

The puzzle of modern population growth in a war-torn Third World country

# MULTIPLY EXCEEDINGLY: BOOK OF MORMON POPULATION SIZES

By John C. Kunich

AS LATTER-DAY SAINTS WE ARE URGED TO STUDY the Book of Mormon and apply its teachings to our lives. In "likening the scriptures unto ourselves," however, we sometimes anachronistically ascribe contemporary attitudes, practices, and phenomena to Book of Mormon peoples. Although usually innocuous, this penchant for viewing the long-ago through now-colored glasses can sometimes distort our understanding of the text.

In this essay I examine one possible problem in contemporary LDS interpretations of the Book of Mormon. In the context of today's much-publicized population explosion, and from the perspective of an era accustomed to miracles in medicine, technology, nutrition, and transportation, I believe we have overlooked a fundamental difficulty in Book of Mormon population sizes. Assuming that Book of Mormon peoples were like us, we have accepted that the multitudes of Nephites and Lamanites reported in Mormon scripture sprang from two small bands of Palestinian emigrants, inasmuch as they had hundreds of years in which to "multiply exceedingly." However, an understanding of historical demography may challenge this traditional interpretation of the scripture.

After briefly summarizing the scriptural information on Nephite-Lamanite population levels, I will explain the basic principles necessary to place these data in perspective. Finally, I will discuss the resulting implications for the Book of Mormon and our comprehension of its message.

## BOOK OF MORMON POPULATION SIZES

ARRIVING at a reasonable estimate of Nephite-Lamanite

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numbers is more an art than a science. The authors of the Book of Mormon favored hyperbolic generalities in this area. Terms such as "multitude," "numerous," "exceedingly great," "innumerable," and "as the sands of the sea" impress more than inform. For example, nowhere in the text is it explained how many Lamanites constitute a multitude. These terms probably meant different things to different authors, and they may have varied according to context as well.

The text does provide sufficient details to allow us to gain some feel for population levels at various points in time. As will be seen, there are several specific reports as to numbers of military combatants and casualties. Arguably, these data may be skewed by the loyalties of the authors who may have exaggerated enemy numbers, both as defeated adversaries and as threatening opponents. However, where such numbers as 12,532 are used, it seems unlikely that they were arbitrarily chosen as a suitably large figure. This degree of precision appears to signify an actual count rather than a wild guess or inflated propaganda ploy. Thus I will treat these specific numbers as substantially accurate and use them as a frame of reference in interpreting less precise terms. And although there are gaps in the scriptural record, we have enough "snapshots" of the numbers at different times and places to permit reasonable extrapolation and interpolation.

It is important to begin with an estimate of the number of original ocean voyagers who, according to LDS tradition, were the literal ancestors of all subsequent Book of Mormon peoples and, for some, all present day Native Americans. The scriptures mention two pioneering groups as forerunners of the Nephite and Lamanite nations: the peoples of Lehi and Mulek. I do not include the Jaredites because of their total extinction (except for Coriantumr) and lack of contribution to the Nephite-Lamanite colonizations (Ether 15:12-34).

When Lehi's group set sail from the Old World in about 591 B.C., his group consisted of the following men: Lehi; his sons Laman, Lemuel, Sam, Nephi, Jacob, and Joseph; Zoram; and

the two unnamed sons of Ishmael (1 Nephi 7:6; 16:7). Ishmael himself died before they began their ocean voyage (16:34). In accordance with the Book of Mormon practice of female anonymity, we know the name of only one of the seafaring women: Lehi's wife Sariah (1 Nephi 2:5). But we are told that Ishmael's five daughters also made the trip, having become wives of Laman, Lemuel, Sam, Nephi, and Zoram. Ishmael's wife and the families of Ishmael's two sons, as well as Nephi's "sisters," also are mentioned as part of Lehi's band (1 Nephi 18:9; 2 Nephi 5:6).

Of this group, some were relatively old with grown children of their own (Lehi, Sariah, and Ishmael's wife). Others (at least Jacob and Joseph) were born "in the wilderness" following Lehi's exodus from Jerusalem but prior to their ocean voyage and thus were very young (1 Nephi 18: 7, 19; 2 Nephi 2:1; 3:1, 25). Also, there were apparently other small children, such as the "family" or children of the sons of Ishmael and the children of Laman and Lemuel (1 Nephi 7:6; 2 Nephi 4:3, 8-9).

It is unlikely that there were other passengers on Lehi's vessel. Jacob, Joseph, and other children were too young to have wives. And if Nephi's sisters had husbands, they probably would have been named or at least noted, but there is no such mention of them.

Therefore, Lehi's group apparently consisted of nineteen adults, plus Nephi's sisters. However, because this essay is concerned with population growth, it is significant that Nephi's sisters had no mates, at least not until boys from the families of Ishmael's sons or their own nephews (sons of Laman, Lemuel, Sam, or Nephi) grew to maturity. Similarly, Jacob and Joseph could not have had spouses until their nieces or the daughters of Ishmael's sons reached marriage age. It is also important that Lehi, Sariah, and Ishmael's wife were elderly or spouseless or both, and therefore no longer reproductive. Thus we are told of only fourteen emigrants who were reproductive at the time of their arrival in the New World: Laman, Lemuel, Sam, Nephi, Zoram, the two sons of Ishmael, and the wives of each.

When these colonists divided into two main groups, the Nephites included Nephi, Zoram, and Sam, and the families of each, plus young Jacob and Joseph, Nephi's sisters, and "all those who would go with [Nephi]" (never named) (2 Nephi 5:6-9; Alma 3:6). The Lamanites were Laman, Lemuel, Ishmael's sons, and the families of each, as well as later dissenters from the Nephites (2 Nephi 4:13; Alma 3:7; 43:13; 47:35).

We have little information on Mulek's colonists. They left Jerusalem a few years after Lehi's group, when Zedekiah was taken captive, and eventually became "very numerous" before joining the Nephites (Omni 1:14-19; Mosiah 25:12-13). The

only specific population information concerns their numbers in 120 B.C. At that time the Mulekites reportedly outnumbered the Nephites, but both groups combined totalled less than half the size of the Lamanite population (Mosiah 25:2-3).

Although Mulek's group began multiplying in the New World shortly after Lehi's, both events may be considered effectively simultaneous. Then, if we assume a roughly equal reproductive rate for the Mulek and Lehi populations, the size of Mulek's original reproductively capable group must have been less than half that of Lehi's emigrants, given the above information from Mosiah 25:2-3. Therefore if there were fourteen initially reproductive members of Lehi's group, there were fewer than seven in Mulek's. There may have been additional voyagers, as with the elderly, unmarried, and young children of Lehi's band, but only fewer than seven were then capable of producing offspring.

From these two small clusters of pioneering emigrants came the population growth which resulted in the Nephite and Lamanite nations. That story comprises much of the Book of Mormon. However, for ease of reference, I have condensed the pertinent population-related information into table 1.

Nowhere in the Book of Mormon is a complete census reported; there are accounts of certain numbers of converts being baptized or warriors dying or people emigrating, but no figures on total population sizes. In order to approximate such data, we need to use a conversion factor to relate known but partial numbers to the population of the entire group. Book of Mormon scholar John L. Sorenson has performed this type of analysis, concluding,

Our first numerical data come at about 90 B.C. from the battle in which Amlicite dissenters suffered 12,532 slain and the loyal Nephites 6,562 (Alma 2:19). All these people were "Nephites," politically speaking; the account does not talk about Lamanites at all. It is reasonable that not over half the combatants were slain, which means that at least 40,000 warriors were involved, and perhaps somewhat more. Various studies of ancient warfare suggest how to translate that figure to total population. The ratio usually believed to apply is one soldier to about five total inhabitants. Using that figure, we may conclude that the total population of those "who were called Nephites" was 200,000 or more.<sup>1</sup>

Coupling this information with the contemporary report (Mosiah 25:2-3) that the total number of Nephites was less than half the size of the Lamanite population at that time, Sorenson estimated the Lamanite population at over 400,000 as of 90 B.C. He also found circumstantial evidence supporting that figure:

The carrying capacity of the entire world for a hunting/gathering way of life is only about five million people.

A decade after the Amlicite conflict we get still more data. Alma 28:2 says that "tens of thousands of Lamanites were slain and scattered abroad." The writer had not used the expression "tens of thousands" when the nearly 20,000 Amlicites and Nephites had been slain, so the term here must mean many more than that—at least 30,000 Lamanite dead. An attacking army on the order of 75,000 or more seems called for. The usual ratio of 1:5 yields a figure of 375,000 for the total population . . . but that figure is probably too low. (The Lamanites were operating hundreds of miles from home, which leads to the conclusion that somewhat fewer than one out of five were mobilized. It would take more people at home to support them on a lengthy expedition such as the geography suggests for this case.) If the ratio of one in six is used instead, the total Lamanite population from which the force had been drawn would be on the order of 450,000.<sup>2</sup>

According to Sorenson, despite the lack of more detailed information and the possibility that Nephite estimates of enemy casualties might be inflated, "the size of the Nephite and Lamanite populations we have calculated is probably of the correct order of magnitude." Although it is impossible to verify directly Sorenson's warrior/civilian ratio for Book of Mormon populations, it is true that substantial numbers of people were noncombatants. For example, Moroni complained to Pahoran that the army was being neglected while the people back home "are surrounded with thousands of those, yea, and tens of thousands, who do also sit in idleness, while there are thousands round about in the borders of the land who are falling by the sword" (Alma 60:22). And Zeniff, while sequestering the women and children safely beyond the field of battle, sought reinforcements among old men and young men who were otherwise non-warriors (Mosiah 10:9). LDS church president Spencer W. Kimball seemed to recognize the principle that noncombatants outnumber actual warriors when he wrote, "The Lamanite population of the Americas, at the greatest number, must have run into many millions, for in certain periods of Book of Mormon history, wars continued almost unabated and the soil was covered with the bodies of the slain."<sup>3</sup>

Sorenson's formula may actually underestimate the number of civilians necessary to support an ancient army. Even in modern times, the ratio of noncombatants to combatants has usually been much higher than 4 or 5 to 1:

It is essential to realize that in these [historical] examples, nothing approaching the present-day situation arose, where 10 per cent of a national population might often be on active service in a war. In

Until the Industrial Revolution, human population was increasing at a rate dwarfed by modern figures.

Serbia in the First World War, as many as a quarter of the population may have joined the armed forces . . . [In ancient times] it was not possible to absent large numbers of people from agricultural work.<sup>4</sup>

Therefore, it is likely that far more than four or five civilians were needed to support a single warrior during an ancient campaign of more than a very short duration.

If we apply Sorenson's ratio to other military data, we can determine an approximate total population size for other periods in the Book of Mormon era as well. For instance, in 187 B.C., 3,043 Lamanites and 279 of Zeniff's people were killed in just one day and night of combat. Certainly plenty of Lamanites were left alive after this slaughter, because a "numerous host" of them was mentioned a decade or so later (Mosiah 9:18; 10:8, 20). Even if half the Lamanite army died in that one day in 187 B.C., Sorenson's 1:5 multiplier yields a total Lamanite population of 30,430. If the Nephite total were somewhat less than half that figure, as it was sixty-seven years later (Mosiah 25:2-3), then 10,000 to 15,000 Nephites were alive in 187 B.C.

The reader may make similar calculations for other points in time by referring to the population information above. Various combinations of casualties, reinforcements, and civilian noncombatants may be pieced together, along with an appropriate multiplier, to estimate total populace at several stages in Book of Mormon history. For the present, however, we have sufficient working information to place these data in perspective. To do so, we must first discuss humankind's numbers throughout history and the factors that influence population growth rates.

#### HUMAN POPULATION GROWTH THROUGHOUT HISTORY

IT is sometimes difficult for people in the twentieth century to comprehend the profound and fundamental changes that have occurred recently in human history. Such myopia is understandable, given that most of us have never known a world without, for example, penicillin, safe drinking water, antiseptic surgery, and readily available food. But unless we disabuse ourselves of the assumption that things have always been this way, we cannot appreciate the multiple revolutions that have coalesced to produce our modern world.

If we imagine a world without agriculture and domesticated animals, a world in which we depend on our ability to find, track, hunt, and kill wild game on a frequent basis and to scrounge sufficient edible vegetable matter, we can gain some insight into the precarious existence that confronted humanity before the Agricultural Revolution.<sup>5</sup> Before approximately 8000 B.C., humans struggled to eke out a subsistence level of

nutrients as hunters and gatherers. Such a migratory, unpredictable, catch-as-catch-can society requires a large amount of space per person, approximately one-to-two square miles per human being. To illustrate this, the carrying capacity of the entire world for a hunting/gathering way of life is only about five million people.<sup>6</sup>

Population growth during this pre-agricultural period was virtually nonexistent, roughly .001 percent per year or less.<sup>7</sup> Starvation and severe malnutrition were the rule rather than the exception. Cities were out of the question; people roamed

in small bands to follow the food supply. Stability was found only in death.

It should be evident that our hunting/gathering ancestors had no reliable medicines, no inoculations, no climate control, no rapid transportation, and no modern hygiene. Infant mortality was extremely high, and life for those who survived infancy was difficult, dirty, and short. The earth's population increased only with glacier-like slowness through all but the last 1 or 2 percent of humankind's existence on this planet.

With the advent of the Agricultural Revolution, people in

TABLE 1

Dates	Events	Dates	Events
588-70 B.C.	Nephites began to multiply (2 Nephi 5:13).		
560	Nephite-Lamanite wars already 40 years after leaving Jerusalem (2 Nephi 5:34).		27, 35); too many Nephite men, women, children killed to number (3:1-2); another Lamanite and numerous Nephite army not many days later, many Lamanites slain (vv. 20-23); thousands and tens of thousands slain in one year (vv. 25-26).
544-42	Nephite multitude gather together (Jacob 7:17); continual Nephite-Lamanite wars (Enos 1:20-24).		
399	Nephites multiply exceedingly and wax strong (Jarom 1:5, 8); Lamanites exceedingly more numerous than Nephites (Jarom 1:6).	85	3,500 Nephites baptized in one year (Alma 4:5).
323	Nephites have had many serious wars (Omni 1:3).	81	Lamanites slay all inhabitants of great city of Ammonihah (Alma 16:9-11).
279-130	Mulekites exceedingly numerous, have many wars (Omni 1:14-19).	90-77	Thousands of Lamanites, many cities, brought to believe (Alma 23:5, 9-13); Lamanites kill 1,005 (24:22); more than 1,000 Lamanites saved (vv. 26-27); many thousands saved (26:4, 13).
187	Numerous hosts of Lamanites (Mosiah 9:14); 3,043 Lamanites, 279 of Zeniff's people slain in one day and night (v. 18).	76	Tens of thousands of Lamanites slain and scattered, plus many Nephites in largest battle since left Jerusalem (Alma 28:2-3); many thousands mourn (vv. 10-12); many thousands killed during 15 years of war (vv. 10-11); too many killed to number (30:1-2).
178-60	Numerous hosts of Lamanites (Mosiah 10:8); so many Lamanites killed they did not number them (v. 20).	74	Alma speaks to 2 multitudes of Nephites (Alma 32:4, 7); thousands of Lamanites at war (43:5); Priests of Noah's descendants almost as numerous as Nephites (vv. 13-14); Lamanites more than double Nephites, enemies much more numerous (vv. 21, 51).
145-22	Lamanites slay many Limhi people (Mosiah 21:8); Limhi people suffer much loss (vv. 11-12); many still left alive (v. 17).	73	Many thousand Nephites and Lamanites converted (Alma 37:9-10, 19); Nephite, Lamanite dead exceedingly great, too many to number (44:20-22).
130	King Benjamin's army kill many thousands of Lamanites (Words of Mormon 1:13-14).	72	Numerous host of Lamanites (Alma 48:3; 49:6); more than 1,000 Lamanites slain (49:23).
124	Great multitude of King Benjamin's people, too many to number, because they had multiplied exceedingly and waxed strong (Mosiah 2:2, 7-8).	71	Many Nephite cities (Alma 50:13-15); thousands of wicked Nephites in bondage or perish (v. 22); Nephites multiply and wax strong (v. 18).
121	Lamanites too numerous to fight against (Mosiah 22:2); multitude of Limhi people (8:4).	67	Lamanite army wonderfully great despite many thousands slain (Alma 51:11); 4,000 Nephite dissenters killed (v. 19); Lamanite's numerous hosts take many cities, slay many Nephites (vv. 26-30).
120	Mulekites more numerous than Nephites, but Mulekites and Nephites together are less than half as numerous as Lamanites (Mosiah 25:2-3).		
100-92	Nephites very numerous, scattered everywhere (Mosiah 27:6).		
87	12,532 Amlicites, 6,562 Nephites slain (Alma 2:17-19); numerous host of Lamanites (v. 24); Lamanites and Amlicites almost as numerous as the sands of the sea, too numerous to number (vv.		

effect increased the earth's carrying capacity, enabling it to support more humans. Agriculture was basically unknown prior to about 8,000 B.C.; before this, all human groups survived by hunting and gathering.<sup>8</sup> Even after the emergence of agriculture, food production was still primitive by modern standards and prone to suffer from low productivity and frequent failure, but at least there was some degree of organization and dependability in the food supply.<sup>9</sup> It was no longer necessary to rely totally on the vagaries of the hunt; some animals were kept in herds, and some crude cultivation

of low-yielding crops was practiced. Pesticides, preservatives, genetically selective breeding of plants/animals, effective irrigation, and fertilizers were thousands of years into the future or in their infancy, but it was still an improvement over a scavenger subsistence. For the first time, "some members of early agricultural communities were able to turn entirely to other activities, all of which helped to raise the general standard of life."<sup>10</sup>

Agriculture enabled people to found and maintain farming villages and eventually cities. The increased availability and

<i>Dates</i>	<i>Events</i>	<i>Dates</i>	<i>Events</i>
66-64	Enormity of Lamanite numbers (Alma 52:5, 12); Moroni sends large number of men (v. 7); much bloodshed, more taken prisoner than slain (vv. 35, 40).		Lamanites exceedingly more numerous than Nephites (v. 25).
65	10,000 Nephite reinforcements, plus wives and children (Alma 56:28).	30	8,000 Lamanites baptized (Helaman 5:19).
64	2,000 stripling warriors (Alma 53:18)	28	Nephites and Lamanites multiply and wax exceedingly strong (Helaman 6:12).
63	Additional 6,060 Nephite men (Alma 57:6); enormity of Nephite numbers (v. 13); 2,000 Lamanites killed, many prisoners (vv. 13-14); 1,000 Nephites slain (v. 26); 2,000 more Nephites arrive guarding food (58:7-8); Lamanites' numerous hosts in army (vv. 8, 15, 18).	23-20	Many great Nephite cities (Helaman 7:22; 8:5-6).
66-62	Vast number of Nephites slain (Alma 56:10); Lamanites take many cities (vv. 13-15); great slaughter of people of Nephihah (59:7-8); numerous Lamanite armies (vv. 7-8); thousands of Nephites killed (60:5, 7); tens of thousands of Nephites not in army (v. 22).	21	Nephi goes from multitude to multitude (Helaman 10:17).
61	6,000 Nephite men join Helaman, 6,000 join Lehi and Teancum (Alma 62:12-13); many Lamanites slain, but 4,000 not slain (vv. 15, 17); greatness of Nephite numbers (v. 19).	17	Thousands of Lamanites and Nephites die in famine (Helaman 11:6).
60	Nephites multiply and wax exceedingly strong (Alma 62:48); great slaughter of Lamanites (v. 38).	16	Nephites multiply, spread, and cover face of the land (Helaman 11:20).
55	5,400 Nephite men, with their wives and children, emigrate North; many others die trying (Alma 63:4-10); numerous Lamanite army, great loss of Lamanites (v. 15).	11	Numerous robbers war with Nephites and Lamanites (Helaman 11:30-32).
51	Numerous Lamanite army (Helaman 1:14, 19); great slaughter of Nephite people and Lamanites (vv. 27, 30).	A.D. 1	Robbers slaughter many (3 Nephi 1:27).
46	Exceedingly great many Nephites and people of Ammon emigrate North (Helaman 3:3-5, 12).	15	Numerous robbers slay many, cause much death and carnage (3 Nephi 2:11-13).
43	Tens of thousands baptized into church (Helaman 3:24-26).	17	Nephites march by the thousands and tens of thousands to fight robbers (3 Nephi 3:22, 24).
38-30	Long war, numerous Lamanite army, great slaughter of Nephites (Helaman 4:1-11, 16-20);	19-21	Robbers slain by thousands and tens of thousands, in largest slaughter ever (3 Nephi 4:11, 21, 24); many thousands become prisoners (v. 27).
		34	Many slain as 16 cities destroyed (3 Nephi 8:8-10, 14-15; 9:3-10; 10:13); great multitude still left alive (11:1; 17:1, 5, 9-10, 12-13, 15, 18, 21, 23, 25); 2,500 people see and hear Savior (17:25).
		36-60	People of Nephi multiply exceedingly fast (4 Nephi 1:10).
		322	Nephite army of over 30,000 (Mormon 1:11).
		331	Nephite army of 42,000; Lamanite army of 44,000 (Mormon 2:9).
		346	Nephite army of 30,000; Lamanite army of 50,000 (Mormon 2:25).
		364-75	Thousands slain on both sides (Mormon 4:9).
		385	230,000 Nephite warriors killed (Mormon 6:10-15); greatness of Lamanite numbers (v. 8).

constancy of food and stability in lifestyle resulted in a greatly increased population growth rate. By the time of Jesus, world population had risen to 200-400 million, with an estimated annual growth rate of .04 percent.<sup>11</sup> Although an infinitesimal growth rate by modern standards, it represented a forty-fold leap from the hunting/gathering era.

Unfortunately, the lack of a reliable food source was only one of the problems holding down the population; moreover, the dawn of urban existence brought with it a whole array of new threats to human life. Increased association with herding animals introduced new diseases such as anthrax, tuberculosis, and brucellosis, and the concentration of more people into less space facilitated the spread of disease. Disposal of waste became a serious problem, as did transportation of food to the urban areas.<sup>12</sup> Life expectancy was still fairly short, about 30-40 years, and infant mortality was still very high. Famines and outbreaks of disease, when they occurred, were apt to be devastating, because modern checks against these potential killers were still many years away. Cities were filthy agglomerations of people and beasts.

The evidence of narrow streets and small rooms in houses huddled within the compass of defensible walls tells us that crowding in ancient cities was extreme. Garbage accumulated in the houses, where the dirt floors were continually being raised by the debris, and human wastes were rarely carried further than the nearest street. The water supply, from wells, rivers, and canals, was likely to be polluted. Life expectancy was short, due in part to the high infant mortality. Flies, rodents, and cockroaches were constant pests. Even air pollution was not absent. In addition to dust and offensive odors, the atmosphere was filled with smoke on calm days. Even today, in large preindustrial cities such as Calcutta the smoke of thousands of cooking fires, in addition to other human activities, produces a definite pall of smoke and dust which seldom dissipates for long. Under these unhealthy conditions, the death rate must have been high in Mesopotamian cities.<sup>13</sup>

During the thousands of years between the Agricultural Revolution and the next great change in human development, the Industrial Revolution, global population levels inched gradually upward. From about five million during the hunting/gathering era, the population grew to 200-400 million in A.D. 1, and continued to rise until it reached about 470-545 million in A.D. 1650.<sup>14</sup> If this increase in global population is plotted on a graph versus time, the curve is virtually flat for the vast majority of humankind's existence, with a very slight,

almost imperceptible upward slant. However, it would be wrong to assume that the population everywhere was growing at the same rate for all those millennia. Where conditions such as absence of famine, disease, and war were especially favorable, human numbers increased at a faster rate than the global average. Conversely, areas disproportionately stricken with natural disasters, pestilence, famine, plague, or war suffered a loss of population or experienced a much slower growth rate. Thus the average global growth rate subsumed substantial local variation within its smooth, sluggish slope.

The year A.D. 1650 is often used as the beginning of the modern era and the birth of the Industrial Revolution. It is important to remember that until that time, human population was increasing at a rate dwarfed by modern figures; at .04 percent annually, it took over 1,500 years for the world's population to double.<sup>15</sup> The Agricultural Revolution had greatly enhanced humankind's growth rate from that of the hunting/gathering period, but the rate was still negligible by today's standards. This is logical when one considers the dearth of preventive medicine, antiseptic surgery, antibiotics, proper sanitation and hygiene, pesticides, and other modern advances that have made current growth rates possible. Even during the glory days of the great civilizations in Rome, Egypt, and Greece, life

was precarious, tentative, and brief.

The Industrial Revolution comprised an interrelated group of revolutions causing an unprecedented, prolonged, and tremendous surge in world population and growth rates. Revolutions in medicine, energy production, transportation, food production/preservation/distribution, communication, and information all hitched rides from one another to lift humanity to a level previously only dreamed of even in the palace of Caesar. The nature, cause, spread, and treatment of disease was discovered and infant mortality began to fall; for the first time, people could have a fair chance of living out their biblically allotted three-score and ten years. With longer life expectancies, more people lived up to and through their reproductive years. The advent of preventive and curative medicine not only reduced mortality rates but made life more enjoyable, hopeful, and productive for more people than ever before. One expert summarized the factors causing this dramatic population growth:

1. Increased productivity ushered in by the agricultural, commercial, and industrial revolutions resulting in higher levels of living--including better nutrition, better living conditions, and better health.
2. The emergence of national governments with the elimination of internecine warfare and the emergence of national markets which permitted a more equitable

The large numbers of Book of Mormon peoples could not have been produced from the tiny Lehi-Mulek colonizing groups.

distribution of the nation's product. 3. Improvements in environmental sanitation and personal hygiene, resulting in uncontaminated food and potable water and a decrease in the probability of infection and contagion. 4. The natural disappearance of some of the agents of disease and death; for example, scarlet fever. 5. The development of modern medicine, climaxed by chemotherapy and the availability of pesticides.<sup>16</sup>

Table 2 illustrates various estimates of global annual growth rates and population sizes during these eras. These increases from the .04 percent annual growth rate of the pre-Industrial period to .4 and higher beginning in the Industrial age were primarily the result of decreased mortality, not increased birth rate.<sup>17</sup> Basically, people continued to reproduce at the same rate as before, at least for a time, but more of their offspring survived to have children of their own. These soaring growth rates translated into an "explosive" world population. In fact, during the second half of the twentieth century, "there could be a greater increase in world population than was achieved in all the millennia of human existence up to the present time."<sup>18</sup> The six-fold increase during the 310 years from 1650 to 1960 "is a phenomenal achievement, which stands in sharp contrast to the situation that must have existed during the many thousands of years of man's existence on the earth before this time . . . In other words, the rapid increase in the world's population began only recently."<sup>19</sup>

Again, these global figures mask local and regional differences, but these differences are not random; they are the predictable result of the operation of "unique combinations of local conditions."<sup>20</sup> Especially significant is the fact that greatly accelerated, explosive population growth, the "Vital Revolution," first occurred among nations first experiencing modernization, and did not reach significant proportions among the peoples of Asia, Africa, and Latin America (which constitute two-thirds of humankind) until after World War II.<sup>21</sup> It was only then that the so-called underdeveloped countries received, virtually instantaneously, the medical advances that had been evolving in the rest of the world. Most significant were inoculation for infectious diseases, reduction of malaria through DDT spraying, and the cure of infectious disease through antibiotics.<sup>22</sup> Essentially, people in underdeveloped countries continued to maintain the high birth rate of an agrarian society, while suddenly enjoying the low death rate of the industrialized world. This "death control" produced "the most rapid, widespread change known in the history of population dynamics."<sup>23</sup>

This change can be seen by comparing annual growth rates

for industrialized and developing regions. From 1750 to 1920, the industrialized regions as a group had far greater growth rates, as mortality rates declined and birth rates remained high, but beginning in the 1920s and increasing after 1940, the developing regions outpaced the industrialized areas. For example, from 1940 to 1950 and from 1950 to 1960, industrialized regions grew at .35 percent and 1.26 percent annually, respectively, while developing regions expanded at 1.44 percent and 2.07 percent. Prior to 1920, developing regions never had an annual growth rate in excess of .52 percent, while industrialized regions reached peaks of 1.05 percent from 1850 to 1900 and 1.26 percent from 1950 to 1960.<sup>24</sup>

One researcher, considering the trends described here, reached "some indisputable, significant conclusions: 1. Contemporary population growth rates could not possibly have obtained for any long period in the past. 2. Contemporary population growth rates cannot possibly persist for long into the future."<sup>25</sup> Another wrote:

Where formerly less than half of all children grew to maturity, today, in the advanced countries, nine-tenths reach voting age. But the rate of population growth, which in the past only under very exceptional circumstances ever rose to 2 percent a year (on rare occasions 3 percent for short periods), has now

reached the point where these percentages have become the norm for entire continents. At these rates of increase in regions such as tropical Latin America, i.e. at three percent a year or better, we could create enough human protoplasm to cover the surface of the earth in no more than three centuries.<sup>26</sup>

I have mentioned the large differences in growth rate that may exist not only between industrialized and developing regions, but between continents within each region and among nations and sub-nations within each continent, at least short-term. Some of these differences reflect differential rates of migration. When examining population growth rates it is important to know whether the rates reflect the rate of natural increase (which includes birth and death rates but excludes migration rates) or the overall growth rate (which includes migration rates). For example, the phenomenal growth rates reported for North America after 1750 are due in large part to the swarms of immigrants (voluntary or otherwise) arriving from Europe, Africa, and Asia. The population of North America grew at 3.65 percent annually from 1750 to 1800, while the global population increased at only .50 percent, and Africa actually shrank at .06 percent. An understanding of the applicable rates of immigration and emigration is the key to proper evaluation of such data.<sup>27</sup> Indeed, industrialized nations in their entire history have rarely exceeded a natural

There is evidence that the Book of Mormon peoples had a low rate of growth. In addition to the hunting/gathering Lamanite culture, there is another powerful population retardant that was virtually omnipresent: War.

growth rate of 1 percent annually, even in North America.<sup>28</sup>

It is also important to realize that high rates of natural increase have never persisted for more than a century or two. It is well known that, after the huge increase in growth rate spurred by the Industrial Revolution, the more developed nations experienced a "demographic transition" to a lower birth rate and a lower death rate, thereby stabilizing their populations.<sup>29</sup> With more infants surviving to maturity, it was no longer necessary to bear so many children in order to perpetuate the family. Also, the more industrialized and less rural the society, the greater the tendency for children to be economic drains rather than economic assets to the family. Instead of being additional field hands, they are simply more mouths to feed, clothe, house, and educate. Over time, developed regions thus transitioned from high birth rates and high death rates to high birth rates and low death rates, and finally to low birth rates and low death rates. Thus far, the underdeveloped regions have not undergone this transition, still maintaining their former agrarian birth rates, but this cannot long continue without causing economic collapse.

It is true that much of the data on population sizes and growth rates are only estimates, particularly for the periods prior to A.D. 1650.<sup>30</sup> Even today, census information is patchy

or of questionable accuracy in some parts of the world; centuries ago, the situation was far more uncertain. Historical demographers have devoted much time and effort to piecing together evidence from many sources to arrive at reasonable approximations for various times and places, but we can never know with absolute certitude what the actual figures were. Consider the following:

Our picture of world population in the past has been built up like a gigantic jigsaw puzzle, there is no one piece or source of evidence which tells us [the answer.] . . . Apart from the buried record and experimental results, evidence from comparable contemporary source is readily available from people living in Stone Age cultures in New Guinea, Australia, and elsewhere. Australian Aboriginals, insofar as they have not been affected by the dominant European culture, have found that their harsh environment, without the assistance of agriculture, will support about two-and-a-half persons to the square mile . . . Agricultural scientists can show what yields there will be from different sorts of crops in different environments and climates and thereby give a good indication of how much food is available. Physiologists and nutri-

TABLE 2  
AVERAGE PERCENT ANNUAL GLOBAL GROWTH RATES  
(according to source)

Date (A.D.)	U.N. <sup>14</sup>	Smith <sup>6</sup> ; Ehrlich <sup>7</sup>	Hauser <sup>16</sup>	Bogue <sup>9</sup>
1650-1750	.4	.3	.3	.34
1750-1800	.4	} .5	—	.50
1800-50	.5		.6	.43
1850-1900	.5	} .8	—	.68
1900-10	} .8		—	} .65
1910-20			—	
1920-30			—	1.07
1930-40	} .8	} .8	1.0	1.11
1940-50			—	1.10
1950-60	1.8	} 1.8	—	1.83
1960-	2.0		2.0	—

WORLD POPULATION

Date	Population (in millions)	Date	Population (in millions)
7,000-6,000 B.C.	5 - 10	1850	1,128 - 1,402
AD 1	200 - 400	1900	1,550 - 1,762
1650	470 - 545	1950	2,486
1750	629 - 961	1960	2,982
1800	813 - 1,125	1965	3,289



tionists can provide evidence on the needs of people of different body weights doing various amounts of work in different temperatures and humidities . . . The really important thing to remember about earlier populations is that simply huge errors in measuring and describing them are of very little significance in the light of what has happened since the middle of the seventeenth century--a time when our studies of population and society were beginning to be more reliable.<sup>31</sup>

This does not mean that the estimates are wildly inaccurate; they are of the correct order of magnitude and are within reasonable error limits. "Population data prior to the modern era are admittedly speculative. But they provide a reasonably sound perspective and permit a very firm conclusion: Whatever his precise numbers may have been, during his habitation of this planet man has experienced a great increase in his rate of growth."<sup>32</sup> In addressing the postulate that world population might have been much higher long ago, only to decrease prior to the modern era, one authority made the following points:

[T]he combined evidence from paleontology, from the geographical distribution of plants and animals, from ecology and particularly plant ecology, from archaeology, from prehistory, and from history, masses such weight against [the postulate] as to be practically conclusive. In short, all the relevant evidence seems to indicate that there were as many (or more) human beings living on the face of the earth in 1630 as there ever had been at any prior time . . . Most particularly to be counted against [the aforementioned theory] is the fact that until recent times man's culture was not of the sort to make possible the existence of large populations on the earth. Hunting, pastoral, and primitive cultures are not compatible with large total populations . . . because high densities cannot be supported at these cultural levels or stages . . . So then we are left with . . . a very slow and irregular time rate of growth of world population over a very long time prior to the Middle Ages . . . followed by a relatively tremendous spurt of growth not yet ended.<sup>33</sup>

Therefore, the evidence indicates that the basic trends described above are accurate to the extent the recognized scientific authorities in the field are capable of determining this. Based, then, on our knowledge of the time and place in which a people lived, the type of society they had, their degree of exposure to disease, famine, and war, and their level of technological advancement, we are prepared to estimate their growth rate with a reasonable degree of precision.

The excision from the gene pool of almost 20,000 men would have been felt long into the future in terms of a greatly reduced growth rate.

#### POPULATION PROJECTIONS FOR THE NEPHITE-LAMANITE PEOPLES

MATHEMATICAL models can simulate the population growth of a human community based on a given percent annual growth rate. Populations grow in the way that money grows in a bank account when interest is compounded; just as the interest dollars themselves earn interest, so people added to populations reproduce and add more people.<sup>34</sup> However, although simplifying approximations are feasible, it is most accurate to consider human "interest rates" to be compounded continuously, rather than annually, semi-annually, or quarterly. This is because people in any given group are born and reproduce more or less continually throughout the year.

The formula for computing the growth of human populations may be written as follows:<sup>35</sup>

$$N_2 = (N_1) (e^{rt})$$

Where  $N_1$  = the number of (reproductive) people initially

$N_2$  = the number of people after  $t$  years

$e$  = the base of natural logarithms, approximately 2.718

$r$  = the growth rate per year, expressed as a decimal, where  $100r$  = the growth rate as a percent

$t$  = the number of years elapsed between the initial measuring time and the final measuring time

This formula assumes that all people in the initial population are then capable of reproducing. It further assumes that there are no internal restrictions to mating with any other member of the population. If a given population forbids or restricts marriage with close relatives, then the growth of the population will be slower than indicated by the formula. As an aside, the approximate doubling time for a population may be obtained by dividing 69.31 years by the growth rate (in percent).

I computed the Nephite-Lamanite population sizes in table 3 using this formula. As an example of how to read the data, assume you want to know the population size fifty years after arrival, given an annual growth rate of 1.0 percent. Find 50 in the left hand "Years Elapsed" column; you will see this corresponds to 540 B.C. Then follow this line to the 1.0 percent annual growth rate column for the answer: 49 people. For  $N_1$ , the initial population size, I used thirty people for the combined reproductively capable populations of Lehi's and Mulek's colonizing groups. As discussed earlier, a figure of twenty or so would be more in line with the information from the scriptures, but I chose thirty so as to allow for the slight possibility that there were more people in these groups than is

apparent from the Book of Mormon text. Thus the population sizes in table 3 are probably too large. Readers wishing to convert any of the data in these tables to reflect a different initial population size may easily do so.<sup>36</sup>

The numbers in the table are also slightly higher than they should be because Mulek's group did not arrive in the New World until several years after the Lehi contingent, and thus got a late start. However, in the interest of simplicity, I assume Mulek's group began reproducing in the New World in the year 590 B.C., just as did Lehi's.

I selected the various percent annual growth rates for several reasons. I chose .04 percent because it is the approximate growth rate prevailing in the world between the Agricultural Revolution (about 8,000 years B.C.) and the Industrial Revolution (around A.D. 1650). Thus it represents the average annual global rate of natural increase during the actual period in which the Nephite-Lamanite population was reproducing. All other growth rates in table 3 are rates from the modern world. From A.D. 1750 to 1850, the world average was about .5 percent, more than ten times greater than the pre-industrial rate. The remainder of the rates, from .9 percent to 2 percent, are rates known only in very recent history, primarily in the post-World War II era. They are included here

to illustrate the difference between late-twentieth-century rates of population increase and the rates for all the preceding years of human history.

Finally, the population figures in table 3 represent the total reproductive-age number of all Book of Mormon peoples during the years indicated. Nephites, Lamanites, Mulekites, and all other "-ites" are combined, again for sake of convenience, because they are all assumed to have descended from the Lehi and Mulek pioneers. I assume an equal rate of natural increase for all groups, although there were significant differences in Nephite and Lamanite cultures and lifestyles for much of the period in question.

#### IMPLICATIONS

THE results contained in table 3 call for a reevaluation of our approach to the Book of Mormon. When these data are compared with the population information from table 1, and our knowledge of historical demography, it is apparent that the large numbers of Book of Mormon peoples could not have been produced from the tiny Lehi-Mulek colonizing groups. No growth rate even close to the rate of increase prevalent from 590 B.C. to A.D. 390 would have produced the population

TABLE 3  
TOTAL BOOK OF MORMON POPULATION SIZE

YEARS ELAPSED/ DATE	PERCENT ANNUAL GROWTH										
	0.04	0.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.8	2.0
10/580 B.C.	30	32	33	33	33	34	34	35	35	36	37
20/570	30	33	36	37	37	38	39	40	40	43	45
30/560	30	34	39	40	42	43	44	46	47	51	55
40/550	30	37	43	45	47	48	50	53	55	62	67
50/540	31	39	47	49	52	55	57	60	64	74	82
60/530	31	40	51	55	58	62	65	69	74	88	100
70/520	31	43	56	60	65	69	75	80	86	106	122
80/510	31	45	62	67	72	78	85	92	100	127	149
90/500	31	47	67	74	81	88	97	106	116	152	181
100/490	31	49	74	82	90	100	110	122	134	181	222
110/480	31	52	81	90	101	112	125	140	156	217	271
120/470	31	55	88	100	112	127	143	161	181	260	331
130/460	32	57	97	110	125	143	163	185	211	311	404
140/450	32	60	106	122	140	161	185	213	245	373	493
150/440	32	64	116	134	156	181	211	245	285	446	603
160/430	32	67	127	149	174	205	240	282	331	534	736
170/420	32	70	139	164	195	231	273	324	384	640	899
180/410	32	74	152	181	217	260	311	373	446	766	1,098
190/400	32	78	166	201	243	293	355	429	519	917	1,341
200/390	32	82	181	222	271	331	404	493	603	1,098	1,638
210/380	33	86	199	245	302	373	460	567	700	1,314	2,001
220/370	33	90	217	271	337	420	524	653	813	1,574	2,444
230/360	33	95	238	299	377	474	597	751	945	1,884	2,985
240/350	33	100	260	331	420	534	679	864	1,098	2,256	3,645
250/340	33	105	285	365	469	603	774	993	1,276	2,701	4,452
260/330	33	110	311	404	524	679	881	1,143	1,482	3,233	5,438
270/320	33	116	341	446	585	766	1,003	1,314	1,722	3,871	6,642
280/310	34	122	373	493	653	864	1,143	1,512	2,001	4,634	8,813
290/300	34	128	408	545	729	974	1,301	1,739	2,324	5,548	9,909
300/290	34	134	446	603	813	1,098	1,482	2,001	2,701	6,642	12,103

sizes described in the scriptures, even if there had been no wars.

Consider the battle in 187 B.C. in which 3,043 Lamanites and 279 of Zeniff's people were slain in a single day and night (Mosiah 9:18-19). Obviously the total Book of Mormon population at that time was much larger than 3,322 because numerous warriors were left alive, as well as women and male noncombatants. But even to produce a *total* population as large as the *casualty* figures for that one day would have required an average annual growth rate of 1.2 percent during the preceding four centuries. To put this in perspective, a growth rate of 1.2 percent was never achieved on a global basis or in the industrialized regions of the world as a whole until A.D. 1950-60, and was not reached in the developing regions as a whole until the 1930s. This rate is thirty times the rate that existed in the world as a whole during the Nephite-Lamanite era. Moreover if, as is far more likely, the total population in 187 B.C. was in excess of 35,000, it would have taken an average annual growth rate of 1.8 percent to multiply the original thirty pioneers to that level at that time. This is a rate that has never been reached in the industrialized world, and has only been achieved in the world overall since A.D. 1950.

Let us take as a second example the Amlicite-Nephite war of 87 B.C. Recall that Alma 2:17-19 reports a total of 19,094 fatalities, and that Sorenson estimated the total Nephite-Lamanite population to be over 600,000 at that time (about 200,000 Nephites-Amlicites and over 400,000 Lamanites). For an original band of thirty reproductive individuals in 590 B.C. to proliferate even to 19,094 by 87 B.C. would require an average annual growth rate of 1.3 percent, sustained over the span of five centuries. Furthermore, to reach the 600,000 level Sorenson determined to have existed at that point, the growth rate would have had to be 2 percent, again maintained for five centuries. This is a level never reached on a global scale until A.D. 1960, and fifty times the actual world rate of the pre-industrial epoch.

Less specific information from the scriptures also produces some startling results when viewed in the light of data from table 3. For example, the Nephites and Lamanites had already had wars against one another by 560 B.C. (2 Nephi 5:34). Even if the original colonists had been multiplying at the unheard-of rate of 2 percent annually, the total number of reproductive-age Nephite and Lamanite men and women alive in 560 B.C. would have been a mere fifty-five. If half of those

YEARS ELAPSED/ DATE	PERCENT ANNUAL GROWTH										
	0.04	0.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.8	2.0
310/280	34	141	488	666	908	1,238	1,688	2,301	3,138	7,952	14,782
320/270	34	149	534	736	1,014	1,396	1,922	2,647	3,645	9,520	18,055
330/260	34	156	585	813	1,131	1,574	2,189	3,045	4,235	11,398	22,053
340/250	34	164	640	899	1,263	1,774	2,493	3,502	4,921	13,646	26,935
350/240	35	173	700	993	1,410	2,001	2,839	4,029	5,717	16,337	32,899
360/230	35	181	766	1,098	1,574	2,256	3,233	4,634	6,642	19,559	40,183
370/220	35	191	838	1,213	1,757	2,543	3,682	5,330	7,717	23,417	49,080
380/210	35	201	917	1,341	1,961	2,868	4,193	6,132	8,966	28,035	59,946
390/200	35	211	1,003	1,482	2,189	3,233	4,775	7,053	10,417	33,564	73,218
400/190	35	222	1,098	1,638	2,444	3,645	5,438	8,113	12,103	40,183	89,429
410/180	35	233	1,201	1,810	2,728	4,110	6,193	9,332	14,062	48,108	109,229
420/170	35	245	1,314	2,001	3,045	4,634	7,053	10,734	16,337	57,595	133,412
430/160	36	258	1,438	2,211	3,399	5,225	8,032	12,347	18,981	68,954	162,950
440/150	36	271	1,574	2,444	3,794	5,891	9,147	14,203	22,053	82,553	199,027
450/140	36	285	1,722	2,701	4,235	6,642	10,417	16,337	25,622	98,834	243,093
460/130	36	299	1,884	2,985	4,728	7,489	11,863	18,792	29,768	118,326	296,914
470/120	36	315	2,062	3,298	5,277	8,444	13,510	21,616	34,586	141,662	362,651
480/110	36	331	2,256	3,645	5,891	9,520	15,386	24,865	40,183	169,600	442,943
490/100	36	348	2,468	4,029	6,576	10,734	17,522	28,601	46,686	203,048	541,012
500/90	37	365	2,701	4,452	7,341	12,103	19,954	32,899	54,241	243,093	660,794
510/80	37	384	2,955	4,921	8,194	13,646	22,724	37,843	63,019	291,035	807,096
520/70	37	404	3,233	5,438	9,147	15,386	25,879	43,530	73,218	348,432	985,789
530/60	37	425	3,538	6,010	10,211	17,347	29,472	50,071	85,067	417,148	1,204,045
540/50	37	446	3,871	6,642	11,398	19,559	33,564	57,595	98,834	499,417	1,470,624
550/40	37	469	4,235	7,341	12,723	22,053	38,223	66,250	114,829	597,911	1,796,224
560/30	38	493	4,634	8,113	14,203	24,865	43,530	76,206	133,412	715,830	2,193,913
570/20	38	519	5,071	8,966	15,854	28,035	49,573	87,658	155,003	857,004	2,679,652
580/10	38	545	5,548	9,909	17,698	31,609	56,455	100,831	180,087	1,026,020	3,272,934
590/A.D.	38	573	6,071	10,951	19,756	35,639	64,292	115,983	209,232	1,228,368	3,997,571
600/10	38	603	6,642	12,103	22,053	40,183	73,218	133,412	243,093	1,470,624	4,882,644
610/20	38	633	7,268	13,376	24,617	45,306	83,383	153,460	282,433	1,760,657	5,963,675
620/30	38	666	7,952	14,782	27,480	51,083	94,959	176,521	328,141	2,107,889	7,284,049
630/40	39	700	8,701	16,337	30,675	57,595	108,142	203,048	381,245	2,523,601	8,896,757
980/390	44	4,029	203,048	541,012	1,441,504	3,840,824	10,233,706	27,267,263	72,652,429	1,374,300,000	9,756,500,000

fifty-five people were women, and some of the males were too old, too young, or too infirm to fight, or were occupied with agriculture or other tasks, then the total number of combatants on both sides in these "wars" must have been fewer than twenty.

Similarly, between 588 and 570 B.C., Nephi and his people constructed a replica of Solomon's temple (2 Nephi 5:16). By 570 B.C., the total reproductive-age Nephite-Lamanite population would have been forty-five people, even at the A.D. 1960 growth rate of 2 percent. If about half of these were Nephites, then fewer than two dozen people—including people busy with farming or hunting, infirm persons and pregnant women—were available to build a structure that required large numbers of skilled workers and a great deal of time in the Old World.

It is interesting to note that if the Lehi-Mulek groups reproduced at the .04 percent average annual rate which prevailed in the world as a whole during their era, they would have numbered only forty-four individuals in A.D. 390, 980 years after they landed. As discussed earlier, population growth was, by modern standards, virtually nonexistent during those thousands of years between the invention of agriculture and the dawning of the industrial period. It took well over a thousand years for the world's population to double during that era. This is counter-intuitive to us who have known nothing but the population explosion during our lifetimes, but the evidence is clear; rapid population growth is a recent phenomenon.

Another way of viewing the same principle is to note what would have happened had the thirty people of Lehi-Mulek multiplied at 2 percent annually. Those thirty individuals would have exploded into 9,756,500,000 people by the time of the Nephites' destruction in A.D. 390—double the total population of the planet earth today. Such a rate of growth has only existed very recently, and only for very short spans of time; it cannot continue for long.

**C**OULD such a twentieth-century rate of growth have prevailed in the region inhabited by the Nephite-Lamanite peoples, while humans in the rest of the world were increasing at much slower rates? We know that there is substantial regional variation in growth rate today, and that such variation has existed throughout history. Since the global growth rate is an average, clearly some regions have a higher-than-average rate of increase while others lag behind or even decrease. Perhaps Book of Mormon peoples "multiplied exceedingly" at a rate thirty-to-fifty times the world average, so as to produce the enormous populations described in the scripture. There

are several ways in which such a supercharged growth rate might have been achieved.

First, the people may have been divinely spared from death due to disease, and thus achieved a reduction in mortality rates equivalent to that effectuated by modern preventive and curative medicine. Alma 9:22 speaks of the blessings the Nephites had received from the Lord, including being "saved from famine, and from sickness, and all manner of diseases of every kind." Alma 46:40-41 mentions "some who died with fevers, which at some seasons of the year were very frequent in the land," but indicates that others were preserved "because of the excellent qualities of the many plants and roots which God had prepared to remove the cause of diseases, to which men were subject by the nature of the climate." In fact, "there were many who died with old age."

However, this blessing is only specifically mentioned in reference to the Nephites, not the Lamanites. Also, as Alma 46:40 states, this blessing was not a panacea; some did die of fevers (see also Jacob 2:19; Alma 1:27,30; 3 Nephi 17:7-9; 7:22; 26:15; 4 Nephi 1:5). And although the blessing also states that they were saved from famine, there were several deadly famines during this era (see Mosiah 1:17; 9:3; Alma 53:7; 62:35, 39; Helaman 11:4-8, 12-15; 12:2-3). Thus, while there may have been some divine

intervention to spare the Nephites and Lamanites from destruction and "prolong their existence in the land," neither group was in any way spared the normal and natural consequences of living in the ancient world, where herbal remedies were their best hope and modern vaccines, antibiotics, and antiseptics were unknown.

A second possibility is that Book of Mormon peoples were extremely advanced, in essence a twentieth-century culture, complete with the myriad technological advances that have smoothed the path for modern growth rates. There is virtually no scriptural basis for this, however, other than the mention of "machinery" in Jarom 1:8. Still, it is possible that their technological innovations were so commonplace that they were not deemed worthy of mention.

There are problems with this theory, as well. For example, even the more advanced Nephites had only an agricultural society. They raised crops, kept herds of domesticated animals, and were able to build many cities, but there are no indications of heavy agricultural equipment, mass-production, rapid transportation/communication, engines, or anything of that nature (see 2 Nephi 5:11; Jarom 1:8; Enos 1:21; Mosiah 9:9; 10:4, 21; 21:16; Alma 62:29; Helaman 6:12; 3 Nephi 3:22). All of the information in these scriptures is consistent with the proposition that the Nephites were only as advanced as other contemporary cultures. Thus, there is no reason to presume

No group of people can maintain even a moderately high growth rate over a period of centuries scarred by a constant succession of wars.

that their growth rate was significantly higher than the .04 percent typical of such societies.

Second, even if the Nephites were relatively advanced, the more numerous Lamanites were not. If the Nephite descriptions of their enemies are close to accurate, the Lamanites were a primitive, nomadic, hunting/gathering society for much of their history. Enos 1:20 states that the Lamanites dwelled in tents, fed upon beasts of prey, wandered about in the wilderness, and that many of them ate nothing but raw meat. This description is juxtaposed with the observation in the next verse that the Nephites tilled the land and raised grain, fruit, and domesticated animals. Similarly, 2 Nephi 5:22-24 labels the Lamanites an idle people who "did seek in the wilderness for beasts of prey" (see also Jarom 1:6; Alma 17:14-15; Mosiah 9:12; Helaman 3:16). To the extent these scriptures are correct, the Lamanites lived in a pre-agricultural society for hundreds of years after their arrival in the New World. Although they eventually began to inhabit some cities (Alma 23:2-15), significant numbers of Lamanites still "lived in the wilderness, and dwelt in tents," even as late as 77 B.C. (22:28). This is important, because pre-agricultural peoples have a growth rate much lower than the .04 percent of pre-industrial agricultural societies. Recall that Parsons and others estimated the rate of natural increase of such peoples at .001 percent annually, and that societies dependent on hunting and gathering for their food require one-to-two square miles of space per person. Such imperceptible growth rates and sparse population densities contrast with the numerous hosts of Lamanites frequently described in the Book of Mormon. Thus, even a .04 percent growth rate seems too high given that more than half of the Nephite-Lamanite population lived under pre-agricultural conditions.

A third possible theory for abnormally high Nephite-Lamanite growth rates is that as with some antediluvians mentioned in Genesis, Book of Mormon peoples lived to extremely old ages and were able to reproduce for many more years than ordinary humans. Again, there is almost no scriptural foundation for this hypothesis, other than some lifespans apparently in excess of 100 years as obliquely mentioned in 4 Nephi.<sup>37</sup>

On the contrary, even Jesus' New World disciples were only allotted seventy-two years (3 Nephi 28:3). And Mosiah 29:45-46 states that Alma the elder lived to be eighty-two, while Mosiah died at age sixty-three. Nowhere else is there any information pertaining to unusually lengthy lifespans; without such evidence it is difficult to afford much weight to this postulate.

Perhaps the actual descendants of the Lehi and Mulek groups constituted only a tiny fraction of the total population described in the Book of Mormon.

Finally, it is conceivable that the ancient Americans reproduced at an accelerated pace due to the intervention of God. However, there is no evidence for such miraculous procreation in the Book of Mormon. It is reasonable to expect that if there were a dramatic surge in the incidence of multiple births, a shortening of the gestation period, or a prolongation of the female reproductive years, the authors of the Book of Mormon would have mentioned it. Instead, all we find is the standard scriptural phrase, "multiply exceedingly and wax strong." To suggest, without other evidence, that this signifies divinely enhanced biological propagation does not seem justified.

**I**NDEED, there is significant evidence that Book of Mormon peoples had a lower than normal rate of growth. I have already discussed the evidence concerning a nomadic hunting/gathering Lamanite culture, with its concomitant low rate of natural increase. But there is another powerful population retardant that was virtually omnipresent during most of the Nephite-Lamanite era: war.

Table 4 contains a summary of the multitudinous bloody conflicts of the ancient Americans. From the beginning of the split between the Nephite and Lamanite groups, a succession of wars took a terrible toll on the people. Until the generations immediately following Jesus' visit to the New World, there was virtually no respite from the horrors of war. It is essential to understand that war hampers population growth in several ways, not simply in the obvious sense that some combatants are killed. Consider the following:

Direct military losses represent but a small part of the effects of war on population growth . . . Most of the men killed in war are comparatively young . . . This means that the number of couples which were of the age to have children in the generation following the war was considerably reduced by reason of this shortage of men . . . A third source of loss in population growth arising from war is the reduction in the births during the war below what could reasonably have been expected had there been no war . . . The chief point to bear in mind is that the effects of war on population growth over a period of several decades are by no means measured adequately by military losses; such losses are small compared with those arising from the reduction in births to be expected as a result of the disturbances of war.<sup>38</sup>

**M**OREOVER, actual combat losses hardly tell the whole story of fatalities caused by war. Ancillary deaths may equal or exceed deaths on the battlefield.

Prolonged warfare . . . though it might kill comparatively few men by the sword, might decimate population nonetheless. Armies harbored many diseases, notably typhus and venereal diseases, and as

they moved about could spread them through wide tracts of country. In addition war took men off the land and in doing so reduced the production of food much as a bad harvest might. And war meant heavy taxes

TABLE 4

Dates	Events	Dates	Events
560 B.C.	Wars already waging within 40 years after leaving Jerusalem (2 Nephi 5:34).	68-67	Moroni's army defeats Morianton's (Alma 50:26, 35); 4,000 Nephite dissenters slain (51:10-11, 17-20, 22-28).
544-421	Lamanites continually seeking to destroy Nephites; wars (Enos 1:20, 24); Lamanites delight in wars and bloodshed, seek by power of arms to destroy Nephites continually (Jacob 7:24).	66-64	Nephite-Lamanite war, much bloodshed (Alma 52:4-7, 25, 34-35; 56:13).
420-361	Many times Lamanites battle Nephites (Jarom 1:7); in 238 years, wars and contentions for much of the time (vv. 13-14).	64	Stripling warriors slay Lamanites (Alma 56:54).
323	Nephites and Lamanites have had many seasons of serious war and bloodshed (Omni 1:3).	63	Nephite-Lamanite battles (Alma 57:6-9, 23-28).
279	The more wicked part of the Nephites are destroyed (Omni 1:5).	62	Lamanites slay many of Nephiah (Alma 59:7).
279-130	Much war between Nephites and Lamanites (Omni 1:10); many wars among Mulekites (v. 17); serious war, much bloodshed with King Benjamin's army, many thousands of enemy slain (v. 24; Words of Mormon 1:13-14).	61-60	Exceedingly great length of Nephite-Lamanite war, more slaughter (Alma 62:15, 25-26, 35, 38-39, 41).
187	War between Zeniff's army and Lamanites; 3,043 Lamanites and 279 of Zeniff's men killed in one day and night (Mosiah 9:18).	53	Another Nephite-Lamanite war, great loss (Alma 63:14-15).
178-60	Zeniff's army kills too many Lamanites to count (Mosiah 10:20).	51	Lamanite army of Coriantumr wars with Nephites (Helaman 1:14-15, 19-20, 25-32).
145-22	Lamanites defeat Limhi's people (Mosiah 20:9-11; 21:2, 7-8, 11-12).	35-31	Long Nephite-Lamanite war, much slaughter (Helaman 4:5-11, 13, 16).
90-77	Lamanites war against Anti-Nephi-Lehis, kill 1,005 (Alma 24:20-22, 28); war, many battles, including destruction of Ammonihah (25:1-8); Lamanites slay Anti-Nephi-Lehis (27:1-4).	20-19	Civil war for 2 years among Nephites (Helaman 10:18; 11:1-2).
87	Tens of thousands slain in Nephite-Amlicite-Lamanite war, including 12,532 Amlicites and 6,562 Nephites in one day (Alma 2:17-19, 27, 38; 3:1, 23, 26).	12-11	War against robbers (Helaman 11:24-29, 30-33).
81	Lamanites kill all people of Ammonihah, Zoram defeats Lamanites (Alma 16:2-3, 8-9, 11).	A.D. 13-	War with robbers throughout all the land, many slain and cities laid waste, Nephites threatened with utter destruction (3 Nephi 2:11-13, 17-19).
76	Tremendous battle, largest since Lehi left Jerusalem; tens of thousands of Lamanites slain and scattered by Nephites (Alma 28:2-3, 10-12).	18-22	War against robbers, greatest slaughter since Lehi left Jerusalem; tens of thousands of robbers slain (3 Nephi 4:1, 5, 11, 21); huge Nephite army (3:22, 24).
74-73	Nephite-Lamanite war (Alma 43:3-5, 37-39, 41-44; 44:21-23).	322	Nephite-Lamanite war, 30,000 Nephite army, many slain (Mormon 1:8-11).
72	Nephite-Lamanite wars never ceased for the space of many years (Alma 48:22); immense slaughter, over 1,000 Lamanites killed (49:21); more battle with Lamanites (50:7).	326-30	Nephite-Lamanite war; 44,000 Lamanite army, 42,000 Nephite army (Mormon 2:1-5, 8-9).
		345	Nephite-Lamanite war (Mormon 2:16).
		346	Nephite army of 30,000; Lamanite army of 50,000 (Mormon 2:25-26).
		360-62	Nephite-Lamanite war (Mormon 3:1, 4-9).
		363-67	Thousands slain on both sides in war (Mormon 4:1-4, 7-11, 13-16).
		375-80	Exceedingly great slaughter (Mormon 4:16-23; 5:4-9).
		385	Final immense slaughter of Nephites, 230,000 killed in battle (Mormon 6:10-15).
		401	Lamanites war with themselves (Mormon 8:8).

which took money away from those most in need of it to tide them over a poor harvest.<sup>39</sup>

These war-related side effects are well known and have plagued humanity throughout the ages. In fact, in World War I, "there were more civilian deaths because of lowered resistance to disease, and fewer births owing to the enforced separation of married couples."<sup>40</sup> "War is clearly a dysgenic force in that it gathers together the finest physical and mental specimens of a people at the time of the height of their reproductive powers and arbitrarily kills off large numbers of them, and prevents normal family relations among the rest for appreciable periods of time."<sup>41</sup> Far from being a simple matter of life or death, war is a powerful and complex phenomenon.

Although war has been an important population check throughout man's history, its precise effects on mortality have been exceedingly difficult to measure. Deaths among military personnel may occur on the battlefield, later on as a result of wounds received during combat, or from war-associated deprivation and disease. Most wars have also caused heavy civilian casualties indirectly through disease carried by armies, plunder, famine following the laying waste of agricultural lands, and other hardships accompanying social and economic disorganization.<sup>42</sup>

The Book of Mormon specifically mentions some of these ancillary effects of war on the Nephite-Lamanite peoples. Alma 3:2 states that "many women and children had been slain with the sword, and also many of their flocks and their herds; and also many of their fields of grain were destroyed, for they were trodden down by the hosts of men." Similarly, Alma 4:2 discusses "the loss of their flocks and herds, and also . . . the loss of their fields of grain, which were trodden under foot and destroyed by the Lamanites." And Alma 62:35, 39 references the famine that had been caused by the prolonged Nephite-Lamanite conflict. Clearly, at least during this portion of Book of Mormon history, the usual side-effects of war firmly gripped the people.

In contrast to the weakly supported theories of an accelerated Nephite-Lamanite growth rate, there is considerable evidence for the retardant effects of war. The long, virtually uninterrupted record of costly, destructive, devastating wars among the descendants of the Lehi and Mulek pioneers argues strongly against a higher than normal growth rate for these peoples. The more likely result of these continual slaughters was just the opposite: greatly reduced growth rates or even extinction.

For example, consider once more the 19,094 warriors slain in the Amlicite-Nephite battle of 87 B.C. (Alma 2:17-19). It is

likely that most of these men were still fairly young, and thus had not yet completed, or even begun, their families. Therefore, irrespective of how rapidly their numbers had been growing up to that point, the loss of so many reproductive males would have caused a plunge in the birth rate for many years to follow. Many thousands of babies would not have been born to the next generation, because their would-be fathers were killed in the war. Similarly, the children those children eventually would have

produced would also never have been born. The excision from the gene pool of almost 20,000 men would have been felt long into the future in terms of a greatly reduced growth rate. Moreover, this battle, bloody as it was, was scarcely unique. Just a decade later, in 76 B.C., an even larger battle took place, in which "tens of thousands of Lamanites were slain" (Alma 28:2-3, 10-12). And in A.D. 18-22, a still greater slaughter was visited upon the people, with additional tens of thousands killed (3 Nephi 4:1, 5, 11, 21).

Not just once or twice, but repeatedly and "continually" (Enos 1:20; Jacob 7:24) these tiny bands of immigrants, who must have been struggling to carve out an existence in a hostile, unfamiliar wilderness, were stricken with the effects of war. With initial populations so small, the very existence of their societies was precarious, even under ideal conditions. One epidemic or natural disaster could have caused their extinction

during their first centuries in the New World; even at a then unheard-of growth rate of 2 percent annually, the total number of Book of Mormon peoples would have been a mere 2,001 in 380 B.C. But when we add the destructive impact of war to the other problems facing these pioneers, it becomes clear that the most they could have hoped for was survival. No group of people can maintain even a moderately high growth rate over a period of centuries scarred by a constant succession of wars. The Nephite-Lamanite story is one of relentless conflict; the scriptures allow for only brief and infrequent periods of peace and recovery before the next war assailed the population. Given that the ramifications of warfare extend for generations, Book of Mormon peoples could never have caught their breath between wars sufficiently to sustain a high growth rate.

Moreover, the populations also experienced some reductions due to emigration. Alma 63:4-10 describes 5,400 Nephite men who, together with their wives and children, emigrated northward, while many others were lost in similar emigration attempts (see Helaman 3:3-5, 12). The loss of these groups must be considered when evaluating the population size of the peoples left behind (for example, vv. 24-26). Unless and until these emigrating groups rejoined the main populace, they must be subtracted from the reproductive base, just as if they were fatalities.

Lastly, the devastating upheavals, earthquakes, and floods

If the admonition to study the Book of Mormon is to have meaning, our study must be honest, open, and diligent, and not limited to preconceived views.

that took place in A.D. 34, at the time of the Savior's crucifixion, would have had an enormous dysgenic impact on the population for the remainder of Book of Mormon history. As described in 3 Nephi chapters 8 through 10, many entire cities were utterly destroyed, essentially setting back the population hundreds of years. The ensuing generations of long-denied peace would have scarcely begun to restore the populace to its previous level.

ALL of these factors taken together argue against the population sizes reported in the Book of Mormon. This conclusion may be disturbing, but it is important that we try to confront this problem rather than hide from it. Perhaps the actual descendants of the Lehi and Mulek groups constituted only a tiny fraction of the total population described in the Book of Mormon. The "true" Nephites and Lamanites may have interacted with indigenous native groups, becoming their religious and/or political leaders by virtue of their more advanced cultural level. The authors of the Book of Mormon may have chosen not to mention these aboriginal peoples out of a penchant to focus only on the "chosen people." In this way, the enormous populations described in the scriptures may be accurate, but not as direct biological progeny from those two tiny clusters of immigrants.

Book of Mormon scholars Hugh Nibley and John Sorenson have discussed this possibility in some detail. Both seem inclined to view the Book of Mormon as a record of a relatively small, insular group of religious and political leaders. They feel that this explains various difficulties, such as the dark skin of the Lamanites. Sorenson has written:<sup>43</sup>

The answer may be that the Lamanites in the original immigrant group became dominant over a native population of folk already scattered on the land when Lehi arrived. As far as the Nephites were concerned, those subject folk would have been treated the same as the original Lamanites, even if some physical or cultural differences between them were apparent . . . The fervid ambition of Laman and Lemuel to be rulers would have driven them to try to dominate not only the Nephites . . . but anybody else who happened to be around. Latter-day Saints are not used to the idea that other people than Lehi's immediate descendants were on the Book of Mormon scene. Abundant evidence from archaeological and linguistic studies assures us that such people were indeed present, so we need to understand how the Book of Mormon account accommodates that fact.<sup>44</sup>

B. H. Roberts, on the other hand, believed that the Book of

Mormon itself contradicted this theory. Arguing against the proposition that the Lehi/Mulek people only occupied a small part of the Americas while indigenous groups proliferated nearby, Roberts wrote:

To this answer there would be the objection that if such other races or tribes existed then the Book of Mormon is silent about them. Neither the people of Mulek nor the people of Lehi . . . nor any of their descendants ever came

in contact with any such people, so far as the Book of Mormon account of it is concerned. As for the Jaredites, they are out of the reckoning in this matter . . . since their language and their culture, as active factors, perished with their extinction. Any beyond them, so far as a more ancient possession of the American continents is concerned, by previous inhabitants, . . . [is] barred probably by the Book of Ether statement that the people of Jared were to go "into that quarter where there had never man been," and nowhere is there any statement or intimation in the Book of Mormon that the people of Jared ever came in contact with any other people upon the land of America, save for the contact of the last survivor of the race with the people of Mulek, which does not affect at all the matters here under discussion.<sup>45</sup>

It is not my purpose to resolve this continuing debate. I introduce the possibility of the existence of other native inhabitants simply to offer one response to the conclusion that the Book of Mormon population sizes are impossible.

FINALLY, to return to a point I mentioned at the outset, there is one other possible explanation for the inflated population figures in the Book of Mormon: The ancient authors of the scriptural record may have greatly exaggerated all of their reports. This seemingly easy answer is, unfortunately, totally wrong.

First, as shown earlier, this hyperbole would have had to be thirty to fifty times greater than the actual population numbers. This is an enormous degree of puffery, if not outright falsification, sufficient to put any modern-day politician to shame. One could understand a biased author's doubling or even tripling the data to make them suit his purpose, but not a multiplication of that magnitude.

Second, this penchant for population inflation would have had to be shared by not just one or two but by several contributors to the Book of Mormon record. The figures listed earlier span centuries of history and fall within the purview of various ancient authors. Therefore, the tendency to distort population figures must have been not only pronounced but endemic as well.

There is no reason to assume that the Americans of old had

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a culturally inculcated multiplication factor which they used whenever recording population figures for their sacred history. The Book of Mormon contributors seem to have been perfectly capable of using numbers accurately. Of course, when terms such as "host" or "multitude" or "tens of thousands" are used, we can discern very little information as to the actual numbers involved. It is where these broad generalities are found that exaggeration or, more accurately, vagueness may be attributed to the Book of Mormon authors. But where, as in Alma 2:19, figures such as 12,532 and 6,562 occur, it simply does not comport with reality or common sense to assert that these numbers were grossly inflated exaggerations rather than precise, specific, actual counts.

Moreover, to argue that the numerous Book of Mormon population figures cited in this essay are uniformly wrong, and in several instances wrong by factors of thirty to fifty, is to open an entirely new Pandora's Box of difficulties. Latter-day prophets from Joseph Smith to Ezra Taft Benson have repeatedly emphasized that the Book of Mormon is the "most correct of any book" in existence. In contrast to the Bible, which is accepted as God's word only insofar as it is correctly translated, the status of the Book of Mormon as the word of God is an Article of Faith, without qualification or exception. No Mormon prophet or other general authority has ever stated that the Book of Mormon is "most correct" *except* in the many passages in which population figures are given, and that in those passages the scripture is drastically wrong.

The Book of Mormon is the sacred record of a religious people written for the most part by their religious leaders. These were holy men engaged in a holy mission. They cherished their history and endured great hardships to preserve it. Nephi killed Laban to obtain the sacred history of the Jews so that his group could bring it to their new home (1 Nephi 3:3-11; 4:7-18). Nephi was commanded by the Lord to make his own record and use it to instruct his people (2 Nephi 5:30-32). And throughout the entire span of Book of Mormon history, the preparation and safeguarding of the record was regarded as a solemn obligation and a direct commandment from God (for example, see Mormon 5:12, 8:16; Ether 2:11; Alma 37:2; and Jacob 1:1-2,4). There is no indication that the devout ecclesiastical authorities who wrote these accounts would have exaggerated, distorted, or in any way misrepresented the truth. On the contrary, they were doing God's work and strove to be as accurate as possible.

For all these reasons, the proposition that the unrealistically large population sizes reported in the Book of Mormon are merely the product of scriptural hyperbole is insupportable. It is utterly contrary to the evidence and to rationality.

#### CONCLUSION

THIS population study challenges many assumptions Mormons have about the Book of Mormon, including its historicity, its geography, the ancestry of Native Americans, and the Prophet's method of translation. I do not know the

answers, but if the admonition to study the Book of Mormon is to have meaning, our study must be honest, open, and diligent, and not limited to preconceived views. If we do not bring to our study of the scriptures all of our abilities, we acknowledge that the scriptures cannot withstand the same degree of attention we bring to our occupations and avocations. Such a superficiality is more akin to condescension than to reverence. If, for example, the descendants of the Lehi and Mulek bands formed only a small portion of the ancient American population, then we should consider where that leads us, e.g., to a reexamination of the literal darkening of the Lamanites' skin and the notion that present-day Native Americans are "Lamanites." Other alternatives must also be explored.

As Hugh Nibley repeatedly demonstrates, the Book of Mormon has powerful messages which speak to our modern situation. Our faith must be strong enough to withstand its hard truths. Real faith is not threatened by knowledge of the facts; they challenge us to ask, seek, and find. However, real faith is threatened by an unwillingness to feed it the truth and let it grow and "multiply exceedingly." ☐

#### NOTES

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 28. Hauser, *Rapid Population Growth*, 107-108.  
 29. Smith, 68; Hauser SP, 107; Ehrlich and Ehrlich, 18-21.  
 30. Mortimer Spiegelman, *Introduction to Demography* (Cambridge, MA: Harvard University Press, 1955), 417.  
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 32. Hauser, *Rapid Population Growth*, 104. See also Parsons, 25-27; Fraser, Dean. *The People Problem* (Bloomington: University of Indiana Press, 1971), 13-18; Bogue, 47; Pearl, 259; U.N., 20.  
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 35. *Ibid.*, 10.  
 36. Simply divide the population size indicated in the table by thirty, then multiply by however many people it is desired to assume for the initial population size. For example, to see how many reproductive-age people would have existed 360 years after landing in the New World (230 B.C.), assuming an annual growth rate of .5 percent, and an initial

- population size of twenty rather than thirty, divide the figure from Table 3 (which is 181) by thirty (yielding 6.03), and then multiply this result by twenty ( $6.03 \times 20 = 121$  people).  
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## A PHONE CALL FROM THE DESERT

Lodgepole pine rustle in the backyard,  
 A small forest to remind me of the mountain.  
 Moist coolness from Puget Sound blankets me.

In the desert of your departure,  
 I roamed with a lost wind that howled  
 In gullies and canyons. Red cliffs  
 Echoed back its cry.

Orcas Island comes slowly to meet the ferry.  
 Seagulls scold the coming tourists, then skim by,  
 Playing with the wind, looking for fish on the sea.

I waited for you to return  
 With the late summer rains,  
 But I could not build a house  
 With bleached logs and slivered bones.

Pine needles weave sunlight into pale green ribbons  
 That rain gently upon fern and flower. Moss cushions  
 My feet as I bend to count the five points of the sorrel-wood.

Grief hung low within me  
 Like a dead fetus. I was hollow  
 With the hunger of a lone dog,  
 Having no tears left to drink from.

If you stayed with me, you may have loved  
 These forests green with rain coming over the Cascades  
 As a mist rising to quench the Garden of Eden.

I abandoned my memories and grief  
 In the wastelands where the past  
 Transforms itself continuously  
 Into the hunted and hunter.

You called me from a public phone halfway across  
 The planet. Your voice was a thin reed  
 In the flood of trucks, cars, and people.

A tall stand of cedar rises from the desert,  
 With a ring of tamerisk trees about it.  
 Bones lie in the sage beyond, but birds  
 Sing in the red light of morning.

You said that you finally know it is not  
 Where we are, but who we are that matters.  
 I miss you, you said. I want to come back.

The cedars smell sweetly, like a trunk  
 Packed with a yellowed wedding gown.  
 The tamerisk are silver green,  
 As green as they can be in the desert.

I could not speak, thinking of hundreds of nights  
 I prayed for your return, my love, my spouse,  
 Grief exploding inside me like a dying star.

The roots of the cedar tangle  
 Toward the empty streambed that  
 Runs past, dry, dry as any heart  
 That grieved too long.

—CARA BULLINGER