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Mutilation and Mutation: Epigenetics and Racist Environments in Octavia Butler's *Kindred* and Salman Rushdie's *The Satanic Verses*

A special issue of the *American Journal of Human Biology* appeared in 2009 focused on the study of 'Developmental Plasticity in a Biocultural Context'. One article in the issue, a study by Grazyna Jasienska, examined the question of why African American babies have tended to have a lower birth weight in comparison with the birth weight of European American babies, and attributed the difference not only to contemporary socio-economic inequalities, but to the conditions experienced by black Americans during slavery, the effects of which, the article claimed, have been passed on through intergenerational signals of environmental quality, or epigenetic processes.¹ Jasienska argues that while difference in socio-economic status does account for some racial differences in birth characteristics, it does not account for the significant differences in the weight of newborns between black and white women on low incomes or, within black populations, between the babies of black women born in African countries living in the United States, and those of black women who were born in the United States.² Jasienska suggests that the difference can be explained by the 'influence of intergenerational life conditions, especially for the female line' which for African Americans comprises the 'inadequate diet and strenuous workload' of enslaved populations who 'experienced an imbalance between energy intake and energy expenditure, and had high energetic costs of fighting infectious diseases'.³ The low birth weight of African American children is thus partly the result of the low weight of enslaved children, the low rate of childhood growth as a result of poor nutrition and intense labour from a young age experienced by enslaved people, and the fact that enslaved mothers and grandmothers had poor nutritional development during adult life.⁴ The experiences of ancestors become

embodied in health disparities in the present, the genes carrying a 'memory' of these experiences, while the genes also create new memories as they are affected by the psychosocial stresses of racism in the present.

Another study in the issue focused on the environmental influences on the genes which occur during the lifetime of an individual as the cause of racial differences in health outcomes. Kuzawa and Sweet, studying US black – white disparities in cardiovascular disease, suggest that 'there is now a strong rationale to consider developmental and epigenetic mechanisms as links between early life environmental factors like maternal stress during pregnancy and adult race-based health disparities in diseases like hypertension, diabetes, stroke and coronary heart disease.'⁵ According to the authors, racial differences in rates of disease can be explained by the fact that lower birth weights in African Americans are related to higher blood pressure in later life, and that lower birth weights are caused by maternal stressors and the passage of stress hormones across the placenta, which are, in turn, caused by psychosocial stress, depression, exposure to racial discrimination and residential segregation.⁶ They note that 'whereas group membership and continental race are poor predictors of genetic variation, these same categories are directly related to the social and structural manifestations of inequality that impact the development of responsive biological systems.'⁷ What such studies appear to demonstrate is that racial difference is a fluid, complex combination of the influence on the genes of an individual's current environment and the environment of their ancestors. Put differently, racism has biological effects which in turn create racial disparities in health; rather than biologizing social definitions of race, race is revealed as a social construct with biological consequences.

The new science upon which these studies rely is epigenetics, which, in its broadest sense, is concerned with the interaction of genes with their environment. Epigenetics is the study of the processes by which the chemicals and proteins within DNA are modified, through methylation and histone modification, in ways which affect gene expression, but not the fixed sequence of DNA. The discovery which has forced scientists to reconsider their long-held assumptions is that these epigenetic marks can be switched on or off according to the environmental conditions in which the body finds itself, and, in some cases, that such changes can be inherited by offspring and passed from generation to generation. For Tim Spector, Professor of Twin Research and Genetic Epidemiology, epigenetics challenges four fundamental assumptions that have governed genetic science: that genes singlehandedly define the essence of human beings and are the only mechanism of inheritance; that genes and

heritable genetic destiny cannot be changed or modified; that an environmental event can't produce a long-lasting influence on your genes; and that you cannot inherit the effects of your ancestors' environments.⁸ The more familiar linear model of development and inheritance in which genes are fixed for life and passed on unchanged has thus been fundamentally challenged by the newly revealed complexity of the gene and environment relationship. The study of epigenetic mechanisms reveals that the human body's genetic structures can change and change back, that the body is in a dynamic relationship to its environment, that culture can become embodied. In the case of race, the initial findings of epigenetic studies have the potential to work against the more traditional inscription of race as genetically real; for rather than consolidating racial categorizations, or fixing race as a deterministic essence, epigenetics reveals how the experience of being racialized influences genetic development and inheritance.

These developments have been met with a great deal of excitement in the academy, particularly among social scientists, philosophers and humanities scholars, who have viewed epigenetic science, and developments within post-genomic biology more broadly, as a sign that the entanglement of the biological and the social is finally being taken seriously within genetic science. That racialization and racism have real and profound impacts on health is not a new idea; social epidemiologists, most notably Nancy Krieger, have long argued that patterns of inequality in health and disease are fundamentally shaped by societal conditions, and that racism and discrimination can harm health by becoming embodied across the life course.⁹ However epigenetics is providing scholars with a new way to frame and evidence 'the effects of white racism'¹⁰ on the physiology of black and brown bodies, offering, as Maurizio Meloni contends, 'a key missing link to explain the molecular pathways by which transient environmental factors can leave marks or be inscribed on the biological body'.¹¹ Such explanatory epigenetic mechanisms have been popularized in the media where headlines such as 'Post-Traumatic Slave Syndrome and Intergenerational Trauma: Slavery Is Like a Curse Passing through the DNA of Black People'¹² and 'The Epigenetics of Being Black and Feeling Blue: Understanding African American Vulnerability to Disease'¹³ have embedded a racialized understanding of epigenetics within the public imagination. Epigenetics is understood both as a mechanism which operates transgenerationally and as genetic markers which result from contemporary racial microaggressions, which can have negative health-related consequences for the mental, emotional and physical well-being of black people.¹⁴

Yet headlines and articles such as these have also caused a significant degree of unease among scientists and sociologists, who have increasingly criticized the media as well as their fellow academics, for making 'wild claims'¹⁵ and creating hype around a science which is still very much in its infancy. Over the past ten years there has been, as Brigitte Nerlich has argued, 'a general shift from breathless excitement, grand claims and hype to more nuanced, modest and humble assessments of what epigenetics is and what it can achieve.'¹⁶ Critics of epigenetic 'hype' emphasize that there is still a great deal of uncertainty around its findings and therefore that the bold and to a degree revolutionary claims being made for it simply cannot be scientifically supported. Such uncertainties and contingencies include the fact that 'there is a lack of consensus within bioscience over the meaning of epigenetic effects, mechanisms, and even the word itself', a major instability which means that, according to Martin Pickersgill, the enthusiasm for transgenerational inheritance among sociologists risks co-producing an 'alien science' that may disaffect the very communities of life scientists with which sociologists would like to collaborate.¹⁷ The concept of transgenerational epigenetic inheritance has proved particularly controversial, with some suggesting that what appears transgenerational could in fact be the result of the experience of similar environments in the present.¹⁸ Ruth Müller et al. have expressed concern about 'over-simplified translations from social structures to biological processes and vice versa' which may ironically lead to a new kind of determinism, arguing:

if we hope to translate the findings of epigenetic research on the developmental mechanisms linking nutrition with disease risk into effective health policy, it is imperative that we view nutrition not as a simple exposure in isolation, or a function of individual choice, but as a resource that is constrained in complex ways by social and structural factors that distribute resources, and chances of health, unevenly across society.¹⁹

The rush to embrace an epigenetic view of inheritance and development risks a failure to recognize the complexities encompassed by the environment and risks 'individuals, their health and their behaviour' becoming 'bound and ruled by the epigenetic marks they have acquired in early life'.²⁰ This risk is only magnified when it comes to race because, as Lundy Braun et al. argue, 'once race is presumed, the ways in which multiple genetic inheritances interact with the environment within that individual seem to disappear',²¹ as racial difference is assumed to be the primary factor affecting a person's life experience.

A significant element of the misunderstandings, simplifications and hype around public and lay understandings of epigenetics has been attributed to the

metaphors, language and allusions through which this new science has been communicated by both scientists and the press. The ideas of the nineteenth-century biologist Jean-Baptiste Lamarck are frequently invoked in popular and academic writing on epigenetics.²² Lamarck's thesis, set out in his 1809 *Philosophie Zoologique*, was that it was possible for organisms to acquire physical characteristics during their lifetimes, which were then inherited by their offspring.²³ It was a controversial theory which was invoked throughout the nineteenth century but which enjoyed a significant resurgence during the debates that followed Darwin's *Origin of Species* in 1859.²⁴ The idea that environmentally acquired characteristics might be passed on genetically was, after dominating debates for several decades, ultimately laid to rest with the Modern Evolutionary Synthesis in the 1940s when Darwinian natural selection became the basis of modern genetic science. However, the transgenerational responses identified by recent epigenetic studies have led some to conclude that Lamarck was, in fact, partially right.²⁵ Such invocations situate epigenetics as a kind of neo-Lamarckism and, in so doing, according to critics such as Ute Deichmann, create a misleading picture of what epigenetics actually means because, unlike Lamarckism, 'phenomena of inherited variation related to epigenetic marks ... are not actively acquired ... they are not adaptive (except by chance), and in many cases are detrimental for the organisms'.²⁶ Nevertheless the similarities between epigenetic mechanisms of inheritance and Lamarck's theories (as they were understood in opposition to Darwinism at the end of the nineteenth century) have proved irresistible to popularizers of epigenetics. Tim Spector references Rudyard Kipling's *Just So Stories* (1902), fantastic tales of how various animals came to obtain their physical characteristics through human or environmental intervention – stories which were influenced by Lamarckian ideas²⁷ – in the leopard-print design of his book's dust jacket. Kipling's Lamarckian-influenced stories *How the Camel Got His Hump*, *How the Leopard Got His Spots* and *How the Rhinoceros Got His Skin* are also recalled in one of the major metaphors used to communicate epigenetic processes – the idea that epigenetics 'gets under the skin'. This is a metaphor that, Nerlich notes, operates on several levels in epigenetic discourse, as it means 'to affect someone very strongly in a way that is difficult to forget' but it is also a phrase which

like many metaphors for emotion, has a physiological basis. Think about expressions like 'to be a pain in the neck', 'to stick in one's throat', 'to step on somebody's toes', 'to get hot under the collar', etc. This intimate link between talking, meaning, thinking and physiology makes the 'getting under the skin' metaphor quite potent and probably contributed to popularising epigenetics in particular contexts.²⁸

As is the case with genetics more broadly, literary references and metaphor have been frequently employed as a communicative tool to explain the meaning and mechanisms of epigenetics to a public audience, but often in ways that are then also blamed for the public misunderstanding of that science.²⁹

This chapter explores whether literature might be considered differently in relation to epigenetic science; not as a source of either misleading or distorting images and metaphors, but as a means of thinking through the implications of this science, a means of amplifying and expanding both scientific and lay understandings of emerging issues in epigenetics. For while leading epigeneticist Edith Heard has claimed that 'there's a gap between the fact and the fantasy' of epigenetics and 'Now the facts are having to catch up',³⁰ I want to argue, as I have throughout this book, that contemporary fiction offers ways of comprehending the relationship between fact and fantasy, reality and fiction, which suggest that there might be something to be gained from taking a relational, rather than oppositional, approach to the imagined and the real as epigenetic science develops. This is nowhere more important than for the concept of race. The novels examined as case studies in this chapter, Octavia Butler's *Kindred* (1979) and Salman Rushdie's *The Satanic Verses* (1988), each explore how race is created at the intersection of the imagined and the real, through a focus on the impact of racist environments on the body; US plantation slavery in the case of the former, and late-twentieth-century hostile immigration environments in the UK in the case of the latter. While both novels were published years before epigenetics came to prominence, each imagines processes of bodily change and transformation which are comparable to the mechanisms which epigenetic science is beginning to uncover: Butler and Rushdie employ fantastical modes to represent the way experiences of racism become biologically embodied, imagining how black and brown bodies acquire certain characteristics through exposure to racist environments in the UK and United States. Their representations of the porous boundary between the body and its wider environment offer a mode of comprehending the epigenetic effects of racism as the imagined or fictional (the racist belief in the inferiority of other races) made real (in apparently 'racial' biological characteristics). These fantastic literary interrogations of the dynamic relationship between the imaginary and reality not only shed light on the entanglement of the biological with specific, historical, cultural and social environments through which epigenetic changes are formed, but reveal how fiction itself is, and might productively be, intertwined with the 'facts' of epigenetic science.

Heard sounds a note of caution about the nascent state of epigenetics, claiming that ‘it’s our duty as scientists to pass on the right messages’,³¹ something which is indisputable. Yet it is also the case that epigenetic science is currently in a state of flux and uncertainty, a state which Pickersgill contends is productive and necessary for driving science forward.³² This state, while carrying the danger of public misunderstanding, also offers an opportunity to recognize and to explore what Mary Midgley calls the ‘imaginative visions’³³ upon which science is based, and it is my contention that contemporary fiction might contribute to, and illuminate, those visions, actively and productively informing the inevitable biofictional formation of race in an equally biofictional epigenetic science. Indeed, Meloni has suggested that it might be possible to move beyond ‘debates about determinism and anti-determinism in epigenetics’ by looking at the long histories of theories of plasticity, histories in which literary studies has played a significant part.³⁴ Meloni’s contention, which he develops by drawing on canonical works of European philosophy and literature, is that such histories reveal plasticity to be an ambiguous concept, a concept that while ‘capable of undermining atomistic and insulated models of the body’ is also historically ‘deeply racialised and gendered’ and therefore not necessarily emancipatory.³⁵ This chapter focuses instead on the import of writing concerned with the mechanisms, experience and effects of racism, and in so doing uncovers an alternative literary approach to plasticity which, while acknowledging the ways in which it may be racialized, understands that it is also something that people subject to racialization have had to learn to live with. *Kindred* and *The Satanic Verses* each interrogates how and why, as Achille Mbembe puts it, ‘racism consists, most of all, in substituting what *is* with something else, with another reality’, and how those who live in racist environments might not only adapt and survive, but gain new knowledge from racism’s ‘power to distort the real and to fix affect’.³⁶ These fictional portrayals offer alternative pathways for conceiving of an epigenetics of race, moving beyond debates about determinism and anti-determinism and towards an understanding of race as biofiction.

Kindred as post-genomic novel

Kindred is the tale of Dana, a twenty-six-year-old African American woman living in Los Angeles, who, on 9 June 1976, is ‘called’ back in time by her ancestor, Rufus Weylin. Rufus’s family owns a plantation in antebellum Maryland, and among the enslaved people who work on the plantation is another of Dana’s

ancestors, Alice. Dana is called back in time to save her white ancestor, Rufus, from harm and illness at various points across the course of his life. Early on in the novel Dana realizes that her own survival is dependent on her ability to save Rufus; she must endeavour to keep him alive until he has raped Alice, whose subsequent child, Hagar, Dana knows to be her several times great-grandmother. As Dana ambivalently tends to Rufus, becoming a part of the plantation's black population, she is subject to the horrific violence and trauma of being enslaved. While Rufus heals from each accident or illness, Dana is by turns beaten and whipped, forcing her to experience life as a slave first-hand; only when she truly fears that she might be killed does Dana return to the 1970s, and to her new husband Kevin, who joins her on some of her trips back in time to the Weylin plantation, a place that she comes to call 'home'.³⁷ While Dana's visits to Rufus in the past are often years apart, and she can be stuck in Maryland for months, time works differently in the 1970s present, where only minutes, hours or days have passed, giving Dana very little time to recover from her wounds and to prepare for Rufus's next 'call'. She is only freed from moving back and forth in time when, knowing that Hagar has been born, she finally kills Rufus as he tries to rape her. However, she returns to the 1970s permanently mutilated through the loss of an arm, a loss which she is unable to explain to anyone other than Kevin, and which she must learn to live with permanently.

Butler described her novel as 'a grim fantasy',³⁸ a departure from the science fiction writing for which she was (and would be) predominantly known, because despite the fact that the novel involves the protagonist travelling through time, as Butler asserts, 'with *Kindred* there's absolutely no science involved. Not even the time travel'.³⁹ Instead, for Butler the novel is 'the kind of fantasy that nobody had really thought of as fantasy',⁴⁰ a consciously fantastical representation of enslavement which contrasts sharply with the emphasis on truth and authenticity to be found in the nineteenth-century slave narratives upon which Butler drew.⁴¹ Yet while the novel is clearly not science fiction in that, much like Ishiguro's approach to cloning in *Never Let Me Go*, there is no discussion of or interest in the scientific ideas which may have enabled Dana to travel through time, *Kindred* does, I want to suggest, bear the imprint of Butler's wider interest in bioscience, evident in her science fiction published both before and after *Kindred*. Butler's oeuvre is full of engagements with genetics, from the selectively bred and mutated humans of her first novel *Patternmaster* (1976) to her *Xenogenesis* series (1987–1989), which depicts an alien race called the Oankali, who have the ability to genetically engineer themselves and the DNA of others. The latter series in particular has been read

as in part a response to sociobiology, a field (considered pseudoscientific by some) concerned with the way social behaviour is determined by biology.⁴² Butler's approach to the biological is, however, not deterministic, but evinces the kind of approach that is now emerging in humanities' scholarship on post-genomic biology, as encapsulated in the following exchange with an interviewer:

ALK: So you're saying that knowledge of the body can be used to empower and not necessarily to determine? OB: Yes. Sure! ALK: Well, the determinism is what scares me about sociobiology. OB: Don't worry about it. ALK: How can you not worry about that? OB: Don't worry about the real biological determinism. Worry about what people make of it. Worry about the social Darwinism. After all, if sociobiology, or anything like it (people don't really use that term much any more for obvious reasons), is true, then denying it is certainly not going to help. What we have to do is learn to work with it and to work against people who see it as a good reason to let the poor be poor, that kind of thing-the social Darwinism: 'They must be poor because of their genes,' that kind of foolishness.⁴³

Butler embraces the biological body, but not biological determinism, situating the biological as integral to knowledge of the self and of society because 'the body is all we really know that we have. We can say that there're always other things that are wonderful. And some are. But all we really know that we have is the flesh.'⁴⁴ This is a position which, as her interviewer notes, is at odds with 'postmodern thinking and writing which calculates the human body as primarily a discursive entity-perhaps in defensive response to the ways genetics studies have often allocated political power and influence according to hierarchies of raced and gendered bodies.'⁴⁵ However it is also a position which prefigures the more recent new materialist turn towards biology which Sarah Ahmed argues has been built on the erasure of earlier feminist engagements with biology,⁴⁶ engagements of the kind Butler demonstrates here and has developed in her wider fictional writing. Butler's insistence on the significance of embodied knowledge, on 'body-knowledge' as 'what's made of genetics',⁴⁷ instead offers a proto-epigenetic understanding of how the dynamic relationship between genes and their environment shapes what and how we know ourselves to be, a vision which, rather than shying away from the biological, examines what it might mean to understand ourselves in these terms, while moving beyond biological determinism. It is this form of embodied knowledge and what we might now understand as epigenetic embodiment which Butler explores in the context of the racism and racialization of US slavery in *Kindred*.

The environment of the Weylin plantation to which Dana is transported in *Kindred* is the kind of past environment identified in epigenetic studies of the intergenerational effects of slavery as the cause of disparities in health in the present. The novel depicts how this environment shapes the bodies of those who live within it, but also the bodies of their ancestors, as Dana's trips back to the past come to be defined by the pain and injuries which she permanently sustains as a result. Dana's first meeting with Rufus occurs when she rescues him from drowning, but is overwhelmingly defined by her experience of being beaten by his mother Margaret, as Dana tries to resuscitate him, before returning – at the threat of being shot – wet and muddy to the present with 'an ache in my back and shoulders where Rufus's mother had pounded with her fists'.⁴⁸ Such injuries only increase as Dana first witnesses the flogging of an enslaved person; 'I could literally smell his sweat, hear every ragged breath, every cry, every cut of the whip. I could see his body jerking, convulsing, straining against the rope as his screaming went on and on. My stomach heaved ...',⁴⁹ before experiencing something similar herself shortly afterwards, 'the man tackled me and brought me down hard... he began hitting me, punching me with his fists'.⁵⁰ As she becomes accustomed to life on the plantation on one visit, she begins to live like other enslaved people, eating 'corn meal mush' alongside other slaves, waiting to 'get better food later on after the white folks eat'.⁵¹ When sent to work in the fields she relates how 'I didn't think my shoulders could have hurt much worse if they'd been broken. Sweat ran down into my eyes and my hands were beginning to blister'.⁵² Even when she is stationed in the house, tending to Rufus, she cannot escape the violence of the Weylins, whether it be from Margaret who 'threw scalding hot coffee at me'⁵³ or her husband Tom Weylin who attacks Dana after he discovers that she has been teaching Nigel, an enslaved boy, how to read, 'I never saw where the whip came from, never even saw the first blow coming. But it came – like a hot iron across my back, burning into me through my light shirt, searing my skin ... I screamed, convulsed. Weylin struck again and again, until I couldn't have gotten up at gunpoint'.⁵⁴ On each visit, Dana is forced to withstand the harsh and violent conditions of the plantation, and on each occasion is left in the present exhausted and in pain, her injuries getting worse and worse until she finally loses her left arm.

Dana comes to understand that there is a marked difference in the impact of the racist environment of the Weylin plantation on its black inhabitants and the white people whom they live alongside. Dana and Kevin each try to account for, and sometimes excuse, Rufus's behaviour, by thinking of it in environmental terms; reflecting on Rufus as a child, Dana thinks that 'his environment had left

its unlikeable marks on him'⁵⁵ and Kevin counsels her that she will ultimately be unable to change Rufus's behaviour because 'his environment will be influencing him every day you're gone'.⁵⁶ The environmental effect of the plantation on white people is a psychological one, the 'marks' it leaves are on attitudes and behaviour, rather than the body, an effect which Dana worries might impact upon Kevin when he is also brought back to the past; 'if he was stranded here for years, some part of this place would rub off on him. No large part, I knew. But if he survived here, it would be because he managed to tolerate the life here'.⁵⁷ Kevin's ability to survive depends upon his ability to adjust psychologically, neither his nor any white bodies are under real threat. However for Dana and the other slaves the psychological cannot be separated from the physical; it is the terror of violence and pain which shapes their behaviour, something which Dana has to experience in order to understand. Prior to being called back, Dana's understanding of slavery is little different to Kevin's; she 'has seen people beaten on television and in the movies'⁵⁸ and waiting to be called back again she manages to find 'a compact paperback history of slavery in America'⁵⁹ which she thinks might be useful. She uses her time at home in the 1970s to 'read books about slavery, fiction and nonfiction ... I read everything I had in the house that was even distantly related to the subject',⁶⁰ yet none of it can prepare her for the reality. As Sherryl Vint contends, for Dana, 'being black and knowing "the facts" is not enough', and instead she must come to know what slavery was like through her own body, for 'as long as Dana envisions herself as a disembodied subject, she deludes herself that the experience of slavery is safely contained in the past'.⁶¹ For Butler, the trauma of enslavement is something which African Americans must learn to live with; it is an embodied intergenerational history which black people carry with them, biologically.

Dana has little choice in the matter; she is powerless to prevent herself going back in time and returning home without her left arm, and is left to live with a significant physical disability that marks her body in the manner comparable to the inheritance of health-damaging epigenetic marks. Her life becomes in some sense determined by her ancestry in a way which critics of epigenetic science have identified as problematic. Meloni writes that 'the inheritance of acquired characters is a double-edged sword ... bad habits can become bad biology, and the scars of past exposures and traumas can give rise to ideas of specific groups being "too damaged" to be rescued'.⁶² When these purportedly damaged groups correspond to racial groupings, there are concerns that a different form of biological determinism might ensue; 'claims of degeneration of specific populations for their too long exposure to pathogenic environments have been

a significant part of the eugenic experience,'⁶³ Meloni contends, so that rather than extinguishing racialization, epigenetic understandings of race risk a kind of re-racialization of social debates and are in danger of replicating oppressive biological projects that have drawn on the science of unfixed characteristics.⁶⁴ In this view, Dana's biological inheritance – represented by her bodily scars and mutilation – is determining and limiting, an affirmation, rather than disavowal, of the racial forms of categorization which led her ancestors to be treated as slaves and created the racist environment which marked their, and Dana's, bodies.

Yet the novel suggests that, on the contrary, a kind of freedom is in fact achieved for Dana through her acquired, intergenerational body knowledge, an inheritance which, while physiologically limiting, is also on some level empowering and healing when it is fully known and understood. For, before she is called back in time, Dana's life is already bound and ruled by an environment saturated with subtle forms of racism and sexism, to which she only becomes attuned once she experiences a bodily connection to her ancestors. The past in the novel is not only that of the early nineteenth century, but also the much more recent past of Dana's life: as the narrative moves back and forth in time, it often returns not to the present but to Dana's descriptions of her life with Kevin in the months before she began to time travel. It is in these descriptions of the more recent past that Butler draws parallels between Dana's life in the present and the experience she will have on the Weylin plantation. Dana's relationship with Kevin, around which her immediate past centres, is largely unextraordinary. They meet while they are both 'working out of a casual labor agency',⁶⁵ drawn together by the fact that they are both writers (and using agency work to supplement their income). While Dana narrates her burgeoning love for Kevin, it is punctuated by small, subtle, uncomfortable insights into his character: when they first meet, Kevin assumes that Dana flunked out of high school, then when they start thinking of living together Dana recalls how 'Kevin did suggest once that I get rid of some of my books so that I'd fit into his place'⁶⁶ and encourages her to quit her job. While Dana pushes back, Kevin gets annoyed then angry when Dana refuses to type his manuscripts; 'he said if I couldn't do him a little favour when he asked, I could leave'.⁶⁷ Kevin's microaggressions, both racial and patriarchal, demonstrate that beneath his relaxed, liberal exterior, he holds little regard for Dana's needs, independence or intellectual life.

Dana has been conditioned to put up with his attitude, but as she begins to travel back and forth in time, she begins to relate to his behaviour differently. Dana's first trip to the past occurs when she and Kevin have just moved and begins while 'we were still unpacking – or rather, I was still unpacking. Kevin

had stopped when he got his office in order.’⁶⁸ As she spends more time in the nineteenth century, she begins to see small parallels between her petulant, needy and narcissistic ancestors Rufus and his father Tom, and Kevin, who while maintaining an abhorrence for slavery and defending Dana, cannot quite comprehend her experiences. His initial reactions to her inexplicable disappearance and reappearance are clumsy; in pain after being beaten by Margaret, ‘Kevin hadn’t helped’⁶⁹ by squeezing Dana’s shoulders, and he declares ‘that’s a lot better’ when she has cleaned herself up, when for Dana, ‘it wasn’t.’⁷⁰ When Dana says ‘I don’t feel secure here,’⁷¹ it isn’t only being pulled back to the past which is making her uneasy. Fighting off a patroller trying to rape her, Dana returns to the present with Kevin on top of her, who before allowing her to rest and recover wants to know ‘Did he rape you?’⁷² a question he asks her again at the end of the novel about Rufus, ‘What’s he done to you?’⁷³ While Dana explains that she hasn’t been raped, Kevin doesn’t quite believe her and his attitude betrays the sense of ownership he feels he has over her body; ‘he looked at me uncertainly. “Look, if anything did happen, I could understand it. I know how it was back then.” To which Dana replies, ‘You mean you could forgive me for having been raped?’⁷⁴ While Dana tries to be as clear as possible, ‘I’m not property, Kevin,’ he ‘only half understood’.⁷⁵ The sexual possessiveness Kevin feels towards Dana mirrors Rufus’s proprietorship of Alice. Alice has no choice but to succumb to Rufus, who threatens to whip her if she resists, and while Dana’s relationship with Kevin is chosen, it follows a more subtle patterning that Dana can only see clearly once she has been to the past; as she tries to comfort Kevin, ‘he pulled away from me and walked out of the room. The expression on his face was like something I’d seen, something I was used to seeing on Tom Weylin. Something closed and ugly.’⁷⁶

Thus when Dana narrates at the start of the novel that ‘the trouble began long before 9 June 1976, when I became aware of it,’⁷⁷ she signals her narrative as being written with a newly acquired understanding of her (recent) past of which she has only become aware through her visits to the nineteenth century and her subsequent injuries. Her embodiment of ‘the trouble’ which is the history of enslavement and its unacknowledged legacies in the present is necessary for her survival as a black woman in the 1970s; for, as Butler suggests, ‘sometimes we can work around our programming if we understand it.’⁷⁸ Dana’s biological inheritance – the trauma of racialization and its consequences – cannot be ignored but must instead be understood in order to both live with and move beyond it, and Dana’s multiple trips back in time offer some suggestion of how this might be done. For it is in adopting an altered relation to time and space

that Butler suggests that Dana, and by extension African Americans, might begin to understand the nature of race and racism differently, to understand that the novel's 'grim fantasy' is not the fantastical ability to live in and with two moments in time and two different environments at once, but the white supremacy and patriarchy which distort and warp the real. Unlike the temporally linear, teleological narrative of enslavement presented by Haley in *Roots*, the narrative structure of *Kindred* moves back and forth in time, until what initially feels to Dana like a temporal disjunction becomes familiar and homely; on one of her later trips to rescue Rufus, Dana narrates how 'finally, after more woods and fields, the plain square house was before me, its downstairs windows full of yellow light. I was startled to catch myself saying wearily, "Home at last"'.⁷⁹ From the first line of the novel, 'I lost an arm on my last trip home', Dana signals that the plantation is for her as much her home as her new house with Kevin. At the Weylins' 'Kevin and I became more a part of the household, familiar, accepted, accepting'⁸⁰ and while this acclimatization disturbs Dana she is also aware that 'I had begun to feel – feel, not think – that a great deal of time had passed for me too ... Some part of me had apparently given up on time-distorted reality and smoothed things out'.⁸¹ As the novel progresses, Dana's experience becomes less and less fantastical and more real.

On one level, the apparent ease with which Dana can exist across time is another way in which she is forced to confront the uncomfortable parallels between the past lives of her ancestors and her existence in the present. Yet her inability to remain an observer and to 'maintain the distance'⁸² between past and present, however uncomfortable, is also how she learns to feel 'at home' with the truth of her family history. Her ancestry is one which, as Philip Miletic contends, problematizes 'the cultural wholeness of an African black identity' that was being promoted by the Black Power movement in the 1970s.⁸³ Dana's discovery that she has a white ancestor, whom she must repeatedly save, undermines an idea of race premised on genetic difference by emphasizing the entangled genealogies of white and black Americans. Instead, race is made through an embodied knowledge in and of the black body, the locus of multiple temporal and environmental junctures which coexist; Dana's body is a site where binary distinctions between the fantastic and the real are dissolved, as being black becomes – as in Whitehead's *Apex Hides the Hurt* – about how, through embodiment, to live with, but not be determined by, the (very real) pain and trauma of the past. If epigenetics, as Becky Mansfield and Julie Guthman contend, 'moves toward a notion of biological difference as part of the warp and weave of space and time',⁸⁴ then we might consider Butler's time travelling

tale as a form of post-genomic writing, a novel which models, in its narrative structure, a way of living with 'a new form of racialization based on processes of becoming rather than on pre-given nature'.⁸⁵ Mansfield and Guthman caution that research into these processes of racialization, while appearing anti-racist, is in danger of pathologizing epigenetic plasticity by seeking to improve and 'normalize' epigenetic variation, which is increasingly conceived of as 'abnormal' and categorized as disease.⁸⁶ *Kindred*, however, attempts no such correction: Dana never attempts to alter history and there is no attempt to change her body from being marked and scarred. Instead, Butler presents Dana's new-found body knowledge as a form of empowerment, a means of understanding what it means to be African American – which is to live with racialization across space and time and with the fantasy of racial categorization.

Acquiring race in *The Satanic Verses*

Where *Kindred* is primarily interested in the inheritance of acquired characteristics, *The Satanic Verses* is more concerned with how biological markers might be acquired from certain environmental exposures during an individual's lifetime. A dense and complex novel, *The Satanic Verses* is about the experiences of immigrants in Britain in the 1980s under Margaret Thatcher's conservative government. The novel follows the lives of two Indian immigrants, actors Saladin Chamcha and Gibreel Farishta, as they struggle to make their way in London following their abrupt arrival in England; in one of many fantastical moments, the narrative opens with Saladin and Gibreel falling to earth from an exploded jumbo jet which has been hijacked by terrorists. In London, Gibreel struggles with mental illness, while Saladin becomes part of the multicultural community of Brickhall (an amalgam of Brick Lane and Southall) before they eventually both return to Bombay. The novel became famous for the controversy which surrounded Rushdie's depictions of Gibreel's visions, and the resulting fatwa calling for Rushdie's death which was issued on 14 February 1989. Yet this focus obscured Rushdie's detailed portrayal of experiences of racism in late-twentieth-century England, a portrayal which, I want to suggest, like *Kindred*, offers a proto-epigenetic understanding of the impact of racism upon the body.

Rushdie is a writer who has become increasingly interested in biological science and its relationship to fiction. In 2009, the twentieth anniversary of the fatwa against his life, Rushdie became a member of the advisory board of Project Reason, a not-for-profit organization (now no longer in existence)

set up with the purpose of spreading secular values and scientific knowledge in society. The project, whose board members included writers Ian McEwan and Ayann Hirsi Ali, as well as several prominent contemporary biologists and geneticists including Richard Dawkins, Steven Pinker and Craig Venter, brought together thinkers from the literary and scientific worlds who share in the belief that rational thinking, science and secularism need to be asserted in the face of the irrationality and fundamentalism of religious belief, particularly as it is manifested in Islam and the strands of American Christianity which promote creationism. Rushdie's involvement is perhaps not surprising given his increasing participation in public debates about Islam following the terrorist attacks of 9/11 and 7 July 2005, debates which have often sought to construct Islamic belief as a pre-modern dogma irreconcilable with the West which, in contrast, is heralded as the embodiment of rational, progressive thought.⁸⁷ Yet what Project Reason added to the debate, and made explicit, was the specifically scientific character of the reason it promoted; the project placed biological science and evolutionary theory at the centre of its response to religious belief, as the ultimate answer to it. Rushdie has increasingly adopted the logic of evolutionary biology as a means of explaining – and defending – storytelling, as a way of foreclosing objections to literary expression, such as those put forward at the publication of *The Satanic Verses*. In recent interviews Rushdie claims that the 'story instinct is hardwired in our DNA'⁸⁸ and that 'any external limitations on our ability to speak, or on the content of our speech, therefore, interferes with something essential to us all, whether we are writers or not.'⁸⁹ Stressing the innateness and universality of storytelling through a neo-Darwinian framework in which we are all 'storytelling animals',⁹⁰ Rushdie appears to align himself with the evolutionary explanations of literature to be found in sociobiology and the Literary Darwinist movement.

In this context it might seem unlikely that Rushdie's writing could engage with the fluidity, plasticity and non-deterministic character of epigenetics – the opposite of the deterministic worldview which characterizes neo-Darwinian approaches to biology and literature. Yet as several critics have noted, Rushdie's non-fictional writing and journalism are consistently more polemical than his fiction, the ideological clarity of the former at odds with the more ambivalent, contradictory character of the latter.⁹¹ Moreover there has been a 'profound ideological shift'⁹² in Rushdie's thinking, which began with the fatwa against him in 1989, but was cemented by the events of 9/11.⁹³ Indeed, Rushdie's engagement with evolutionary biology prior to this 'shift', in *The Satanic Verses* itself, is of a more complex kind than the neo-Darwinian view he would later come to

adopt. The novel does reflect Rushdie's scepticism towards the kinds of religious fundamentalism which deny Darwinian evolution: waking from a nap during his flight to the UK, Saladin finds himself sitting next to Eugene Dumsday, an American creationist who introduces himself as 'a man of science' and explains that he has been in India

warning your fellow men ... against Mr Darwin and his works. With the assistance of my personal fifty-seven slide presentation. I spoke of my own country, of its young people ... I see them in despair, turning to narcotics ... If I believed that my great-granddaddy was a chimpanzee, why, I'd be pretty depressed myself.⁹⁴

As his name suggests, Dumsday is dumb, his blinkered religious fundamentalism can only be laughed at – Saladin's response is to 'giggle'⁹⁵ – and Dumsday's sermonizing is comically undermined when later in the novel Saladin hears him on the radio and he now embodies the things which he abhors; the devil (having 'lost the half of his tongue'⁹⁶ in the hijacking incident) and modern biomedical science, which has enabled his tongue to be rebuilt 'with flesh taken from his posterior'.⁹⁷

Yet the novel resists taking its own fundamentalist stance towards biology and instead draws upon a pre-Darwinian theory of evolution, Lamarckism, as a means of addressing one of its foremost themes – the condition of migrancy. As Saladin and Gibreel fall through the sky they encounter 'the debris of the soul, broken memories, sloughed-off selves, severed mother-tongues, violated privacies, untranslatable jokes, extinguished futures, lost loves, the forgotten meaning of hollow, booming words, *land, belonging, home*'.⁹⁸ These are the changes wrought on the individual by migration, Rushdie suggests, and to emphasize their force, such change is depicted as being manifested in a physical change in the body of the migrant. Saladin and Gibreel metamorphose as they fall, the 'processes of their transmutation'⁹⁹ playfully explained by the narrator through reference to the early-nineteenth-century botanist Jean-Baptiste Lamarck:

Mutation?

Yes sir, but not random. Up there in air-space, in that soft, imperceptible field which had been made possible by the century and which, thereafter, made the century possible, becoming one of its defining locations, the place of movement and of war, the planet- shrinker and power-vacuum, most insecure and transitory of zones, illusory, discontinuous, metamorphic, -because when you throw everything up in the air anything becomes possible – wayupthere, at any rate, changes took place in delirious actors that would have gladdened the heart of old Mr Lamarck: under extreme environmental pressure, characteristics were acquired.¹⁰⁰

Rushdie comically invokes Lamarckian evolution as the magical science which explains the immigrants' equally magical transmutation by migration: just as Lamarck 'draws on mythic concepts of metamorphosis and transformation and explains them causally',¹⁰¹ Rushdie's narrator and his characters offer Lamarck as the explanation for the migrants' newly acquired characteristics. Later in the novel, when Muhammad Sufyan, a landlord of the rooming house above the Shaandaar Café, tries to account for Saladin's mutation to the Shaandaar residents, it is Lamarck to whom he turns:

The theories of Lamarck, I am pleased to report, were quoted by the exiled schoolteacher, who spoke in his best didactic voice. When Jumpy had recounted the unlikely story of Chamcha's fall from the sky... Sufyan, sucking teeth, made reference to the last edition of *The Origin of Species*. 'In which even great Charles accepted the notion of mutation in extremis, to ensure survival of species; so what if his followers – always more Darwinian than the man himself! – repudiated, posthumously, such Lamarckian heresy, insisting on natural selection and nothing but, – however, I am bound to admit, such a theory is not extended to survival of individual specimen but only to species as a whole;- in addition, regarding nature of mutation, problem is to comprehend actual utility of the change.'¹⁰²

Here, Sufyan recognizes – in the manner of some contemporary commentators on epigenetics – that Lamarckism is limited in its ability to explain the acquisition of characteristics which aren't adaptive but are instead damaging. For it is apparent to the migrants that it is the socially and culturally hostile environment of England which dictates the nature of the characteristics they go on to acquire.

Picked up by the police and immigration officers, who abuse him in the back of their van, dragging off his clothes, beating him and making him eat his own excrement, Saladin becomes the 'animal'¹⁰³ they call him, growing horns, hairy thighs and hoofs, 'squealing like a pig'¹⁰⁴ before being beaten unconscious. Saladin's literal dehumanization is a direct result of the racism to which he is subject, and he is taken to a medical facility at the detention centre where he is surrounded by other immigrants who, the manticore in the bed next to him explains, have undergone similar transformations; "there's a woman over that way," it said, "who is now mostly water-buffalo. There are businessmen from Nigeria who have grown sturdy tails. There is a group of holidaymakers from Senegal who were doing no more than changing planes when they were turned into slippery snakes".¹⁰⁵ The experience of racism manifests itself in physical, bodily changes which the immigrants themselves can hardly believe are true: in the face of the impossible, Saladin is forced to remind himself that 'he was

a member of the real world',¹⁰⁶ that 'I am a real man',¹⁰⁷ and is particularly confounded by the fact that the police officers who abuse him are not alarmed by his mutation; 'what puzzled Chamcha was that a circumstance which struck him as utterly bewildering and unprecedented – that is, his metamorphosis into this supernatural imp – was being treated by the others as if it were the most banal and familiar matter they could imagine'.¹⁰⁸ Yet the police officers are not surprised by Saladin's appearance because for them it is not unreal or impossible; they see immigrants as animals and as less than human, and that becomes their reality. The enduring effect of racism is to make the imaginary real, as Saladin finally discovers in hospital; "they describe us," the other whispered solemnly. "That's all. They have the power of description, and we succumb to the pictures they construct."¹⁰⁹

Rushdie's insistence that it is racism which creates race, that the immigrants' difference is constructed and made rather than biologically fixed or inherited, has clear parallels with epigenetic studies which locate seemingly racial characteristics as the biological embodiment of cultural and environmental circumstances. Rushdie's (like Butler's) representation of these processes, however, is of course 'unrealistic': changes to genetic structures are not the same as physical human-animal metamorphosis. This raises the question of what value such a magical-realist fictional representation can have for how we think about epigenetics; can Rushdie's fantastic depictions of humanity shed any light on a scientific (epigenetic) understanding of life and of race? A similar question is posed by Ian McEwan in his 2005 novel *Saturday*, in which the novel's neuroscientist protagonist, Henry Perowne, questions the efficacy of the magical-realist style of contemporary writers, including Rushdie:

What were these authors of reputation doing – grown men and women of the twentieth century – granting supernatural powers to their characters? He never made it all the way through a single one of those irksome confections. And written for adults, not children. In more than one, heroes and heroines were born with or sprouted wings ... Others were granted a magical sense of smell, or tumbled unharmed out of high-flying aircraft.¹¹⁰

Perowne objects to fictions such as *The Satanic Verses* because they are not grounded in a 'recognizable physical reality'; their magical or supernatural forms evidence, in Perowne's view, of an 'insufficient imagination' because 'the actual, not the magical, should be the challenge'.¹¹¹ However what *The Satanic Verses* works to show is precisely that the actual and the magical are not as easily separable as Perowne imagines them to be. The value of Rushdie's magical

representation of the formation of race lies in its very ability to reveal the dynamic relationship between the imaginary and the real; the immigrants' unprecedented animalistic transformations work to show the arbitrariness, absurdity, but also the ultimate power of the racist belief which shapes their reality. When Jumpy Joshi offers racism as an explanation of Saladin's transmutation – an alternative to Sufyan's invocation of Lamarck – this is a truth which the immigrants can accept: “what has happened here? A: wrongful arrest, intimidation, violence. Two: Illegal detention, unknown medical experimentation in hospital,” – murmurs of assent here, as memories of intra-vaginal inspections, Depo-Provera scandals, unauthorized post-partum sterilizations, and further back, the knowledge of Third World drug-dumping arose in every person present to give substance to the speaker's insinuations.¹¹² Saladin's physical transformation can be accepted because ‘what you believe depends on what you've seen, – not only what is visible, but what you are prepared to look in the face’.¹¹³ In a manner comparable to Dana's gradual understanding of the realities of slavery in *Kindred*, once the migrants of *The Satanic Verses* acknowledge the force of their racist environment upon them, their bodies' physiological responses are no longer inexplicable or strange. In the context of an emerging epigenetic science, Rushdie's magical representation of processes of racial formation highlights what is latent in emerging epigenetic studies; namely that race is no more than a powerful biofiction made real by racism.

Towards a literary epigenetics

Writing in 2005, five years after the mapping of the human genome, geneticist Johnjoe McFadden noted that the idea that there are ‘genes for’ certain diseases and conditions was already beginning to crumble. Systems biology, he argued, has revealed that ‘rather than having a single major function, most genes ... probably play a small part in lots of tasks within the cell’.¹¹⁴ Genes can no longer be considered ‘discrete nuggets of genetic information’ but are ‘diffuse entities whose functional reality may be spread across hundreds of interacting DNA segments’.¹¹⁵ The complexity of the system, in contrast to the reductionism of the gene-centric biology that dominated the latter half of the twentieth century, is comparable, in McFadden's view, to the ‘holistic approaches’ which have ‘always dominated the humanities and social sciences’.¹¹⁶ He ends his article with the following example: ‘The first eight chapters of Salman Rushdie's *Midnight's*

Children describes the lives of the narrator's grandparents, parents, aunts, uncles and friends against the backdrop of the tumultuous politics of 20th-century India and Pakistan. The reason, according to the narrator, is that "to understand just one life, you have to swallow the world". Perhaps biologists ought to have read more.¹¹⁷ McFadden's suggestion, that fiction has already imagined the kinds of complexity that post-genomic biology is only now beginning to uncover, and that biologists might learn from literary ways of knowing the world, is a provocative one. Few scholars, whether literary or scientific in background, have suggested that literature might offer models or approaches which science might look towards, undoubtedly wary of reviving the clashes of the culture wars of the 1990s. Although McFadden's call for biologists to read more is perhaps made somewhat flippantly, in inviting the literary into the realm of the biological, positioning it as a discipline of comparable epistemological weight with the capacity (even when not addressing science directly) to influence how genetics is conceptualized and understood, McFadden's article raises interesting questions about the role that fiction might play in post-genomic biology as it moves towards a complex, non-deterministic conception of the gene. If new genetic understandings of the body have been in some way previously conceived of in fiction, then how can fiction guide understanding of these emerging scientific insights?

In the case of both *Kindred* and *The Satanic Verses*, fiction highlights what might be necessary for the creation of an anti-racist epigenetics; that is, an understanding of the inextricability of the body and its environment in which 'the environment' is understood to encompass both historical and contemporary racist practices. Evelyn Fox Keller, writing on the 'cellular complex' around the gene which 'not only reads, translates, and interprets that sequence, but also defines it',¹¹⁸ claims that 'when scientists attempt to score the effects of nurture, that concept has already been substantially trivialized, focusing almost exclusively on physical resources. Heritability studies, for example, rarely if ever include such factors as maternal love, community values, or racist expectations in their measures. The same must be said of the new sociogenomics'.¹¹⁹ The potential danger of epigenetics, and the sociological discourses taking shape around it, is that a limited understanding of the environment might in turn limit the scope of investigation and possibility. Biologists need, according to Keller, 'a language capable of expressing how the beliefs, expectations, and behaviour of others constitutes an individual's environment and, in turn, work to shape both the body and the behaviour of that individual'.¹²⁰ While Keller looks towards

cultural anthropology for this language, the language of literature can also offer a point of entry for comprehending this process. *Kindred* and *The Satanic Verses* offer visions of a body–environment dynamic which foregrounds racism as a central factor in biological inheritance and development, offering fantastical representations of bodily transformation which underscore how cultural fantasies and fictions determine real, environmental conditions. The dissolution of the boundaries between reality and fiction in these texts not only parallels but also pushes further the collapse of nature/nurture and biology/culture distinctions in post-genomic biology. They create space for the possibility that fiction itself might be taken seriously as a significant shaper of human environments, for if racist fantasies can have such power, then why not anti-racist literary fictions? While these novels represent the problematic marks left on bodies by racist environments, they also express the potential that there might be in knowing the body in this way – a potential for an altered understanding of reality and truth based on an acknowledgement of the fact that ‘absent environmental factors, genes have no more power to shape the development of an individual than do environmental factors in the absence of genes.’¹²¹

As the initial ‘hype’ around epigenetics dies down, more and more concerns are being raised about the potential of this science to do harm. For Mansfield and Guthman, ‘epigenetics produces an intensified racialization because it redefines difference as epigenetic *damage*’¹²² and ‘if epigenetics is about how racism and disadvantage get under the skin, it normalizes white bodies and behaviors and reinforces the idea that people of color need to emulate the environments and behaviors of rich white people in order to protect themselves and their offspring.’¹²³ These concerns should certainly be taken seriously, but in the face of continuing attempts to define race more traditionally as simply ‘in the genes’, epigenetics provides a radical opportunity for the re-thinking of race. It enables a much-needed reassertion of the importance of both historical and contemporary forms of racial discrimination, factors often excluded from identity-focused theorizations of race in the biosciences. There is no denying the harm that ensues from racist environments, and epigenetics does not necessarily enable us to move past racial thinking altogether, but it does call for a change in our understanding of processes of racialization, a change in our notion of the boundaries between reality and fiction. Novels such as *Kindred* and *The Satanic Verses* can help us to navigate this new understanding of the formation of race, but also offer ways of overcoming the potential pitfalls that it presents. By demonstrating that the imagined must be acknowledged, accounted for and ultimately accepted as part of ‘the real’ in a science which itself was not long

ago considered 'magical', they create space for their own fictions to be taken seriously in a genetic culture, as sites of knowledge about how people living with the experience of racialization, while they may be harmed by their biological inheritance or development, also have to learn to live with the knowledge of how it is formed. These novels are repositories of embodied knowledge which can inform a scientific reality which is constantly changing and incorporating what was previously unreal. They evidence the 'power of description', be it in the racist thought of slave owners and immigration officials or in fictional works themselves, in shaping the environments in which we live.