days and in both positive and negative ways." In a digression Kruskal also cites the two biblical accounts of David's census in the books of Samuel and Chronicles, and interprets the two sets of counts as replications of a census rather than two separate reports of the results of the same census. This paper grew out of a personal interest in exploring the ancient roots of censuses, seeing how various (non-statistician) analysts have interpreted the results of and inconsistencies in the biblical censuses, and tracing the origins of the present-day reluctance of people to participate in censuses because of biblical injunctions.

The Old Testament provides details on three[2] censuses, the two Mosaic censuses (Numbers 1:20–47 and Numbers 26:5–51) and the Davidic census (2 Samuel 24:1–9 and 1 Chronicles 21:1–6). It also provides two passages that may be viewed as a basis for the reluctance to participation in censuses even seen in our society today. The prescription, found in Exodus 30:12–16, describes how a

[2] Actually there are many more censuses cited in the Old Testament, including one by Jacob (Genesis 46:8–27, whose total is cited in Exodus 1:5 and Deuteronomy 10:22), six by Moses (Exodus 12:37, Exodus 30:11–16 cum Exodus 38:25–26, and the two cited above, plus the count of the Levites in Numbers 4:34–49 and 26:62 and the count of the first born in Numbers 3:43), one taken before the Israelites avenged the outrage of the concubine of Gibeah (Judges 20:2), four by Saul (1 Samuel 11:8, 13:15, 14:17, and 15:4), one each by David (cited above), Solomon (2 Chronicles 2:17–18), Jeroboam and Abijah (2 Chronicles 13:3), Rehoboam (1 Kings 12:21), Jehosophat (2 Chronicles 17:14–18), Amaziah (2 Chronicles 25:5–6), Uzziah (2 Chronicles 26:12–13), and by Ezra (Ezra 2:64 and 8:1–14 and Nehemiah 7:66).

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census should be conducted (along with a con-comitant warning of what would happen if the prescription were not followed). The descrip-tion of what actually happened when David did not follow the prescription is found in 2 Samuel 24 and 1 Chronicles 21. Since the Old Testament has been the object of centuries of analysis, rabbinic and otherwise, a study of these analyses may provide deeper insight into three puzzling aspects of the Biblical census material, (1) the magnitude and variation of the counts in the Mosaic censuses, (2) the dis-crepancy between the two published counts of the Davidic census, and (3) the basis for the fear of a "plague" resulting from the taking of a census. This we do in the three sections of this paper.

2. Mosaic Censuses

The two detailed Mosaic censuses were counts of all male Israelites over twenty years of age belonging to each of the secular tribes, i.e., all but the tribe of Levi, the tribe assigned the religious duties associated with the care of the temple. The first count was taken in the

second year[3] and the second count was taken in the fortieth year of the Exodus. The respec-tive counts are given in Table 1. (Table 1 also includes for comparison purposes the frag-mentary military counts at the time of David as given in 1 Chronicles 12.) These numbers have been criticized for two major reasons. They are inconsistent with other numbers in the Old Testament (see, for example, the analysis by Colenso (1863), that of Gray (1903), or that of Ibn Khaldun (1958) written in the 14th century) and they are virtually not possible given what we know to be true about Biblical times.

The essence of the impossibility argument is that these counts imply that over 2,000,000 people subsisted in the desert for 40 years (assuming that males over 20 years old represent about one quarter of the popula-tion). Moreover, Albright (1925) estimates the population of Israel at approximately a quarter million only a generation or two after the time of Moses.

The main inconsistency argument stems from a juxtaposition of this count with the count of first-born males aged one month or older given in Numbers 3:43, namely 22,273.

Table 1.

	Numbers 1	Numbers 26	Albright		1 Chronicles 12
Reuben	46,500	43,730	46,500		*
Simeon	59,300	22,200	22,200		7,100
Gad	45,650	40,500	40,500		*
Judah	74,600	76,500	73,730		6,800
Issachar	54,400	64,300	54,400		?
Zebulun	57,400	60,500	57,400–	60,500	50,000
Manasseh	32,200	52,700	45,600–	45,650	*a
Ephraim	40,500	32,500	64,300–	69,300	20,800
Benjamin	35,400	45,600	31,500–	32,500	3,000
Dan	62,700	64,400	62,700		28,600
Asher	41,500	53,400	45,400		40,000
Naphtali	53,400	45,400	53,400		37,000
	603,550	601,730	597,630–606,780		331,300[b]

* Individual counts not given, but sum is 120,000.
? no information.
[a] Over 18,000.
[b] Including the 120,000 in the 2 1/2 tribes.

[3] An earlier census is reported in Exodus 30:11–16, 38:25–26 with a total count equal to that of the census reported in Numbers 1, namely 603,550.

Assuming an equal number of first-born females, we conclude that, (a) of the 600,000 females aged 20 or over there were only about 45,000 mothers, and (b) the average family size is 2,000,000/45,000 = 45. (This argument is brushed aside by Hertz (1936), p. 578) by his interpretation of that count as being merely that of first-born males under twenty years of age at the time of the census. Even so, assuming a life expectancy of 60 years merely triples the count. After dividing the calculations in (a) and (b) above by three one is still left with impossible counts.)

The other inconsistency is with the various approximate counts in the Book of Judges, namely the 600 armed men of the tribe of Dan (Judges 18:11) contrasted with the 60,000 + given in the Mosaic census, and the 40,000 fighting men of the tribes of Benjamin, Ephraim, Manasseh, Naphtali, Zebulun, and Issachar of Judges 5:8 contrasted with the 270,000–300,000 given in the Mosaic censuses. The estimates of the total count also do not agree with the count of approximately 40,000 armed men of Reuben, Gad, and the half-tribe of Manasseh at the time of the conquest of Canaan (see Joshua 4:13). If the latter count is correct, then a ratio estimate of .36 $(40,000/(43,730 + 40,500 + .5 \times 52,700))$ is the factor to be used to adjust the 600,000 count down to 216,000.

The first Mosaic count is given in Exodus 12:37 as approximately 600,000. This count is cited again in Numbers 11:21, this time after the second census. One interpretation of the origin of this count is via a creative use of "gematria," a method of divination of the hidden meaning of Biblical source text by converting each Hebrew letter into its numeric equivalent, summing these values, finding (or constructing) another text (not necessarily Biblical) with the same numeric equivalent, and using the "found" text to shed light on the hidden meaning of the source text. If one sums the numeric values of the first letters of

Jacob's sons (including Joseph and excluding Levi), one obtains the sum 597. A multiplication by 1,000 and an addition of 3,000, representing the number of Israelites who died in the aftermath of the golden calf incident (Exodus 32:28), yields the 600,000 count of Exodus 12:37 (see Braude and Kapstein (1975)).

Another gematria, cited by Fohrer (1968), multiplies the numeric value of *bene yisra'el* (the children of Israel) by 1,000, obtaining the value 603,000, and adds to it the numeric value of *kol ro's* (all the heads) and produces a total of 603,551, which is within 1 of the total reported in Numbers.

Still another bit of number-play is embodied in the work of Barnouin (1969). He argues that the 600,000 count had primacy and that both the 45,650 count of Gad in the first census and the 43,730 count of Reuben in the second census are reporting errors, in that they are the only counts not reported in hundreds (see Table 1). Barnouin then alters them to be 42,100 and 42,000, respectively, thereby bringing the two sets of counts down to exactly 600,000. He then notes that the order in which the tribes are mentioned in the second census does not coincide with the birth order of the sons of Jacob, so that there is a special meaning implied by the order. Since the sum of the counts of the first six tribes mentioned in the second census is 306,000, a number divisible by 60, and since the Babylonians expressed their numbers in base 60, Barnouin argues that this is evidence of an attempt by the redactors of the book of Numbers to produce counts which were conveniently handled by their number system.

Mendenhall (1958) (based on a suggestion of Petrie (1906)) takes a different view in interpreting these censuses. He notes that the term *elep*, translated "thousand" in Numbers, also means "military unit" or "population unit" (see, e.g., Judges 6:15). Thus if one reinterprets the numbers before the comma

(i.e., the thousands) of Table 1 as a count of military units and the numbers after the comma as a census, one obtains census figures of 5,550 and 5,730 and units counts of 598 and 596 in the respective censuses. The difficulty with this interpretation is that the Hebrew text of Numbers states the counts as "*x elep* and *y* hundreds," with the "and" inducing the translation of *elep* to be "thousands." One can, however, dismiss this if one takes the view, as Gray (1903) does, that the 600,000 count had primacy in Hebrew folklore, so that the redactor who compiled Numbers interpolated the "and" and interpreted *elep* as "thousands" to produce counts which added to approximately 600,000.

This interpretation by itself does not reconcile the 40,000 count of the armed men in Joshua 4:13 with the (43,730 + 40,500 + .5 x 52,700) = 110,580 count of the tribes of Reuben and Gad and the half tribe of Manasseh. Nevertheless if the average number of men in a unit in Numbers was about 10 and that in Chronicles, and hence Joshua, was 47 (see Mendenhall (1958)), then the count in Joshua is 40 x 47 = 1,880 men and the comparable count in Numbers 26 is (43 + 40 + .5 x 52)10 = 1,090. This means that the counts are at least of the same magnitude.

An interesting new approach to reconstructing the size of the exodus population was taken by Finkelstein (1984). He estimated the size of the population in each of about 285 archeological dig sites in the Iron Age, and arrived at a total of 38,500. Adjusting for uncertainty in his separate estimates, he provides an upper bound of 55,000 as the size of the exodus population.

One can obtain an independent estimate of the number of Israelites at the time of the Exodus based on the genealogical information given in Genesis and 1 Chronicles. The form of the procedure is given by Lucas (1944). He assumes, based on Exodus 7:40–41, that the Israelites were in Egypt for 430 years. If they entered as 70 in number (Genesis 46:27) then,

assuming a rate of population increase of 11.69 percent per 1,000 population every 10 years (that rate being the average rate of population increase in Egypt in 1907–1937!), Lucas estimates that the population would have grown to $70 \times (1.01169)^{430} = 10,363$. An alternative calculation, which does not make the error of converting a 10 year rate to a one year rate by dividing by 10, leads to an estimate of $70 \times (1.1169)^{43} = 8,123$.

One can make this calculation more precise by noting that the Israelites were in Egypt for only 210 years (see Hertz (1936)) and by noting, from the genealogy of Judah given in 1 Chronicles 2:3–12, that the generations that left Egypt were the fifth and sixth generations after the sons of Jacob (Nachshon ben Aminadab, leader of the tribe of Judah in the Exodus, was the fifth generation after Judah). Assuming four sons per family per generation (Jacob's twelve sons begat an average of 51/12 = 4 +sons), at the end of six generations the number of adult males could grow to $12 \times 4^6 = 49,152$.

Ben-Gurion (1972) used similar reasoning to reach the conclusion that the number of people who left Egypt was 600. The basis for his argument is that, from the genealogy of Levi given in 1 Chronicles 6:1–66, the generation that left Egypt was the third generation after the sons of Jacob (Aaron was the third generation after Levi). Assuming, based on the count of the great grandchildren of Levi given in 1 Chronicles, that, along with wives, this cadre numbered 50 people, Ben-Gurion multiplies 50 by 12 to arrive at his count of 600 as the total size of the Exodus.

The number 600 appears often enough in the books of Judges and Samuel (Judges 3:31, 18:11 ff, 20:47, 1 Samuel 13:15, 14:2, 23:13, 27:2, 30:9, 2 Samuel 15:18) that scholars (e.g., Finegan (1963)) interpret it to be a euphemism for a "brigade" or "troop" rather than an accurate count. Thus 600,000 may be a euphemism for 1,000 brigades. Or, consistent with Ben-Gurion's conclusion, the count may have

been as small as one brigade and subsequently exaggerated a thousandfold in accordance with Deuteronomy 1:11.

In summary, given the detailed counts of the tribes given in Numbers, it is clear that they must be a record of count (or counts) of some aspect of tribal size. But, since their magnitude is inconsistent with both other biblical counts and otherwise defies tests of reasonability, we are left to speculate on the nature of the counts. Perhaps the Petrie-Mendenhall work is in the right direction. Perhaps Albright's "guesstimated" reconstruction (Albright (1925), included in Table 1), which hypothesizes that the two lists are "garbled versions of the same original" Davidic (and not Mosaic) census, is on the right track. Neither, though, is a definitive resolution of the conundrum of the Mosaic census counts.

3. Davidic Census

2 Samuel 24:9 puts the census count of Judah at 500,000 and that of the tribes of Israel at 800,000; 1 Chronicles 21:5 puts the respective counts at 470,000 and 1,100,000. Is this merely recording variation? Not so, say the rabbis. The rabbis first base their rationalization of the discrepancies by interpreting the ambiguous phrase "sword carrier" in 1 Chronicles 21:5 as explaining away the differences between the counts in Chronicles and those in Samuel. Second, with regard to the count of the tribes of Israel, the standard rabbinic explanation is their interpretation of 1 Chronicles 21:6, "and Levi and Benjamin were not counted therein," as referring to the understatement of the census in 2 Samuel 24:9, i.e., they impute part of the 300,000 difference to be the combined count of the tribes of Levi and Benjamin.

Ginzberg (1913) summarizes the Midrashic[4] treatment of this census as follows:

"Joab had no choice but to obey. He selected the tribe of Gad as the first to be counted, because he thought that the Gadites, independent and self-willed, would hinder the execution of the royal order, and David would be forced to give up his plan of taking a census. The Gadites disappointed the expectations of Joab, and he betook himself to the tribe of Dan, hoping that if God's punishment descended, it would strike the idolatrous Danites. Disliking his mission as he did, Joab spent nine months[5] executing it, though he might have dispatched it in a much shorter time. Nor did he carry out the king's orders to the letter. He himself warned the people of the census. If he saw the father of a family of five sons, he would bid him to conceal a few of them.[6] Following the example set by Moses, he omitted the Levites from the enumeration, likewise the tribe of Benjamin, because he entertained particularly grave apprehensions in behalf of this greatly decimated tribe.[7] In the end, David was not informed of the actual number obtained. Joab made two lists, intending to give the king a partial list if he found that he had no suspicion of the ruse."

Thus by legend is the discrepancy explained away.

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[4] The rabbis engaged in a process of intense examination of the biblical text, both legal and narrative, to determine its meaning for the contemporaries of their time. This process continued for centuries, and the results are preserved in anthologies referred to as the Midrash which have been collected and edited over several centuries as well.

[5] By contrast, legend has it (see Ginzberg (1928, p. 80)) that the taking of the Mosaic census of Numbers 1 lasted only one day, "the people and the leaders being equally anxious to carry out God's command without delay." Whould that such cooperation be the case in censuses today!

[6] Again by contrast Ginzberg (1911, pp. 225–226) relates this legend about the census of the Levites. "When Moses was ordered to number among the Levites all children from a month old and upward, he said to God: 'Thou biddest me count them from a month old and upward. Shall I now wander about in their courts and houses and count each child, seeing that Thou givest me such a command?' But God replied: 'Do thou what thou canst do, and I will do what I can do.' It now came to pass that whenever Moses betook himself to a Levite tent he found the *Shekinah* (Divine Presence) awaiting him, telling him exactly the number of children without his having to count them." Would that such accuracy be the case in censuses today!

[7] See Judges 20:46–47, wherein 25,000 Benjaminite fighting men were killed and only 600 escaped death.

4. Census: Sin and Expiation

Frazer (1918) devotes a chapter of his "Folk-lore in the Old Testament" to a list of various cultures which, like the ancient Hebrews, had a superstition against being counted. His examples are all relatively modern, based primarily on anthropological reports in the early twentieth century and range as far back as an eighteenth century study of the Lapps. The difference between the superstitions retold in Frazer and that of the ancient Hebrews, however, was that the Hebrews had instituted a method of warding off the evil effects of the census, namely the payment of half a shekel[8] to the Lord as a ransom for one's life.

Frazer gives primacy to the superstition and argues, citing modern biblical critics, that the passages Exodus 30:11–16 are part of the Priestly Code and therefore date "from the Exile or later." As Frazer puts it, "(a)t a later time the Jewish legislator so far relaxed the ban upon a census as to permit the nation to be numbered..." by instituting the half-shekel payment, interpolating (i.e., "backdating") this institution into the Book of Exodus, and redacting the Book of Numbers accordingly.

One bit of evidence in support of this thesis is the reference by Nehemiah (Nehemiah 10:33) to the institution of an annual charge of one-third of a shekel "for the service of the house of our God."[9] Hartom (1973) presents

a condensation of the rabbinic explanations of this passage, namely (1) Nehemiah meant the one-third of a shekel to be in addition to the one-half of a shekel of Mosaic times, (2) this obligation was in no way associated with a census, and (3) the amount was one-third of a Persian shekel, whose value was equivalent to one-half of an Israeli shekel. In addition, references to 2 Kings 12:15–17, 22:3–7, 2 Chronicles 24:5–14, 34:8–14 indicate that the half-shekel contribution was a permanent institution, independent of the census. In fact, the Sabbath of Shekalim was instituted as the Sabbath two weeks before the first day of the month of Nissan, to remind the public of the institution of the one-half shekel contribution to the temple upkeep.

As further confirmation, the first century historian Josephus ((1965, Book XVIII:18.9.1 §312) and (1928, Book XVII:7.6.6 §218)) points to the "national custom" of each person depositing two drachmas (the equivalent of one-half shekel) to the temple of Jerusalem, and the translator by footnote reminds the reader that in the days of Nehemiah the contribution was one-third of a shekel, but "afterwards one-half of a shekel."

Recent archeological research at Mari, one of the principal centers of Mesopotamia during the third and early second millennia B.C., has produced cuneiform letters which not only describe a census but also an associated "purification" (see Kupper (1950) and (1957)). In the latter reference Kupper points out that the Romans also closed their censuses with a purificatory sacrifice. Moreover, he says he would not be surprised at discovering another manifestation of this primitive belief in Babylon as well. The term used for the census in these letters is *tebibtum,* but, as Speiser (1958) argues, a better translation of this term is "expiation," i.e., it is the Mari equivalent of the Hebrew term *koper,* used in Exodus 30:16 to describe the function of the half-shekel, and is usually translated as "ransom." An incidental

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[8] Ginzberg (1911, p. 46) notes that legend has it that at the first census by Saul every man put down a pebble, but at the second census the people were so prosperous that instead every man brought a lamb. This is based on a translation of *bezeq* in 1 Samuel 11:8 as "pebbles" and *tĕlā'îm* in 1 Samuel 15:4 as "lambs" instead of the usual translation as names of sites.

[9] The phrase "offering to the lord" is cited three times in the Pentateuch, the Five Books of Moses, to indicate according to Rashi (Rabbi Shlomo Yitzchaki, an eleventh century exegete), that there were three separate purposes for the offering, (1) contributions for the tabernacle, (2) the purchases of communal sacrifices and (3) offerings of silver and brass for the temple.

process of ritual purification was associated with the Mari census and hence the Mari word for census is also their word for purification, *tebibtum.*

Speiser argues that, since the underlying purpose of the census (both in Mari and by the Hebrews) was to provide rolls for military conscription, the census was an ominous process. (Indeed, the Hebrew term *paqqēd* and the Mari term *paqadum* have the dual meanings of "to muster/conscript" and "to count/record." The connection between these rolls and the lists in the cosmic books of life and death that were so prevalent in the literature of the Mesopotamian region was too close to be taken lightly. (See, for example, the Gilgamesh epics, Tablet 7 column 4 verses 49–52 and Tablet 10 column 4 verses 36–39.) Thus it was natural to propitiate the gods or seek expiation as a general precaution during a census, in the form of the Mari *tebibtum* or the Hebrew *koper.*

Hertz (1936) notes that the word *negep,* usually translated as "plague," comes from the same root as the Hebrew word for "slaughter in battle." He then repunctuates, and hence reinterprets, Exodus 30:12–13 to mean that just as *koper* was the punishment in the case of deeds resulting in unintentional death, so too does the context of Exodus 30 apply only to the potential taking of life, i.e., going into the military conscripts, and not to a general census. His translation would read:

> 12 When thou takest the sum of the children of Israel, according to their number, then shall they give every man a ransom for his soul unto the Lord, when thou numberest them, that they not suffer defeat in battle.
> 13 When thou numberest them, this they shall give, every one that passeth among them that are numbered, ...

Since his variant punctuation is contrary not only to the standard punctuation but also to the cantillation of the various sentences,

Hertz's interpretation of the text is not well-accepted.

On the other hand, the 15th century rabbinic commentator Abravanel and others (see Leibowitz (1980)) note that the command in Numbers 1:1–2 to take the first Mosaic census makes no reference to the half-shekel ransom, and argue that the half-shekel token of Exodus 30 was needed to provide sockets for the construction of the tabernacle, and was not a general requirement for a census. (In fact, the first reference to the 603,550 count of Numbers 1 is in Exodus 38:25–26, viz, 100 talents plus 1,775 shekels for the sockets and hooks for the pillars of the tabernacle were collected. A talent equalled 3,000 shekels, and so 301,775 shekels equals 603,550 half-shekels.) In response to the thesis that it was the Davidic census that was responsible for the plague, Abravanel and the 13th century rabbinic commentator, Gersonides, argue that David's sin lay in his sudden reliance on the creation of a permanent army instead of on the Lord and on David's desire to boast of his numeric military superiority before his enemies.

Some rabbis hold a general view that taking a census is a sin only if taken "improperly," where the view of what constitutes an impropriety ranges from direct counting without making the half-shekel contribution to taking a census without a "proper purpose." The Davidic census, for example, resulted in a plague only because of its improper purpose, according to the first century Midrashic contributor and compiler Rabbi Eliezer (see Slotki (1977) or Talmud Yoma 22b). Other rabbis hold the view that it is a sin to take a census because Hosea 2:1 ("yet the number of the children of Israel shall be as the sand of the sea, which cannot be measured or numbered...") is taken to be an injunction against a census. This statement, coupled with the promise of Jeremiah 33:13 that in the Messianic age "shall the flocks again pass under the

hands of him that counteth them," solidifies their view that no Israelite should submit to a census until the Messiah comes.

Given the longstanding religious-based reluctance to conduct and/or participate in a census, how does modern-day Israel justify their censuses, especially to the devout? First, consistent with the principle that a census is permissible if it is conducted for a "proper purpose," the Israeli census is legitimated as being necessary for economic and social planning. Kasher (1964) cites four reasons for permitting participation, namely:

(1) a literal interpretation of the Biblical injunction is that only a "headcount" is forbidden, and not a "namecount." Thus a count of names on a filled-in form does not violate the strictures of the Bible.

(2) even if a written form is not used, as long as the count is based on the enumerator asking someone (e.g., the head of the household) for the count of the number of members of the household, rather than actually counting each member personally, no violation has occurred.

(3) it is merely impermissible to count the Jewish people. In the case of the census of Israel, since the count encompasses all inhabitants of the country, not merely Jews, then, even though a count of the number of Jews is a byproduct of the census, the Biblical injunction is not breached.

(4) since it is a computer, and not a human, that performs the counting, no human has committed a sin in performing a census.

It is clear that the taking of and participation in a census carried a stigma, ranging from the incitement of the "evil eye" against the participants up to the potential of a plague erupting among those counted. It is also clear that, not only in modern times but also in medieval times, rabbis have tried to lay such superstitions to rest. Unfortunately, it is the Bible, and not its exegeses, that is read and interpreted literally.

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