FT WEEKEND - BOOKS: Molecules take sides: Jerome Burne considers a change of direction
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RIGHT HAND, LEFT HAND: The Origins of Asymmetry in Brains, Bodies, Atoms and Cultures by Chris McManus Weidenfeld Pounds 20, 256 pages

If you were to follow Alice into a looking-glass world that reversed left and right, one of the many curious results is that food would taste and smell different. What's more, should you take any drugs with you, they might either do nothing at all, or have very different effects.

The key to these differences lies with the "handedness" of the molecules that make up the proteins in every cell of our bodies, and the chemicals in drugs. Most molecules come in two versions - left- and right-handed - and although these are chemically identical, they can have quite different effects. So the right-handed, or dextral, version of the molecule carvone smells of spearmint, while the left-handed one (laevo) smells of caraway. Similarly, the smells of eucalyptus and fennel come from mirror images of a single molecule. If you took the asthma drug salbutamol through the looking glass, it would be far less effective.

This is just one of dozens of examples of the ways that handedness is fundamental to our world. It not only affects the building blocks of our bodies - we are composed entirely of left-handed proteins - but it threads its way through every aspect of human life - from metaphorical divisions in politics and religion, to the direction our clocks turn, to the different directions men and women faced in Neolithic graves. Something so apparently simple turns out to be surprisingly tricky. For instance, if left-handedness runs in families, as it does, how come one of a pair of identical twins can be left-handed while the other is right?

Running through Right Hand, Left Hand is a detective story, so it is appropriate that the book should begin with a Dr Thomas Watson. Like his fictional counterpart, Dr Watson was a Victorian physician who, in 1835, was confronted by a deep mystery. A post mortem revealed that one of his patients had his heart on the "wrong" (ie right) side of his body. Not only that, but all his internal organs were reversed, as though he belonged in a looking-glass world. The puzzle was that, unlike when individual molecules are reversed, this switch made no difference. For most of his life the man had been perfectly healthy. This prompted the question: why are nearly all of us profoundly asymmetrical - heart on the left, a strong preference for the right arms and legs, left side of the brain controlling speech and language and so on?

Unfortunately for the real Watson, there was no Sherlock Holmes around to wrap up the case in a few days. In fact, it has taken another 165 years and the work of hundreds of researchers in fields as far apart as astrophysics and molecular biology to unearth the clues. As professor of psychology at the University of London, Chris McManus has been sleuthing the case of the right-handed heart - now know to occur in between one in 10,000 and 20,000 births - and all other matters relating to handedness for 30 years. This is his extraordinarily wide-ranging and gripping "whatdunnit".

His first witness is Louis Pasteur, best known for the germ theory of disease, who was the scientist who first spotted the handedness, or "chirality", of molecules. In 1848 he reported that crystals of tartaric acid, produced when wine goes sour, polarise light clockwise, while the chemically identical synthetic version, racemic acid, turns it to the left. Here was a clue as to why all the proteins, the building blocks of bone and muscles, have the same handedness - constructing something out of identical bricks is much easier. But why should virtually all living creatures use only the left version?

An answer to this question only became possible just over 100 years later. In 1957 a landmark experiment showed that the electrons given off by spinning atoms were more likely to go to the left. Suddenly here was a source for a universal left bias. What's more, there was a link to proteins - studies of meteorites have found that they contain a greater proportion of left proteins. Some scientists now believe that life on earth was started by meteorites freighting in these proteins from deep space.

Electrons' leftward bias also provided an answer to a philosophical problem. How could you tell left from right in space, without anything to refer to? Check out the electron spin. Which, surprisingly, brings us right back to Dr Watson. That's because, abstract as the problem might seem, it is actually very similar to the one that faces the foetus in the womb. How to tell left from right so it can grow the heart and all the other asymmetric bits of the body in the right place?

The answer involves some very recent Japanese research and a molecular motor that drives a tiny propeller - but revealing the final twist of a thriller is bad-mannered in a reviewer, so read this deservedly prize- winning book and find out for yourself.