Introduction: blood/food/climate—physiology/nation/race

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Abstract This is an introduction to a series of essays, originally a panel at the iCHST conference in 2017, which explore the moral economy of physiology in the modern period, focusing particularly on issues of race, place and nation. By examining a series of interconnected, but not interchangeable, concepts, these papers offer a broader context for the understanding of physiology, physical anthropology, and fertility studies, particularly by moving from Europe to South America and from there with explorers and scientists across the globe. Starting with Malthusian discussions in the early nineteenth century, working through to post-colonial debates about race and belonging, the papers argue for an increased focus on cross-century histories of these topics, showing a continuity in beliefs and practices, and highlighting the interdisciplinary and inherently political nature of these researches.

The following papers have as a connecting theme a series of interrelated concepts which tie together physiology and place, sometimes using a collection of proxy concepts, such as blood and food. Blood is here in its literal meaning—taken as samples from historical actors and studied and scrutinised in laboratories across the globe—but also in its rhetorical meaning as a shorthand for race, heredity, even nationhood and national culture. Likewise physiology can sometimes be taken as a proxy for place itself, with the assumption, embedded as strongly in anthropology and physiology as it is in eugenics and evolutionary thinking, that bodies and minds are shaped by climates in a way that can be easily read by scientists. This shaping could be short-term, changing from one generation to another, or it could be long-term and therefore a way to trace the ancient history of humankind (particularly the

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evolution of different races). That we are made by place includes our practices of consumption: food could create an indolent race, or protect an immigrant from the risks of a new climate, while indigenous food cultures could be studied for hints to bioprospect new cures. Throughout these papers the issue of change and continuity is paramount: how could the survival of the race, or the nation, be ensured? For some the mixing of races could create robust mestizo populations, adapted to their environment, and also eradicate hereditary disease; for others such racial mixing was inherently degenerate. Survival was also an ambiguous category—while fertility could be read as a positive marker of health and strength (and potential national fitness) through the nineteenth century and beyond, the ‘excess’ fertility of the ‘wrong sort’ provoked scientific scrutiny and cultural repression.

Antonello La Vergata sets the context for this collection, outlining a continuity in physiological beliefs from the eighteenth through to the twentieth century, where we often see instead discontinuity. Typically, eighteenth century faith in the beneficence of nature, which would prevent the unhealthy or immoral from reproducing, is supposed to have been challenged by Malthus and then shattered by late nineteenth century degenerationist panics. In fact, La Vergata argues, there is much that links the physiological writings of the eighteenth and early twentieth centuries, particularly a common assumption that there was a way of reading the moral laws of nature through the body. There was no question but that the right mode of living was indicated by fertility, or, perhaps more accurately for the nineteenth century onwards, that the wrong mode of living was indicated by the loss of fertility. In this story ‘blood’ makes its move from literal substance to rhetorical marker—initially a bodily fluid whose humours could be rearranged by immoral behaviour or inappropriate diet and therefore the literal fluid of inheritance, it becomes instead a word used to highlight issues of racial decline or class conflict as aristocratic families sought “fresh and healthy blood from elsewhere” or certain races preserved “a spark of primeval barbarity” (p.47) in their blood.

As physiological attention slipped from the vascular system to the nerves as a medical explanation for differential fertility, so food also altered its role. Initially as part of a holistic—if not necessarily humoral—understanding, foodstuffs initially literally constituted the blood and the body, but shifted through the centuries to a more symbolic role. The ‘poor but plain’ food of the most fruitful laborious poor was what gave them a fertility advantage over the voluptuous and idle, whose luxurious food was a hindrance to a successful, moral, and reproductive life. Clearly these ideas were modified by class, but they were also altered by location and climate. The noxiousness of the great towns was identified as a source of ‘barrenness’ by the eighteenth century, including a self-reinforcing combination of more temptations to immorality, more access to luxuries, and what we would term ‘food poverty’, a relative lack of access to wholesome and unadulterated foodstuffs. Rural life, across Europe at least, offered hard work and simple diets, whose reward was not only increased fertility, but in some cases increased chances of bearing sons.

La Vergata demonstrates the continuity of these views over more than two centuries; attitudes and assumptions that persisted despite a distinct challenge from eugenic and degenerationist thinkers, who of course framed differential reproduction as a threat rather than a reward. That they were able to promote both the fear of

an overwhelming overbreeding underclass at the same time as discussing the eventual sterility of degenerates indicates the persistence of the concepts that he outlines. While La Vergata concentrates on Europe, Juliana Manzoni Cavalcanti picks up this degenerationist rhetoric in a quite different context in South America. By focusing on an infamously ‘racialised’ disease of the blood—sickle cell anaemia—in Brazil, Cavalcanti offers an alternative view of nation, blood, and race in a country whose national projection is often of a racially harmonious population.

In the middle decades of the twentieth century Brazilian medical scientists explicitly contrasted their approach to sickle cell to that found in the ‘racist’ USA; Brazilian medics hoped that racial intermixing would eliminate the disease by ‘diluting’ the gene frequency across the population, in stark contrast to the preventative approach of the American medical services, which focused on preventing the marriage and child-bearing of those affected, to the point that high profile campaigners such as the Nobel Prize winning Linus Pauling could suggest using ‘tattoos’ to mark carriers of the disease (a suggestion offered, apparently, in jest, but reflecting a deeper belief in the utilitarian morality of social reproductive control). Sickle cell anaemia was even used by eugenicists as a justification for the banning of inter-racial marriages. In the ‘melting pot’ of Brazil the exact opposite approach was taken—the more interracial the marriage, the better. Yet, as Cavalcanti shows, this approach still absorbed deeply racialised, and racist, understandings of nationhood, blood, and disease. With the strong association between African heritage and sickle cell disease, ‘breeding out’ the disease meant ‘breeding in’ whiteness, an approach to nation building that had been present since at least the late nineteenth century—and not just in Brazil, as intellectuals and political elites in Cuba, Venezuela and elsewhere championed white immigration and the “transfer [of] regenerative [European] blood” (p.51) into the veins of Latin American populations—a direct mirror of the processes La Vergata describes in the reproductive anxieties of aristocratic European families a century earlier.

Blood—as the real bodily substance—played a complicated role in notions of Brazilian nationhood and citizenship. Large scale, often public health-informed blood work surveys were carried out across Brazil. Such studies included the use of blood group analysis as a way of identifying racial groups and racial mixing, but also continued to use sickled cells as a proxy marker for African heritage; researchers keen to find ‘isolated’ indigenous communities celebrated the ‘pure’ nature of such populations when they were free of this disease. But blood studies also mapped other diseases that could be localized in the blood, including bacterial and parasitical infection, confirming that the ‘degeneration of the tropics’ was disease-based, and not an inevitable consequence of the effect of a non-temperate climate on human bodies. While a focus on sickle cell anaemia centralises blood in the story, Cavalcanti demonstrates that climate remains a force understood to be shaping national character, and native bodies. Much of the anxiety about the ‘degenerate’ nature of populations in South America was concentrated on the potentially negative consequences of the climate, from the hot and wet ecosystems of the equatorial rainforest, to the ‘thin air’ and challenging agricultural conditions of the Andean plateaus that lead to poor nutrition. Rather than a widespread, climatic ‘tropical anaemia’, doctors and politicians in Brazil contemplated an ‘anemia Brasileira’ since “blood

deficiencies were common to most of Brazil's inhabitants by virtue of poor nutrition, alcoholism and endemic infections" (p.51).

My contribution to this collection picks up on this link between climate and blood. While the people of Latin America were conducting their surveys of race, blood and disease, Western scientists also turned to the continent as a place to study the White body, and to establish whether or not it could survive (and thrive) in non-temperate climates. As the circulatory system is one of the first to respond to changes in altitude, Western and South American researchers studied mid-altitude populations in the Andes as well as temporary visitors, and concluded that there was a universal, human response to the challenge of altitude, an assumption that offered the promise that sea-level born populations could eventually adapt to altitude (an idea that was overturned when Sherpa were eventually recruited into blood work studies and demonstrated entirely different adaptational mechanisms).

Twentieth century studies of acclimatisation and adaptation constantly dealt with issues of race, and of 'belonging' in certain ecosystems, climates, and even countries. For Western researchers the predominant concern was establishing how (or whether) the White body could survive in non-temperate climates, whether that was the boiler of a navy ship sailing at the equator, an Antarctic explorer heading for the South Pole, or the fantasy of 'White Australia'. Studies of bodies indigenous to these environments were shaped by assumptions about what the 'normal' or 'standard' human body was—including pushback from non-Western researchers who framed the bodies of high-altitude, heat, or cold adapted bodies as 'normal' in their own right.

Studies of acclimatisation, e.g. short-term adjustment to new environments, borrowed heavily from indigenous and local knowledge, particularly in terms of survival technologies such as clothing, diet, and housing. In a sense this reaches back to the Hippocratic practices raised by La Vergata, where human bodies fitted themselves to their environments by appropriate management of the six non-naturals. On the other hand, studies of adaptation, e.g. long-term, usually evolutionary, adjustment to environments, seemed to reinforce ideas of racial hierarchies; finding that humans survived in cold weather using technology and innovation, but survived in hot weather using evolutionary, biological, unconscious mechanisms. Cold was civilized; heat was primitive.

As with Cavalcanti's paper, 'purity' is a ghost haunting the researchers. While racial mixing could be read as a positive, both politically and medically, for those scientists hunting the origins of human evolution, it confused their data. It was the 'pure' 'isolated' and almost always 'primitive' indigenous population whose blood offered an insight into the history of the human race. These complex and contradictory motivations are also clearly present in the article by Adriana Martins Keuller, which focuses on the scientific work of one man, Edgard Roquette-Pinto, to show how physiology, anthropology, and expeditions to find 'native' plants and animals, were crucial to nation-building in Brazil. Combining human anthropology and physiology with botany and zoology, Roquette-Pinto maintained a line that there was no evidence of degeneration caused by racial mixing, and instead that many of the social problems of Brazil were caused by poverty, lack of sanitation and infrastructure—just as the researchers in Cavalcanti's paper also argued.

But at the same time Roquette-Pinto was committed to a model that represented races as discrete entities that could be scientifically studied and measured; indeed the commitment to a modern form of scientific practice, which included careful measurement, statistical examination, and standardized data collection, was core to Roquette-Pinto's drive to reform or reshape Brazilian science in this area. This 'modern vision' sought to bring anthropology in line with other life sciences, and that was to be achieved through the laboratory of the National Museum of Brazil, and through expeditions—or as Keuller puts it, 'missions'—both into the countryside of Brazil to retrieve plants and animals and human artefacts, and also to other countries, notably Paraguay, to forge international networks.

This is physiology as nation building in a quite different sense to the preceding papers: as well as the concern over race, degeneration, blood, and purity, the scientific work of the Anthropological Laboratory at the museum also allowed international exchanges, and for Brazilian research to be presented alongside that of other, often Western, nations. Further, it allowed Roquette-Pinto to affect the founding of similar practices in other countries, as Keuller outlines with his inauguration of a physiological course at the Faculty of Medicine at the University of Asunción in Paraguay. Yet this form of physiological-nationalism, while a different political process to those outlined in the other three papers, also shares with them the assumption that something could be learnt from (some of) the indigenous populations of any nation. People identified as 'primitive' nonetheless survived in environments that challenged the 'civilized'—whether that was the indigenous populations of the high Andes, or the peasant class of eighteenth century Europe—and there was some worth in understanding their diets or the drugs they made from native species. Of course, such knowledge had to be ratified through Western science, whether that was explaining peasant fertility through theories of degeneration, or population fitness through blood group analysis, or, in Keuller's paper, Roquette-Pinto's careful investigation of the pharmacologically active Cumarú/Fava-Tonka bean. Brazilian physiology could differentiate itself from major competitors—for example by contrast against the racist science of the United States—and present itself on a national stage, but did so by taking the blood, and the knowledge, of its indigenous peoples.

As both Cavalcanti and Keuller make clear, South America, and Brazil in particular, have been sites of intense scholarly attention to issues of race, biology, heredity, and eugenics. It is no wonder that case studies from this region prove so informative in investigating the relationship between physiology and place, but they also help to reframe existing narratives. In my paper in this collection I hope to show that studies of, and by, people in the global south were vital to the creation of an international physiology—and although attempts to challenge the hegemony of the temperate, northern, white body as 'normal' were not roundly successful, the failure to consider other normals had measurable impacts on the science of physiology. Meanwhile, La Vergarta also demonstrates a continuity in the complex relationship between blood, food, race and nation, that should prompt us to longer *durée*, more globally focused, histories of race and heredity.