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Reproductive Futurity at the Level of the Molecular and the Border: Race, Reproduction and Nation in Contemporary Biopolitics

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Abstract

This working paper is concerned with the interrelations between three central concepts: race, reproduction and nation. Assessing the three as a conceptual triad, I evaluate the ways in which contemporary politics relies on and produces the triad as tightly bound and in so doing reproduces older conceptions of 'the Human' and human difference. In particular, I argue that forms of biopolitical governance invest in these interactions to manage life at the scale of the molecular and the border. Bringing to the fore black feminist thinkers of reproduction, including Spillers, Roberts and Hartman, I inflect Foucault's biopolitics to center the racial politics and reproductive futurity that sustain it. I tackle the ways in which the triad reproduces limiting conceptions of the human, kinship and belonging. I also follow the intellectual paths of others that break the triad's hold and suggest alternative ways to be human, to be kin and to reproduce.

List of Abbreviations

AIMs Ancestry Informative Markers

ARTs Assisted Reproductive Technologies

HGP Human Genome Project

HPPP Human Provenance Pilot Project

mtDNA Mitochondrial DNA

UKBA United Kingdom Border Agency

"I am not a prisoner of History. I should not seek therefore the meaning of my destiny. I should constantly remind myself that the real leap consists in introducing invention into existence."

(Frantz Fanon, Black Skin, White Masks, 1986)

"It matters what ideas one uses to think other ideas (with). Reproduction concerns everyone. Yet when human beings reproduce themselves, they inevitably do so with already existing and thus specific forms of themselves in mind"

(Marilyn Strathern, Reproducing the Future, 1992)

"Global perspectives of human mobility are increasingly refracted through those of fertility and mortality. Population politics is once again a cipher for broader geo-racial struggles and new forms of enmity....borderisation might be the new form of negative Eugenics."

(Achille Mbembe, Borders in the Age of Networks, 2019)

Introduction

This working paper is concerned with the interrelations between three central concepts: race, reproduction and nation. These concepts and their relationships are complex and contradictory, yet I suggest they are foundational to the birth of the modern world. Assessing the three as a conceptual triad, I will evaluate the ways in which contemporary politics relies on and produces the triad as tightly bound and in so doing reproduces older conceptions of 'the Human' and of human difference. In particular, I argue that forms of biopolitical governance invest in these interactions to manage life at the scale of the molecular (by which I mean at the biological, genetic, and microscopic levels) and the border (by which I mean the human-made boundaries that divide the planet into territorialised nations). Classifications of nationality, genetic ancestry and biology re-write race and the human anew. Bringing to the fore black feminist thinkers of reproduction, including Spillers, Roberts and Hartman, I inflect Foucault's biopolitics to center the racialised and reproductive logics that sustain it. I assess how future human life is stratified in contemporary global politics: wherein some human life is presented as valuable, worthwhile, preseverable and proper (re)producers of humanity, whilst others are systematically neglected and marginalised to 'protect' from future racial degeneration. Taking seriously this politics of future life, I adapt Foucault's 'make live and let die' to 'foster future life for some and foreclose future life for others'. With this framework I tackle the ways in which my conceptual triad reproduces limiting conceptions of the human, kinship, belonging and life on earth. I will characterise, historicise and exemplify my articulation of contemporary biopolitics as a shoring up of the race-reproduction-nation triad. I also follow the intellectual paths of others that break the triad's hold and fully embrace alternative ways to be human and to live and nurture on the planet.

I discuss the concept of reproduction as both a biological and social process. I take the lead from scholars of reproduction (such as Strathern 1992, Vora 2020, Haraway 1996) who emphasise the contested histories of reproduction, wherein the social aspects (motherhood, kinship, parenting, biological family, lineage) are not simply given, but are produced under conditions of unequal power. Black feminist thinkers (including Morgan 2018, Spillers 1987, Hartman 2016, Roberts 1997) highlight the centrality of the enslaved black maternal body in sustaining and producing ideas of race and capital from which the idea of 'the Human' emerged. The violent histories of enslaved women as both producers and reproducers within a capitalist system make them central to understanding the creation of the modern world, and the ways in which future gains became enmeshed in biological understandings of the human as 'self-reproducing'. Reproduction thus acts doubly in a literal biological sense and a symbolic conceptual sense.

Race too is a type of biological script that confers a whole set of social relations concerning the nature of humanity and human difference. The social emergence of race coincided with the emergence of modernity and the rise of global capitalism. Wynter highlights the ways in which the natural and bio-

logical sciences served to transform understandings of the human, resulting in a conception of man as "purely secular and biocentric" (2003, 282) which became dominant through the nineteenth century. This project expands on the ways in which biological understandings of the human continue to influence our understandings of ourselves as social and political beings. Race and reproduction and their reliance on biology to produce social meaning, thus form two sides of my triad. Nation, the third side, reflects the key ways in which human difference and separation is justified based on ideas of belonging and how this too is a salient means through which humanity has come to be understood.

Thinking through the lens of race, reproduction and nation reveals the ways in which divisions between nature/culture, biological/artificial, animal/man, self/other, national/foreigner are constructed. The idea that nineteenth century racial classifications and race science have been overcome by innovations in genetic science and technologies is by now a commonplace. I challenge this, instead charting the ways in which these older divisions continue to haunt our self-understandings as biological beings - fitting within an evolutionary timescale and increasingly understood within the laboratory - and social beings - having peoples and places with which we have come to be identified. Race is re-emerging as a biological category through genomic science. Fullwiley (2014, p.803) describes this as the "contemporary synthesis" of race: "this new synthesis combines ideas about human biological difference that draws on measures of physical characteristics and human genetic material that are both race and population based, yet conflated". Whilst Fullwiley is primarily engaged with the genetic reconfigurations of race, I would also add to this synthesis the race and population-based projects of nation-states and their borders. Through institutions, policies, technologies and imaginaries, the spectral figure of the nineteenth century Human is continually reproduced at the level of the molecular and the border.

I will evaluate these themes through three scenes which, read together, show how race, reproduction and nation emerge as tightly bound and suggestive of new modes of biopolitical governance where future life is fostered for some and foreclosed for others. The first scene is the national reference genome project for Egyptians and Ancient Egyptians; the second is the stateled genetic testing for asylum claims on the UK border (HPPP UKBA); and the third is the AI technology Fenomatch which matches prospective parents with donor gametes by matching their phenotypical resemblances. The scenes engage with technologies of biometrics, reproduction and genomics. I read these technologies as types of texts which embody, re-express and make manifest conceptions of the Human, human difference and belonging. They are speculative and fictive in the sense that they imagine a problem in the world and seek to fix it, whilst being heavily reliant on modes of narration to make them useful and conceivable.

In what follows, I will explore how new and old biopolitical arrangements including the gene and the border make human biology politically useful. Together, race, reproduction and nation, create and respond to biological understandings of humanity to produce powerful narratives that underwrite biopolitical modes of governance. In the first section of this paper, I will lay the conceptual groundwork for my analysis of the three scenes I describe in

section two. The third section, the coda, is a reflection on the first two sections through an analysis of the short film *Pumzi* by Wanuri Kahiu. Reading the film as a counter-technology to those I have analysed in the scenes, I follow hidden paths out of the matrix of race, reproduction and nation and into more productive and fruitful futures. These, I hope will plant seeds for a new type of human life on a dying earth.

Situating Race and Reproduction in Biopolitics

Foucault's concept of Biopolitics, appearing in *History of Sexuality (volume 1)* (1978) and his lectures at the Collège de France (1977-9) (2007, 2008), anticipates the interrelations between race, reproduction and nation. He explicates the overlapping ways in which state power shapes individual bodies and populations. He differentiates juridical power, such as the power of punishment/ death a king has over his people, from biopower being a technology of power used to govern "through which the basic biological features of the human species became the object of a political strategy" (Foucault 2007, 16). This entails a strategy of managing life through birth, education, health and taking these as the point of intervention for applications of power, characterised by the following shift:

"The ancient right to take life and let live was replaced by a power to foster life or disallow it to the point of death" (1978, 138).

Biopolitics took on the 18th century notion of 'population', birthed through the technologies of statistics, probability and demography, and operationalised as a state apparatus through understandings of 'normal variation' and 'optimal outcomes' of a group of people (see also Hacking 1984, Murphy 2017). Biopower is positioned beyond the binary of permitted vs prohibited; instead mathematical calculations are used to categorise 'optimal' safety, 'acceptable' bounds and 'risky' individuals (Foucault 2007, 20). Through shaping the bodies and population of the polity, social control and discipline came to define this new type of politics. Biopolitics also requires populations to be bounded and enclosed (Foucault 2007, 33).

Animating biopolitics is the idea that human futures can be intervened in in the present. This possibility to affect the "biological destiny of the human species" (Foucault 2007, 25) only became possible in the late 17th century because of the rise of the biological and natural sciences. Ideas of biological human development shaped philosophical and scientific understandings of the human governed by cartographies of the world as a pre-determined unfolding of history (see for instance Hegel's philosophy of history, 1837). History was a magnetic and forward thrusting notion, written as the sacred ownership of the west. Africa and racialised peoples were written out of history, temporally relegated to a continent of no history (*ibid.*). As Mbembe writes, "Europe had the monopoly on that essential human quality

we call the disposition toward the future, and the capacity for futurity was the monopoly of Europe" (2021, 53). These timeframes, made possible by reproductive futurity (which refers to how future life can be politicised through biological reproduction) depict future human life as inevitable, yet malleable. As such, I re-write Foucault's biopolitical framework as one of *fostering future life for some and foreclosing it for others*, in order to highlight the centrality of the politics of the future to writing life at the biological level. Reproduction serves as a key way in which biopolitical governance is enacted.

Similarly to Foucault, black feminist theories of reproduction take up the ways in which biological life became a political and economic object. However, they differ from Foucault in their focus on race and reproduction as central to biopolitcs. Theorists such as Spillers (1987), Roberts (1997) and Hartman (2016), use the historical space of the plantation and the material and symbolic figure of the black enslaved maternal body to explain the multidimensional ways in which life and death have been managed. Hartman argues "the reproduction of human property and the social relations of racial slavery were predicated upon the belly ... subjection was anchored in black women's reproductive capacities" (2016, 68). Indeed, the African enslaved woman transported from her home on slave boats, removed from her kinship relations and thrust into new social relations that she did not create, has her autonomy and humanity violently negated. She enters the New World as biological capital, always already thought of in terms of reproductive potential and as self-replicating capital. As Weinbaum argues, wombs are imagined as "engines of Future increase" (2022, 10). Racialised reproduction therefore serves dual functions as a symbolic metonym for future human life (in these cases the lives of the enslaved) and as articulation of the enslaved as biological capital, a type of future-orientated value that reflects relations of ownership and private property. The black maternal figure symbolically and literally births the modern world.

The 1662 legal Act, *Partus Sequiter Ventrum*, translating as 'the child follows the belly', states that any child inherits the enslavement (or freedom) of the mother (Laws of Virginia 1662 Act XII quoted in Morgan 2018). This law was essential in legislating slavery as inheritable. Taking biological reproduction as the source of political intervention, the law writes race as a socio-biologically deterministic variable of human difference. Biology becomes Law, law becomes biology. Biopower is at work: race *made* and *making*, fuelled by reproductive logics.

Enforced "natal alienation" (Patterson 2000, 36), being the separation from family over the middle passage, was essential to producing the slave position. The prior kinship relations of the slave were denied in addition to any future kinship relations (*Partus*). In rejecting the history of the slave and the possibility of them writing their own futures, slave owners enacted a "monopoly over the future" (Mbembe 2021, 53) by intercepting black women's reproductive capabilities and foreclosing their future lives. This state legislation of reproduction made it such that for the enslaved, "reproduction does not ensure any future other than that of dispossession nor guarantee anything other than the replication of racialised and disposable persons or 'human increase' (expanded property-holdings) for the master" (Hartman

2016, 168). Under this dynamic, rape by the master of enslaved women, with the outcome of a child, served only to increase the wealth and property of the master; sexual violence and spiritual and bodily dispossession operated as a norm in (re)productive labour. These negotiations and negations of future life happen at the level of the biological, where race is seen to signify biological difference. This symbolic ordering remains today in what Spillers calls "hieroglyphs of the flesh" (1987, 67), and Weinbaum calls the "slave episteme" (2022), whereby race, racialisation and racism enter dominant understandings of reproduction and reside there, often unacknowledged.

Histories of the enslavement of the black maternal body thus help to explicate the racial and reproductive elements of biopolitics. It is through racialized reproduction and its future orientation (reproductive futurity) that race becomes viewed as something atemporal and rooted, a biological fact rather than a historical contingency.

Nations, Borders and Biopolitics

Nations (from the latin 'natio', meaning 'to birth') are a relatively new concept. Balibar and others argue that the transition to nation-states is concurrent with the era of modern capitalism (Balibar 1991, 89). Despite this, nations are often imbued with a sense of deep historical time far preceding this, projected as organically bounded entities of naturally formed populations. Benedict Anderson, for instance, describes how Nations "always loom out of an immemorial past, and ... glide into a limitless future" (1983, 19) demonstrating not only a projection of a long history but also a long and unfolding future. This mythic quality is understood by many theorists as constitutive of nationalism (Balibar 1991, Anderson 1983, Gilroy 2004, McClintock 1995, Bhaba 1990, Miller 1996). Equally, the ways in which people within a nation are said to relate to each other, and see themselves as a united community, are also a matter of how national histories are narrated (Bhabha 1990) or imagined (Anderson 1983). Less frequently assessed are the ways in which race and gender figure, as metaphor, as justification, and as legitimisation for national imaginaries.

Nation making and reproduction are intimately linked. Reproductive futurity operates in nation-making to secure land ownership across time and to naturalise claims of nationality as transferable and legitimate. Birth right citizenship says we inherit our claims to a certain population through one, or both, parents (mirroring the logic of *Partus*). As such biological understandings of reproduction are coded into understandings of national identity: "It is in the 'race of its children' that the nation could contemplate its own identity in the pure state" (Balibar 1991, 59). Women are bound in this – as reproducers of the race/nation – in a truly biopolitical fashion (See Davin 1997, McClintock 1995, Yuval-Davis 1997). With possibilities of racial degeneration that risk interrupting origin stories of unity and rootedness, policing of wayward sexualities and racial mixing became a means through which to secure racial/national homogeneity. This can be seen in the violent anti-miscegenation laws in the US, South Africa, the colonies and across the globe, that positioned women as potential pollutants to future populations (McClintock 1995, Yuval-Davis 1997).

Political theorists and philosophers that defend the nation have identified national citizenship as entailing 'special relations' between members of the national body (Miller 1996, 410). These types of relationships tend to be vague and ill-defined. Often they are explained through comparisons, especially to the family. Anderson, Gellner and Miller all engage in this familial comparison to explain what ties of national kinship might look like. Anderson, for instance, often speaks of "fraternity" (1983, 36) (with implicit gendering noted) and Gellner argues "Our nationality is like our relations to women: too implicated in our moral nature to be changed honourably, and too accidental to be worth changing" (quoted in Weinbaum 2004, 26). Appeals to prior social relations that are deemed 'natural' animate the discourse and theory of nationalism. It is therefore reasonable to compare nations to, as Balibar does, "One big family" (1991, 100). So too is the national 'homeland' depicted as a 'home', national belonging as a feeling of being 'at home'. The space of nation is laced with ideas of private property and individual ownership that reflect male-coded notions of dominion. The domestic order provides not only metaphorical but conceptual sustenance to nationalism.

Reproduction, too, through this idea of the nation as 'one big family' becomes centrally important to nation-making projects. Davin (1978) and McClintock (1995) highlight the ways in which reproductive work was increasingly attached to nation-making projects in the 19th and 20th century, thus transfiguring social meanings of motherhood. Similarly, 20th century eugenic projects attached procreation directly to the creation of racial nations. Recent histories of reproductive policies are filled with forced sterilisations, family planning projects and targeted contraceptive programs that show how these eugenic tendencies remain active. As Balibar argues, eugenic thinking "is always latent" within relations between family making and nation making (1991, 101). Nationhood enforced gender division to separate the productive citizens from the reproductive, thus making invisible the continual necessity of reproduction in the making of nations. Further, Yuval Davis (1997) emphasises the ways in which national cultural identity is linked to the biological body politic such that foreigners are perceived as not just cultural dilutors but as biological threats.

Nation-making, with its reliance on reproduction and the making of social identities, is a quintessential biopolitical undertaking. The attempt to naturalise human difference in accordance with man-made national boundaries is central. Borders serve to delineate foreigner from national and 'our' land from 'theirs', and can be idealised as a biological bounding of a culturally and racially homogenous population within an enclosed space. It is through borders that the body politic continually and ritualistically expels those who threaten its sense of unity. Thus borders, at their core are "meant to concretise the principle of dissimilarity rather than that of affinity" (Mbembe 2019b). It is through this that I come to understand borders and nations as biopolitical arrangements intrinsically interested in maintaining, sustaining, legitimising and reconfiguring notions of biological human difference for the continual preservation of the dominance of a certain type of humanity.

Characterising Contemporary Biopolitics

In the 21st century, beginning with the completion of the Human Genome Project, the character of race has shifted. Although once purely based on phenotypical characteristics, it is the gene that now provides the scientific basis for understandings of race. This new genomic understanding of race supposed itself to have made obsolete the 19th century distinctions of racial types through the discovery that all humans share more than 99.9 per cent of their DNA. Yet as Duster, who describes the shift as the "molecular reinscription of race" (2015) and Fullwiley, who uses the term "contemporary synthesis of race" (2014) emphasise, this proclamation of a break away from race thinking and racism was premature. They identify the ways in which race, as a social construct and in its 18th/19th century formations, has entered covertly into genomics (see also TallBear 2014, Roberts 2011). Modern genomic projects are presented as means to address genetic health concerns, yet there remains spillage and mixing of the social conception of race, and the newly emerged scientific and genetic conception of race. Race-based biomedicine and population-based genetic studies thus dance between the two conceptions of race while being unable to address the ways they feed into each other. They simultaneously advocate for treatment of racial disaparities in healthcare to move past social race but also reify constructions of racial categories by investigating genetic differences between racial/national groups. Race, in this way, is 're-biologised' through genomic science.

In this section I characterise the ways in which contemporary biological sciences, of which the gene is a protagonist, are used for contemporary political agendas. The genome is now both biological reality and social object. Although often presented as something natural that was 'discovered', it is important to reflect on the ways in which 'the gene' is a synthetic composite of ideas about who we are as humans as well as a reimagining of this humanity. For Choksey "the cult power of genomics" (2021, 2) is in its ability to write all human life as reducible to a molecular code, with consequences for how we see ourselves and each other: "encountering oneself as a string of code means not just thinking about what makes us human, but confronting ourselves as human beings *in* code" (*ibid*, 3).

Biopolitics in the contemporary is influenced by this shift in figuration of the human *as* code. This introduces a techno-scientific inflection to biopower, whereby biological intervention is mediated through newly possible processes of microscopic dissection, atomisation and datafication. It is in this vein that I adopt Haraway's (1997, 12) term *technobiopower*, a new type of governmentality for the age of the microscopic and the technological. Ruha Benjamin describes code as "both reflective and predictive. They have a past and a future" (2019, 10). Indeed, this can help us understand the paradoxical position of the genome which was marketed as a type of code for human life, taking up older conceptions of race and programming them for an imagined post-racial future. Further, science provides an apparent objectiveness to its claims, making invisible the ways in which the gene is *made by* and *making* understandings of ourselves as biological beings. For Wynter, this invisibi-

lisation of the social creation of 'the biological' is an essential component of European modernity's understanding of the human (2003, 265, 326). In this light we can see 'the gene' as part of a *gene*alogy of a certain type of human that is continually unfolding in the present.

The genome is, additionally, orientated "towards the future tense" (Rajan quoted in Choksey 2021, 3), our biological destinies already determined by our genetic code. Reproductive futurity operates on new scales to foster future life for some and foreclose it for others, continuing this genetic ordering of life and value. With emphasis on genetic disease-free futures, "the machinery of eugenics still determines genomic futures" (Choksey 2021, 7). Genetic medicine is figured as the new frontier for human life and wellbeing with increasingly personalised medicine capitalising on people's understandings of themselves as uniquely genetically determined individuals. Yet, the gene builds on nineteenth century understandings of human development compressing evolutionary time into a biological vector of human life in the present, able to prefigure our lives to come. This is evident in the way genetic variation is explained as a result of the environmental conditions of ancient populations. Algorithmic thinking and predictive modelling (with the same language of 'code') also build into the imaginary of genetic determinism, where small and disparate bits of information are seen as always already process-able into wider models or databases to represent images of the world 'as it is'. Technobiopower, like biopower, takes up the political usefulness of reproductive futurity.

Reproduction remains foundational to the ways in which geneticized understandings of race and nationality are transmitted from one generation to the next, via genetic inheritance. The new millennium has seen a continued policing of the maternal body, only now at the new level of the molecular. The media is filled with stories of 'designer babies' as well as moral responsibilities regarding genetic screening; global overpopulation and the humanitarian need for contraceptive intervention in the global south; debates of 'abortion rights' which position the mother in opposition to the fetus. These stories prompt continued media attention and scientific scrutiny of the maternal body, newly positioning the maternal figure as one of genetic and ethical responsibility, rather than health policy and regulation holding the responsibility (Rose 2001, Clarke 2003). These new genetic responsibilities and subjectivities have been explored by feminist science and technology scholars in the context of Assisted Reproductive Technologies (ARTs) (Stabile 1992, Vora 2020, Roberts 2009, Newman 2019).

Stabile (1992) and Roberts (2009) have analysed the ways in which the body has become racialised with respect to new technological wombs. Technological environments for foetuses have been figured as protective, controllable environments, where every aspect of development can be monitored by the patriarchal figure of the father/scientist. Whereas the maternal body is increasingly depicted as a place where "anything could go wrong" (Aristatkhova 2005, 47) and a potentially hostile environment. This is articulated alongside a racialising of the biological fleshiness of the maternal body that frames the womb as holding the ability to racially/culturally 'contaminate' innocent offspring (see for instance Stabile (1992) and Roberts (2009) analy-

ses of the 'crack mother'). "Techno fantasies" of automated reproduction (Vora 2015a, 88) are built from social understandings of the invisible and passive female subject, and racialised womb, and are made material in technologies that represent the fetus as entirely separable from the maternal body. The social and emotional aspects of the reproductive process are increasingly made subordinate in understandings of biological process, with genetic screening, fetal monitoring and regulations on what pregnant mothers can and cannot do increasingly shaping care. Technobiopower produces a new ethics of mothering, reproduction and kinship.

In bordering practices, the shift to technobiopower has produced increasingly rigid and concrete borders. As a technology, borders now align with genomics and algorithms to write national belonging as genetic code. Who are you? Where are you from? Where do you belong? The gene, with all its seductive powers of 'decoding', promises answers to all of these questions. I dub the emerging association of genetic code with national identity Genetic Nationality. This is indicative of new socialities around genetics and new articulations of immigration restrictions. Populations are increasingly associated with an imagined bio-geographical 'place of origin', speaking to a new spatialisation of race. Genetic Nationality thus fits within Fullwiley's "Contemporary synthesis of race" (2014). Some theorists have posited that the emergence of genetic populations allows for new forms of collectivity that can be used to leverage social rights. Nelson (2016) for instance suggests black genetics as a means to access reparations and reconnections of ancestral kinships that were negated during slavery. Heath et al. (2007) and Rose (2007), also suggest new types of social mobilisation can occur on a national level for genetic health rights. These views, I contend, take for granted the ways in which the further bounding of race, reproduction and nation through the genome naturalises relationships of citizen to state as biological, and (re)produces 'others' as biologically and culturally distinct. Through genetic nationality, there is a fundamental prioritisation of ideas of racial/national fixity and enclosure rather than principles of movement and interrelation. 'Foreigners' are consigned to eternal unbelonging and framed as not just a variation of humanity but a fundamentally different type of humanity who are governed by different rights. Indeed, as Mbembe claims, "borderisation might be the new form of negative eugenics" (2019b).

I have so far provided the key alignments of race, reproduction and nation and have showed the three to be intimately linked in our contemporary moment. The triad represents the overlapping lenses through which humanity is understood. Racialised reproduction produces a temporality in which future life is seen as governable and able to be intervened in in the present. Nationality, too, provides the connection to space and 'a people' which shapes how we view and describe human difference. Through technologies of power that shape the individual as well as the collective (operating on the family, the maternal body, the gene, the national body, the border) biopolitics has made biology matter. Identities have been forged and violently produced: hierarchy and human differentiation have been naturalised to legitimate forms of exclusion and, in the process, ideas of the human have been reconfigured whilst remaining symbolically reminiscent of 19th century European moder-

nity's concept of Man. Technology can accelerate and further invisibilise the connections of the triad, posing problems for contemporary liberation projects.

The challenge we face is therefore to open up the future for all, to loosen the tightening grip of the race-reproduction-nation triad and to nourish alternate models of belonging, kinship, care, parenting and cohabitation (see for instance TallBear 2018 on Native American love and relations, Spillers 1987 on enslaved family relations, and Mbembe 2018 on African kinship models). The project of decolonisation is to open up the future, to embrace its contingencies, and thus to introduce "invention into existence" (Fanon 1986).

The Reference Genome Project for Egyptians and Ancient Egyptians

The Human Genome Project (HGP) sparked a worldwide genomic revolution. Since then, national genome projects have sprung up across the globe, often imagined as 'filling the gaps' of the HGP based on calls for diverse inclusion. Within this context, the Reference Genome Project for Egyptians and Ancient Egyptians (henceforth abbreviated as 'the Reference Genome Project') is "the largest research project in the history of the modern Egyptian scientific research system" (ASU website) and the only active nationally orientated genome project in Africa (El-Attar et al 2022, 13). President Abdel Fattah El-Sisi launched the project in March 2021 with a funding of 2 billion Egyptian pounds (128 million USD) (ibid., 15) spanning a time frame of 5 years. Located primarily in the Medical Research and Regenerative Medicine Center at the Ministry of Defense, the project involves the construction of new infrastructures and scientific networks that span the entire country. A notable genomic project preceding this one was EgyptRef (Wohlers et al. 2020), which was the first de novo assembly of an Egyptian Genome. This project highlighted the differences between Egyptian and European genetics (specifically "allele frequencies" and "linkage disequilibrium" differences (ibid., 6)) to advocate for population specific genetics to counter the Euro-American draft genome (ibid). The Reference Genome is framed within this context and its proponents say it "will help predict future epidemic diseases and identify ways to confront them, and will help in the early detection of genes related to the most common diseases in Egyptians and the best therapeutic and preventive protocols for them" (ASU web). The project is divided into three categories: the population genome category, the genome of the ancient Egyptians, and the category of disease groups (*ibid*.).

The Reference Genome Project is presented as a massive national undertaking and expression of Egypt's scientific excellence, entailing "a propaganda campaign to encourage citizens to volunteer DNA samples for the project" (ibid.). It has also called for a wider diaspora of genomic scientists to participate and for an "Arab regional alliance in human genomics" (ibid.). As such, the media campaign surrounding the project activates a national and transnational consciousness building on histories of anti-colonialism and postcolonial nation building. Making this link explicit, video content pro-

duced for the launch of the genome project begins with a carousel of national iconography, including a sarcophagus, a digital reconstruction of Egyptian queen Tiye, an Egyptian modernist portrait by Mahmoud Saï, the current skyline of Cairo and finally the 'Nahdat Misr' statue (Figure 1).



Figure 1: "Egyptian Genome" - Screenshot from promotional video for the Reference Genome project, Egypt's Renaissance statue by Mahmoud Mokhtar

This modernist statue was made by Mahmoud in 1928 and translates to "Egypt's Renaissance". It was erected in Cairo as a monument for Egyptian independence, referencing both Huda Sha'arawi who led the 1922 anti-British demonstrations and the heavily criticised excavation of the tomb of Tutankhamun by British Archeologists that same year (UCL Equiano centre website). The statue depicts the kinship between ancient and contemporary Egyptians (ibid.). Pharonist iconography is frequently used in Egyptian nationalist movements to connect nation building to ideas of deep historical pasts of spirituality and early technological advancement (Wood 1998). The modern Egyptian in the statue is positioned as a protector of the sphinx (from European plunder) and as a united national entity through the singular piece of Egyptian marble. Within the context of the genome project, the frequent comparisons between the modern and the ancient reflect the same attitude, suggestive of a chronology between ancient and genetic technologies, both invoking aspirations of protecting national resources (first cultural, now genetic).

The Egyptian national genome symbolically imposed on 'Egypt's Renaissance' becomes another monument in the unfolding history of the

Republic. The Reference Genome project frames national identity as biological/genetic; inclusion as genetic participant and within the national community is increasingly aligned with biology. The aspiration to connect the study of contemporary and ancient Egyptian genes demonstrates a retooling of Pharonist iconography for the new biopolitical age. This is a formidable shift in an era where scientific authority confers notions of legitimacy and objectivity, cementing forms of national identification as genetic. I take this to be a prime example of Genetic Nationality, whereby technobiopower shapes the bounds and histories of a population. As Benjamin points out, because of nationalist sentiment, it is tempting to "overlook the ways in which the geneticisation of national populations impacts groups differently, enriching some and dispossessing others, solidifying and weakening group ties to the nationstate in unexpected, and potentially detrimental ways" (2009, 342). Issues of inclusion are not dominant in media around the Egypt genome project, yet the question remains: what of Egyptians who aren't genetic citizens? Those understood as 'genetic foreigners' are rendered invisible or peripheral in the imagination of national genome building.

The building of a population-specific genome will most likely be done through 'admixture analysis' to evaluate bio-geographical ancestry, already utilised by the EgyptRef project. Drawing on Fullwiley (2014) and Duster's (2015) analysis, I understand the process to work like this:

- 1. geneticists define geographical regions and racial populations (e.g. North Africans, South Asians, etc.);
- 2. they then form genetic models out of the relative frequency (based on perceived recurrence of certain traits within a population) of distinct alleles within those populations, known as Ancestry Informative Markers (AIMs);
- 3. these markers are then used to define 'pure' reference populations;
- 4. contemporary genetic material is then compared to these reference populations to determine the percentage similarity.

This process, although appearing objective in the end result of percentages and diagrams, in actuality reflects a series of assumptions about the bounds, movements and cohesiveness of ancient peoples, often built from relatively small samples. Fullwiley describes the process of constructing reference populations as one of "purification" and "filtering" (2014, 807), whereby genetic heterogeneity is deliberately excluded in favour of homogeneity (from step 2 to 3). It is through this process that EgyptRef identifies the genetic ancestry of the Egyptian genome being 29% Middle Eastern, 24% European/Eurasian, 15% North African and 9% East African (See Figure 2). Evident in this process is that it is the social constructions of racial/national identities that fundamentally shape the reference populations. Additionally, the contemporary composition of the Egyptian population attempts to make distinct the uniqueness of the admixture profile, based on its difference from surrounding

populations, presenting the population as "uniquely heterogenous vis-a-vis other nations" (Benjamin 2009, 345). Maps further visualise and naturalise political bounds as biological, each with their own distinctive genetic identity.

Necessarily orientated towards the future, the National genome project is filled with language of prevention, genetic disease-free futures and early detection built on the biological contributions of the Egyptian national body. That is not to say there won't likely be real medical advances that improve people's lives, but to emphasise the ways in which social and political power operate over and above the medical advantages, producing distinct categories

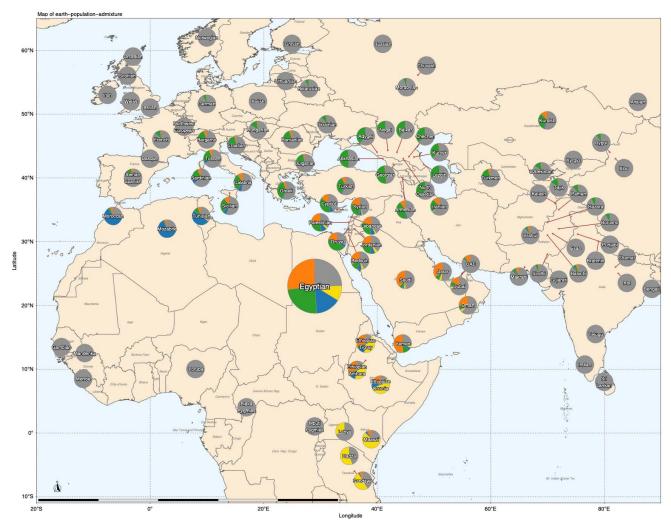


Figure 2: Population Genetic Characterisation of the Egyptian population (Wohlers et al., 2020) - Orange: Middle East, Green: Eurasia;
Blue: North Africa; Yellow: Sub-Saharan Africa

of insider/outsider, foreigner/native, colonial/postcolonial. The social mechanisms of race, nation and reproduction continue to shape the ways in which people understand their identity and their relations to a people or a place. Left out are the ways in which genes do not tell the full story and how our relatedness to space and land extend beyond such classifications.

UK Border Agency Human Provenance Project

DNA testing at the border has been envisioned by governments around the world as a means to validate asylum claims. The UK government first took up such a project at the beginning of 2009, putting together the The UK Border Agency (UKBA) Human Provenance Pilot Project (HPPP). After some setbacks because of critical response, the project ran from September 2009 to March 2010. Over the course of the pilot, 38 individuals were tested for 'country of origin', and 76 family groups for various familial relations (Tutton et al 2014, 739). The project aimed to evaluate the ways in which mtDNA, Y chromosome DNA and Isotope testing could be used in border asylum claims to validate (a) country of origin and (b) familial claims of relatedness. The project developed on biometric technologies of identity management, fitting into histories of fingerprinting (Bivins 2022), Language Analysis (Campbell 2013) and migrant databases (Chouliaraki and Georgiou 2019). Another factor that influenced the design of the project was the social and political concerns of 'nation swapping' by asylum seekers from East Africa: there was an assumed prevalence of Kenyans who would falsely claim Somali nationality in order gain asylum (Tutton et al. 2014, 740). Despite the pilot being shut down (Home Office FOI release 2010), DNA testing has continued in shadow form due to uneven regulations on the requirements of DNA testing: "it has become apparent that the Home Office has been requiring DNA evidence in some cases contrary to our policy" (Home Office 2019, annex A).

Initial protests against the HPPP highlighted the use of population genetics to determine nationality. Ancestry testing was at the time still an emerging field and the validity of its claims remained contested, with Mark Thomas (a geneticist at UCL) arguing "mtDNA will never have the resolution to specify a country of origin" (quoted in Travis 2011). The use of mtDNA to assign individuals to a bio-geographic location relies on highly subjective markers to create reference populations (see scene 2.1) and remains a technology still in the making, leaving migrants as vulnerable subjects of experimental science. Further, critiques of the use of Isotope testing, which is the identification of specific isotopes linked to diet and environment, discerned from nail and hair samples, point out that isotope tests can only identify short-term environmental factors up to six months (Tutton et al. 2014, 744-6). With migrants frequently on the move, as well as the globalisation of imported foods from other parts of the world, these tests neglect the material realities of a world in flux. Six months of diet and environment analysis cannot imply 'country of origin' by any stretch of the imagination.

Even without the scientific inaccuracies of such tests, the idea of genes as a means to 'fix' peoples identities highlights the naturalising force of genomic thinking within social and political imaginaries. This takes up a long biopolitical history of biological population making through processes of identification, surveillance and control. The project connotes a series of

assumptions about legitimate vs illegitimate asylum claims; a conflation between biogeographic ancestry and nationality; and the apparent decipherability of race/ethnicity. These imaginaries, activated by racialised debates about the influx of 'fraudulent asylum seekers', make it possible for someone's bio-geographical profile to stand in for their national identity. Further, the allure of technological objectivity and efficiency intensifies this genetic profiling. Social ideas become biological facts become technological design become 'reality'. Technobiopower thus produces genetic nationality as a reality.

HPPP technologies also presuppose that asylum seekers are lying about their reasons for entering the country and shift the ways truth claims are assessed. A hierarchical division is created between what asylum seekers say, and the 'reality' as presented by their genes. As Tutton et al. argue "the UBKA sought to bypass asylum seekers' testimonies of persecution and of why and how they came into the UK, replacing them with impersonal methods of assessing eligibility" (2014, 739). 'Genetic truth', so to speak, is something that must be navigated in the new laws of 'voluntary testing' often at the claimant's own cost. Migrants are forced to work within these new truth fields produced by genetic technologies, at times feeling obliged to provide DNA evidence for their claim to appear strong enough. Thus, initial criticisms of 'coerced consent' are sublimated into 'voluntary testing'. Ultimately, genetic identities come to take precedence over the multiple dimensions of a migrant's lived experience, which is deemed suspicious in comparison. This is a characteristic shift in the rise of Genetic Nationality, which re-writes nationality as genetically founded. The racialising forces of nationality are thus magnified at the same time as race is molecularised (Duster 2015).

Central to these forms of identity creation are the reproductive logics contained within both the gene, and the political body. This is especially evident in the ways in which familial claims are tested in HPPP, as well as in contemporary UK policy. HPPP tests for familial relations (using mtDNA for maternal lines and Y chromosome for paternal lines) in family reunification claims sought to legitimise relationships of child-parent, or sibling relations and to reject 'fake family' claims. The idea being that national identity was passed down from parent to child such that family units could be assessed together. Many critics of the HPPP seem to understand familial claims as less problematic as the tests are "well established" and "well validated" (Tutton et. al 2014, 743). I contend, however, that this type of testing does represent an intervention, on new scales, into family relations. The assumptions of national lineage presuppose kinship patterns of biological relatedness as being the only legitimate form of family. African and Asian communities, for instance, have long practiced alternative forms of kinship through which non-biological kin are incorporated into understandings of family. Testing based on the assumption of a nuclear family model disrupts and confounds these alternative models. We might also think how practices of adoption, guardianship and step-children are also depicted as illegitimate parentage under HPPP, or in need of further explanation and validation within immigration policy. This flattening of familial relationships is part of a continued reliance on reproductive futurity to produce citizens. Birth-right citizenship is reified as the most authentic form of national belonging.

The HPPP policy reveals how racialised bordering policies are subject to technobiopower resulting in the rise of Genetic Nationality. Forms of identification, surveillance and control seek to categorise migrants based simply on their genetic profile, neglecting the ways in which people are more that the sum of their biological parts. Technologies of DNA identification seek to compress all these relations into one permanent identifier, entered into databases and algorithms at transnational levels. Alternate claims to nationality based on naturalisation, marriage, adoption are intrinsically thrown into contestation, moved to the periphery of legitimate citizenship.

Fenomatch

Fenomatch, founded in 2018, is a tech company that developed an AI algorithmic technology to optimise gamete donor selection based on phenotypical and genetic resemblance to the patient: "facial biometry applied to fertility techniques" (Fenomatch videos, 2019). The algorithm uses photographs of the patient, which is then coded into biometric information and matched to the equivalent biometric markers of the donors. A resultant 'Fenomatch score' assesses the phenotypical similarity and suggests donor profiles that best match the patient. Fenomatch is marketed as a tool to be used by fertility clinics, as an additional verification to clinician's subjective recommendations of resemblance for people looking to make a family that looks like them. The technology is said to extend beyond the limited criteria of traditional selection processes: ethnicity, skin, tone, hair colour, hair type and eye colour, supposedly matching more accurately based on "objective scientific and biological criteria" (ibid.). The company is based in Spain (a fertility treatment hotspot) and operates mainly in Spanish speaking countries, with some uptake in the UK.

Assisted reproductive technologies like IVF and surrogacy are utilised by parents and individuals who for some reason or another cannot or do not want to produce children through sexual intercourse. This mostly entails couples who struggle with fertility, homosexual couples and single people who want children (mostly women). For many seeking these technological alternatives to reproduction, the attempt is in some way to recreate traditional procreation (either through a surrogate or through embryo implantation). Most often missing from this reformulation is the genetic link between parent and child. This is the problem Fenomatch tries to address. Their marketing materials present the motivations of the technology as assuring prospective parents an affirmative answer to the question "will my child look like me?" (Ibid.). They attempt to satisfy the desires of those who want biologically related children by producing the appearance of genetic authorship of the parent and associated feelings of familial resemblance. This delimits the realms of affective desire that Fenomatch works within and demonstrates the framework of family-making that they attempt to assist. Visually, this realm is depicted as smiling white babies and mothers, with traces of biometric markers connecting them both (see figure 3), suggesting that happy reproductive futures are sustained by Fenomatch's technovision.



Figure 3: Fenomatch brochure cover

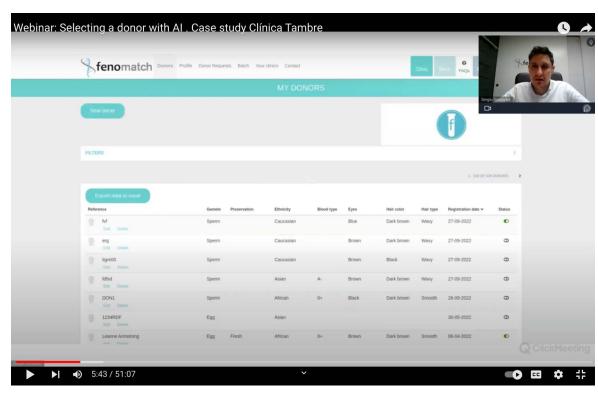


Figure 4: Database of Donor Gametes. Relevant identifiers are: Gamete type, Ethnicity, Blood type, Eyes, Hair Colour, Hair type, registration date

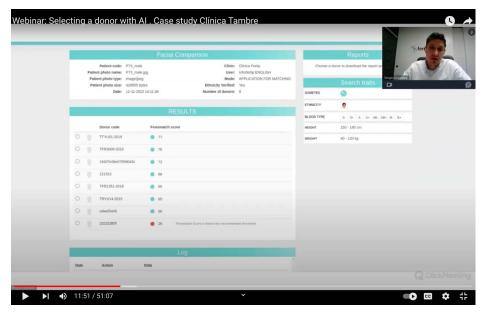


Figure 5: Fenomatch 'find a donor' matching results displaying fenomatch score for different gametes. Similarity score of 29 reads "Fenomatch score is below the recommended threshold"

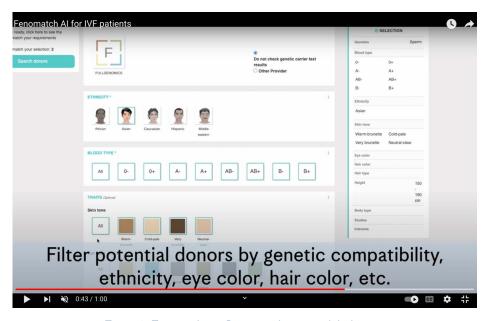


Figure 6: Fenomatch site: Inputing ethnicity, with little cartoons

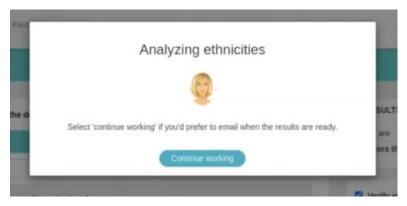


Figure 7: 'Analysing ethnicities' Sergio describes how the code "will tell you if the ethnicity is correct regarding the photo you have previously uploaded"

Fenomatch prides itself on finding "the right" match and "ideal donor" (Fenomatch videos 2019) for the patients. This terminology reflects an understanding of family-making that is perceived as universally valid and desirable (see also scene 2.2): that of the biological family that resembles each other. ARTs and associated biotechnologies continuously recreate or reconfigure ideas of family whilst attempting to hold steady ideas of biological relatedness and kinship that remain essential to people's self-identification with regards to race, nation and gender. I do not wish to villainise prospective parents who chose to use such technologies, but instead to highlight the political and social ideas about family that make such technology possible. Parenting in the contemporary age has become synonymous with genetic relatedness (Strathern 1992, Vora 2020). Norms of the nuclear family sustain the visions of the technology and often produce contradictory results in racialising parents and gametes. For instance Newman (2019) describes the bind that interracial lesbian couples find themselves in when selecting between race and sibling relationship of their children, when both want to carry a child.

Fenomatch connects parent to child via phenotypic filters, genetic filters and biometric filters (Webinar, Fenomatch videos 2023, figures 4-7). It is these pathways that literally encode family and mark systems of gamete identification. Huge databases of donor and patient information demonstrate the ways in which technology is able to atomise and define biological material on new scales (See figure 4). Further, 'Fenomatch scores' out of 100 make opaque the value of biological sameness in gamete selection considerations, through new scales of 'recommended thresholds' (see figure 5). These thresholds frame phenotypical similarity as an essential component of the gamete donation process. In the Webinar, Sergio Gonzalez, Embryologist and Product Owner at Fenomatch explains that scores too high (above 85) are suggestive of a biological relation link and are not recommended out of fears of incest (Webinar, Fenomatch video 2023). Scores too low (below 35) are also not recommended but he fails to explain why. Reading between the lines it is understood that child-parent relationships that do not have a physical resemblance are illegitimate in a similar way to the illegitimacy of incestual relations. Numbers and calculations here produce, in typical biopolitical fashion, notions of what is 'recommended' that will come to affect patient's decisions and subjectivities on parenthood.

Race and ethnicity continue to animate Fenomatch in covert and overt ways. The technology at times requires the "ethnicity" of the donor/patient to be inputted. This not only projects race as knowable in a discrete way, but also positions it as a 'mandatory field' in biological reproduction (see figure 6). As Roberts argues "Fertility clinics use of race in genetic selection procedures may help to reinforce the erroneous belief that race is a biological classification that can be determined genetically" (2009, 789). Fenomatch does just that in both requiring ethnicity as an input and then later algorithmically verifying the ethnicity according to the inputed photo (see figure 7), the idea being that algorithms can determine race potentially more accurately than the donors/patients. Benjamin (2019) has extensively analysed the ways in which technological facial recognition/matching software fails to accomplish the task of race identification. Posing race as essential to gamete donation

and implantation reflects historical fears of 'race mixing' as degeneration. In contemporary politics, with reproduction technologies framed as extending the possibilities of choice, it is important to remember how the selection of choices is prefigured by older conceptions of what it means to be kin and to reproduce. I agree with Moll that "donor matching must be considered in an historical context that relies on racial imaginaries of whiteness and difference" (2019, 589).

Fenomatch engages with histories of biopolitical family-making that frame its vision for future human life. As Vora points out, ARTs are "as engaged with health and wellbeing as [they are] with managing bodies as resources and in discipling social relations" (2015, 89). Seeking to 'fix' the problem of a missing genetic link between donated gametes and receiving parents, the technology re-articulates limiting conceptions of family, kinship and reproduction.

Section Three - CODA

The scenes I have presented each highlight aspects of contemporary biopolitics that indicate a tightening of the race-reproduction-nation triad. These scenes show how racial classifications are redrawn for the genomic age, cementing racial classifications as biological ones. Reproduction and kinship become a means to stabilise and naturalise these classifications as valid not just in the present but in the future, especially evident in the ART of Fenomatch. National borders are more and more seen as a means to bound people based on part-imagined (and as I have demonstrated socially consructed) ideas of biogeographical ancestry. Genomics has become a meaningful way in which nationality is identitified, assigned and understood (see especially UKHPPP and Egypt Reference Genome Project). The scenes I have presented reveal the ways in which real world technologies are science fiction texts made material. They re-imagine future human life, but inevitably draw from age-old scripts about human difference and belonging and, in so doing, they stratify human life where future life is fostered for some and foreclosed for others. Contemporary biopolitics refracts older conceptions of the human along these three axes of race, reproduction and nation.

This section will present an integrated conclusion and film analysis as a reflection on the implications of my discussion in section 1 and analyses of the scenes in section 2. I have selected the short Afrofuturist film *Pumzi* (2009) by Wanuri Kahui, which provides a fruitful lens into the power of futurity. *Pumzi* presents a different type of future, speculative yet powerful. The challenge is to not be beholden to technologies that reproduce the limiting confines of the Human, but to create new paths out of the closing nexus of race, reproduction and nation. *Pumzi* presents worlding possibilities outside the hegemony of the West, implicitly objecting to the "monopoly of the future" (Mbembe 2021, 53) of the West. Film decenters the privileged space of academia and speculative story-telling makes imaginative thought into a praxis of liberation pushing the boundaries of what we take for granted as 'natural' or 'inevitable' and bringing other world views into the realm of possibility. As Benjamin argues, "Fictions

... are not falsehoods but refashionings through which analysts experiment with different scenarios, trajectories, and reversals, elaborating new values and testing different possibilities for creating more just and equitable societies" (2016, 2). Through this alternative politics of the future, we can "introduce invention into existence" (Fanon 1986).

Pumzi is set in a dystopian future 35 years after World War III, 'the water war', in which land has been made desert and the natural world has been reduced to dead tree stumps and animal skulls preserved within the decidedly unnatural 'natural history museum' of the compound. A nation-state-like community called the 'Maitu Community' has been established within a bunker, where citizens' kinetic energy is harnessed to power the compound, and their sweat and urine, purified, make up the stratified water economy controlled by the state. Systems of identification, through barcodes on the arms of the inhabitants, mark individuals and functions as a means of surveillance and discipline, as well as water allocation. Asha, the protagonist, is wrapped up in a spiritual mystery where her dreams, outlawed by the state, and the arrival of a high-water content soil sample from an unknown sender, take her on a journey to plant a long-dormant seed and reinvigorate the natural world. Pumzi highlights the ways in which Kahui interrupts, interrogates and intervenes in problematic conceptions of the human, belonging and kinship.

Symbolic marking is a powerful mechanism for monopolizing the future. In *Pumzi*, the barcode tattooed on the citizens' arms accords them access to certain amounts of water (figure 8). Technology, through systems of identification and sorting, is seen to extend and align digital powers of abstraction with the alienating powers of biopower: technobiopower accelerates. The salience of identification as a source of power is produced by histories of naming, marking and enclosing. Kahui foregrounds this in the Natural History Museum, which shows shelves of categorised plant and animal remains reminiscent of colonial animal and plant collections (figure 9). The idea of trying to understand life through the removal of animals/plants from their living environments by colonial categorisation is parodied and critiqued in these scenes. Yet Kahui also points to a mystical power that defies



Figure 8: Asha gets scanned so that she can receive her water



Figure 9: Close up shot of the 'Natural' History Museum

naming. Asha's dreams and the mysterious arrival of the soil sample represent 'that which cannot be contained' in an identifier. Unassimilable into the logics of the compound, the council and their prescribed dream suppressants disallow the otherworldly as a dangerous anomaly. But for Asha, these dreams and the seed represent possibilities for a new world where life is not equated with pre-determined futures. We might ask ourselves how our own ideas of national/racial identity are embedded in symbolic marking and identification (see also Spillers "hieroglyphs of the flesh" (1978, 68)).

Reading formations of genetic nationality alongside Kahui's narrative, systems of biometric identification (see UKBA HPPP and Fenomatch) and genetic sorting (see UKBA HPPP and Egypt reference Genome) are aligned with extraction of vital energy for political agendas. What results is a genetic individual in a biologically bounded population, where alternative narratives of human life are rejected in favour of a cohesive national/racial identity. Contemporary narratives of the gene presented in genome projects suggest that the secrets of human life and identity are contained within our DNA. Social scripts are, through the gene, made biological such that race and nationality are increasingly understood on a molecular level. Barcodes reflect genetic code, which writes human life as reducible and determinable. But I ask alongside Choksey: "How does the messiness of what genomics does not account for – other histories, other forms of inheritance, other modes of being – interrupt and destabilise the seemingly implacable logic of cause and effect bound up in the idea of a molecular script?" (2021, 5).

Gilbert, Sapp and Tauber (2012) provide a scientific theory of just such a messy life. They explore "symbiotic life", which is the interdependent networks of microbes, organisms and environments (symbiots) that make up human and animal life. We only exist because of our interactions with other beings in the world. Perceptions that we can disentangle ourselves from this forget the wider life systems we are embedded in. Kahui, perhaps unwittingly, narrates scientific understandings of symbiotic life. She shows us this through the mutual dependencies between the seed and Asha, both need her water supply, both are necessary to recreate the natural world, both journey together and dream together.

Conventional distinctions between mother and child are disrupted in Pumzi. Asha 'mothers' the seed, and yet the seed is also a mother, its name 'Maitu' translating as both as "mother" and "our truth". The seed too exchanges vital energy, in the form of dreams, with Asha, and it too is a reproducer (of the natural world). In re-writing reproduction in this way Kahui, renarrates the logics of reproduction through the black maternal figure, liberating her from her figuration within dominant orders of reproduction as symbolic captive. Kahui acknowledges the overlapping formations of the female body as technological, natural and composite, whilst also transgressing the nexus of race, reproduction and nation that presents foreclosed futures. In this way she responds to Spiller's call to make a place for the different social subject of the black mother. This is a new mode of belonging together on the Earth.



Figure 10: Asha the mother and the mother seed

Mothering as a symbiotic process suggests more interdependent ways to understand of reproduction. Restructuring such relations halts the perception of parent as 'genetic author' that is entangled with desires for biologically related kin (see Fenomatch), filled with racialised understandings of reproduction and nationalised responsibilities of citizen creation. The child no longer unilaterally follows the belly, the belly too follows the child (see also Vora on 'Fetal cell michrochimerism', 2015, 2020). This would not create a limitation on the right to choose based on bodily autonomy, but would instead nourish autonomy as an appreciation of the entanglements of life that disrupt relations of property and possession. As such gender, racialised and sexual politics of the maternal body become reframed.

Reproductive justice movements also re-imagine these relationships, acknowledging the female body as composite formations of technology, biology and nature. Vora's work on technologically enabled international surrogacy, for instance, demonstrates the ways in which Indian surrogates advocate, politicise and re-imagine their identities as gestational carriers: "Surrogates themselves point to ways to radically reconsider sociality and relationality" (2020). Sophie Lewis (2019), too, imagines how ARTs can produce queer reproductive utopias of communal 'bio-bags' that reform care and connection

as a community project (although this proposal has its own challenges). These technological horizons for reproductive justice—requiring critical attention and careful design—speak to reproductive futures that do not shirk the technological advances of the contemporary period but rather embrace and re-imagine them. Kahui, alongside feminist STS scholars and black feminists thinkers of reproduction, re-narrate kinship and reproduction as symbiotic, rhizomatic and cyborgian. They therefore continuously sustain new modes of being human and open up new dimensions of the liberation project.

I have demonstrated throughout this paper that biopolitical arrangements and technologies of future life have often reproduced blighted visions of the Human. Constructions of nature, self, family, nation have drawn themselves around forms of biological human difference forged in the modern era by the natural and biological sciences. Contemporary biopolitics continues a history of making the biological essence of a population politically useful, where biology functions to fix people in time and space. At stake is the future possibilities for people in the planet. Those racialized or categorized as outsiders are not just rejected from inhabiting certain spaces but are also temporally made prisoners of the past (Fanon 1986). As the world is described increasingly in terms of land and resource scarcity, futurity becomes a contested territory through which biopolitical governance acts to foster future lives for some and foreclose it for others. This occurs under the new justifications of national cohesion, assisted reproductive choice, and genetic disease-free futures. What results is the tightening of the race-reproduction-nation triad, with reproductive futurity and technology modulating these arrangements. In this context, paying close attention to films such *Pumzi* might point towards paths out of this matrix and suggest new ways to foster care and open futures for all.

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