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Books | Article published Sunday, July 13, 2003

Fascinating unraveling of left-handed mystery

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RIGHT HAND, LEFT HAND: THE ORIGINS OF ASYMMETRY IN BRAINS, BODIES, ATOMS, AND CULTURES. By Chris McManus. Harvard University Press. 412 pages. \$27.95.

Maybe it's a mark of arrogance that so few wonder why so many of us are right-handed. It's like driving on the right side of the road or reading left to right; it simply seems like the right way to do things. It's natural. It's logical. And it ignores the fact that about 10 percent of us aren't right-handed, a good chunk of the world's population drives on the left side of the road, and plenty of cultures find reading right to left sensible.

What Chris McManus makes clear in his book, *Right Hand, Left Hand: The Origins of Asymmetry in Brains, Bodies, Atoms, and Cultures*, is that not only are most of our assumptions about handedness illogical, but that the foundation of right-handedness, or even driving on the right side of the road, is a lot more interesting than our thoughtless presumptions.

Dr. McManus, a psychology professor at University College London, brings us a rare book. It's a journey of ranging curiosity, examining left and right in ways deep, wide, and often witty. If you've ever fallen under the spell of an idea, or a belief, or a moment in history and had the pleasure of exploring all the intricacies within it, the hows and the whys and the still mysterious, then you will know the feel of the investigations here. But this time you'll have an expert guide who tells a graceful story, sees the value of the occasional side trip, explains dozens of daunting concepts clearly, and isn't afraid to remind you more than once of the meaning of a technical term without talking down to you.

It turns out handedness is just one part of our world that exhibits the asymmetry of left and right. Even DNA, proteins, and the sugars in our body have preferential twists. DNA, with a chain of sugars forming its backbone, forms a right-handed spiral. Proteins, the stuff DNA makes to runs cellular processes - twists to the left. Explorations of this strange phenomena leads us to the "weak force" in physics, then out into the cosmos, where neutron stars spin out the massless, invisible, left-handed particles called neutrinos.

But what brings me to a halt is learning that the protein that misfolds and builds up disastrously in Alzheimer's disease carries a single right-handed amino acid, just one wrong-way building block that throws off the entire machine. In a left-handed world of left-handed tools, it seems there's no mechanism for throwing out the right-handed error.

Then there's the heart of the matter, which, for most of us, is on our left. Yet for a few, everything's flip-flopped - a condition called situs inversus. The heart is on the right. The stomach is on the right. The liver is on the left. It's all backward. Dr. McManus takes us inside the embryonic decisions that lead to our leftist hearts - and the occasional reversal in some people. He demonstrates that our heart lies where the embryo places it, due to the left-handed nature of our proteins.

Interestingly, even those with situs inversus tend to be right-handed. Clearly, something else is at play

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Asymmetry affects not only the layout of our internal organs, but the organization of our brains, and the dominant hand, eye, and foot we spend our life favoring. (Yes, one eye dominates. To find out which one, Dr. McManus provides this neat trick for your next dinner party: Point at something in the distance and close one eye. If your finger is still on the object you're pointing to, the open eye is the dominant one. If your finger "moves" when your eye closes, your other eye dominates. Most of us favor our right eye.)

Dr. McManus gives us asymmetry in culture, body, brain, and genes, developing, finally, a wonderful and provocative theory for why you probably favor your right hand that goes back nearly to the Big Bang.

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