Many of the ideas behind these trends can be traced back to sociology faculties. This makes it all the more remarkable that the sociologists Bradley Campbell and Jason Manning have been willing to place their heads above the parapet. As the authors remark, the fact that they identify and try to explain victimhood culture marks them out as 'outsiders rather than believers' in their discipline's sacred values. Where Lukianoff and Haidt emphasise the role of a wider safety culture in spawning a fragile new generation, Campbell and Manning point more squarely to intellectual developments. Their central premise is that victimhood culture has much in common with the honour culture of an earlier epoch, in which men were expected to react violently to perceived psychological threats. Words that conveyed disrespect could lead a man to demand a duel to preserve his honour.

In the modern West, honour culture came to be supplanted by what Campbell and Manning term 'dignity culture'. A thin-skinned sensitivity to slights was gradually replaced by a thick-skinned belief that 'words will never hurt me' (though traces of the old ethos persist in the American South and among inner-city African-American gangs). Severe verbal attacks such as libel began to be reported to the authorities, who adjudicated matters in the courts. Resolving disputes this way, once seen as cowardly, became perfectly respectable, all of which bred a climate of openness and trust.

The rise of campus victimhood culture represents a reversion to a world of thin skins in which words once again are akin to violence. Yet the new sensibility also borrows from dignity culture, since those who feel offended turn to the authorities to settle scores with microaggressors and the like. Complainants rely on a new set of cultural agents – influential members of the Twitterati or diversity officers – to police norm violation. These figures engage in what Lukianoff and Haidt term 'vindictive protectiveness', a kind of cry-bullying, where one considers oneself a victim and uses that status to persecute others. Both books nicely document the plethora of campus excesses since 2012. Lukianoff and Haidt are especially good at using large-scale data to show that their case doesn't just rest on anecdotes.

Is the new campus ferment a break with the past? Not necessarily. The buzzwords and online tactics are new tools pressed into the service of established New Left pursuits. Race, gender and sexuality are the central issues, just as they were during the two previous waves of cultural radicalism, in the late 1960s and late 1980s. Therapeutic idioms are more prominent, but the preoccupations of today's campus extremist remain what they were: equality of outcome for totemic cultural groups and the replacement of the majority tradition with 'diversity'.

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ADRIAN WOOLFSON

Deoxyribonucleic Ascent

Five books about genetics

In the decades since James Watson and Francis Crick determined its double helical structure, much has become known about DNA. But the tiny molecular machines known as ribosomes, which are responsible for translating the information of genes into proteins via a chemical intermediate known as messenger RNA, have presented a more significant challenge to scientists. Indeed, Watson once stated that the structure of ribosomes was so complex that it would be impossible ever to comprehend it. To attempt to do so would be tantamount to career suicide.

In his candid and carefully observed book ***Gene Machine: The Race to Decipher the Secrets of the Ribosome*** (Oneworld 288pp £20), Nobel Laureate Venki Ramakrishnan provides a lucid, charming and eminently understandable firsthand account of how he and an assorted collection of fearless scientific pioneers attempted to unravel the structural secrets of the ribosome. The book has all the excitement of a detective novel, successfully communicating the thrill of the chase while also stressing the importance of the MRC Laboratory of Molecular Biology in Cambridge, known as the LMB, in which much of the modern science of molecular biology was invented. The LMB achieved this, in part, by insisting that investigators work in small but carefully selected groups and focus on only the most important scientific problems. It also helped buffer the immense career risk that embarking on such projects entailed by not insisting that its scientists produced regular articles for publication. The eventual success of Ramakrishnan's team represented a major milestone in scientific history.

In ***She Has Her Mother's Laugh: The Powers, Perversions, and Potential of Heredity*** (Picador 672pp £25), Carl Zimmer examines the concept of heredity and delves into the history of genetics. He does so, in part, by exploring his own genome and Jewish ancestry and delivering a series of thoughtful, artfully interwoven historical anecdotes. He charts some early examples of mankind's attempts to manipulate heredity through selective breeding. The 18th-century farmer Robert Bakewell, for example, once described as having 'invented sheep', scoured the country for the finest specimens of rams. He then crossbred them with a humdrum local breed called Old Leicester to produce the transformed New Leicester breed of super-sheep. The successes of this type of breeding project led to the convoluted logic of eugenics. One of the earliest eugenicists, Francis Galton, predicted that the 'men and women of the present day are, to those we might hope to bring into existence, what the pariah dogs of the streets of an Eastern town are to our own highly-bred varieties'.

Zimmer demonstrates the fallacies behind the simplistic and poorly contrived ideas of eugenics, emphasising the influence of extensive interbreeding on human evolution and the role played by the

environment and a host of other non-genetic factors in determining the way we are. It turns out that many human characteristics are not controlled by single genes or even by small groups of genes. They are instead 'omnigenic', being influenced by complex networks of genes that operate in concert. He argues that the concept of heredity must be adapted to accommodate this. His book is erudite, well researched and highly engaging.

In his entertaining ***The Book of Humans: The Story of How We Became Us*** (Weidenfeld & Nicolson 272pp £18.99), Adam Rutherford assails the notion of human exceptionalism while simultaneously detailing why it is that humans are, nevertheless, a highly distinctive species. Not unsurprisingly it is once again the extragenetic agencies of human culture and social organisation that differentiate us from all other species and establish us as the 'paragon of animals'.

Although some of the characteristics once thought to be uniquely human are discernible in other organisms, our ability to make, in the words of Wilhelm von Humboldt, 'infinite use of finite means' through language, writing and combinatorial technologies such as printing and word processing enabled humankind to develop in an unprecedented manner. These abilities have their roots in the evolution of a brain capable of abstract thought.

Rudimentary examples of some of the capabilities previously thought to be uniquely human may be found in several species of animals. Tool use, for example, has been observed in creatures ranging from octopuses to monkeys. Elephants are known to break branches off trees and use them to swat flies. Chimps use sticks to extract honey from beehives and stones to crack open nuts, while New Caledonian crows use hooked tools to extract grubs. Black kites appear to have developed the ability to manipulate fire by picking up smouldering twigs and depositing them selectively so that they can perform a 'turkey shoot' on fleeing animals.

Perhaps the most important challenge to the doctrine of genetic essentialism – the reductionist notion that information in genes is the principal causal determinant of human structure and behaviour – has come from the emerging field of heritable epigenetics. In ***Lamarck's Revenge: How Epigenetics is Revolutionizing Our Understanding of Evolution's Past and Present*** (Bloomsbury 288pp £25), Peter Ward puts forward an original and compelling case for the role of epigenetic inheritance in life's history. Although many aspects of Jean-Baptiste Lamarck's theory, including his idea that evolution is driven by a force compelling species to a state of continued perfection, were manifestly wrong, emerging evidence suggests that, in certain species and specific situations, some life events may indeed impact genes, permanently altering the chemical marks attached to DNA through a chemical process known as methylation. Such 'imprinted' genes may in some instances be passed on to offspring.

Ward argues that at times of significant environmental stress, such as mass extinctions and ice ages, and also periods of social stress, such as famines, epigenetic modes of evolution become more prominent. Unfortunately, he fails to provide compelling evidence for the relevance of this type of epigenetic development to humans, reviewing the literature inadequately and not making a clear distinction between the evidence for epigenetic inheritance in species other than humans and in humans themselves.

In his entertaining and thought-provoking ***Primate Change: How the World We Made is Remaking Us*** (Cassell 320pp £16.99), Vybarr Cregan-Reid explores how genes comprise just a portion of the overall story of heredity. He argues that DNA sequences are like the script of a Shakespeare play. The same script will be used in a production put on by the Royal Shakespeare Company and at an elementary school, but might generate quite different results.

Whereas genetic evolution operates over protracted timelines, cultural evolution is rapid and occasionally immediate. As a result, the physical and biochemical configuration of our bodies is out of step with the environment that we now inhabit. The sedentary lifestyle of current times is a case in point. Rather than sitting at desks in offices, our hunter-gather ancestors spent thirty to forty hours a week foraging for food. The cultural change that has fostered inactivity has been a potent contributor to many of the illnesses that afflict us, including diabetes and heart disease. It is compounded by the large quantities of processed foods we consume that are laced with sugar.

The artefacts that we have created reinforce our self-imposed maladaptive tendencies. Chairs, for example, were rare in the past – the 18th-century poet William Cowper extolled the exotic experience of reclining on a sofa in 1785 – but these items are now commonplace. There are today more than fifty billion sofas scattered across the planet.

As Carl Zimmer states in his book, if we wish to comprehensively capture the diverse factors that shape human nature, we will need to 'loosen the boundaries of what we call heredity'. I suggest that the term 'informiome' be used to encompass both the genetic and the extragenetic information that together define human nature and contribute to human heredity. In the future, human genomes will be written and rewritten, reconfigured, repaired and redesigned with the same ease with which we edit text on computer screens. The ethical issues are unfathomable. Despite the obvious medical advantages, the potential for the coupling of eugenic principles with this unprecedented new power looms menacingly over humankind's future.

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