

DESCRIPTIONS OF PAST POPULATIONS

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Several creationist writers have discussed the growth of populations. Usually they have taken the growth to be geometric or exponential. Then, from known facts about present populations, they have tried to calculate back to the time of the Flood, or of creation.

*Here I shall comment mostly on Rodabaugh's work, since it appeared recently in the *Quarterly*, and had some refinements which were not found in other treatments.*

If the constants in the treatment are arranged to make the formulae fit the present populations, and some for ancient times, say in Jacob's day, the formulae give populations in intermediate times, say David's time or the beginning of the Christian era, which are too low by as much as five orders of magnitude. A more elaborate formula can fit the known figures for the Jewish population, for instance. But the result is of little use in proving the youth of the earth, or in finding the time of the Flood.

It is recommended, then, that, because of the discrepancies which may be introduced, that these arguments about populations not be used in popular public lectures.

Introduction

In two recent issues of the *Quarterly* Rodabaugh^{1,2} examined the growth of the world and Jewish populations. In the first article he fitted a simple exponential curve of the form

$$p = 2^n s, \text{ where } n = t/d \quad (1)$$

to recent and original populations of the Jewish people. He then used a more accurate population equation; his equation can be rewritten

$$p = s \exp(at) / (1 + ms(\exp(at) - 1)). \quad (2)$$

In these equations p is the population at some time t after an initial population s . The doubling period of the population is given by d ;

$$a = (1/n) \ln 2 / d. \quad (3)$$

The inverse of a limiting value to the population is m . A value of m was assumed and then Equation 2 was fitted several times to essentially two data points at the beginning and recent values of the Jewish population, the values of the data points changed slightly for each fit. Using the derived values of a , and a new assumed m for the world population, Equation 2 was then used to see how long it should take for the world population to nearly reach the limiting value.

In his second article Rodabaugh assumed different values of m and recalculated his a and other values, which showed only slight changes. He claimed in both articles that his curves are "reasonable" descriptions of the population. Rodabaugh also pointed out that a population equation by Morris is basically an exponential of the form of Equation 1 modified by probably slowly varying terms. The conclusions of the current article with regard to Equation 1 should therefore also apply to that equation by Morris.

It will be shown that the simple exponential Equation 1, and the more complicated Equation 2, when Rodabaugh's constants are used, give unreasonably small population values for the times between his two end data points.

Values of Time

The years mentioned in the Biblical books of Genesis, Exodus, Judges, Kings, and Chronicles were used to construct a time line on which to plot population values. Several commentaries were also used to convert Biblical years to the present calendar system. Key dates are 587 B. C. for the fall of Jerusalem and 722 or 721 B. C. for the fall of Samaria. Before these dates possible errors start to creep

in. Problems are possible in the interpretation of the lengths of reign of certain kings. These result in a 60 year spread of values for the date of the end of Solomon's reign as given by the several commentaries.

The length of the period of Judges also shows a diversity of opinion. This results in a spread of about two hundred sixty years for the date of the Exodus. Times before Joseph appear to add together without much difficulty, but the diversities of opinion of later years produce at least the same size error possibility in dating the early years according to our present calendar system. Such error bars are used in Figure 1.

Values of Population

Figure 1 is a ten-cycle semi-logarithmic graph of population with time. This form of graph was chosen because the plot of Equation 1 is a straight line, thus aiding in interpretation. Population values quoted by Rodabaugh are plotted. The recent Jewish values form a compact cluster at the upper right edge. The initial population of Jacob and his four wives is plotted at 1850 B. C. with a ± 150 year error bar. Some encyclopedia estimates of world population since 1650 A. D. are also shown, but with unknown errors.

Using a recent ratio of Jews to the total population and these world population estimates, some more Jewish data points were generated.

The average value of a for the initial population of 5 as given in the second article was found to be $a = 3.966 \times 10^{-3}$. Using Rodabaugh's limiting value of $1/m = 8.07 \times 10^7$ people, Equation 2 was fitted to the Jewish data points in Figure 1. The curve turns out to be a nearly straight line which starts to bend slightly only in recent times. The straight line fit of Equation 1 is also plotted for comparison. These lines are a close fit to the data points estimated for 1650 to 1850 A. D.

The same a was then used with Equation 1 to extrapolate the world population back to a small value from the 1922 value. As seen with the Jewish data, the line for Equation 1 is essentially the same as Equation 2 until the population gets close to the limiting value. It is seen that this line also is a good fit to the world population estimate for 1650 to 1922 A. D. Lowering of the death rate by modern technology is the usually quoted cause for the recent rapid increase in population that fails to fit this line.

Discussion of the Equation Values

Using Rodabaugh's constants Equation 2 indicates that only about 45 descendants of Jacob were available to leave Egypt in about 1300 B. C. during the Exodus. This compares unfavorably with the report of 70 people³ entering

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Egypt with Jacob a few 100 years earlier at the time of the seven-year famine. The equation indicates that there were only 145 descendants for David to rule over in about 1000 B. C. and fewer than 450 people in both Israel and Judah at the fall of Samaria in 722 B. C. It indicates about 8300 descendants of Jacob scattered around the world during the time when Jesus fed 5000 men,⁴ and their women and children in addition.

The parallel line showing the world population indicates only 50,000 people in the entire world at the time Sennacherib's army was destroyed leaving 185,000 dead.⁵ It shows that there were fewer than 20,000 people living in the world when David counted 1.3 million males in his kingdom⁶ who could contribute to his army. It shows that only about 700 people were living in the world at the time Joseph presided over food distribution in Egypt during the seven-year famine.

Clearly, both the Jewish population and world population curves by either Equation 1 or 2 do not fit estimated or reasonable populations between the time of Jacob and recent years. Estimated or known populations between the end points are consistently larger than the equations indicate. A simple exponential of the form of Equation 1, probably including one by Morris, cannot ever be adjusted to fit the points available. A curved line on this semi-logarithmic graph is needed, not a straight one.

Alternative Descriptions of Population

Equation 2 has the potential of being curved on a semi-logarithmic plot if different constants are used. Rather than assuming a value for m as Rodabaugh did, one can be calculated. Three data points will be used for the Jewish population: 5 at 1850 B. C., 2.7×10^6 at 1300 B. C. to represent the Exodus⁷, and 5×10^6 at 980 B. C. to represent David's kingdom⁶. (The latter two are crude extrapolations from the numbers of military age males counted in each census.)

The three unknowns of Equation 2, s , a , and m can be determined for any three data points. The first point easily give $s = 5$. The other two together yield $1/m = 5.001 \times 10^6$ people and $a = 2.541 \times 10^{-2}$.

Curve (2) with these constants is also plotted in Figure 1. It shows a steep rise (doubling period 27 years) during the time when the descendants of Jacob should have been prospering in Egypt due to their favored political status (Joseph was second in command, after Pharaoh, and in charge of the food). The curve's rise starts to slow when the Israelites in Egypt experienced their slavery. The curve's rise comes to a halt during the period of the Exodus, Conquest, and the Judges when the people lived a semi-nomadic life, were shepherds in hills, and suffered from wars and famines. The curve suggests that the Israelites were as numerous as the land could support around the time of David.

The present Jewish population has increased only by a factor of three since the time of David, showing the effects of population controls by wars, famines, three deportations and scatterings, apostasy and blending into the world population; and other factors. (It is a bonus of the fit that the new curve for the Jewish population also passes close to the data point for 70 people entering Egypt.)

A similar curve could be estimated which would rise from the eight people of Noah's time to well above the rise of David's kingdom and then level off towards modern population values. It, too, would show the population being held down by some limiting value which it may be supposed, increases with advances in technology. Letting m be

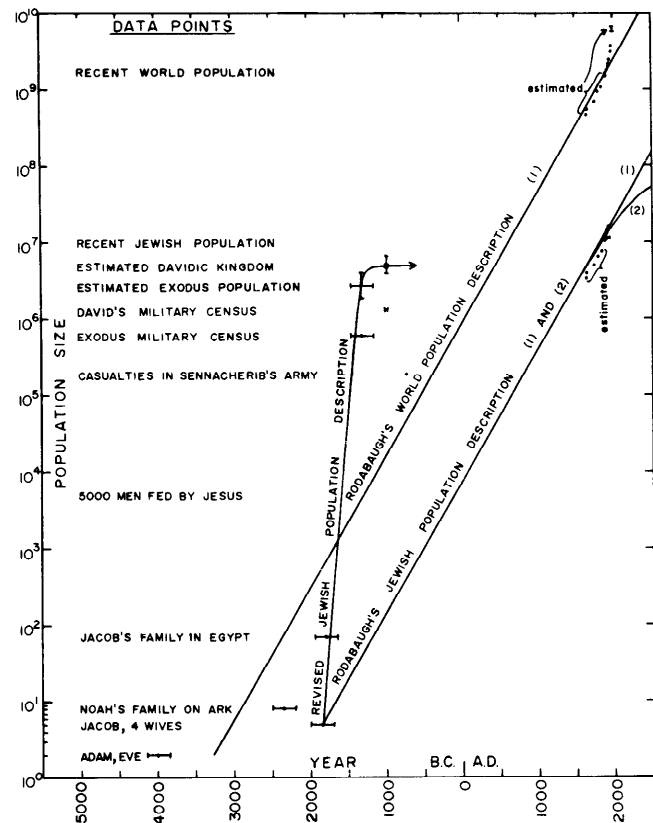


Figure 1. A semi-logarithmic graph of population with time. 10^0 is one, 10^3 is one thousand, 10^6 is one million, and 10^9 is one billion. A few known populations are plotted; some estimates have error bars included. Population descriptions by Rodabaugh for Jewish and world populations appear as nearly straight, parallel lines. A revised description for the Israelites rises steeply and then levels off. Any world population curve rising from the time of Noah must clear this hurdle of the Davidic kingdom population by at least a factor of a hundred before leveling to intersect modern population values. The rates of rise of the Israelite curve and one necessary after Noah's time are the same as for the present world population and are therefore reasonable.

a function of time would be more realistic than having it constant. The population has fluctuated in historic times as a result of wars and other crimes, food supply, disease, and social practices.

No form of a function $m(t)$ is being offered here; there are insufficient data to examine its shape. Many reasonable forms could be suggested. In fact by selecting a and an $m(t)$ either arbitrarily or with reason one could make a curve say nearly anything one likes about ancient populations.

A destruction of world population by the Flood and a rapid restoration afterwards to some limiting, slowly varying value is entirely possible to design into the equations. So is, however, a curve of the form (2) which assumes no Flood and lets the world population be limited through $m(t)$, since times even as great as those suggested by evolutionary theory. When t becomes large in (2), the equation reduces to its limiting value, $1/m$, whatever that may be.

Conclusions

The population descriptions by Rodabaugh were examined and found to introduce errors of up to five orders of magnitude if applied to intermediate times. It is therefore

recommended that, to save embarrassment, Rodabaugh's equations and constants *not* be used in popular lectures.

Equation 2 can still be used with proper constants to describe certain short term events. It should *not* be used to indicate that a Flood probably happened. The term *m* has apparently dominated the equation for the past 3000 years, much too long for giving an indication of when a population recovery occurred.

Whatever form of *m* is suggested to fit historical population data, and then used to extrapolate back towards the times of the Flood, another form of *m* could be suggested

giving reasonable values back to times unacceptable to creationists. Further efforts with this equation should therefore prove of little value in showing that a Flood occurred.

References

- ¹Rodabaugh, David J. 1975. The queen of science examines the king of fools, *Creation Research Society Quarterly*, 12(1):14-19.
- ²Rodabaugh, David J. 1975. Human evolution is still nonsense, *Creation Research Society Quarterly*, 12(2):107.
- ³Genesis 46:27.
- ⁴Matthew 14:21.
- ⁵See 2 Kings 19:35.
- ⁶See 2 Samuel 24:9.
- ⁷Numbers 1:46 (603,550 males of military age).

RESPONSE TO COMMENTS BY EDMOND W. HOLROYD, III

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I shall comment on Holroyd's article in terms of what I have written. It may be that much of what I have to say will apply to treatments of populations by others.

Israel, God's miracle people

To begin with, it is important to observe that Jewish population growth, as recorded in the scriptures, indeed does not fit with the equations generally given for population growth. To the Christian, this is evidence of the miraculous character of God's dealings with Israel.

One of Holroyd's concerns is that this fact could prove embarrassing in popular public lectures. This is not the case for several reasons. First, those who support the theory of evolution do not accept the statements of scripture mentioned in Holroyd's article. They do not admit Biblical data. In my article, information on Jewish population was purposely taken from liberal or secular sources. Evolutionists will admit that kind of data.

Population discussions apply only to long time spans and large populations

Second, to derive any meaningful information that compares one population to another, both should involve long time spans and large populations.

Everyone is aware of the fact that one man might have 20 children while another has none. This does not contra-

dict the population equations. It simply is not what they are intended to describe. The population must be large.

Population equations should also cover a number of generations. Numbers must be such that the population can be thought of as essentially a continuous function of time.

This requires a long time span. Jewish population actually dropped between 1939 and 1946; but this only conflicts with an improper use of the population equations.

Ad Hominem Argument

Third, the basic point in my articles was that the assumptions of the evolutionist lead to an absurdity.

In such a discussion, it is appropriate to allow certain presuppositions of evolutionists, and show in turn, conflict with their conclusions. This style of argument is valid and is even used in the scriptures (e.g., Matt. 12:26-27).

As mentioned above, the evolutionist will admit the data in my paper but will not accept the data of the scriptures.

Conclusion

For these reasons, it is quite proper (and effective) to use population figures in popular public lectures.

To be sure, those who believe the Bible know that God's miracle people—the Jews—did not conform to the normal population equations.

However, the evolutionist is such a committed uniformitarian that he would assert that the population equations are essentially valid. Such equations do contradict his system.

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MONUMENTAL ANACHRONISMS

Two more examples of the ease with which anachronisms may be built into monuments have been noted recently.

Galloway, Strome, in "Brave yesterdays, dints in their domes", *Legion Magazine*, 50 (4): 64 (published by the Royal Canadian Legion, September, 1975) remarked on monuments at St. Julien, France, to the Canadians in the second battle of Ypres, April 1915, and at Obourg railway station, outside Mons, to the Fourth Middlesex Regiment, which fought a notable battle there in 1914.

The point is that in both of these monuments the soldiers are shown wearing steel helmets. But the steel helmet

did not come into use *until 1916*.

It is true that these are anachronisms of only a year or two. But if a short anachronism can occur, so can a long one. So when information, or supposed information, from ancient monuments seems to conflict with Scripture, one should not suppose that the monuments are always right and Scripture is wrong. For that particular piece of supposed information could be an anachronism—or if anachronisms can appear in monuments, so could mistakes, or plain falsehoods.

—Editor Armstrong