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THE MAKING OF A NEW RACE IN THE EARLY TWENTIETH CENTURY IMPERIAL IMAGINARY*

TOM QUICK
University of Manchester

ABSTRACT. *This article contends that understandings of race and practices of racial differentiation underwent a significant epistemological shift around the first decades of the twentieth century. It reaches this conclusion via consideration of a dog breeding programme conducted by the statistician and hereditarian theorist Karl Pearson. In 1913, Pearson proclaimed that he, along with his collaborators Edward Nettleship and Charles Usher, had created a 'new race' of dog. Notable for its complete absence of hair pigmentation, this race appeared to demonstrate the potential that experimental animal breeding had for imperial policy-making. In differentiating his dogs from the Pekingese spaniels from which they had been produced, Pearson sought to show that 'foreign' animals could be made to approximate British racial standards. In Pearson's wake, animal breeding became an increasingly persuasive means by which scientists sought to legitimate racial contentions. By the 1920s, established anthropocentric approaches to human differentiation had begun to be replaced by new, animal-centred techniques and practices. Whereas nineteenth-century conceptions of race had primarily been articulated in relation to the study of human bodies, in the new race of the twentieth century, differentiation would involve study of and experimentation with bodies of all kinds – animal and human.*

I

Sometime towards the end of March 1913, the statistician, philosopher of science, and critical figure in the emergence of genetic science Karl

Centre for the History of Science, Technology and Medicine, University of Manchester, Brunswick Street, Manchester, M13 9PL thomas.quick@manchester.ac.uk

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Pearson gave the second half of a two-part speech at University College London.[1] The year was an auspicious one for Pearson, marking the combination of the two professorial Chairs that he held at UCL (in Applied Mathematics and Mechanics, and Eugenics) within a single department.[2] Yet as far as the lecture's attendees were concerned, this was not the most intriguing aspect of his academic endeavour. More engaging was a locked cage onstage. This contained a female Pekingese dog named Ling. During his lecture, Pearson claimed that Ling, when considered alongside her relatives (many of whom were on display outside the lecture hall that evening, in UCL's main quad), could be understood as having unparalleled significance for understandings of human nature, racial difference, and the future of the British empire. (Figure 1). The dogs, he explained, represented the possibility of turning the entirety of the empire's peoples into civilized citizens. What had started out as a foreign, variously coloured breed of dog had been transformed since the start of a scientific breeding programme in 1908 into what he called a 'new race': a population of domestic, white, albinos. He even gave his new race a new, English name: the 'Dondo'.[3]

This article contends that the institutionalization of animal breeding programmes in scientific institutions at the start of the twentieth century marks an epistemological inflection point in the history of conceptualizations of the nature of racial difference. Historians of biology have detailed the association between experimental breeding programmes and the emergence of such scientific objects as Mendelian 'factors' and model animals, as well as the elucidation of population-based and inter-generational approaches to medicine.[4] The implications of these for racial thought remain, however, surprisingly opaque. Without claiming that early twentieth-century experimental animal breeding

[1] 'Professor Pearson and the dog', *Illustrated Sporting and Dramatic News*, Thursday, 29 Mar. 1913, p. 20. Though not a 'geneticist' in the disciplinary sense, Pearson both proposed population-based theories of genetic inheritance and became a critical influence on population genetics itself. See e.g. Margaret Morrison, 'Modelling populations: Pearson and Fisher on Mendelism and biometry', *British Journal for the Philosophy of Science*, 53 (2002), pp. 39–68; and James G. Tabery, 'The "evolutionary synthesis" of George Udny Yule', *Journal of the History of Biology*, 37 (2004), pp. 73–101.

[2] On the two positions, see M. Eileen Magnello, 'The non-correlation of biometrics and eugenics: rival forms of laboratory work in Karl Pearson's career at UCL', *History of Science*, 37 (1999), pp. 79–106 and 123–50.

[3] Karl Pearson, 'Albinism in dogs & men' (Lecture B) [1913], University College London, Special Collections: PEARSON/2/1/34/1. Unless otherwise stated, all archival references in this article denote material held at UCL Special Collections.

[4] Canonical studies of the 'Mendelian revolution' include Robert C. Olby, *Origins of Mendelism* (London, 1966); and Peter J. Bowler, *The eclipse of Darwinism: anti-Darwinian evolution theories in the decades around 1900* (Baltimore, MD, and London, 1983). See more recently Staffan Müller-Wille and Hans-Jörg Rheinberger, *A cultural history of heredity* (Chicago, IL, and London, 2012); Bernd Gausemeier, Staffan Müller-Wille and Edmund Ramsden, eds., *Human heredity in the twentieth century* (London, 2013); and Staffan Müller-Wille and Christina Brandt, eds., *Heredity explored: between public domain and experimental science, 1850–1930* (Cambridge, MA, and London, 2016).

Fig. 1. 'Pekingese dogs kept at UCL by Karl Pearson' (c. 1913), UCL Special Collections: PEARSON 7/158/2. Reproduced with permission from UCL Special Collections.

was in any way inherently or inevitably directed at questions of race, I here explore the significance that it had for the articulation and implementation of racial politics. In contrast to nineteenth-century race theorists' almost exclusive emphasis on human difference, twentieth-century scientists positioned the investigation – and in particular the breeding – of animals as a critical means by which human kinds might be defined.[5] Despite extensive exploration of the relevance of racial thinking to contemporary genetic science, many histories of early experimental research on biological inheritance continue to give the impression that racial concerns were peripheral to it.[6] Concentrating on the

[5] Helga Satzinger, 'Racial purity, stable genes, and sex difference: gender in the making of genetic concepts by Richard Goldschmidt and Fritz Lenz, 1916 to 1936', in Susanne Heim, Carola Sachse, and Mark Walker, eds., *The Kaiser Wilhelm Society under National Socialism* (Cambridge, 2009), pp. 145–70, esp. pp. 149–59.

[6] On breeding animals in early experimental hereditary science, see e.g. Robert E. Kohler, *Lords of the fly: drosophila genetics and the experimental life* (Chicago, IL, and London, 1994); and Karen Rader, *Making mice: standardizing animals for American biomedical research, 1900–1955* (Princeton, NJ, 2004). See also Alexander von Schwerin, 'From agriculture to genomics: the animal side of human genetics and the organization of model organisms in the longue durée', in Gausemeier, Müller-Wille, and Ramsden, eds., *Human heredity*, pp. 113–25.

British imperial context, this article demonstrates that at least some institutionally scientific experimental breeding programmes were framed as epistemically relevant to the definition of racial categories from their very beginning. Existing scientific conceptualizations of race were not simply adapted to the experimental re-conceptualization of heredity in Britain at the start of the twentieth century: they were integral to its very construction.

My focus on this burgeoning fascination with experimental animal breeding amongst hereditarian scientists is motivated by two broad historiographic concerns. First, despite increasing engagement with the 'new imperial history' (through which domestic European culture and politics have been shown to have been deeply influenced by imperial endeavour) in histories of science, technology, and medicine, hereditarian science has so far remained largely absent from it.[7] By drawing out ways in which scientists enrolled experimentally bred animals in the projection of imperial norms and values, I demonstrate that recent attempts to associate animal-centred programmes of biological control with inherently 'modernist' creeds or ideologies – such as Tiago Saraiva's recent identification of experimental breeding programmes with fascist forms of European governmentality – risk obscuring a more general and longer-term trend through which racial differentiation, imperial politics, and animal experimentation became ever more entangled.[8] As Rohan Deb Roy and Sujit Sivasundaram suggest, Europeans' very construction of categories of human racial difference came to rely on the characterization of non-human bodies as their most relevant others from at least the middle of the nineteenth century. Nevertheless, the twentieth century did see the scientific study of race constituted ever more in relation to both human and non-human bodies.[9] My second aim here then is to emphasize that this process both motivated and was dependent on the construction of specific environments in which animals could be made to speak in certain ways (and not others) to human concerns: breeding laboratories were not simply abstract means of discovering the

[7] Foundational texts include Catherine Hall, ed., *Cultures of empire: colonisers in Britain and the empire in the nineteenth and twentieth centuries* (Manchester, 2000); Antoinette Burton, ed., *After the imperial turn? Thinking with and through the nation* (Durham, NC, 2003); and Catherine Hall and Keith McClelland, eds., *Race, nation and empire: making histories, 1750 to the present* (Manchester and New York, NY, 2010).

[8] Tiago Saraiva, *Fascist pigs: technoscientific organisms and the history of fascism* (Cambridge, MA, and London, 2016).

[9] Sujit Sivasundaram, 'Imperial transgressions: the animal and human in the idea of race', *Comparative Studies of South Asia, Africa and the Middle East*, 35 (2015), pp. 157–72; and Rohan Deb Roy, 'Introduction: nonhuman empires', *Comparative Studies of South Asia, Africa and the Middle East*, 35 (2015), 66–75. On the emergence of race as a concept, see e.g. Nicolas Bancel, Thomas David, and Dominic Thomas, eds., *The invention of race: scientific and popular representations* (New York, NY, and Abingdon, 2014), esp. chs. 2–4; and Nancy Stepan, *The idea of race in science: Great Britain, 1800–1960* (London and Basingstoke, 1982). See also Snait B. Gissis, 'Visualizing "race" in the eighteenth century', *Historical Studies in the Natural Sciences*, 41 (2011), pp. 41–103. I am grateful to an anonymous reviewer for pointing me to this latter article.

mechanics of organic change, but spaces in which it became possible to test the extent to which embodied subjects might withstand the imposition of racial ideals. Pearson's dogs, largely forgotten as an insignificant curiosity of early twentieth-century hereditarian science, thereby reappear as a critical moment in the construction of an animality-entangled racial imaginary.

This article consequently identifies more intimate connections between the day-to-day politics of imperial Britain and the establishment of experimental animal breeding programmes than have previously been recognized.[10] Though Pearson is well known as a race theorist, historians have addressed his empire-related speculations separately from his evolutionary and statistical concerns.[11] Indeed, the tendency to identify scientific conceptualizations of race *tout court* with human eugenics at this time has lent credibility to such separation.[12] These assumptions downplay the extent to which Pearson and others lent academic respectability to their racial and imperial claims via the breeding of animals. The cultural status of the dogs that Pearson himself bred is particularly relevant here: as Sarah Cheang has emphasized, the prominence of Pekingese in the early twentieth-century British dog fancy encouraged breeders' fascination with Chinoiserie, contributing to a more general fashion for 'oriental' objects and practices.[13] Notably, however, Pearson's dogs had by 1913 become decidedly un-oriental: not only did they now evince the whiteness associated with 'civilized' European bodies, but they had also shed the orientalist name that tied them to their attributed point of origin. This then was a programme in which the breeding of animals spoke directly to contemporary politics of empire.

Equally, racial concerns informed Pearson's approach to dog breeding itself. Studies of animals and race have primarily concentrated on ways in which the former were made to stand in for and justify discriminatory conceptions of

[10] For a comparable study of plant breeding, see Berris Charnley, 'Experiments in empire-building: Mendelian genetics as a national, imperial, and global agricultural enterprise', *Studies in History and Philosophy of Science A*, 44 (2013), pp. 292–300.

[11] Hamish G. Spencer and Diane B. Paul, 'The failure of a scientific critique: David Heron, Karl Pearson, and Mendelian eugenics', *British Journal for the History of Science*, 31 (1998), pp. 441–52; Magnello, 'The non-correlation of biometrics and eugenics'; Donald Mackenzie, *Statistics in Britain: the social construction of scientific knowledge* (Edinburgh, 1981). See also Theodore M. Porter, *Karl Pearson: the scientific life in a statistical age* (Princeton, NJ, 2004); and Donald Mackenzie, 'Karl Pearson and the professional middle class', *Annals of Science*, 36 (1979), pp. 125–43.

[12] Daniel J. Kevles, *In the name of eugenics: genetics and the uses of human heredity* (Cambridge, MA, and London, 1995). See also, however, Dan Stone, 'Race in British eugenics', *European History Quarterly*, 31 (2001), pp. 379–425; and Chris Manias, *Race, science and the nation: reconstructing the ancient past in Britain, France and Germany* (New York, NY, and London, 2013), ch. 7.

[13] Sarah Cheang, 'Women, pets and imperialism: the British Pekingese dog and nostalgia for Old China', *Journal of British Studies*, 45 (2006), pp. 359–87. For context, see Sadiah Qureshi, *Peoples on parade: exhibitions, anthropology, and empire in nineteenth-century Britain* (Chicago, IL, 2011).

human nature.[14] This article shows that experimental studies not only supplemented racial presumptions 'out there', but also helped create nationally domestic spaces (in this case the first animal house at University College London) in which strategies of racial control could be rehearsed and articulated.[15] At a time when fears surrounding the so-called 'yellow peril' were at its height, the prospect that all peoples might be coerced into becoming white remained an enticing prospect to many in Britain and its empire.[16] Pearson presented his canine charges as representatives of the possibility that all human races could be so 'improved'. The new ethos of experimental hereditarian investigation that he helped promote did not herald a 'retreat' of scientific racism during the first decades of the twentieth century, but rather constituted new horizons of racial possibility.[17] Due to the epistemic entities (animals) now positioned as central to its practice, the scientific study of race could no longer be understood as the exclusive purview of anthropological investigation. Instead, it was incorporated ever more within the study of organic and developmental processes more generally.

The following then sets out the anthropological context of Pearson's studies in biological inheritance, before addressing the intersection between imperial ideologies of whiteness and scientific animal breeding in Britain. It closes with a consideration of the extent to which the animal house that Pearson established at UCL both expressed and helped legitimate more broadly held imperial anxieties and projections. Throughout, it shows how animal breeding was brought to bear on matters of human racial concern. This process contributed to the creation of a 'new race'; the articulation of a set of strategies of imperial management and control in which experimentation with animal bodies would inform those imposed on human beings, and (crucially) vice versa.

I

In his lectures of 1913, Pearson characterized the various types of dog that he along with his collaborators the ophthalmologists Edward Nettleship and

[14] E.g. Aaron Herald Skabelund, *Empire of dogs: canines, Japan, and the making of the modern imperial world* (Ithaca, NY, and London, 2011); Harriet Ritvo, 'Race, breed, and myths of origin: Chillingham cattle as ancient Britons', *Representations*, 39 (1992), pp. 1–22.

[15] For a suggestive account of a comparable earlier instance of animal 'whitening', see Sarah Amato, 'The white elephant in London: an episode of trickery, racism and advertising', *Journal of Social History*, 43 (2009), pp. 31–66. I am indebted to an anonymous reviewer for highlighting this article. See also Jonathan Saha, 'Murder at London Zoo: late colonial sympathy in interwar Britain', *American Historical Review*, 121 (2016), pp. 1468–91.

[16] Michael Keevak, *Becoming yellow: a short history of racial thinking* (Princeton, NJ, and Oxford, 2011); Warwick Anderson, *The cultivation of whiteness: science, health, and racial destiny in Australia* (Carlton, VC, 2005).

[17] Cf. Elazar Barkan, *The retreat of scientific racism: changing concepts of race in Britain and the United States between the world wars* (Cambridge, New York, NY, and Melbourne, 1992); and Stepan, *The idea of race in science*, ch. 6. For a corrective, see Gavin Schaffer, *Racial science and British society, 1930–1962* (Basingstoke, 2008).

Charles C. Usher had been breeding as different 'races'. Such nomenclature was fairly routine at the end of the nineteenth century: zoologists, fancy breeders, and agriculturalists alike referred to strains of animals in such terms.[18] Pearson and Nettleship had bred various strains of dog from their initial pair of albinotic Pekingese acquired in 1908. In total, Pearson claimed to have created four new canine 'races', primarily by crossing the Pekingese 'Dondos' with a group of carefully selected Pomeranians (discussed more fully below). In addition to the Dondo Pekingese, he announced a breed of 'Pompeks' constituted by blending the two original breeds, a sub-type of these named the 'Galton Spaniel', and a Pompek-albino Pekingese cross named after the French-Swiss ophthalmologist Édouard Cornaz.[19] Pearson boasted to his wife, the poet and feminist historian Maria Sharpe Pearson, that these acts of creation demonstrated that he 'had control of the vital processes'.[20]

Nevertheless, Pearson's approach to the differentiation of animals would have been surprising to casual contemporary observers. For example, rather than consider the various 'points' that fancy breeders valued, Pearson concentrated on the precise lengths and breadths of his dogs' heads:

> There can hardly be a greater contrast than [the] broad head of the Pekinese with its short muzzle and the narrow head & long muzzle of the Pom…The first cross between Pomeranian & Pekinese were all described by us as 'short muzzled dogs'…The long fine muzzle of the Pom was clearly recessive, and it ought to come out again when the Pompek was crossed with Pompek…[Yet] what we have got are rather mongrel looking heads which are neither Pom not Pekinese.[21]

Pearson's obsession with what he elsewhere in the lecture called the 'muzzle indexes' of his animals was by no means incidental. As this section demonstrates, the criterion emerged directly out of an already established set of anthropological concerns: Pearson's programme for the study of inheritance (which he referred to as 'biometrics') was unapologetically human-oriented.

During the 1890s, Pearson had become a key proponent of one of the more complex attempts to define and differentiate between human races on anatomical grounds. The belief that humans could be distinguished using a single, measurable anatomical characteristic had its origins in the constitution of race as an object of scientific investigation by European explorers, natural philosophers, and academics from the seventeenth century onwards.[22] In this context, anatomical characteristics of all kinds came to be deployed as indicators of imperial

[18] Ritvo, 'Race, breed, and myths of origin'.

[19] Pearson, 'Albinism in dogs & men' (Lecture A), fos. 10–15.

[20] Karl Pearson to Maria Sharpe Pearson, 14 May 1908: PEARSON/11/1/16/46.

[21] Pearson, 'Albinism in dogs & men' (Lecture B), fo. 23. See also Karl Pearson, Edward Nettleship and Charles H. Usher, *A monograph on albinism in man* (Text Vol. II) (London, 1913), pp. 465 and 481–9.

[22] Qureshi, *Peoples on parade*, ch. 6; Keevak, *Becoming yellow*, pp. 48–51; Michael F. Robinson, *The lost white tribe: explorers, scientists, and the theory that changed a continent* (Oxford, 2016), pp. 55–63.

subjects' political prospects. For such figures as Petrus Camper and Johann Friedrich Blumenbach, skull size and shape in particular came to be understood as a critical index of racial typology.[23] Yet mid-nineteenth-century physical anthropologists found that individuals' skulls often refused to accord with established classificatory expectation. European skulls, generally considered the largest and most symmetrical (and therefore the most capable) were not always shown to be so when subject to the discipline of measurement. New approaches to measurement and calculation grew up around such problems. Most notable amongst these was the 'cephalic index' – a ratio of the lengths and breadths of skulls. Towards the end of the century, cephalic indexes became indelibly associated with an increasingly influential strand of physical anthropology, in which statistics played a critical role.[24] And it was from this measurement technique that Pearson's muzzle-related terminology was drawn.

Pearson's mentor Francis Galton's science of statistical differentiation, and especially his development of normal distribution curves, did most to legitimate the cephalic index as an authoritative technique of anthropological classification.[25] Galton cast his nascent science as simultaneously a means of characterizing and differentiating between races, and a contribution to the newly respectable investigation of organic evolution: for Galton, distribution curves described historical as well as spatial relations amongst races. Most notably, the centre or highest point of a distribution curve – the point representing the most 'normal' individual of a given race – was held to represent the historical origins of that race. Deviations from the norm were historical anomalies; expressions of 'heredity defect' that would, if allowed to propagate, distort the character of the group as a whole. The continuation of racial 'types' was nevertheless ensured by a mechanism Galton referred to as the 'ancestral law', by which individuals were defined by the summation of characteristics passed down to them by all of their predecessors. Inheritance thus appeared as a force that was simultaneously constitutive of and potentially destructive to racial integrity: though populations tended to revert to their historically defined ancestral types, anomalous individuals, if allowed to pass their quasi-pathological characteristics on, could cause undue deviations from the historical norm ('degeneration'). In exceptional cases, extreme deviations, or 'sports', might also constitute new racial kinds.[26]

Pearson began to refine Galton's work during the 1880s and 1890s. His contributions were twofold: first, he sought to re-cast Galtonian statistics as

[23] Bancel, David, and Thomas, eds., *The invention of race*, esp. chs. 2–4; Gissis, 'Visualizing race', on pp. 91–102.

[24] Manias, *Race, science and the nation*, pp. 119–20.

[25] On Galton, see e.g. Nicholas Wright Gillham, *A life of sir Francis Galton: from African exploration to the birth of eugenics* (Oxford, 2001).

[26] On this apparent contradiction, see Peter J. Bowler, 'Francis Galton's saltationism and the ambiguities of selection', *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 48 (2014), pp. 272–9.

demonstrative of a gradualist vision of biological development. Along with figures such as W. F. R. Weldon and collaborators including Alice Lee and Ernest Warren, Pearson contended that statistical techniques made it possible to observe contemporary evolutionary change directly. These biometricians took anomalies in distribution curves as indicators of instances of developmental divergence, most famously in a population of Mediterranean crabs portrayed as two differently constituted, diverging groups.[27] Yet historians' tendency to identify biometry exclusively with studies of non-human animals ignores the explicitly imperialist nature of much early biometric endeavour.[28] Most notably, it elides the significance for evolutionary thinking of a major element of imperial science at this time: archaeological anthropology. And it was Pearson's contribution to this latter endeavour that had the most immediate relevance to his dog studies.

Pearson's collaboration with W. H. Flinders Petrie, one of the most prominent archaeologists of the late nineteenth century, played a crucial role in his engagement with and revision of Galton's ideas.[29] By 1895, Pearson and Weldon had embarked on their above-mentioned crab claw study. Yet at this very moment, Pearson was addressing another set of measurements. These described the extensive collection of human bones that Petrie unearthed during his excavations in Egypt that year. Pearson and Petrie corresponded intensively during the appropriation of the remains of what they referred to as a 'new race' of ancient Egyptian people; Pearson even found a temporary home for the collection at UCL.[30] Pearson's denotation of the dogs as themselves a 'new race', then, was a deliberate echo of a pre-existing intellectual trope. Notably, a significant strand of nineteenth-century anthropology contended that Egyptians had originally been a prototypically 'white' people, and were thus potentially a common evolutionary ancestor of Europeans.[31] Petrie's initial report to Pearson declared the find to be of 'great ethnographic interest':[32] skull size and comparison was central to their evaluation of the significance of this collection for evolutionary theory.

[27] Walter Frank Raphael Weldon, 'On certain correlated variations in *Carcinus moenas*', *Proceedings of the Royal Society of London*, 54 (1893), pp. 318–29.

[28] For a significant exception, see Sarah Jansen, 'Den Heringen einen Paß ausstellen: Formalisierung und Genauigkeit in den Anfängen der Populationsökologie um 1900', *Berichte zur Wissenschaftsgeschichte*, 25 (2002), pp. 153–69. I am grateful to Raf de Bont for alerting me to this publication.

[29] Debbie Challis, *The archaeology of race: the eugenic ideas of Francis Galton and Flinders Petrie* (London and New York, NY, 2013), pp. 223–5; Debbie Challis, 'Skull triangles: Flinders Petrie, race theory and biometrics', *Bulletin of the History of Archaeology*, 26 (2016), pp. 1–8 (article 5).

[30] Pearson to William Mathew Flinders Petrie, 17 June 1895; Pearson to Petrie, [early Aug.] 1895; Pearson to Petrie, 11 Aug. 1895; Pearson to Petrie, 12 Aug. [1895]; Pearson to Petrie, 16 Sept. 1906: Archives of the Petrie Museum of Egyptology, University College London (hereafter Petrie Museum Archives), 6/PEA/01–05.

[31] Keevak, *Becoming yellow*, pp. 16–18; Robert J. C. Young, *Colonial desire: hybridity in theory, culture and race* (London and New York, NY, 1995), pp. 127–9.

[32] W. H. F. Petrie to K. Pearson, 1 Feb. 1895: PEARSON/11/1/16/94.

Critically, Pearson deployed the Egyptian new race to challenge a key element of Galton's scientific programme of racial differentiation.[33] The problem that the bones seemed to present was that they deviated from established ideas as to the anatomical proportions of both Africans 'proper' and of (more 'European') modern Egyptians. In correspondence with Pearson, Petrie thus initially characterized the ancient skulls as the remains of a 'cannibal race' of 'ancient Libyans' who had he supposed migrated to Egypt, displacing a more primitive group.[34] Pearson disagreed: comparisons between the lengths of skulls in a range of anthropological collections indicated that the new race possessed heads of a size comparable to if not larger than those of modern Europeans. Including skull breadth via his cephalic index calculations repositioned them as a transitional stage on an evolutionary continuum, in which 'primitive' humans with 'long' heads had gradually been replaced by those with 'broad' heads.[35] Thus, Pearson insisted to Petrie, there had been no migration: 'roundheads have been derived from longheads by a selection of breadth rather than length'.[36] This contention would become something of a shibboleth for biometricians in the ensuing decades.[37]

In asserting the primacy of anthropometric calculation over the civilizational speculations of his collaborator, Pearson was combining archaeological, evolutionary, and historical claims in a manner that had become increasingly routine amongst contemporary theorists of empire. Nevertheless, his conclusions diverged from conventional wisdom regarding the causes and implications of racial evolution. Liberal theorists for example tended to identify education rather than organic development as the critical factor in civilizational progress: an assumption that led many to emphasize that social policy could improve racial stock. More biologically determinist thinkers tended to assume (following Galton) that populations free of distortion from degenerative environmental pressures would tend to 'revert', or 'regress' to their original types (Galton's statistical 'means').[38] Pearson attempted to reconcile these stances, articulating a progress-oriented and yet simultaneously biologically determinist conception

[33] It should be noted here that although Galton's statistical studies retain their status as key contributions to modern science, the programme of human categorization and manipulation that he developed his statistics to facilitate do not. During his own lifetime, however, the two strands of investigation were understood as part of a single set of scientific claims, and were evaluated as such. See e.g. Stepan, *The idea of race in science*, pp. 124–34; and Stone, 'Race in British eugenics'.

[34] Petrie to Pearson, 1 Feb. 1895: PEARSON/11/1/16/94; William M. Flinders Petrie and James Edward Quibell, *Naqada and Ballas* (London, 1896), pp. 62–4.

[35] On long versus short heads, see Manias, *Race, science and the nation*, pp. 119–20 and 157–62.

[36] Pearson to Petrie, [early Aug.] 1895, Petrie Museum Archives, 6/PEA/02.

[37] Challis, 'Skull triangles', pp. 5–6.

[38] Theodore Koditschek, 'Narrative time and racial/evolutionary time in nineteenth-century liberal imperial history', in Hall and McClelland, eds., *Race, nation and empire*, pp. 36–55; and Kay Anderson, *Race and the crisis of humanism* (London and New York, NY, 2007), esp. pp. 176–86.

of civilizational change. To do so, he differentiated Galton's identification of normal characteristics with ancestral origins.[39] The Egyptian and the canine new races were neither pathological deviations from racially pure ancestors, nor superior invaders that had displaced backward groups. Rather, they represented a universal, gradually progressive process of evolution.

Pearson's attention to the muzzle indexes of his canine charges was not thereby an expression of scientific eccentricity. Rather, it reflected deep-seated investment in anthropometric anthropology, and a desire to extend its influence over zoology. The very denotation of the new statistical field as 'biometry' (replacing Galton's 'anthropo-' prefix with the more evolutionarily pertinent 'bio-') belays Pearson, Weldon, and their associate's aspirations. The implications of this move moreover went beyond simply deploying techniques developed in relation to human bodies to account for differences amongst non-human beings. Specifically, Pearson reopened Galton's mathematics to the possibility that all organisms (humans included) might be enrolled in projects of gradual 'improvement'. His interest in animal heads thus extended beyond dogs. Shortly before he and Nettleship began their canine studies, he had attempted to instigate a farm-based programme that would (as he related to Maria) 'from black pigs with short heads and white pigs with long heads… produce a race of white pigs with short heads'. 'If that can be done', he claimed, 'then most things are possible.'[40] Pearson adapted anthropometric techniques of racial characterization to new, experimental approaches to heredity: discernment by measurement was to be a means of defining generally biological rather than exclusively human difference.

If Galton's science of statistical discrimination played into an increasingly prevalent conception of ancestrally maintained racial stability, it also resonated with then-prevalent conceptions of canine nature. Galton himself conducted an extended survey of breeders' records of Basset Hound mating, with a view to discovering the nature of coat-colour inheritance. Breeders, as Worboys et al. have recently emphasized, began to identify different kinds of dog with historically distinct ancestral forebears only towards the end of the nineteenth century.[41] Pearson and Nettleship's amateur breeder informants assured them that Pekingese were an inherently 'civilized' breed that evinced a peculiarly 'oriental' set of racial characteristics. Prominent breeder George Brown thus informed Nettleship that the dogs were the inspiration for the so-called

[39] Karl Pearson, 'Mathematical contributions to the theory of evolution – III. Regression, heredity, and panmixia', *Philosophical Transactions of the Royal Society of London A*, 187 (1896), pp. 253–318, on p. 280.

[40] Karl Pearson to Maria Sharpe Pearson, 12 May 1908, and K. Pearson to M. S. Pearson, 14 May 1908: both PEARSON/11/1/16/46.

[41] Michael Worboys and Neil Pemberton, 'The invention of the Basset Hound: breed, blood and the late Victorian dog fancy, 1865–1900', *European Review of History – Revue européenne d'histoire*, 22 (2015), pp. 726–40; Michael Worboys, Julie-Marie Strange, and Neil Pemberton, *The invention of the modern dog: breed and blood in Victorian Britain* (Baltimore, MD, 2018).

'guardian lion' (shíshī: 石獅) statues in front of China's imperial palaces, probably making the breed over 2,000 years old.[42] Nettleship similarly asserted it to be '*very* ancient', and asserted 'one of the Chinese gods, a gentleman called Fo', to be a 'monstrous charicature [sic] of these dogs'.[43] Orientalist assumptions that the dog was of both extreme age and mysterious import added important cultural inflections to the breeding programme.[44] Nor was Pearson alone in his scientific fascination with breeds originating from 'the east'.[45] Adopting such animals as means of discovering the nature of race itself imported European imperial concerns into the heart of the new experimental science.

Nevertheless, in contrast to Galton, Pearson invested in a then counter-intuitive conception of racial differentiation, in which the progression or degeneration of races primarily depended on the contingencies of transmission between individual generations. In announcing his creation of 'new' canine races, then, Pearson was advancing a specific claim regarding the prospects of hereditarian investigation. Though the muzzles of his dogs might be 'mongrel looking', that they blended two previously existing types into an apparently persistent new form indicated that it was possible to direct evolution itself. Biometric dog breeding thus helped constitute new horizons of political possibility. First, it indicated that there could no longer be any certainty that a historically homogeneous population, left to its own devices, would retain any inherent 'racial' integrity. Secondly, it appeared possible to cultivate entirely new biological (including human) kinds of being. It was not in relation to head size, however, but the more immediately discriminatory criterion of skin colour that this latter prospect found its most complete expression in Pearson's own work.

II

Pearson and Nettleship's breeding programme was an explicit attempt to constitute a science of heredity that could account for and potentially direct the development of both human races and animal species. As such, the characteristics accorded most epistemic significance by them were not osteological, but epidermal. The fact that the dogs were apparently entirely devoid of pigmentation was for Pearson especially of great import. 'We simply must have them', he had declared on hearing of the existence of the original albinotic pair.[46]

[42] Edward Nettleship, 'Memoranda about Pekingese dogs from conversation with Mr George Brown, 15th July 1911' (16 July 1911): E A PEARSON/3/9.

[43] Nettleship to Pearson, 9 Jan. 1909: PEARSON/3/13/35. Nettleship's emphasis.

[44] See especially H. P. Wang Yun to George Brown, 10 Apr. 1905: PEARSON/3/9. Cf. Cheang, 'Women, pets and imperialism', pp. 376–7.

[45] Arthur D. Darbishire, 'On the result of crossing Japanese waltzing with albino mice', *Biometrika*, 3 (1904), pp. 1–51; Robert M. Yerkes, *The dancing mouse: a study in animal behaviour* (New York, NY, 1907). See also Rader, *Making mice*, pp. 33 and 131; and Satzinger, 'Racial purity, stable genes', pp. 151–3.

[46] Nettleship to Pearson, 25 Oct. 1908: PEARSON/3/13/34; Pearson to Nettleship, 28 Oct. 1908: PEARSON/3/13/47.

This section addresses the meanings that the dogs' whiteness had for Pearson the theorist of empire as well as Pearson the biometrician. Albinism featured prominently in Pearson's discussions of race during the 1910s. Before his and Nettleship's discovery of the dogs, they had embarked on an extensive survey of albinism amongst British imperial subjects: a project that resulted in the publication of two volumes (in 1911 and 1913) of a longer-projected monograph series entitled *Albinism in man*. It was in order to exemplify and expand on this human-centred study that they embarked on their canine investigations. By determining the processes of transmission of coat colours between generations of dogs, Pearson in particular sought to position himself as an authority on one of the most contentious and long-standing questions in imperial science: the nature of human skin colour inheritance.

The year before he presented the dogs at UCL, Pearson had made the following portentous pronouncement:

> My studies on…albinism of the dark races have convinced me that with sufficient funds, dictatorial power, and longevity in the dictator, a very few generations would suffice to produce a race of negroes with white skin, yellow hair, and blue eyes. I do not believe that any funds or power or length of time would enable me [sic] to reverse the process. The white [race] almost certainly had a dark-skinned, dark-haired, and dark-eyed ancestor, and he has lost something which it would mean reversal of selection to regain.[47]

Three connected contentions are exemplified by this quote: first, Pearson conveyed a conception of evolution in which characteristics could appear and disappear rapidly. Second, evolutionary progression was non-reversible and characterized by a change in colour from (undesirable) black to (desirable) white. Finally, ensuring the continuation of this process was of necessity a matter of imperial government (the most certainly effective form of which being 'dictatorial power'). All three informed Pearson's approach to dog breeding. Most notably as far as this article is concerned, Pearson employed a group of Pomeranians, selected for having the most complete black-coated ancestry possible, in place of 'the dark races'.[48] The animals resulting from crossing these with 'Dondos' became exemplars of the dangers and possibilities relating to human miscegenation. Most notably, Pearson appealed to the albino Pekingese as embodiments of the possibility that 'dark' and 'oriental' imperial subjects might be 'improved' through interbreeding with 'whites'.

It is difficult to over-estimate the extent to which associations between whiteness and civilizational superiority pervaded politics at this time.[49] In addition to

[47] Karl Pearson, *Social problems: their treatment, past, present, and future: a lecture delivered at the Galton Laboratory for National Eugenics, March 19th, 1912* (London, 1912), pp. 7–8.

[48] Pearson, 'Albinism in dogs & men' (Lecture A), fo. 10.

[49] Duncan Bell, *The idea of Greater Britain: empire and the future of world order, 1860–1900* (Princeton, NJ, and Oxford, 2007); Douglas Lorimer, *Science, race relations and resistance: Britain, 1870–1914* (Manchester, 2013); Koditschek, 'Narrative time'.

the above-described long-standing fascination with the possibility of biological change and its relation to archaeological and historical progress, anxieties regarding the perceived physical inadequacy of lower-class 'whites' had become a matter of intense domestic political concern. This was partly prompted by the perceived failure of British imperial projects in China and Southern Africa. In 1906, the reigning Conservative government in Britain suffered a crippling defeat at the hands of an alliance between Henry Campbell-Bannerman's Liberal party and a burgeoning Trades Union movement. Electoral collapse came as something of a surprise, as Conservatives had recently presided over a much-anticipated (if frustratingly belated) military victory in South Africa: long-awaited suppression of Britain's Boer rivals did not translate into Conservative votes. This, as historians have shown, was at least in part due to the prominence during the campaign of the so-called 'Chinese slavery' question.

Liberal and trade unionist politicians campaigned on a platform of protecting the rights of white labourers throughout the British empire. That this issue had such resonance in 1906 was, however, related to a specific set of policies regarding the movement of labour around the British empire in general, and into South Africa in particular. Commitment to free trade extended for many imperial policy-makers to the free movement of people. Yet in the now-predominantly 'white' territories around which ideas of establishing a 'Greater Britain' circulated, 'coloured' labour migration seemed to many to threaten the integrity of the imperial project. South Africa's status as a nominally white territory that nevertheless relied heavily on the exploitation of its indigenous population placed it in an especially uncertain position. Gold mining industrialists had found themselves facing severe labour shortages following Britain's assertion of military dominance. Yet many white mine employees remained deeply suspicious of free trade labour policy, and accused policy-makers of deliberately undercutting their bargaining capacity. When in 1904 the Conservative government sought to solve the labour shortage by importing workers from China, then, the stage was set for direct confrontation. Organized 'white labour', union leaders and liberal politicians contended, had been deliberately stymied by a contrived invasion of 'yellow' workers subjected to slave-like working conditions.[50]

It was precisely during this period of intense racial anxiety that experimental approaches to inheritance gained intellectual prominence in Britain. Biometric technologies and anthropological presumptions regarding the natural differentiation of races played a prominent role in Conservatives' reassurances regarding the possible consequences of racial mixing. Conservative policy dictated that

[50] Alan Keith Russell, *Liberal landslide: the general election of 1906* (Newton Abbot, 1973); Jonathan Hyslop, 'The imperial working class makes itself "white": white labourism in Britain, Australia and South Africa before the First World War', *Journal of Historical Sociology*, 12 (1999), pp. 398–421.

Chinese workers would be carefully monitored, and their movements confined within exclusion zones strongly reminiscent of the concentration camps that had been used against Boer and indigenous groups during the war. For the first time, identificatory fingerprinting of a defined racial group – an approach that enrolled Galton's new science directly into programmes of imperial government – would ensure that state control of a migrant population remained absolute.[51] In any case, politicians suggested, such workers posed no risk to the racial integrity of their white counterparts, as it was not possible for distinct races to 'blend' to any long-lasting degree.[52]

Many British scientists' discussions of heredity overlapped with and supplemented Conservative reassurances regarding the risks of miscegenation. Most notably, new conceptions of hereditary mechanics seemed to imply that even were Chinese or African workers to procreate with colonizing Europeans, a natural reassertion of racial integrity would be possible. Though Weldon and Pearson's rival William Bateson did not actively support conservative causes, he was a close associate of Lord Balfour, who both sponsored Bateson and acted as British prime minister during the Boer War. Perhaps not coincidentally, Bateson was an early enthusiast regarding the German biologist August Weismann's contention that an individual's bodily characteristics were expressive of a more fundamental 'germ-plasm' that carried the originary characteristics of a race across generations.[53] Even greater excitement surrounded the 'rediscovery' of Gregor Mendel's investigations of hereditary transmission. Experimental animal breeding encouraged fellow enthusiasts of Bateson's including Charles Davenport and George P. Mudge to declare that human bodily diversity was the product of as-yet imperceptible pairs of racial elements or 'unit characters'. Moreover, albinism featured as a placeholder for white racial purity in early British discussions of Mendel. As the avowedly conservative Mudge put it, 'when two sex-cells unite, one carrying blackness and the other albinism, these…remain distinct': 'sex cells are the carriers of the characters of the race'.' The 'blending' of races, in this vision, was a temporary aberration rather than an irreversible 'dilution' of stock.

[51] Rachel Bright, *Chinese labour in South Africa, 1902–1910: race, violence, and global spectacle* (London, 2013). On Galton and fingerprinting, see Chandak Sengoopta, *Imprint of the Raj: how fingerprinting was born in colonial India* (London, 2003), esp. ch. 3; and Keith Breckenridge, *Biometric state: the global politics of identification and surveillance in South Africa, 1850 to the present* (Cambridge, 2014), ch. 2.

[52] As Conservative Prime Minister Arthur Balfour asserted, 'Men are not born equal…The differences between one family and another of mankind lie deep in the remote and unfathomable past, and it is folly to suppose that…petty educational regulations…can obliterate distinctions deep-seated under the laws of nature.' A. J. Balfour, 'Chinese labour (Transvaal)', *Hansard*, HC Deb 21, Mar. 1904, vol. 132, cols. 321–71, on cols. 351–2.

[53] On Bateson's politics, compare Greg Radick, 'The professor and the pea: lives and afterlives of William Bateson's campaign for the utility of Mendelism', *Studies in History and Philosophy of Science Part A*, 44 (2013), pp. 280–91; and William Coleman, 'Bateson and chromosomes: conservative thought in science', *Centaurus*, 15 (1971), pp. 228–314.

Pearson remained vehemently opposed to any suggestion that evolution occurred at the level of transmission between individuals: his was a population-wide inheritance in which change expressed itself as a series of pan-generational averages rather than along family lines. Accordingly, he characterized Mendelian unit characters as an unscientific attempt to reassert a pre-Darwinian ideal of nature as static creation. As his dog lectures explained:

> No other conception of heredity [than Mendelism] can today obtain a hearing. Yet…the present experiments…indicate that there is still a chance for philosophic Darwinism. Even by hybridization, a new race can be created which is not a mere shuffle of old unit characters, but is a true intermediate.[54]

This gradualist, quantitative notion of evolution nevertheless sat awkwardly with Pearson's imperial investments. Britain for him constituted a simultaneously racial and political unity: it was through active selection of the white population above all else that national ascendency would be ensured.[55] Yet it was also perfectly possible for entirely new races to be created through interbreeding between historically distinct populations. The racial integrity of the British empire therefore relied on rigid sexual discipline amongst its white constituents. The prospect of Chinese workers mythologized in the British imagination as amoral and sexual promiscuous coming into contact with British workers was potentially calamitous.[56] Hence, Pearson's animal studies played directly into contemporary imperial ideology. During initial attempts to adapt Galton's dog colour data to his own evolutionary concerns, he despaired of finding any pattern, lamenting to his mentor that 'between the Boers & the Bassett [sic] Hounds I don't get much sleep o'nights!'.[57] Without a more fundamental, 'hidden' mechanism of hereditary transmission, there was no possibility that the intermingling of populations could be undone.

Pearson asserted that all races were inherently capable of attaining white characteristics, and thereby becoming civilized.[58] Moreover, he contended, there was no record of dark skin being produced from properly white parentage.[59] Whiteness was a progressive, fragile achievement rather than an originary state. Such claims challenged conservative preconceptions regarding inherent racial separability. As Pearson reported to Galton, the lecture audience, 'while ready to accept a monkey ancestry were not prepared for the [suggestion that they were descendants of] negroes!'.[60]

[54] Pearson, 'Albinism in dogs & men' (Lecture B), fo. 29.

[55] Karl Pearson, *National life from the standpoint of science* (London, 1901), pp. 19–20 and passim.

[56] See e.g. Bright, *Chinese labour in South Africa*, ch. 5.

[57] Pearson to Galton, 17 Nov. 1899: GALTON/3/3/16/9.

[58] Karl Pearson, 'Lectures on albinism in man at the Royal Institution' (Lecture A) [1909], fo. 3 and passim: GALTON LABORATORY/2/1/3/1.

[59] Ibid., fos. 22–3.

[60] Pearson to Galton, 23 Jan. 1909: GALTON/3/3/16/9.

As exemplary figures of whiteness, albinos were thus a (or even *the*) driver of evolutionary progress. They were marked by an increase of 'delicacy' that simultaneously rendered organisms more susceptible to disease and more capable of discerning the true nature of their surroundings. As Europeans had begun to attain their proper place in the global order, albinos had helped cultivate an aspiration towards whiteness amongst even the most 'primitive' peoples.[61] This was in some respects of course a well-established assimilationalist trope: though presently below the standard of rationality embodied by white Europeans, colonized peoples might be 'improved' to approach it.[62] Yet Pearson's claims associated improvability with bodily change alone. It was only with proper procreative supervision that South African mine workers might attain the capabilities of their white overseers. During the lecture, Pearson noted his especial indebtedness to the 'excellent photographic work of Dr. G[eorge] A[lbert] Turner of Johannesburg', though neglected to mention that it was his position as a medical officer of the Witwatersrand Native Labour Association (a migrant worker recruiting agency for the gold mines) that had made his pictorial survey possible.[63]

It should be emphasized that Pearson's capacity to influence British imperial policy directly remained slight. Though he might have dreamt of attaining dictatorial power, his inability to implement his ideals directly led him to concentrate his efforts on the breeding of non-human 'races'. Dogs were thus employed as stand-ins for an imaginary in which 'dark' peoples would be coerced into becoming 'light'. By 1911, having established to their satisfaction that whiteness could be transmitted between generations, Pearson and Nettleship – now in collaboration with Usher – began to experiment with hybridizing albino Pekingese with the black, 'long-muzzled' Pomeranians. To Pearson's delight, subsequent generations did not seem to 'revert' on average to their black or white progenitors. Hence the announcement to his Dondo-contemplating audience that he had created multiple new races of dog. Pearson there proclaimed his 'firm conviction…that if you can obtain in any species with a normal black or dull colouring, an absolute or imperfect albino, then you can secure every variety of colour…There is a very close parallelism between men & dogs.'[64]

[61] Karl Pearson, Edward Nettleship and Charles H. Usher, *A monograph on albinism in man* (Text Vol. 1) (London, 1911), e.g. pp. 173 and 196. See also Pearson to Galton, [7 Feb. 1909]: GALTON/3/3/16/9.

[62] Duncan Bell, *Reordering the world: essays on liberalism and empire* (Princeton, NJ, 2016), pp. 173–7.

[63] Pearson, 'Lectures on albinism in man' (Lecture A); George A. Turner to [Prof. Reid], 19 July 1908: PEARSON/3/13/70. Pearson did note Turner's mining connections in *Albinism in man*, however. See Pearson, Nettleship, and Usher, *A monograph* (Text Vol. 1), p. 114. In addition to photographs, in 1912 Turner sent Pearson samples of 'black skin shewing cicatrization [scarring] marks', an 'ear shewing ear marks', and 'a strip of Xanthism skin'. See Turner to Pearson, 29 Apr. 1912, and Turner to Pearson, 17 May 1912: PEARSON/11/1/19/64.

[64] Pearson, 'Albinism in dogs & men' (Lecture A), fos. 16–17.

Biometric dog breeding thereby helped support a conception of race in which all beings might attain the white mark of civilizational advancement. Yet it also conveyed deeply held anxieties about loss of whiteness through miscegenation. Imperial projects in territories such as South Africa, where white settler colonists had become acutely aware of their inability to dominate through force of numbers, appeared as especially vulnerable from this perspective. Strategies for the scientific control of dog mating overlapped with those aimed at ensuring national biological security. Racial integrity could only be guaranteed in one of two ways: by individuals of different races restraining themselves from having children, or by direct control of individuals' sexual habits. Pearson's presumption that white populations had attained the greatest degree of civilization implied that they were amenable to persuasion through such statements as his own *National life from the standpoint of science* (1900). Increasingly wild accounts of the dangers to empire of miscegenation amplified presumptions that non-white peoples were incapable of apprehending such calls.[65] Those without recognizably European biological characteristics had, like the dogs under Pearson's care, to be coerced into desirable, racially appropriate generational conduct.

Yet the means by which this was to be achieved was not settled. As the final section of this article demonstrates, whilst the eventual strategies of canine sexual control deployed by Pearson paralleled the increasingly coercive policies of racial segregation being implemented in the British empire and elsewhere at this time, this was by no means inevitable. Indeed, during the early years of the programme, the rather different interests of Pearson's medical, domestic, and breeding enthusiast collaborators placed limits on his ability to conduct the sexual lives of the dogs, and with it redefine ideals of racial conduct.

III

The previous sections have outlined some of the key features of and motivations for Pearson, Nettleship, and Usher's dog breeding programme. Yet the animals concerned were more than sets of bones and coat colours. On a day-to-day level, they necessitated a level of care unfamiliar both to scientific experts in anatomical measurement and medical professionals inured to the routine of limited consultation periods. Such care, moreover, revealed pathological conditions of varying severity and longevity. Some of these appeared to be passed between canine generations. Faced with medical concerns more familiar to fancy breeders, Pearson tended uncharacteristically to defer to veterinary sources of authority. For the medically trained Nettleship and Usher, in contrast, these conditions were critical.

The different concerns of the collaborators were accompanied by different approaches to dog breeding. Nettleship especially was more invested in the

[65] See e.g. Sascha Auerbach, *Race, law, and 'The Chinese puzzle' in imperial Britain* (Basingstoke and New York, NY, 2009), esp. pp. 65–8.

production of genealogies of existing animals than the creation of new races. This encouraged him to collaborate with members of the Pekingese dog fancy, in turn facilitating the emergence of an extensive network of advisers and correspondents. In contrast, Pearson sought at every juncture to determine the dogs' day-to-day lives and mating habits directly. The latter impulse was only fully realized with the construction of a dedicated site for dog breeding at UCL in 1929. This final section emphasizes that investments in animals as sources of anthro-political authority were accompanied by diverse, contested strategies for the management of human–animal relations. The construction of an institution devoted to the scientific breeding of animals at UCL was not simply the consequence of burgeoning intellectual interest in the precise mechanisms of hereditary transmission: it also reflected a deep-seated desire to make the bodies of animals speak to questions of human social organization.

As medical practitioners, Nettleship and Usher stood at one remove from the more strictly biological biometry–Mendelism debate.[66] Hereditarian concepts had long been a feature of medical discourse. Since the eighteenth century, for example, gout, scrofula, and tuberculosis had been discussed in terms of familial inheritance. The apparent incurability of such conditions fed into a more general sense that poor health might be passed from parent to child.[67] Yet by 1900, medical practitioners and public health officials were beginning to link their genealogical concerns more firmly to those of the state, often through statistical analysis.[68] Medical practitioners became ever more aware of nineteenth-century anthropologists' claims regarding the low civilizational status of coloured bodies. Alongside this, prior hereditarian emphasis on the genealogical investigation of specific conditions began to give way to the more general concern with bodily or 'constitutional' strength of race theorists. *Pace* Pearson, medical men routinely identified albinism with racial degeneration. The notion that albinotic weakness was heritable raised the prospect of accounting for a wide range of hitherto inexplicable conditions, including such 'pathologies' as blindness, deafness, immobility, mental defect, and moral deviance.[69]

[66] On Nettleship's attributed 'Mendelism', see Judith Ellen Friedman, 'Coming full circle: the development, rise, fall, and return of the concept of anticipation in hereditary disease' (Ph.D. thesis, University of Victoria, BC, 2008), pp. 29–34.

[67] John C. Waller, '"The illusion of an explanation": the concept of hereditary disease, 1770–1870', *Journal of the History of Medicine and Allied Sciences*, 57 (2002), pp. 410–48; Carlos López-Beltrán, 'The medical origins of heredity', in Staffan Müller-Wille and Hans-Jörg Rheinberger, *Heredity produced: at the crossroads of biology, politics, and culture, 1500–1870* (Cambridge, MA, and London, 2007), pp. 105–32.

[68] Libby Schweber, *Disciplining statistics: demography and vital statistics in France and England, 1830–1885* (Durham, NC, and London, 2006); Theodore M. Porter, *Genetics in the madhouse: the unknown history of human heredity* (Princeton, NJ, and Oxford, 2018), esp. Part III.

[69] On albinism as pathology, see Thomas White, '"Their whiteness is not like ours": a social and cultural history of albinism and albino identities, 1650–1914' (Ph.D. thesis, Manchester, 2011).

Nettleship's professional concerns had made him acutely aware of these trends. The possibility that well-known conditions such as night-blindness and gradual sight-loss ran in families had already attracted attention from eye specialists. During the 1880s, for example, his mentor Jonathan Hutchinson had highlighted ophthalmologic conditions that seemed to behave in a similar manner to other heritable pathologies.[70] However, whereas Hutchinson adopted a wide-ranging, speculative approach. Nettleship devoted his retirement to the collection of specific eye disease pedigrees, substantiating a theory of hereditary in which pathologies could become more virulent over generations.[71] Usher would in turn attain widespread recognition for his genealogical studies identifying retinitis pigmentosa as a hereditary condition, and again associating it with deaf-mutism (the link is now known as 'Usher's syndrome').[72] All three figures then were concerned above all with the transmission of 'weaknesses' between generations.

Nettleship and Usher thus engaged with the dogs as exemplars of heredity weakness rather than evolutionary strength. In this respect, Pekingese were ideal objects of study. 'Toy' dogs had a reputation for constitutional weakness amongst breeders.[73] Toys' propensity to ill health was often portrayed as degenerational, and cast in terms of the effects of civilization: veterinary practitioner John Woodroffe Hill spoke for many in noting that 'specimens of the Toy breed…have been "bred to death"'.[74] Nettleship's breeder informants similarly related their difficulties with Pekingese, which they noted was 'scourged' with eye troubles.[75] The association was moreover fully borne out in the day-to-day experiences of Pearson, Nettleship, and Usher. Again, many of the dogs' problems centred on their eyes, and included the contraction of ulcers, inflammations, and congenital defects in puppies. Many had poor sight, with Nettleship describing their 'divergent squint' and Usher reporting that the dogs in his care 'occasionally run against things'.[76]

For Nettleship and Usher, then, it was not so much in their capacity as living agents, than as a source of genealogically identifiable pathological material that the dogs had their greatest significance. The relative rarity of human albinism meant that it was extremely difficult to obtain organic material relating to it.

[70] Jonathan Hutchinson, 'On retinitis pigmentosa and allied affections, as illustrating the laws of heredity', *Ophthalmic Review*, 1 (1882), pp. 2–7, on p. 3.

[71] Friedman, 'Coming full circle', pp. 35–46.

[72] Charles H. Usher, 'On the inheritance of retinitis pigmentosa, with notes of cases', *Royal London Ophthalmology Hospital Reports*, 19 (1914), pp. 130–236.

[73] Tom Quick, 'Puppy love: domestic science, "women's work", and canine care', *Journal of British Studies*, 58 (2019), pp. 289–314, on pp. 299–300.

[74] John Woodroffe Hill, *The management and diseases of the dog* (6th edn, London, 1905), p. 242.

[75] E.g. Emily J. Lowes to Nettleship, 24 Jan. 1913: PEARSON/3/13/39; Henry Gray to Nettleship, 15 Aug. 1912: PEARSON/3/13/38.

[76] Nettleship to Pearson, 16 Jan. 1910: PEARSON/3/13/36; Usher to Pearson, 22 June 1911: PEARSON/3/13/73.

Even when it was possible to do so, family histories were not always available or forthcoming.[77] The faster-breeding dogs, deliberately selected for albinism and routinely slaughtered as young pups when not hereditarily interesting, raised the prospect of pathological genealogical investigation that could accord more closely with the demands of the new mathematics. Medical hereditarians of all persuasions were increasingly looking to animals as means of establishing the heritability of particular pathological traits and tendencies.[78] Concomitantly, human bodies were gradually being displaced as pre-eminent objects of medical hereditarian research. Pearson's ophthalmologist collaborators were thus motivated at least as much by their own interest adopting 'scientific' methodology in medicine as enthusiasm for his racial ideology.

Nettleship's relative indifference regarding coat colour meant that he accommodated fancy breeders' concerns far more readily than Pearson. This circumstance fed into a more generally liberal approach to breeding practice. During the early years of the study, he and Pearson kept their first few canine pairs at home, relying on their wives and servants for their day-to-day upkeep.[79] Yet the proliferation of dogs soon outstripped the families' accommodative capacities, and presenting puppies as gifts to friends could only temporarily solve the predicament.[80] Moreover, volunteers could assert considerable influence over the direction of the study. When Nettleship requested that one breeder friend assist with their crossing experiments, she expressed horror at the prospect of her charge being made, as she put it, to 'marry a black Pug'.[81] In 1912, perhaps in response to such intransigence, the two scientists began searching for professional breeders willing to take some of the less valued dogs on.[82] As the population of experimental dogs expanded, they thereby came to be dispersed across Britain.

Whereas the medical scientists remained sanguine about the need to negotiate breeding strategies with carers unschooled in the intricacies of hereditarian science, Pearson's concern with racial improvement raised more deep-seated anxieties. Pearson's ideals necessarily excluded the lived reality of his purported objects of study: their tendency to ill health was necessarily subordinate to his racial investigations. Though Pearson commissioned pathological reports on his charges, these were as directed towards the substantiation of his contentions regarding the increased sensory 'delicacy' of albinos as establishing causes of

[77] Usher to Pearson, 7 Nov. 1910: PEARSON/3/13/72, and Usher to Pearson, 11 Jan. 1911: PEARSON/3/13/73.

[78] On medical genetics and inheritance more generally, see e.g. Müller-Wille and Brandt, eds., *Heredity explored*, chs. 12–14.

[79] See e.g. Maria S. Pearson to Julia Bell, 26 Aug. 1912; M. S. Pearson to Ethel M. Elderton, 8 Dec. 1923: both PEARSON/3/13/39.

[80] E.g. Edith [Nettleship] to Edward Nettleship, 8 Nov. 1910: E A PEARSON/3/9.

[81] Alice Dew-Smith to Edward Nettleship, 19 Sept. 1910: E S PEARSON/3/9.

[82] Nettleship to Pearson, 16 Sept. 1912; Nettleship to Pearson, 26 Sept. 1912; Nettleship to Pearson, 6 Dec. 1912: all PEARSON/3/13/38.

death.[83] Nettleship's own death in 1913 thus not only prevented Pearson from continuing their monograph series, but marked a turning point in the experimental programme. He would subsequently assert ever greater control over canine mating and living conditions. Just as the racial logic of imperial government helped justify intense monitoring and confinement of migrant labourers and the constitutionally 'weak', Pearson's miscegenation-fuelled fears would culminate in the construction of a site specifically designed to contain and exclude the racially purified dogs from outside contact.

There was nothing inevitable about this eventuality. Indeed, Pearson had earlier been a proponent of a rather more bucolic vision for the institutionalization of scientific breeding in Britain. The Royal Society's 'Committee for Conducting Statistical Enquiries into the Measurable Characteristics of Plants and Animals', with Galton at its head, Weldon as its secretary, and Pearson a prominent member, had in 1897 expanded to include more senior botanists and zoologists, including Bateson. Galton had hoped that widening membership would provide momentum for the establishment of a farm that could undertake experimental investigation into 'race, heredity, and variation' (as Galton's title for the initial meeting put it).[84] Though Pearson had not been present at this meeting or the one following, and vehemently disapproved of non-'biometricians' joining the project, he responded positively to the plan itself.[85] The scheme eventually collapsed, and Pearson became increasingly bitter over what he perceived as the hijacking of the (eventually renamed 'Evolution') Committee for 'Mendelian' ends.[86] Yet it was precisely a more distributed version of this rural cultivation model that he and Nettleship adopted during the project's early years. Farms, it initially seemed, might be ideal sites on which to improve the biological characteristics of dogs.

By the 1910s, however, Pearson found himself troubled by the lack of supervision that housing the animals in the British countryside entailed. Pragmatically, the changing circumstances of breeders and their kennels created time-consuming logistical difficulties: a notebook from the time charts Pearson's logistical struggles, and he lamented 'the space, time and energy required for dog-breeding' in *Albinism in man*.[87] Yet other concerns centred on the perceived risks that carers unversed in the intricacies of biometry seemed to pose to canine racial purity. The extent to which this was a personal concern for Pearson is indicated by a comment to his wife Maria regarding her habit of walking the dogs on Hampstead Heath (to which the family home

[83] Frederick W. Twort to Pearson, 21 Dec. 1911: E A PEARSON/3/9; K. Pearson to M. S. Pearson, [21] Apr. 1920: PEARSON/11/1/16/46.

[84] Francis Galton, 'Race, heredity and variation: rough notes. Dec. 4 1896': GALTON/2/5/4/1.

[85] Pearson to Galton, 12 Feb. 1897: GALTON/3/3/16/9.

[86] For Pearson's account, see Karl Pearson, *The life, letters and labours of Francis Galton*, III: *Correlation, personal identification, and eugenics* (Cambridge, 1930), pp. 126–35.

[87] Karl Pearson, 'The dogs of 7 Well Road. Hampstead. N.W.' (c. 1912–14): PEARSON/7/158/5; Pearson, Nettleship, and Usher, *A monograph* (Text Vol. II), p. 481.

adjoined): 'I fear for you…it is such a place for dogs & the gypsies…bring dogs from all the country & mongrels of all kinds.'[88] Here, the intersection between Pearson's beliefs regarding the threat posed to the 'white race' by miscegenation and his concerns regarding the purity of his own living circumstances are particularly prominent: putting faith in breeders unaware of the racial consequences of miscegenation risked the failure of the entire project.[89] Given the presumption that sexual discipline could not be instilled in dogs, it was necessary to eliminate any possibility that they might come into unsanctioned contact with racially distinct bodies completely.

From 1913, then, Pearson became ever more preoccupied with enclosing the dogs in a space amenable to his direct personal supervision. An early opportunity arose in 1911, with the construction of a new building to house the Department of Applied Statistics.[90] 'Isolation from other kennels' was, he claimed, of utmost importance, as 'any man who has done work of this sort knows the importance of having these animal rooms under his eye and at hand'.[91] Though the building committee remained sceptical, extensive wrangling elicited temporary accommodation for small animals such as 'rats and mice' in an old adjoining stable.[92] Despite initially housing some dogs here, the premium put on space at UCL during the First World War soon forced them back to their country lives.[93]

Following the war, Pearson again turned his attention to canine accommodation. By the early 1920s, he had cast his net far and wide in his search for funding, discussing possible additional contributions to the Galton Laboratory from the Drapers' Company, as well as the American Universities Union and personal contacts.[94] The failure of these schemes had also begun to grate, especially in the light of large-scale investment in similar projects then being made in continental Europe and North America. In yet another application, this time to the Carnegie Institution, he characterized 'the accommodation for animal breeding' at UCL as 'absurd…an old stable, unsuited to its

[88] K. Pearson to M. S. Pearson, [22] Apr. 1919: PEARSON/11/1/16/46.

[89] When one breeder, a Mr Albert Clack, unintentionally allowed an albinotic dog to mate with another breed Pearson wrote furiously that he had 'allowed her to be served by a strange dog at first heat', and demanded the animal back immediately. Pearson, 'The dogs of 7 Well Road'.

[90] Karl Pearson, 'Site for the Galton Laboratory', ([1912]): PEARSON/4/6/3.

[91] Karl Pearson, 'Galton Laboratory. University of London', attached to Pearson to Edward Galton Wheler-Galton, 22 Jan. 1913; Pearson to Thomas Gregory Foster, 8 Mar. 1913 [copy]: PEARSON/4/13.

[92] 'Report of the Department of Applied Statistics (including the Biometric and Galton Laboratories) plans and buildings sub-committee' (13 Mar. 1913): PEARSON/4/13.

[93] M. S. Pearson to K. Pearson, 19 Sept. 1915: PEARSON/3/13/39; Usher to K. Pearson, 10 June 1915: PEARSON 3/13/77; K. Pearson, 'Journal of the Galton Laboratory, 1915–1918': PEARSON/4/17, e.g. fos. 49, 61, and 81.

[94] Karl Pearson, 'Report by Professor Karl Pearson, F.R.S., on the work done in his department during the period of the grant made by the Worshipful Company of Drapers (1909–1914)': PEARSON/4/4/3, p. 2; Pearson to C. M. Gayley [c. 1920]: PEARSON/4/18/4.

purpose and improperly fitted from the sanitary aspect'. Despite his claim that the work undertaken was only 'such as relates to heredity in man' and an approving quotation of Benito Mussolini, this submission also failed.[95] Yet Pearson would not have much longer to wait. In 1922, a bequest from the Liberal MP Lewis Haslam had facilitated the fitting out of the temporary animal house, and in 1929 a new building was commissioned in the same location. Finally, it would be possible to contain the experiment at a single site.[96] Unfortunately for Pearson, he was by this time finding the maintenance of his productivity-fetishizing approach to academic life increasingly unsustainable. He would retire in 1933, with only a preliminary report in press.[97]

The construction of the Department of Applied Statistics' animal house marks the culmination of Pearson's long-standing concerns regarding the maintenance of his new race. Just as the Chinese mine workers of South Africa had been cordoned off from the surrounding world, the new space would entirely isolate the dogs from their environment. Inspecting the old building, Pearson's son Egon highlighted the risks that planned drainage along a sloping floor and out onto the street would risk 'wild mice coming in' – a difficulty circumvented via the creation of metal coverings over the holes.[98] Conditions within the construction would be tightly controlled: the fluctuations in temperature experienced in the old building would be ameliorated by a carefully designed heating system involving raised pipes and electric radiators, allowing temperature to be maintained at exactly 62° Fahrenheit.[99] Dedicated spaces for litters and the quarantining of ill dogs were also included.[100] At long last, the new race would be housed in a space that could simultaneously isolate them from foreign bodies, protect them from threatening diseases, and prevent sexual indiscipline. Within such a building, it would truly be possible to demonstrate the prospects for the improvement of all life that experimental investigation into heredity raised. Pearson's imperial ideals appeared finally to have found a permanent place in British institutional life.

Pearson's project was of course only a small part of a widespread movement. The institutionalization of animal breeding programmes during the interwar period helped legitimate a new wave of writing on human race and its management. In 1930s Germany, Eugen Fischer and his colleagues at the Kaiser Wilhelm Institute became keen advocates of the integrated study and

[95] Karl Pearson, 'Appeal for funds to maintain and extend The Institute of Applied Statistics, including the Biometric Laboratory and the Galton Laboratory for Eugenics, University of London' [c. 1925]: PEARSON/4/26.

[96] Egon S. Pearson, 'Karl Pearson: an appreciation of some aspects of his life and work II.', *Biometrika*, 9 (1938), pp. 161–248, on pp. 214–15.

[97] Karl Pearson and Charles H. Usher, 'Albinism in dogs', *Biometrika*, 21 (1929), pp. 144–63.

[98] Frederick Moore Simpson to Pearson, 17 Sept. 1929: PEARSON 4/27; Egon S. Pearson to K. Pearson, 27 Dec. 1929: PEARSON/11/1/16/22; Pearson, 'Karl Pearson', p. 215.

[99] W. G. Dowie to Pearson, 24 Sept. 1929: PEARSON 4/27.

[100] Frederick Moore Simpson, 'Architectural plans for an animal house (part of 134–136 Gower Place) (1929)', PEARSON/4/27.

manipulation of experimentally bred animals and human populations.[101] Saraiva demonstrates moreover that this was by no means the only path by which breeding science came to inform fascist policies and practices.[102] Paul Kammerer in Vienna and Nicola Pende in Rome adapted endocrinological research to articulate 'biotyping', by which the extent to which individuals inherited and conformed to racial ideals could be measured and controlled.[103] In North America, the institutional connection between the United States' Eugenics Record Office and Station for Experimental Evolution, both proposed and run by Charles Davenport, helped legitimate his and Harry H. Laughlin's notorious calls for forced sterilization and hostile immigration policy there.[104] Clarence Cook Little and William Ernest Castle drew on experiments with (Japanese 'waltzing') mice to pronounce on matters of human heredity, most notably in Castle's textbook *Genetics and eugenics* (1916).[105] Helen Dean King drew on her rat experiments at the Wistar Institute to pronounce on the significance of inbreeding in racial improvement.[106] And, in perhaps the most ambitious example of research in this vein, at Cornell Charles Rupert Stockard conducted extensive experiments in dog crossing in an attempt to develop a hereditarian account of personality types.[107] Though Pearson may not have left a lasting intellectual legacy in hereditarian experimentation at UCL, he was by no means alone. In fact his work helped set a trend.

IV

The early twentieth century saw considerable investment in animals and animal breeding as means of defining and policing human difference. Though this article has concentrated on a single example, the influence of experimental hereditarian research on fascist forms of imperial governmentality outlined by Saraiva, as well as the investment of scientists in explicitly genetic conceptions of eugenics, do allow more general conclusions to be drawn. Experimentally bred animals such as Pearson's dogs became significant objects of concern for race theorists during the early twentieth century. By investing in the creation

[101] Hans-Walter Schmuhl, *The Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics, 1927–1945: crossing boundaries* (New York, NY, 2008), pp. 171–3 and passim.

[102] Saraiva, *Fascist pigs*, pp. 101–13.

[103] Cheryl Logan, *Hormones, heredity and race: spectacular failure in interwar Vienna* (New Brunswick, NJ, and London, 2013), esp. ch. 3; and Francesco Cassata, 'Biotyping and eugenics in fascist Italy', in Jorge Dagnino, Matthew Feldman, and Paul Stocker, eds., *The 'New Man' in radical right ideology and practice, 1919–1945* (London and New York, NY, 2018), pp. 39–64.

[104] Garland E. Allen, 'The Eugenics Record Office at Cold Spring Harbor, 1910–1940: an essay in institutional history', *Osiris*, 2 (1986), pp. 225–64.

[105] Rader, *Making mice*, pp. 30–3.

[106] Marilyn Bailey Ogilvie, 'Inbreeding, eugenics, and Helen Dean King (1869–1955)', *Journal of the History of Biology*, 40 (2007), pp. 467–507.

[107] Charles Rupert Stockard et al., *The genetic and endocrine basis for differences in form and behaviour: as elucidated by studies of contrasted pure-line dog breeds and their hybrids* (Philadelphia, PA, 1941).

of 'new races', theorists of biological inheritance helped sustain metropolitan scientific and cultural concern with the superiority of particular human kinds well into the twentieth century. In the process, they contributed to a broader trend in which scientific investigation and the theorization of imperial government would both diversify and align ever more closely.

To make the bodies of animals speak to questions of imperial concern, however, experimenters had to circumscribe their capacity for autonomous life. The construction of controlled breeding environments such as the animal house at UCL created means by which certain features of certain animals (albino dogs' coats, muzzle proportions) could appear as representative of their biological nature, and other features of other animals (coloured coats, visual and reproductive capacities, sexual proclivities) could be either ignored or suppressed. Far from being mere artefacts of the abstract concerns of experimental breeders, such schemes drew on already existent strategies for the control of imperial subjects. Experimental animal breeding programmes and imperial population control strategies became co-constitutive at the start of the twentieth century. The creation of institutions and environments that would control the reproductive capacities of both humans and animals contributed to a break-down of distinctions between biological populations of all kinds: increasingly standardized strategies of more explicitly 'genetic' control would come to be applied to all living beings, be they plant crops, farm stock, or racial groups. Similarly, walls, borders, fences, and boundaries between groups of human and animal bodies came to play an ever more significant role in nominally 'human' politics.

Pearson's Pekingese studies, then, can be taken as exemplifying changing governmental strategies at the start of the twentieth century: whereas nineteenth-century forms of imperial government considered non-human life only to the extent that it could directly facilitate imperial economic expansion, subsequent approaches to the study of population would incorporate human and non-human bodies within a single conceptual and institutional framework. Biological inheritance rather than anthropological classification would become the canonical means by which race theorists would seek to define and police human biological and cultural difference. It is this shift that characterizes the new race of the early twentieth century.