

*The following is an email John P. HARN sent to a Biology professor
at Pacific University in Oregon in early 2007.
The professor's reply is also printed.*

Dear Jon Snorr

I have been doing family history research for a few months now. When I discovered that the first HARN came to America about 1680 (sic), I became fascinated with this individual. But after a while I began to wonder how important this one ancestor really was. I wondered how many other direct ancestors I had alive in 1680 that I didn't know anything about. I wanted to put the one I did know something about in perspective. After fumbling around with some numbers, I calculated that I had 8,192 direct ancestors alive in the year 1675 (see "Population Puzzle" chart, following page).

But calculating that number revealed a mystery:

A little internet searching revealed that the world population in 1680 was roughly 600 million. My 8000 ancestors made up just a tiny fraction of the total world population. No problem.

But as I went further back in time, something bizarre happened with the numbers. With each successive generation (25 years further back in time than the previous generation), the number of my direct ancestors *doubled*. But the total world population was *decreasing* with each generation. At some point, the numbers had to explode.

Using my numbers, in 1400 I had an incredible 16 million direct ancestors, but the world population had decreased to only 375 million. So my ancestors now made up 4.5% of the total world population. Very impressive, even puzzling, but still seemingly possible.

However, by the year 1275, the numbers did in fact explode. I had 536 million direct ancestors. But the world population was only 410 million. So my ancestors made up 121% of the total world population!

How can this be?
John Harn

Dear John,
Wow! Great question....

I think the answer to this conundrum is that you don't really have that many "direct ancestors." In the past, humans tended to breed with other humans nearby. Some people say most marriages occurred between people about five miles apart!?? Who really knows, but I do think that mobility and breeding groups were reduced. Because of that, 1st, 2nd, 3rd, and 4th cousin marriages become the rule rather than the exception. Anyway, if you consider first cousin marriages, the progeny from that union would have two parents and 4 grandparents, but only 6 great grandparents. So by 1675 you would have only 6000 ancestors rather than 8000. And this is if only one of the generations had first cousin marriages. Imagine if many of them did.

Also, biologists tend to be more interested in finding the most recent common ancestor, i.e. the ancestor we ALL share in common. I searched a bit and found a recent paper that uses models and simulations to argue that our most recent common ancestor lived just a few thousand years ago (say 3000). This doesn't mean these two were Adam and Eve, but it does argue that modern people's genealogies overlap with one another and that many lines have died out (no more living descendants). These math models are beyond my area of expertise, but the paper does appear in one of the most prestigious journals.

Thanks for the question! I'll send you more info if something else comes to mind....

Jon Snorr

THE POPULATION PUZZLE

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Number of Generations Ago	Number of direct ancestors alive in this year if no cousin-to-cousin marriages occurred	Years ago (1 generation = 25 years)	Estimated world population at that time	Ancestors as a % of world population
1	(parents) 2	25 (1975)	4.0 billion	<1%
2	(g.parents) 4	50 (1950)	2.5 billion	<1%
3	(g.g.parents) 8	75 (1925)	2.0 billion	<1%
4	(etc.) 16	100 (1900)	1.6 billion	<1%
5	32	125 (1875)	1.4 billion	<1%
6	64	150 (1850)	1.2 billion	<1%
7	128	175 (1825)	1.0 billion	<1%
8	256	200 (1800)	950 million	<1%
9	512	225 (1775)	860 million	<1%
10	1,024	250 (1750)	780 million	<1%
11	2,048	275 (1725)		
12	4,096	300 (1700)	620 million	<1%
13	8,192	325 (1675)		
14	16,384	350 (1650)		
15	32,768	375 (1625)		
16	65,536	400 (1600)	530 million	<1%
17	131,072	425 (1575)		
18	262,144	450 (1550)		
19	524,288	475 (1525)		
20	1,048,576	500 (1500)	450 million	<1%
21	2,097,152	525 (1475)		
22	4,194,304	550 (1450)	400 million	1.1%
23	8,388,608	575 (1425)		
24	16,777,216	600 (1400)	375 million	4.5%
25	33,554,432	625 (1375)		
26	67,108,864	650 (1350)		
27	134,217,728	675 (1325)		
28	268,435,456	700 (1300)	400 million	67%
29	536,870,912	725 (1275)	410 million	121%
30	1,037,741,824	750 (1250)	410 million	250%