Marlene Zuk’s Paleofantasy

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A REVIEW OF MARLENE ZUK’S BOOK “PALEOFANTASY”

In 1844, Robert Chambers anonymously published his book Vestiges of the Natural History of Creation. This work was the effort of an intelligent layman who was drawing attention to the possibility of biological evolution, in contradistinction to the veiled creationism which dominated British biology at that time. The chief intellectual forerunner for Chambers was Lamarck, particularly his 1809 book Philosophical Zoology, who had already received considerable drubbing from the likes of Georges Cuvier and Charles Lyell. Naturally enough, the academic establishment of the day pounced on the work, with later evolutionists like Thomas Henry Huxley poring scorn on Vestiges for its amateurish biology and its far-fetched invocation of the widely-discredited idea of “transmutation,” as evolution was generally called then.

By an interesting historical parallel, we are facing another evolution controversy in the popular press: what evolution tells us about the ideal diet and, more generally, lifestyle for human health and longevity. After a few relatively academic forays into this topic by the likes of Eaton and Konner (1985; New England J. Medicine), a spectrum of physicians and health advocates, even a lapsed economist, have followed suit in suggesting that adult humans remain adapted primarily to a “stone-age diet,” with significant quantities of meat and only minor quantities of foods derived from grains or milk. This is the “paleofantasy” that Zuk refers to in her title.

- Why, I asked Cordain, has this inability to properly digest all these common foods persisted? Surely it should have been selected out of the population.

He was taken aback. The answer was obvious, he responded. The sensitivity had been occurring only since the advent of agriculture, so humans haven’t had an opportunity to adapt yet. I frowned. “Plenty of time,” I said.

“But it’s only been ten thousand years,” he said.

“Plenty of time,” I repeated.

Zuk, 2013, p.114

This is the gravamen of Zuk’s book: evolution has had plenty of time to adapt humans to agriculture (at least among populations with long-agricultural ancestry), over the last 200-400 generations of large-scale agriculture. As our lab has been one of those which has supplied the warrant for this point of view, let us digress, much as Zuk does for most of her book, to explain this point.

In our laboratory, like many others which practice experimental evolution on model organisms, about 100 generations of sustained selection is enough to produce extensive adaptation to novel environments, diets, etc. Authors like Cordain are thinking like Darwin, who famously emphasized the extreme gradualness of the action of natural selection in producing evolutionary change. Zuk makes her case primarily using examples from the studies of natural selection in the wild, covering everything from crickets to sparrows to Australian cane toads to finches to guppies. Repeatedly
she draws attention to the evidence for European adaptation to milk consumption among adult humans, particularly the continued activity of the lactase enzyme in European populations, the enzyme that breaks down the principal sugar in milk, lactose. Toward the end of her book, she even brings in the genomic analysis of high-altitude adaptation among native Tibetans, as a kind of coup de grace.

Our view is that Zuk is both right and wrong in this, her central criticism of the paleo movement. She is almost certainly correct that the majority of young people who have long-agricultural ancestry are well-adapted to the extensive consumption of foods like wheat and rice. That is because natural selection is very powerful at early ages, and there has been enough time to adapt agricultural populations to their characteristic diets. Indeed, this was our view up until 2010, given our lab’s success with producing marked adaptation to novel environments over dozens of generations among the fruit fly populations that we study.

But the problem that Zuk fails to appreciate is that the forces of natural selection fade out with adult age. Very long sustained selection, say for a million years, will probably build extensive adaptation to a pattern of nutrition or activity deep into the life history. This kind of adaptation to a new source of food is particularly likely for primates, most of which have fairly omnivorous diets, and especially for our species, which has been processing, cleaning, and cooking much of its food for at least a million years. [We say this because cleaned and cooked food is much more digestible.] There has been enough time for humans to become well-adapted to the often-cooked omnivorous diet that we have consumed for most of the last million years, as contended by Caleb Finch (The Biology of Human Longevity; Inflammation, Nutrition, and Aging in the Evolution of Lifespans; 2007, Academic Press) and Richard Wrangham (e.g. Catching Fire; How Cooking Made Us Human; 2010, Profile Books). However, it should be said that this diet is not an endless churrascaria, in which one meat dish is followed by another, with mere side dishes of vegetables or fruit. Rather, much of our long-ancestral diet featured the consumption of cooked roots and tubers, along with insects, eggs, honey, and most anything else that could have had its nutrients extracted and its toxins destroyed by some type of cooking, fermenting, etc.

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So we will concede several points to Zuk. The paleo low-carb venison-killed-with-a-bow diet which she so enthusiastically skewers is not the definitive solution to human health for all people at all ages. Among long-agricultural populations, like those of most of Eurasia, young to youngish people are probably well adapted to agricultural diets. The Olympics make little sense otherwise. And as for the ridiculous specificity of some paleofantasies, particularly those concerning evolutionary-psychology inspired advice about philandering males and submissive females, we too feel little but amusement.

But we fear that Zuk is scoring points off hapless authors like Cordain and de Vany chiefly to mark out territory for evolutionary biologists and their proximal colleagues. This is unselfconsciously revealed by Zuk’s own foray into evolutionarily-based lifestyle advice, in her Chapter 8 on child rearing. There she writes much as an anthropologist might, mixing her interpretation of the published literature with her own opinions about appropriate child-rearing. We don’t mean to question any of her conclusions on this topic, only to point out how similar it is to the dietary advice of people like Boyd Eaton or Loren Cordain. And in so doing, Zuk is following the same tradition and practices as great controversialists like Thomas Henry Huxley, first in his attacks on the amateur Chambers and later in his equally aggressive defense of Darwin, after he had switched sides where evolution was concerned.

While the pop-paleo literature is based on erroneous and superficial scientific reasoning, its popularity is based on one simple recurring fact: a lot of people with chronic, but not usually life-threatening, health problems experience relief by taking the advice of Cordain and his ilk with respect to diet and exercise. Not incidentally, from our point of view, many of these people are no longer young, and have often been suffering from their chronic health problems for decades. During the period leading up to their paleo-conversion, many of these individuals have received the best medical advice available, to little benefit. It’s like the obviousness of Lamarck’s evolutionary hypothesis to the young Alfred Russel Wallace, the amateur naturalist who independently discovered the theory of evolution by natural selection in 1858.

As we have outlined in a recent book (Does Aging Stop? Mueller, Rauser, and Rose; 2011, Oxford), the mathematics and experimental evolutionary biology of aging imply that populations which have undergone a major dietary or lifestyle change will rapidly adapt at early ages, but not at later ages. We have further gone to the trouble of breaking down the reasoning behind this for a Cordain-level audience at our website 55theses.org. And we are now actively engaged in both theoretical and experimental research in our laboratory on the details of such age-dependent failures to adapt. But our provisional conclusion, to put it simply, is that Zuk is correct for young people, but wrong for the middle-aged and older.

If you are over forty years of age and have a long-agricultural ancestry, you should take the advice of Cordain and his ilk, albeit with some caution. If you do not have such ancestry, you should go paleo right away. But if you are young, despite your agricultural ancestry, you still aren’t adapted to Twinkies and a Coke. Even Zuk would concede that.”