1991

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1991. *Transactions of the Nebraska Academy of Sciences,* XVIII: 173–177

# FRANKLIN, MALTHUS, AND DARWIN:

# THE PUSH THAT BECAME A SHOVE

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Benjamin Franklin wrote an essay in 1751 that he hoped would help to change the conduct of England toward its North American colonies. In the essay, Franklin made the observation that the colonies were doubling their population every 25 years to illustrate the rapid growth of the colonies compared with that of England. Thomas Malthus discovered Benjamin Franklin's essay shortly after the publication of his own essay on population in 1798. He considered Franklin's data to be proof of his own theory of how populations grow and credited Franklin in the five later editions of his essay. Charles Darwin, in turn, credits Malthus with the inspiration of natural selection—how nature could select some that are born and eliminate others—for it is reading the 1826 edition of Reverend Malthus' essay that gave Charles Darwin the clue which led to what has come to be called "natural selection." These remarkable events are a footnote in the history of science between 1750 and 1858 when "Origin of Species" was published.

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The purpose of this note is to call attention to the contribution of Benjamin Franklin and Reverend Thomas Robert Malthus to Charles Darwin's quest for understanding of the origin of plant and animal species. Each of these persons had considerable influence on his world in his own time, and Darwin's book, "The Origin of Species" (Darwin, 1858), can be said to be one of a few books that has changed the course of history.

When Malthus published an essay on population in 1798, he was unaware of two things: namely, that the essay would become one of the most famous essays ever written, and that he had been anticipated by others, including Benjamin Franklin. As Malthus set to work on an expanded version of the first essay (Malthus, 1798), he became aware of Franklin's own essay on population growth written almost half a century earlier (Franklin, 1751). Over the next quarter of a century, Malthus published five more editions of his essay and, in each, Franklin's comments were given a prominent place in the first chapter (Malthus, 1826).

Both Franklin and Malthus lived in the eighteenth century, a time when Europe had recently escaped the stagnation of the Middle Ages and the Industrial Revolution was making itself felt across Europe and North America. New areas were opening to colonial activity, and it was a time of economic growth and expansion. Life was still difficult for the average person, but the North American colonists found a vast continent, rich in resources and ripe for unprecedented expansion. With unlimited resources, Colonial America began to experience rapid population growth. The American colonists, upon landing in America, had found an essentially unpopulated land with enormous resources. Thus, there were fewer checks on the population than in England or the European continent, where means of subsistence were more marginal. By 1751, when Franklin wrote his essay, there had been 100 years of colonial experience, but no census had been taken to determine the size of the population. Franklin, most likely, made an educated guess in regard to the expanding American population—a guess that was to become a remarkable prediction (Zirkle, 1957).

Thomas Robert Malthus was born into comfortable circumstances, matriculated to Jesus College, Cambridge, and graduated in 1788. The Reverend

Malthus had a curacy in Surrey at the time that he wrote "An Essay on the Principle of Population as it Affects the Future Improvement of Society with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and Other Writers," published anonymously in 1798 (Malthus, 1798). The meaning of the title deserves some explanation. Malthus' father was a so-called utopian; he and his friends discussed the prospect of a future where poverty, misery, vice, want, and greed might be eliminated. They were hopeful for the perfectibility of mankind and society. It was in this setting that Malthus took a non-utopian point of view—a position opposite to that of his father, Mr. Godwin, M. Condorcet, and others (hence, the title). Malthus argued that the way to Utopia was blocked by mankind always pressing on the limit of subsistence. He postulated that "food is necessary to the existence of man" and that "the passion between the sexes is necessary and will remain in its present state." This leads to the often-quoted eloquent statement in the first essay:

> Population, when unchecked, increases in a geometric ratio. Subsistence increases only in an arithmetical ratio.

At the time he wrote this statement, he had no data to support this position, but, as we shall see, Benjamin Franklin was destined to provide that support. Over 25 years later, in the appendix of his sixth edition, Malthus writes:

> The first of these propositions I considered as proved the moment the American increase was related, and that second proposition as soon as it was enunciated (Malthus, 1826).

The restraints that Rev. Malthus postulated on population growth were vice, misery, and lack of sustenance.

Malthus was still basking in the success of the first printing of his essay when he discovered that support for his thesis could be found in the writings of others, especially Benjamin Franklin of the United States. In the Preface to the Second Edition, Malthus discusses his reasons for writing the first paper and states that he made further inquiries and found that more study had been done on population than he was aware of in 1798:

> And of late years the subject has been treated in such a manner by some of the French Economists, occasionally by Montesquieu, and, among our own writers, by Dr. Franklin, Sir James Steward, . . . (Malthus, 1802).

At the time that Malthus wrote these words, there had been considerable discussion about how populations grow. Graunt (1662) is considered by some to be the father of demography, and others, such as Wallace (1753), had shown that populations that grow unchecked tend to grow in a manner of a geometrical progression. As Zirkle points out: "This geometrical increase in unchecked human population is today an accepted truism and is implied in our method of describing population growth. Every population that is growing at a constant rate—no matter what that rate may be—is increasing in a geometrical series" (Zirkle, 1957).

Benjamin Franklin—American printer, inventor, scientist, politician writer, and statesman—was, by every measure, a giant of the 18th century. Aside from his natural curiosity, which must have been prodigious, he seems to have become interested in population growth in the colonies at a time when England's repressive tax measures threatened economic growth. America had an abundance of iron ore and coal, but the British, ever mindful of competition, passed the Iron Act of 1750, which effectively prevented the industry from competing with British iron goods. This, and other repressive measures, prompted Franklin to seek ways to persuade England to grant the colonies more freedom (Fleming, 1972).

Franklin grew up in a family of modest means, born in Boston in 1706, the tenth and youngest son out of a total of seventeen children. His father was a tallow chandler and soap boiler, and Benjamin apprenticed as a printer and journalist. He prospered in the printing-and-publishing business. So much so that he was able to offer a partnership in the printing business to his foreman, David Hall, in 1747 (Fleming, 1972). This allowed him more time to devote to his many other interests, especially science, for this is the period in which Franklin did considerable research in electricity. By the summer of 1750, he had shown that lightning and electricity were one and the same. His discoveries in science and inventions, such as the Franklin stove, were to make him famous in his own time. He also had time for other activities, such as politics in the colonies and the topic that proved so useful to Malthus, his essay on population.

Franklin kept carefully tuned to the politics of the day so it was natural for him to follow the passage of the British Iron Act and to rise up in support of the colonies. He was aware of the uniqueness of the American potential, but was still supportive of

England and saw the colonies as part of a frontier empire (Wright, 1986). He wrote the essay in hopes of winning more freedom for the colonies and circulated among his friends in America and England. Franklin predicted that the population in America would double every 20 years and pointed out that America would soon match England in numbers and wealth.

Franklin wrote in numbered paragraphs and mentions the doubling time, in reference to the colonies, as being 20 years in one place and 25 years in another, with the latter figure being the most frequently quoted. In paragraphs 7 and 22, he writes:

> 7. Hence Marriages in America are more general, and more generally early, than in Europe. And if it is reckoned there, that there is but one Marriage per Annum among 100 Persons, perhaps we may here reckon two: and if in Europe they have but 4 Births to a Marriage (many of their Marriages being late) we may here reckon 8, of which if one half grow up, and our Marriages are made, reckoning one with another at 20 Years of Age, our People must at least be doubled every 20 years.
>
> 22. There is in short, no Bound to the prolific Nature of Plants or Animals, but what is made by their crowding and interfering with each others Means of Subsistence. Was the Face of the Earth vacant of other Plants, it might be gradually sowed and overspread with one Kind only; as, for Instance, with Fennel; and were it empty of other Inhabitants, it may in a few Ages be replenish'd from one Nation only; as, for Instance, with Englishmen. Thus there are suppos'd to be now upwards of One Million English Souls in North America, (tho' 'tis thought scarce 80,000 have ben brought over Sea) and yet perhaps there is not one the fewer in Britain, but rather many more, on Account of the Employment the Colonies afford to Manufacturers at Home. This Million doubling, suppose but once in 25 Years, will in another Century be more than the People of England, and the greatest number will be on this Side the Water. What an Acession. . .

There appears to be no evidence that Franklin had data to support his views on the manner in which the American population was increasing (Zirkle, 1957). If, as Zirkle suggests, Franklin made an inspired guess then it turned out to be a remarkable one for we now know that his prognostications on growth of the colonies were close to the actual growth as later census data would show.

Franklin's essay had a greater immediate impact on the politics of the period than it did on demographic matters. The essay served notice that the colonies had both economic and military potential, and the mother country viewed this with alarm. Although Franklin wrote to forfend restrictive measures (Aldridge, 1949), it actually caused a fear that independence would be the ultimate aim if, indeed the colonies were growing at a rate greatly exceeding the home country. Thus, England's immediate attitude toward America was influenced by what Franklin wrote, but in a manner that he had not intended. When this became clear in 1754, Franklin consented to the publication of the essay, after which it received wide circulation on both sides of the Atlantic (Fleming, 1972).

Franklin correctly deduced that population growth depends mostly upon means of subsistence, a point that is of interest to demographers of later times. He was, however, not writing for demographic posterity and accidentally became a contributor to the works of Darwin. His motive was frankly political and economic, and he made no demographic contribution of note after the circulation of the 1751 essay.

When Malthus read this essay, he recognized that here was the information that he lacked in 1798. The United States had but one census, in 1790, but would have additional census data in 1800, by which Malthus could calculate the rate of growth of the United States were he so inclined. It is doubtful that he ever used American census data; he relied on Franklin's statement and wrote in the second and subsequent editions as follows (Malthus, 1826):

> The cause to which I allude, is the constant tendency in all animated life to increase beyond the nourishment prepared for it.
>
> It is observed by Dr. Franklin, that there is abound to the prolific nature of plants or animals by what is made by crowding and interfering with each other's means of subsistence. Were the face of the earth, he says, vacant of other plants, it might be gradually sowed and overspread with one kind only, as for instance, with fennel; and were it empty of other inhabitants, it might in a few ages be replenished from one nation only, as, for instance with Englishmen. This is incontrovertibly true. Throughout the animal and vegetable Kingdoms Nature has scattered the seeds of life abroad with most profuse and liberal hand; but has been comparatively sparing in the room and the nourishment necessary to

> rear them. The germs of existence contained in this earth, if they could freely develop themselves, would fill millions of worlds in the course of a few thousand years. Necessity, that imperious, all-pervading law of nature, restrains them within the prescribed bounds. The race of plants and the race of animals shrink under this great restrictive law; and man cannot by any efforts of reason escape from it.
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> In plants and irrational animals, the view of the subject is simple. They are all impelled by a powerful instinct to the increase of their species, and this instinct is interrupted by no doubts about providing for their offspring. Whenever, therefore, there is liberty, the power of increase is exerted, and the superabundant effects are repressed afterwards by want of room and nourishment.
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> The effects of this check on man are more complicated. Impelled by the increase of his species by an equally powerful instinct, reason interrupts his career and asks him whether he may bring beings into the world for whom he cannot provide the means of support.
>
> If he attends to this natural suggestion, the restriction too frequently produces vice. If he hears it not, the human race will be constantly endeavoring to increase beyond the means of subsistence. But as, by that law of our nature which makes food necessary to the life of man, population can never actually increase beyond the lowest nourishment capable of supporting it, a strong check on population, for the difficulty of acquiring food, must be constantly in operation. The difficulty must fall somewhere and must necessarily be felt in some or other of the various forms of misery, or the fear of misery, by large portion of mankind.

Thus we see that Malthus picked up on Franklin's application to plants and animals the tendency to breed beyond the capacity of nature to nourish them. This is the clue that Charles Darwin needed to deduce how nature could select some of those born and eliminate others (Zirkle, 1957). The clue that Darwin got from Malthus, the one that Malthus received from reading Franklin's essay, was discovered 20 years before the Origin of Species was published. No doubt the rudimentary concept of natural selection was in Darwin's mind—Malthus merely helped it to blossom into a full-fledged theory:

> In October 1838, that is, fifteen months after I had begun my systematic enquiry, I happened to read for amusement Malthus on *Population*, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed (Darwin, 1958).

Charles Darwin had a wealth of knowledge to draw upon in addition to the Malthus contribution. He was born in 1809 to comfortable circumstances as the son of a well-to-do physician. He took his education at Edinburgh and Cambridge and became a devoted student of natural history. It was his good fortune to be chosen to be the naturalist in the famous surveying expedition from 1831-1836 that resulted in the circumnavigation of the globe by the HMS Beagle. In the process of carrying out the mission of the Beagle, Darwin acquired a wealth of knowledge and a large store of specimens. The enormous diversity among plants and animals that Darwin encountered, along with his natural curiosity, astute power of observation, attention to detail, and long periods of time for reflective thinking, helped to lay the foundation upon which to build his theory of evolution.

"Origin of Species" was published in 1859, and for the first time the theory of evolution was presented in great detail. Darwin presented evidence that organic life evolved from a few primitive types, and that the vast variety of plants and animals that have existed, exist now, or will exist in the future, owe their origin to slow and relentless modification through time. Darwin called this process "natural selection." It was his belief in this process that would cause him to spend over 20 years in study and research before presenting his work to the public.

In the first of Darwin's so-called transmutation notebooks, which ended in February, 1838, he comments:

> . . . death of a species is a consequence (contrary to what would appear from America) of non-adaptation of circumstances.

This indicates that he was already thinking about failure to adapt as a key to transmutation of species. Later in the same year, Darwin left a penciled note in his so-called D notebook, July 15-October 2, 1838:

> Towards close I first thought of selection owing to struggle. (Clark, 1984)

This penciled note was written after the notebook was closed. Apparently on September 28 he wrote in the same notebook:

> We ought to be far from wondering of changes in numbers of species, from small changes in nature of locality. Even the energetic language of Decandolle does not convey the warring of the species as inference from Malthus - increase of brutes must be prevented solely by positive checks, excepting that famine may stop desire - in nature, production does not increase, whilst no check prevail, but the positive check of famine & consequently death. . .Population is increase[d] at geometrical ratio in FAR SHORTER than 25 years - yet until the one sentence of Malthus no one clearly perceived the great check among men. . .The final cause of all this wedging, must be to sort out proper structure, & adapt it to changes. . .One may say there is a force like a hundred thousand wedges trying force every kind of adapted structure into the gaps on the economy of nature, or rather forming gaps by thrusting out weaker ones.

Contrast Darwin's words:

> Population is increase[d] at geometrical ratio in far shorter than 25 years - yet until the one sentence of Malthus no one clearly perceived the great check among men. . .,

with the words of Malthus (Malthus, 1826):

> It may safely be pronounced, therefore, that the population when unchecked goes on doubling itself every twenty-five years, or increases in a geometrical ratio.

Once convinced of the truth of what Malthus had written ("Here, then, I had at last got a theory by which to work. . .") (F. Darwin, 1958), Darwin turned to working out the theory that he would defend in his now-famous treatise on the origin of species. One cannot help but think of Malthus, and Franklin too, as one reads in "Origin of Species":

> Even slow breeding man has doubled in twenty-five years, and at this rate, in a few thousand years, there would literally not be standing room for his progeny.

Perhaps Malthus was a "little nudge that pushed Darwin across a threshold at which he was already standing," as Clark has suggested (Clark, 1984). It could equally well be said that Franklin was a little nudge that pushed Malthus across a threshold and that Malthus, in turn, pushed Darwin.

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