

BIG-ENDIANS/LITTLE-ENDIANS

So there I was in the kitchen one afternoon not long ago, cracking open a hard-boiled egg, which I do by tapping one end of the egg against the tiled edge of the stove. I was about to tap the smaller end of the egg against the stove when, suddenly, feeling that something was wrong, I halted my descending arm and shook my head. "That's not the proper way to do it, is it?" I asked myself, and I switched the egg around in my hand so that the bigger end would be the one that hit the stove.

And that was how I discovered, very belatedly, that I was a Big-Endian.

I have been aware of the Big-Endian/Little-Endian controversy for something close to sixty-five years, ever since I first read Jonathan Swift's *Gulliver's Travels*. I still have my childhood copy of that fine book, a handsome illustrated edition published by Doubleday in 1945, and probably acquired by me no more than two or three years later than that. Unlike a lot of the editions of *Gulliver's Travels* that were given to children then, mine offers the unexpurgated text, with many an explicit bawdy or scatological passage that surely was startling to the eyes of the barely pubescent reader in an era far more delicate about such things than our modern one. But, of course, what really drew me to Swift's masterpiece was its glorious depiction of imaginary continents, for, even then, I was a seeker after fantastic fiction and *Gulliver's Travels* is one of the greatest fantasy novels ever written.

The business about eggs turns up in Chapter Four. Gulliver, has been shipwrecked on the shores of the diminutive land of Lilliput and (after convincing its emperor that his gigantic visitor meant no harm) enters into a conversation with

Reldresal, the imperial Secretary of Private Affairs. This functionary tells him that Lilliput is currently threatened by an invasion from its neighbor and rival, the empire of Blefuscu.

Lilliput and Blefuscu, Gulliver learns, have been "engaged in a most obstinate war for six and thirty moons past. It began upon the following occasion. It is allowed on all hands, that the primitive way of breaking eggs before we eat them, was upon the larger end: but his present Majesty's grandfather, while he was a boy, going to eat an egg, and breaking it according to the ancient practice, happened to cut one of his fingers. Whereupon the Emperor his father published an edict, commanding all his subjects, upon great penalties, to break the smaller end of their eggs. The people so highly resented this law, that . . . there have been six rebellions raised on that account, wherein one Emperor lost his life, and another his crown. These civil commotions were constantly fomented by the monarchs of Blefuscu, and when they were quelled, the exiles always fled for refuge to that empire. It is computed, that eleven thousand persons have, at several times, suffered death, rather than submit to break their egg at the smaller end. Many hundred large volumes have been published upon this controversy, but the books of the Big-Endians have been long forbidden, and the whole party rendered incapable by law of holding employment. During the course of these troubles, the Emperors of Blefuscu did frequently expostulate by their ambassadors, accusing us of making a schism in religion. . . ." And thus eventually events led to war between the two empires, egged on, if I may put it that way, by the Big-Endian exiles from Lilliput dwelling at the court of Blefuscu.

It is a dire war indeed: "We have lost forty capital ships, and a much greater number of smaller vessels, together with thirty thousand of our best seamen and soldiers, and the damage received by the enemy is reckoned to be somewhat greater than ours." Blefuscu, Gulliver learns, is now on the verge of launching an invasion of Lilliput by sea. "Wherefore His Imperial Majesty, placing great confidence in your valour and strength, hath commanded me to lay this account of his affairs before you," and Gulliver, though uneasy about interfering in strife between two foreign countries, eventually agrees to put his great size to work in the service of Lilliput. By singlehandedly capturing the entire Blefuscan invasion fleet he forces Blefuscu to sue for peace.

Doubtless I understood, even as a small boy, that Swift was satirizing the bitter religious differences that had cost so many devout Christians their lives over the centuries. But very likely I also pondered the problem of which end of the egg really was the right one to break, because I was a Very Serious small boy who was struggling to figure out all sorts of things about the adult world. Whether I chose to regard myself as a Big-Endian or a Little-Endian back then, I have no idea. Probably I decided that I was one or the other, and then forgot all about it, and I am quite sure that I gave the issue no thought at all in the next six or seven decades, until that recent epiphany in the kitchen when I realized, at long last, that I was without question a Big-Endian.

Which was worth a moment's giggle, and some pleasant thoughts about Swift's delightful book, and, since *Gulliver's Travels* is certainly relevant to the field of fantasy and science fiction, I thought I might get a column out of the subject. So off I went to Wikipedia for a little background information on Jonathan Swift, and, to my astonishment, discovered that the Big-Endian/Little-Endian controversy is still going on in the wonderful world of Silicon Valley.

The computer chaps haven't been fighting over the right way to break

eggs, exactly, but in general outline the feud hasn't been all that different from the one that raged during the war between Lilliput and Blefuscu. In an essay called "Basic concepts on Endianness," by Juan Carlos Cobes, which is easy enough to find with a bit of Googling, I read that "it refers to the order in which bytes in multi-byte numbers should be stored, most-significant first (Big-Endian) or least-significant (Little-Endian) first." Cobes goes on to explain that "Big-Endian means that the most significant byte of any multibyte data field is stored at the lowest memory address, which is also the address of the larger field. Little-Endian means that the least significant byte of any multibyte data field is stored at the lowest memory address, which is also the address of the larger field."

All this stuff about least significant bytes and lowest memory addresses is as abstract and mysterious to me as the ancient Christian debate over whether the Son is one with the Father or distinct from Him. I have not found it necessary, during the course of a long and busy life, to master either the intricacies of Christian theology or those of computer programming. But I do follow the discussion of the right way to assemble an Internet address: even a layman like me can see that it does make a difference if the system is expecting to find the domain of the e-mail sender listed at the end of the data string and it is at the front of it instead. And I can comprehend the example of the so-called NUXI problem, NUXI being the way a Little-Endian system would store the bytes that a Big-Endian system would (correctly) interpret as UNIX. Beyond that I get lost.

At any rate, what I can understand, in Cobes' discussion of Endianness, is his answer to the question he poses, "Which format is better?" What he says is, "Like the egg debate described in *Gulliver's Travels*, the Big- vs. Little-Endian computer dispute has much more to do with political issues than with technological merits. In practice, both systems perform

equally well in most applications.” (I should stop there; but in fact Cobes does go on to describe “a significant difference in performance when using Little-Endian processors instead of Big-Endian ones in network devices.” I will spare you the details, mainly because I don’t understand them.)

Juan Carlos Cobes’ paper on Endianness dates from 2005. But the controversy within the computer world over the proper method of byte storage has had a Swiftian tone since 1980 and the publication of a famous paper by Danny Cohen, “On Holy Wars and a Plea for Peace.” Cohen, after describing the nature of the conflict between the two systems, concludes by saying, “Swift’s point is that the difference between breaking the egg at the little-end and breaking it at the big-end is trivial. Therefore, he suggests that everyone does it in his own way. We agree that the difference between sending eggs with the little- or the big-end first is trivial, but we insist that everyone must do it the same way, to avoid anarchy. Since the difference is

trivial we may choose either way, but a decision must be made.”

Has a decision been made? I’m not geeky enough to give you a report on that, although I assume, since the Internet does seem to work most of the time, that a *détente* has been reached. My sources tell me that most computer architecture nowadays follows the Big-Endian mode, but where that leaves hardcore Little-Endians I am unable to say. Perhaps, like the last survivors of the various heretical Christian sects of the fourth century, they still hold underground convocations in which they praise their chosen system to one another, and bitterly denounce the mad follies of the opposition.

I don’t know. What I do know is what I discovered in my own kitchen not long ago, which is that I myself seem to be a Big-Endian, at least when it comes to cracking eggshells. I can only hope that my computer is on the right side of things as well.

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