BOOK REVIEW

Impressionable biologies: From the archaeology of plasticity to the sociology of epigenetics, by Maurizio Meloni, Routledge, 2019, ISBN 9781138049406, £130.00 (hardback); ISBN 9781138049413, £34.99 (paperback)

Wondering why identical twins aren’t, well, identical? Epigenetics!
Want to blame your parents for something that doesn’t seem to be genetic? Epigenetics!
Got a weird result from an experiment that doesn’t seem to make sense? Epigenetics!
Want to think yourself healthy? That’s not epigenetics! (Sorry ’bout that).
But what exactly is epigenetics – and does it really live up to the hype?

(The Guardian, 24 April 2014)

In recent years epigenetics has become somewhat of a buzzword in science and popular science, and not to mention in a growing body of pseudo-scientific self-help literature (some of which may even best be described as quackery). As the rhetorical and somewhat tongue-in-cheek questions posed by Guardian writer Cath Ennis (2014) in the quote above indicate, the ‘hype’ surrounding epigenetics may seem to concern everything and anything that cannot be neatly categorised as a consequence of either ‘nature’ or ‘nurture’. Social theorist Maurizio Meloni’s book Impressionable biologies: From the archaeology of plasticity to the sociology of epigenetics (2019) takes a closer look at the paradigm shift that has emerged out of what sometimes goes under the name of ‘the postgenomic era’.

Postgenomics and epigenetics: what are they and where will they take us?

The postgenomic era can be said to have arrived following the completion of the Human Genome Project. The word ‘postgenomics’ refers to the new paradigm that emerged in its wake, and which, in brief, emphasises the fact that living beings ‘are not only controlled by their genetic program – by which segments of DNA are translated into proteins – but are in fact self-organizing systems that involve countless interactions between proteins, nucleic acids, and metabolites within a complex structure’ (Perbal 2015, p. 779). This includes the so-called ‘omics-sciences’, that is, a range research fields ending with ‘-omics’, including nutrigenomics, metabolomics, transcriptomics, proteomics, epigenomics and others (Holmes et al. 2016). In this context, the epigenome refers to the chemical compounds and proteins that interact with genes in different ways, thereby affecting gene-expression.

As Meloni explains, the science of epigenetics developed from, on the one hand, Conrad Waddington’s (1905–1975) coinage of the term as a way to name ‘the branch of biology which studies the causal interactions between genes and their products which brings the phenotype into being’ in the context of developmentalist-embryological research (Waddington 1968, in Meloni), and on the other hand, the molecular epigenetics which originates with David L Nanney’s paper ‘Epigenetic control systems’ (1958). This was further developed by Robin Holliday and colleagues (see for example Holliday and Pugh 1975), and concerns ‘the
transmission of phenotype through mitosis or the germline by mechanisms that did not involve changes in the DNA sequence’ (Felsenfeld 2014, in Meloni). Although Waddington’s name is often mentioned also in popular accounts of epigenetics, it is this latter, molecular, view of epigenetics that dominates contemporary epigenetic science, with areas of utility such as cancer research, the study of neurogenerative disorders, research on environmental toxicity and its impact on gene expression, nutritional epigenetics, ageing research, and much more.

The focus of the book under review here concerns, borrowing the words of Alondra Nelson (2016), ‘the social life of epigenetics’. Of special concern for the author, as I read him, is to historically contextualise and problematise the ‘turn to plasticity’ in which epigenetics plays a key role, together with issues such as neuroplasticity. What we see emerging here concerns not only medical issues; it is rather an emerging paradigm shift, which entails an ontology of the body in which the plastic and ‘impressionable’ nature of (human) biology is placed centre stage. In doing so, Meloni follows a longer tradition of humanities and social science scholars emphasising how biology, both as a discipline and as an object of study, always co-exists with overarching social and political processes as well as individual experiences, identity and belonging, all of which bears down on the question of who and what we, as humans, ‘are’ (see Franklin 2001, pp. 302–303).

The book covers – and occasionally brushes over – a wide range of relevant issues and threads related to this paradigm shift, offering the reader a substantial insight into some aspect of ‘the social life of epigenetics’, while merely flagging up and raising questions about others. The main contribution, as this reader sees it, is his argument that this new post-genomic ontology of the body is, perhaps, not so new at all, but rather represents a return (of sorts!) to previous ways of living with and in our bodies which were hegemonic for centuries and that go under the name of humoralism. Importantly, this historicisation of the post-genomic moment suggest a set of lessons to be learnt from previous eras, not least with crucial implications for race, gender and social justice. Given that it is not possible here to cover all the book’s arguments and intricacies, the following section will offer an overview of the book and its chapters, following which I return to some of the implications of ‘the new plasticity’.

**Summary and organisation of the book**

The book is organised in five chapters, with the first, titled ‘The archaeology of plasticity’, introducing the main aim and overall organisation of the book. Taking the turn to plasticity as its starting point - emphasising especially synaptic plasticity, microbiomics and epigenetics, which are all emerging as part of the life sciences from the early 1990s - the opening chapter critically interrogates the rhetoric of novelty that commonly describes these phenomena. Meloni argues that this understanding of ‘the plastic body’ actually ‘uncannily overlaps ancient and very modern statements on the permeability of bodies to surrounding condition’. Hence, a main aim of the book is to show how ‘the past is never entirely displaced, thus complicating the supposedly clean points of rupture in historical epistemology’ (Meloni 2019, p. 17).

The subsequent chapters are arranged chronologically, beginning with chapter two, titled ‘Plasticity before plasticity’, which deals with the question of what bodies ‘were’, and how they were ‘investigated and understood’ in pre-Enlightenment times. In a Foucauldian-inspired analysis of humoralism (the idea that a person’s health depended on the balance of four bodily liquids), Meloni tracks this paradigm across a range of geographical, cultural, political and religious contexts covering some two millennia. More than a medical model, this ontology of the body, encompassing a range of ‘epistemologies, practices and techniques’ (p. 36), which survived for many centuries in a variety of permutations, had as its key premise that the body
is impressionable, malleable, and permeable by its surroundings – even though, as Meloni importantly discusses, some bodies were understood as more permeable than others. Not surprisingly, such differences in ‘impressionability’ tended to be articulated along gendered and racialised lines. (I will return to this issue in my concluding reflections.)

As discussed in the following chapter – ‘Taming plasticity: Darwin, selectionism, and modern agency’ – the move away from the humoralist worldview in the nineteenth century, and towards the modern understanding of the body as more bounded and autonomous in relation to its surroundings, did not happen overnight. Instead, this was a ‘complex and uneven’ process that eventually gave rise to a very different anatomical and clinical view of the body as much more fixed and solid than had previously been the case. While the biopolitical importance of this shift has been covered in more detail by other scholars, Meloni emphasises the interconnectedness between two of its aspects specifically, namely ‘the medical history of how humoralism was displaced by the bounded modernistic body of biomedicine’ and ‘the consolidation of the liberal humanistic subject, with its strong awareness of boundaries and a personhood relatively buffered from external influences’ (p. 66). Humoralism, simply put, was not compatible with the emerging liberal humanist civic virtues of autonomy, independence, a unique self, and the notion of an inner core (p. 68); an insight which, by extension, also begs the questions of how ‘the new biologies’ of our post-genomic times are intertwined with hegemonic and emerging worldviews.

The fourth chapter, titled ‘Epigenetics or how matter returned to the genome’, argues that the discovery and subsequent rapid expansion of epigenetic research has destabilised the genetic paradigm and the discourse of the modern, autonomous and bounded body. Though still best described as operating within what – to use a Kuhnian vocabulary – can be called a pre-paradigmatic phase, Meloni shows, it has (re-)activated an understanding of the body as more porous and impressionable than is the case within the modern paradigm, and especially its emphasis on genetics. With epigenetics, the body becomes ‘impressionable’ and porous again, and this, in turn, opens up questions concerning the relevance of social structures for genetic functioning (through food, stress, toxins etc.), as well as about biological heritage and inheritance, when once again some acquired characteristics – this time discovered as epigenetic influences, some of which have been proven in epidemiological and clinical research to be inherited across generations as a kind of ‘fine-grained molecular archive’. Relatedly, the potential reversibility of epigenetic influences opens for new opportunities for medical and life-style interventions of genetic conditions.

In order to fully capture the consequences of the paradigm shift from genomics to post-genomics (entailing not just epigenetic but also other fields of science such as proteomics, metabolomics, and exposomics), Meloni argues that ‘we need to rethink what genes are and do’ (p. 119). This, in turn requires a different conceptual vocabulary than the digital metaphors we have become accustomed to as attached to genetics, which describe DNA first and foremost in terms of information and code. Therefore, instead of describing epigenetic processes in similar terms, as is now the case with the terminology of ‘tagging’ or ‘bookmarking’ which are commonly used to describe epigenetic influences, Meloni proposes a discourse that emphasises the material processes involved. This, he argues, can be achieved not only through focussing on chromatin – that is, the ‘complex of DNA and proteins that forms chromosomes within the nucleus of eukaryotic cells’.

For Meloni, this move away from genetics and the modern ontology of the body also means the emergence of a different ‘aesthetics’, which is better described with words such as ‘folding’, ‘enfoldment’, ‘scaffolding’, ‘entrenched’ and ‘entangled’ (p. 125). This, in turn he sees as a (re)turn to a Baroque morphology à la Gilles Deleuze, within which the ‘the outside is never an absolute limit but a ‘moving matter’, a fold understood recursively as an ongoing
succession of ‘folds always folded with other folds’ (p. 126; Deleuze 1993, p. 6). The call for such re-naming and a re-focussing on biological processes as processual and entangled ‘natureculture’ serves simultaneously as the conclusion to chapter four and as a springboard for the final chapter’s reflections on the sociological implications of the postgenomic era, signalling the (re)turn to a more plastic, and less bounded, understanding of the body, heredity and inheritance.

The final chapter identifies a set of ethical, epistemological, biopolitical and bi-economical aspects in need of consideration. As Meloni concludes, a ‘new landscape may be emerging in the biology-society debate, and often in disconcerting ways’, in which ‘the new biology of plasticity’ on the one hand appears more compatible with the long wished-for complexity of deterministic understandings of biology, and on the other hand the risk of moralising, stigmatising and otherwise harmful consequences for vulnerable groups (p. 132). This emerging landscape begs a number of questions, summarised thematically by Meloni as belonging in the overlapping domains of ethics, epistemology and biopolitics.

Ethically, it raises the question of how to ‘live with a porous body, a body in which social things are reconstituted at the molecular level as having a durable impression on cellular processes’. Epistemologically, the fact that the epigenome is often described as a ‘biosocial archive’ raises a set of questions concerning how to think the gene in relation to its environment. Which vocabulary and which metaphors are suitable to ‘think with’ and describe the relationship between the body and its surroundings, now that this relation is once again understood as an ‘indissoluble unity’, such that posited boundaries are intrinsically blurred and intertwined? Biopolitically, a postgenomic paradigm concerns both individual and collective aspects of life. With regard to the former, it raises questions about when, exactly, in an individual’s life cycle is it especially important to mobilise welfare resources (such as during pregnancy or adolescence, when bodies may be particularly ‘impressionable’). Relatedly, this emerging paradigm shift is likely to involve a transformed bio-economy which extends commodification from DNA sequences ‘to enclose the whole spatial influence that regulates DNA functioning, the -omics (the epigenome, the proteome, the microbiome and, ultimately, the whole body)’ (p. 134). These implications are discussed further through three different axes of inquiry: the first concerns the issue of what happens with ‘responsibility and reproduction’ when we shift from a more modern paradigm of genetics to the postgenomic one of epigenetics; second are the cultural and political dimensions of ‘molecular suffering and biosociality’ in relation to epigenetics; and, third, ethics and an emerging plasticity. All of these raise important theoretical and empirical questions to humanities and social science research in postgenomic times, and as Meloni convincingly argues, even if we cannot yet fully grasp the consequences of the emerging postgenomic paradigm, its relevance extends far beyond narrower questions of medical practice and ethics.

The social and political lives of epigenetics: Concluding reflections

As hinted at earlier, Meloni’s insights that earlier ontologies of the body have tended to position some bodies as more ‘impressionable’ than others and mobilised understandings of the body as plastic in highly gendered and racialised ways resonate well with other scholars’ warnings and critiques of the temptation to see the ‘new plasticities’ as inherently progressive, or naively as a long-awaited corrective to the determinism of modern genetics and selectionism. Medical anthropologist Margaret Lock (2013), among other social science and humanities scholars of medicine, has long problematised the dominating status of what she calls the ‘standardised universal body’ of biomedicine, arguing for the need to ‘contextualise and embed bodies in time and space’ in order to highlight and investigate the inextricable
intertwinement of social, political, historical and material aspects of human life, and to problematise the consequences of an overly standardised use of biomedicine (Lock 2013, p. 296). Yet, for Lock, simply focussing on epigenetics as the explanatory model for understanding such entanglements and particularisms will not do the trick. At worst, she argues that placing all the eggs in the epigenetics basket may even lead to a new version of somatic determinism which risk obscuring the full implications that social, economic and political processes have for health inequalities (2013, p. 292).

Relatedly, Sarah S. Richardson (2017) has critically interrogated feminist new materialist thinkers such as Catherine Malabou (2016) and Noela Davis (2014), who both seek to undermine the distinction between the political and the material and ‘approach epigenetics as a grounding for feminist theory, suggesting that epigenetics might serve feminist theories of nonbinary, plastic, and diversity-affirming conceptions of sex and gender’ (Richardson 2017, p. 30). A warning she raises is how the central place that is given to pregnancy in epigenetic science may lead to ‘mother blaming’, expanded forms of surveillance and responsibilities of gestating bodies and mothers (Richardson 2017, p. 44). As Meloni shows, such norms and practices would not be ‘new’, but rather appear as a highly likely risk, one which rings eerily similar to humoralist understandings of maternal impression, that is, the idea that the gestating person’s emotions, thoughts or even sights may cause permanent change to the child in the womb. Likewise, Meloni reminds us that, against some common assumptions, both humoralism and Lamarckianism have historically been mobilised in racialist (and, for that matter, racist) ways, the lesson being that there is no guarantee that postgenomic plasticities will not meet the same destiny.

These historical examples serve as crucial reminders of how humanities and social science scholars need to keep their critical edge when investigating the actual and potential consequences of the postgenomic paradigm. Rather, in the same way that the paradigm of the modern, bounded body needs to be understood within the context of liberalism and norms of autonomy, it is important to investigate not just what epigenetics ‘is’, but also within which social and political discourses it is articulated and practiced. If the ‘hype’ – the scientific and popular embrace – of epigenetics in part forms a critical reaction of the modern and bounded body, then what are the different ways it could be put to use? And what are the consequences of these different, actual or potential, articulations? The aforementioned warnings of a naïve embrace of plasticity-affirming science are certainly warranted, yet the future articulations and practices of the new plasticities remain to a great extent unknown. On the one hand, as Meloni and others have shown, this emerging ontology of the body is highly compatible with neoliberal individualism and self-responsibilisation, not just in pregnancy but also in more ‘gender equal’ ways, where the epigenetic impact of men’s engagements in reproduction and care may be highlighted too. On the other hand, as neoliberalism (at least in the version(s) we have hitherto known it) is increasingly challenged on a transnational scale by new forms of ‘radical conservativism’ (often in the form of right-wing populism, nationalism and authoritarianism) often with very conservative gender norms, we also need to consider how this science can be articulated and put to work in the service of such views. Finally, we also need to remember the examples which show (and which are mentioned by Meloni) how both genetics and epigenetics may be mobilised in more collectivist ways to shed light on and address historical and inter-generational traumas and inequalities, such as those caused by toxic environments, historical genocides and poverty. In short, the history of postgenomics remains largely unwritten, and its future cannot be separated from the world(s) in which it currently exists.
Although I remain unconvinced that the Baroque aesthetic and Deleuzian vocabulary would be the royal road to re-materialise the genome and reposition bodies as more entangled with, and impressionable by, its surroundings than the modern ontology of the bounded and autonomous body would allow, Meloni’s insights are crucial for a broad range of humanities and social science scholarship on medicine and the body. The re-historicisation of postgenomic bodily impressibility – with the insight that the modern bounded body rather constitutes a parenthesis in Western histories of medicine – makes it blatantly clear that the biologies we live by tend to be mobilised along intersectional patterns of domination and subordination, but also that they can be mobilised for equality and social justice. In other words, we cannot separate biological matter and processes from their ‘social lives’ (see for example Nelson 2016), and this is just as true for epigenetics as it has ever been true for previous biological paradigms, including genetics and humoralist theories of black and yellow bile, phlegm and blood.

**Notes**

1 I am referring here to Nelson’s book *The social life of DNA: Race, reparation and recognition after the genome* (2016).
2 Meloni presents a vivid and telling related historical example from the Renaissance literature in which Hippocrates was claimed to have rescued a white princess from allegations of infidelity after having given birth to a black child. Hippocrates’ explanation which was said to have saved her day was that the reason for the child’s skin colour could be found in the fact that the princess had an image of a Moor in her bedroom (rather than the more ready-to-hand explanation of infidelity). Another example of how blatant racialisation could be in the humoralist Renaissance literature is the story about how Galen (a Greek humoralist physician) was said to have given the advice to a black couple to ‘beget a white and beautiful child, to set at his beds a faire picture, upon which his wife might wistfully looke in the time of her conception’ (p. 54). From the more recent historical era, Meloni points out that despite common assumptions of the opposite, Lamarckian ‘impressionability’ played by far a greater role in the evolutionary racism of the late 19th century than did modern Darwinian selectionism (p. 75).

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