

Letter from the Desk of David Challinor
August 2007

Every Thursday, both *The New York Times* and *The Washington Post* have sections devoted to food. Whether this congruence is by chance or design is a mystery to me, but it exemplifies the growing interest in fine cuisine—at least among the subset of the population that reads these two newspapers. The phenomenon is also reflected in the proliferation of slick magazines, television shows and a stream of cookbooks all devoted to assuaging our seeming passion for tasteful, elegantly presented meals. Can we attribute this fascination to the inimitable Julia Childs? Whether she was the progenitor or merely the popularizer of the culinary revival, I leave to the reader. I can, however, reflect on how the nature of food has changed within the prosperous middle class culture into which I was born and still live. This month's letter will examine how cooking food, as opposed to eating it raw, may have had a profound effect on our evolution, leading humans to be the seemingly dominant mammal on this planet.

My family still has grainy 16 mm movies of my childhood birthday parties. The smocked party dresses of the girls have changed little, but the sailor suits of the boys—white shorts and jumpers—are gone. We were inevitably fed chicken à la king—small pieces of chicken in a cream sauce flavored with bits of red bell peppers. Ice cream, often home-made, was limited to two or three flavors (vanilla, chocolate or strawberry); and baked within birthday cakes were tiny wax paper-wrapped toys—thimbles, model cars and even a dime coin! No litigiously conscious parent would dare serve such a cake today. Other meals I remember were shepherd's pie, macaroni, lamb chops and always a fresh vegetable, even in winter. Rice pudding and custards were two common desserts.

In contrast to the rather restricted children's diets of the 1920's, my young grandsons today enjoy sushi and other exotic dishes that we could never have imagined. Such shifts in taste are an understandable result of rapid globalization. Food habits will undoubtedly keep changing, especially for wealthy dominant cultures, as formerly plentiful fish stocks, for example, are "fished out." Fortunately, humans are omnivores and along with pigs, goats and a few other mammals we produce the enzymes that enable us to digest almost anything that is potentially edible.

Nearly all agree that cooked meat and fish taste better than raw with a few exceptions, such as steak tartar, oysters and clams. At some time in our past, humans harnessed fire to cook meat and other food. Exactly when this happened is still not universally accepted, but there are numerous tales of its origin; the best known perhaps may be Charles Lamb's "A Dissertation upon Roast Pig." Lamb, a friend of Coleridge and Wordsworth, tells a story he based on an "ancient Chinese manuscript" of a boy who accidentally sets his house afire and, attracted by a mouth-watering smell, discovered the source to be a roast suckling pig that had perished in the blaze.

Aside from such myths, scientists today search tirelessly to find solid evidence of the earliest cooking hearths. They look for blackened remnants of hearthstones with adjacent charred animal bones. The oldest stone tools, dating to 2.7 million years ago (mya), were discovered in what is now Ethiopia. The most ancient unequivocal hearths only date back to about a quarter of a mya. Scientists are still arguing over the validity of hearths more than twice as old that were discovered in Europe.

A prominent expert, Harvard primatologist Richard Wrangham, hypothesizes that cooking was perhaps the key factor that enabled early hominids to evolve such large brains (compared to other primates). His evidence is that no other animal has been found that cooks. Heat softens collagen (fibrous elements of muscle tissue and cartilage) in meat, making it easier to chew, just as it does for tightly connected plant carbohydrates. Cooking thus allows humans to spend considerably less time chewing and digesting their food than any other mammal. Chimpanzees, for example, spend about five-fold more time chewing than hunter-gatherers do on their cooked food. Think of the time and energy saved! Therefore, cooking is not only a time-saver, but also the food is more quickly and efficiently digested. The payoff, Wrangham believes, results in our having bigger brains than all other primates.

For the brain to become larger in a mammal species, a new source of energy is necessary. A resting human infant devotes 60% of its energy to its growing brain. Even a resting adult's brain consumes 25% of his/her energy compared to only 8% used by ape brains in general. Thus humans evidently traded brain growth for a smaller gut and smaller teeth, both morphological changes only made possible by a shift to a rich diet of cooked meat.

There are still some holes in the "cooked meat/brain growth" theory that have to be filled. Hominid rapid brain development occurred less than two mya (1.9 to 1.6), an age that marked the appearance of *Homo erectus*. The problem is that there is no unequivocal evidence that these early members of our genus actually cooked. *Bona fide* hearths that old are hard to find.

Scientists plot the increase in brain size by measuring fossil skulls. *H. erectus* had a brain of about 1000 cubic centimeters (cc), which is double that of a chimpanzee. With the appearance of *H. sapiens* less than a half-million years ago, brain size increased to an average of 1300 cc where it has pretty much remained ever since. Incidentally, Neanderthals, which overlapped us about 30 to 40,000 years ago, had even bigger brains than ours, averaging about 1500 cc. If their brains were larger than ours, should not they have been smarter? If they were, why did we survive and not the Neanderthals? We do not know the answer to this question, but it is an intriguing one. Cooking may certainly have played an important role in the evolution of our big brains, but there is also a cost to having such proportionately large heads.

When a human is born, it normally emerges from the birth canal head first. However, to fit through this relatively small passageway, the head is skewed at right

angles so that the chin is resting on top of the shoulder. This is an awkward position—try it as an adult! It means that a human mother spends considerably more energy delivering her child than does a female great ape whose infant is much smaller-headed than ours and thus easily passes through the birth canal.

What fascinates me, however, is how rapidly our brains develop, and I had not realized how much energy it takes to fuel this growth. It seems as though the brains of *H. erectus* were expanding from whatever evolutionary pressures were being exerted some two mya. With the appearance of *H. sapiens*, brains became even bigger and more complex. Evidence indicates that they cooked not only meat but vegetable matter as well, both of which in turn were, and still are, critical for infant brain development.

Knowing today about the benefits of cooked food, have we distorted its role in our evolutionary progression? Chewing is no longer perceived as important. As children, we chewed black birch (*Betula lenta*) twigs for their wintergreen flavor. In the south most kids chewed sugar cane for the sweet sap. Today's flavors are often artificial and of doubtful nutritional value. Most restaurant portions are too large, at least for me, and the growing problem of obesity is ubiquitous in prosperous countries. Some segments of the population are reacting to the current dietary assault on our health. Here in Washington, D.C., popular farmers' markets abound; there is even one on the Mall just west of the Smithsonian Castle that is open every Friday. Nutrition seems to be coming back *en vogue*. There is hope that we can curb our gluttony and, if we are successful, the prosperous world will be much healthier.

David Challinor
Phone: 202-633-4187
Fax: 202-673-4686
E-mail: ChallinorD@aol.com

P.S. Information on the research of Professor Wrangham came from: Gibbons, Ann, *Food for Thought*, Science 316:1558-1560 (2007).