The relative roles of politics and science: William Bateson, black slavery, eugenics and speciation

by

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SUMMARY

William Bateson's background and training suggest sympathy with the black emancipation movement. Yet the movement's success is attributed more to battles between political figures, than between scientists with contending views on the biology of racial differences. Perhaps, in the long term, Bateson's contributions to slavery and eugenic issues will be seen as no less important than those of politicians. Mendel's discovery of what we now know as "genes" languished until seized upon by Bateson in 1900. For six exhausting years he struggled to win scientific acceptance of these biological character-determining units. Later, he pressed the Mendelian message home to the general public, opposing simplistic applications of Mendelian principles to human affairs, and arguing that minor genic differences that distinguished races – e.g. skin colour – can seldom initiate new species. Indeed, the spark that initiates a divergence into two species can be non-genic. We are one reproductively isolated population, the human species.

Keywords: black emancipation; biohistory; civil war; genes; Mendel; polymorphism; speciation

Based on the authority granted it by the First Confiscation Act, the Lincoln administration began freeing slaves as a 'military necessity' on August 8, 1861.

James Oakes 2013 [1]

The 'poetic' significance of Abraham Lincoln's birth on the same day as Charles Darwin resonates with historians.[2] Likewise, we can note that William Bateson was born on the day the Lincoln administration began freeing slaves – the poetic aspect being that Bateson's work would become of relevance to this and various related issues that still challenge the peace of the world. The extent to which his scientific and political activities[3] contributed to our understanding of the many issues commonly associated with the words 'racial,' 'ethnic,' 'eugenic' and 'nationalistic,' is a matter for future historians to debate. That he would, through his family background and training have been deeply interested in such issues, is likely. This paper presents the evidence, fragmentary in places, that attests his concern, and summarizes his work.

In the long run, it is both science and politics that combine to bring about epoch-making societal changes. However, in the short term, it is the input of purely political protagonists, such as Martin Luther King, that garner attention. The role of scientific contributions often escapes recognition because scientists often admit neither the solution of political problems as a primary goal, nor the social relevance of their work (should they live long enough to do so). Today, as we approach its sesquicentennial, it is timely to recall that Mendel's 1865 discovery of what we now know as "genes" languished until seized upon by William Bateson in 1900. For six exhausting years he engaged in a fierce David-and-Goliath struggle to win scientific acceptance of these biological character-determining units. In the following decades he pressed the

Mendelian message home to the general public. More importantly, as is only now gaining recognition, he proposed that the spark that initiates a divergence into two species can be non-genic,[4-6] thus further emphasizing the trivial nature of gene-related differences in skin colour.

NOT SO SERENDIPITIOUS SCIENCE?

The deliberative achievement of one goal may serendipitously lead to the achievement of others. In 1983 the theoretical physicist, Heinz Pagels, observed:

> When the history of this century is written, we shall see that political events – inspite of their immense cost in human lives and money – will not be the most influential events. Instead the main event will be the first human contact with the invisible quantum world and the subsequent biological and computer revolutions.[7]

Computer scientists, such as Steve Jobs, were doubtless aware of major problems afflicting our planet as they deliberated on novel technologies that would lead to cell phones. Yet it would seem that the role of cell phones in facilitating politics-of-the-streets revolutions in emerging democracies was more a serendipitous by-product than a primary goal. On the other hand, the revolutions were not just the unintended consequences of technology. Jobs "must have known that once 100,000 creative engineers had access to a handheld device with an accelerometer, a camera, wireless networking, and GPS technology, the future would simply happen – whatever that future was to be".[8] What have been the relative roles of politics and technology in delivering democracy is a question for future historians. Yet, if betting on one person who, more than any other, will be seen to have furthered the democratic cause (be it for better or for worse), Jobs might prove a good choice. Likewise, in another context, we turn here to Bateson.

Today, it is unambiguously agreed that the movement towards black emancipation was for the better. However, although Charles Darwin was well acquainted with the issues relating to black slavery, and was strongly opposed to it,[9,10] anyone perusing his voluminous correspondence would probably be correct in concluding that, as with many other bioscientists, the subject was often far from his mind. While some recognized the evils of black slavery from the outset, and worked deliberatively for reform,[11] for most, approval of emancipation was assisted by the growing understanding of the biology of the corresponding racial differences – an understanding that grew, more by serendipity than by deliberation, from the work of Darwin, Gregor Mendel and, as related here, Bateson (Fig. 1). But "the future" did not "simply happen."

Figure 1. William Bateson 1905 (Bateson papers, Queen's University Archives).

In 1861, while Mendel tended his peas in Moravia and the Unionists entered the Civil War in America, William Bateson was born in England. The Unionists attacked racism militarily and politically. Bateson was to attack racism scientifically and politically. A key issue separating the Unionist North from the Confederalist South was the cotton industry's dependence on black slavery. In classical Greece, slaves were often those who had fared less well in battle, could sometimes play sophisticated roles in the victor society, and were not distinguished by skin colour:

> Individual citizens might prefer certain highly skilled slaves over their fellow citizens in employment and in society. In contrast to the American South, where slaves were sharply marked off from the free by their skin colour and where even non-slaveholding whites formed militias to hunt down runaway slaves, in ancient Greece the lines between free and slave were often blurred and could apparently sometimes be overridden.[12]

Slaves in ante-bellum America were required for menial labor and were traded like horses, sometimes even with support of the prestigious Royal Society.[13] It was all too easy to slip from seeing slaves as racially different, to seeing them as a different biological species, more akin to apes than to humans.[14] To such "scientific facts," American naturalists such as Louis Agassiz and Samuel Morton gave their authority.[15] In this respect the studies of Darwin and Mendel, and their later elaboration by Bateson – all of whom were not primarily concerned with the slavery issue – were to become of major importance.

The date of Bateson's birth,[16] was pivotal for black liberation. On that day, while Washington trembled from having overestimated the probability of a Confederate attack,[17] the US War Department formally authorized the emancipation of any runaway slave who crossed Union

lines.[18] And in January 1863 President Lincoln issued his famous "Emancipation Proclamation." It can now be seen that Bateson, through his championing of the long-ignored discoveries of Gregor Mendel,[19] his caution regarding their implications for human affairs, and his own experimental and theoretical studies, played a major role in furthering understanding of the biological differences between those with black and white skins. Hence, albeit indirectly, he played a major role in furthering Lincoln's work.

BATESON WON THE FIRST SCIENTIFIC BATTLE

Bateson was a grandson of two Liverpool businessmen – cotton merchant, Richard Bateson, and shipping agent, James Aiken. In the course of his voyages Aiken met Anna Elizabeth Harrison of Charleston, a South Carolina port that supplied cotton for Lancashire's mills and was heavily involved in the slave trade. They were married in Liverpool in 1815. In 1857 their daughter, Anna Aiken married William Henry Bateson, the newly appointed Master of St. John's College, Cambridge. Like Charles Darwin (1809-1882), William Henry Bateson (1812-1881) had studied at Shrewsbury School under the Headship of Samuel Butler, a distinguished classicist. As Master, he invited a St. John's graduate, the notorious Bishop Colenso of Natal (1814-1883), to conduct the consecration service for a new college chapel. Colenso had challenged church doctrine on evolution, with the approbation (and financial support) of Darwin and other evolutionists. Even worse (for those times), he had encouraged notions of self-government among the blacks in South Africa![20]

The young William Bateson grew up in the intellectually stimulating environment of the Master's Lodge, keenly aware that the family had escaped from "trades and professions for the

making of money" and had entered "another world, where 'utility' does not count." Given grandparental associations with the cotton trade, and his mother's campaign for the emancipation of women, it seems likely that he would have been aware of, and shown sympathy for, the plight of black American slaves, but the best evidence on this is only a fragment of a 1910 speech (see below).

After unhappy schooling at Rugby, Bateson returned to Cambridge where he was drawn to Francis Balfour's Morphological Laboratory in Alfred Newton's Department of Zoology and Comparative Anatomy. After graduating, he spent the summers of 1883 and 1884 at marine stations in Virginia and North Carolina, under the tutelage of a Johns Hopkins University professor – William K. Brooks (1848-1908). Having shared many happy hours "full of novelty, suggestion and humorously inventive thought," Bateson later acknowledged Brooks as a major influence: "For me the whole province was new. Variation and heredity with us had stood as axioms. For Brooks they were problems".[21] Believing there to be "a profound truth" in the view of Prague neurophysiologist Ewald Hering (1834-1918) that "Heredity is Memory," (which today translates as 'Heredity is due to stored information'[22]), Brooks held that human races were distinguished by only "slight, superficial peculiarities of form, constitution, and character." Darwin's natural selection, acting on such differences, was unlikely to explain the origin of species.[23]

While there is no evidence that they discussed black slavery, Brooks had quoted a critic of Darwin who, on the topic of blending inheritance, postulated the inability of a shipwrecked white man – deemed for illustrative purposes to be of superior intelligence – to appreciably blanch or confer intelligence on, a black population with whom he (and his mulatto descendants) freely

bred for many generations.[24] In a letter home, Bateson described Mrs. Brooks as "a nice little person with a good deal of refinement, though a Southerner." There is no evidence that he sought out his Harrison relatives in South Carolina.

Following Brooks' recommendations, Bateson initiated animal and plant breeding studies in the 1890s, and was well-positioned to recognize the importance of Mendel's now famous "*Versuche*" paper[25] when it came to light in 1900. There was then a fierce struggle between the small band of "Mendelians" led by Bateson, and the well-funded mathematical biologists – the "Biometricians" – led by Karl Pearson and Raphael Weldon.[26] The victory of the Mendelians over the Biometricians in 1906 led to Bateson's naming the new science of heredity "genetics," and his appointment to a special Professorship in Biology. This was ceded in 1910 on his assumption of the Directorship of the John Innes Horticultural Institute.

BATESON LOST THE POLITICAL BATTLE

However, while the battle for the acceptance of Mendelian principles was won, the battle over their interpretation was to continue on fronts both scientific and political. For several years the difference between the strange partial and complete "coupling" of characters (i.e. *degrees* of genetic linkage), lacked a satisfactory explanation, until resolved in the 'fly lab' of Thomas Hunt Morgan.[27] An overt source of political controversy was eugenics, and the views of those deemed knowledgeable in genetics were much sought after. Bateson in 1905 had pondered:

> What … will happen when … enlightenment actually comes to pass and the facts of heredity are … commonly known? One thing is certain: mankind will begin to interfere; perhaps not in England, but in some country more ready to break with the past and eager for 'national efficiency.' … Ignorance of the remoter consequences of interference has

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> never long postponed such experiments. When power is discovered man always turns to it. The science of heredity will soon provide power on a stupendous scale; and in some country, at some time, not, perhaps, far distant, that power will be applied to control the composition of a nation. Whether the institution of such control will ultimately be good or bad for that nation, or for humanity at large, is a separate question.[28]

The Eugenics Education Society, guided by Major Leonard Darwin – one of Charles Darwin's sons – was founded in Britain in 1907. In a monograph, *Mendel's Principles of Heredity*, Bateson in 1909 cautioned against the various proposals that were gaining circulation:

> Genetic science … gives no clear sanction to these proposals. It may also be doubted whether the guiding estimate of popular sentiment is well-founded. Society has never found itself adverse to adopt measures of the most stringent and even brutal kind for the control of those whom it regards as its enemies.[29]

While, in his day-to-day Cambridge activities, Bateson had to deal with gender issues, he was seldom confronted with issues that we would now deem racial or nationalistic. But they were much in evidence at the first Mendel celebration held in 1910 in Brünn (now Brno), in what is now the Czech Republic. In a letter home to his wife, Bateson displayed his sensitivity to such issues, noting that the German-speaking powers-that-be had effectively ousted from the proceedings the Czech Abbot, Franciscus Salesius Bařina, who had known Mendel:

> The gist of my remarks was that though we grieved for Mendel's obscurity, it was no case for sorrow. To have looked, as M. did, once intimately on the face of a new Truth was as keen a pleasure as the world can give. … Tschermak spoke fairly well. Iltis, the little local secretary, very well. The President, a Baron somebody [von Haupt-Buchenrode], referred to Mendel as a liberal [the German word Freisinniger implies free-thinking, even heretical] priest – and someone else – one of the government officials said that if such a thing occurred again in the proceedings, he should leave at once. In Brünn it is just touch and go. The state of strain is extreme. It was arranged that no clerical or Czech speech was to be

made, so the Kloster never once came onto the horizon. The Prälat was there, but no one attended to him, or his office. Every other sort of institution was toasted, and every other sort of big-wig had his health drunk, but this mitred Abbot sat in silence.[30]

An exhibition of documents from the monastery was set up, not in the monastery, but in the "German house" where it was part of a pre-celebration meeting for the participants. Furthermore, the inscription on a monument to Mendel that was unveiled in a city square (Klosterplatz) was in German (Fig. 2).

Figure 2. Monument to Mendel 1910, with the original German inscription that has since been removed (photograph courtesy of the Mendellanum, Moravian Museum, Brno).

Today, the monument is in the monastery garden, and the German part of the inscription has been removed. All that survives of Bateson's speech in the archives is a fragment on the brotherhood of man from Schiller: "Alle Menchen warden Brüdern."

But, as we now know all too well from twentieth century history, Bateson's eugenic warnings were to little avail. The political battle was lost. While still a student, in 1911 a future holder of the Cambridge chair in genetics, Ronald Fisher, referred to the excellence of Englishmen from Shakespeare to Darwin:

> The thought of a race of men combining the illustrious qualities of these giants, and breeding true to them, is almost too overwhelming, but such a race will inevitably arise in whatever country first sees the inheritance of mental characters elucidated.[31]

It is important to note that these words were delivered at a meeting of the fledgling Cambridge Eugenics Society and cannot be dismissed as the Chauvinistic utterance of a young patriot. Sometimes Bateson made similar remarks. For example, in a letter to his mother in 1887, struck by the quirks of various nationalities he was encountering during travels in the Aral Sea region of the Russian-controlled Kasakh Steppe,[32] the young Bateson waxed eloquent:

> All men are no more equal than all animals and plants are equal. A Russian is no more the equal of an Englishman, and a Negro is no more the equal of a white man, than a Kirghiz pony is the equal of an English racer, or the Phylloxera the equal of a vine. … Of course I know there is no test of universal application by which a man's worth can be estimated: this cannot be helped. But there are a set of qualities which we, following our instinct for want of a better guide, regard as denoting superiority. … For all these things it seems to me that we are, as peoples go, well to the fore. It is no light thing that nearly all the great inventions are of English origin.[33]

However, on balance, Bateson's position was more moderate. Thus, it was a more mature Bateson who, in 1912, went on a week's walking tour with Germany's first Professor of

Genetics, Erwin Baur, who would later coauthor the leading German genetics text *Outline of Human Genetics and Racial Hygiene*.[34] This contained a seemingly authoritative hierarchy of races leading up from "blacks," "Mongols," "Alpines," and "Mediterraneans," to the white-skinned "Nordic" pinnacle. Bateson described his walking companion in a letter home:

> His desire is that the Germans and English should combine and simply crush out the other nations, whom he regards as mere trash and doomed in any case to extinction in about 200 years. The notion that France has made untold contributions to civilization is quite new to him, and he doesn't understand how anyone can support such a proposition. A simple soul, you see. He will last me well for a week or so, but I would rather have someone more complicated if … walking for a fortnight.[35]

CIVIC WORTH

That same year Bateson gave the Herbert Spencer Lecture at Oxford.[36] He hailed Spencer as the philosopher whose teachings had helped "men to see themselves as they really are, stripped of the sanctity with which superstition and ignorance have through all ages invested the human species." He praised "the polymorphism of man," for society was rich, full of "natural, genetic distinctions which differentiate us into types and strains – acrobats, actors, artists, clergy, farmers, labourers, lawyers, mechanics, musicians, poets, sailors, men of science, servants, soldiers and tradesmen. Think of the diversity of their experience of life." The problem was "to find a system by which these differentiated elements may combine together to form a coordinated community, while each element remains substantially contented with its lot. To discuss this mighty problem in its full scope I have neither qualification nor desire." And he doubted that the legislators would do better:

> You will think, perhaps, that I am about to advocate interference by the State, or by public opinion, with the ordinary practices and habits of our society. There may be some who think that the English would be happier if their marriages were arranged in Westminster instead of, as hitherto, in Heaven. I am not of that opinion, nor can I suppose that the constructive proposals even of the less advanced Eugenicists would be seriously supported by anyone who realised how slender is our present knowledge of the details of the genetic processes in their application to man. … If we picture to ourselves the kind of persons who would be infallibly chosen as examples of 'civic worth' – the term lately used to denote their virtues – the prospect is not very attractive. We need not for the present fear any scarcity of that class, and I think we may be content to postpone schemes for their multiplication.[37]

These points were reiterated in numerous writings and addresses over the next two decades, during which his power and influence would seem to have increased. In 1920 the Eugenics Education Society invited him to give its prestigious Galton Lecture.[38] But Bateson was under no illusions as to its effectiveness. Shortly before his death in 1926 he turned down an invitation to lecture again:

> I never feel Eugenics is my job. … My Galton lecture, which I thought would be famous clap-trap, had the unique distinction of being the only Galton lecture to which no single newspaper would make allusion, much less report. I infer it got home on to somebody's nerves all right. I have tried to republish these papers with others more or less cognate, but publishers know their public and refuse with contumely. My Eugenic career I regard as closed, and serve me right for dabbling in taboo waters. The kind of thing I say on such occasions is what no reformer wants to hear, and the Eugenic ravens are croaking for reform.[39]

BATESON LOST THE SECOND SCIENTIFIC BATTLE

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The battle over the interpretation of Mendelian principles also continued on the scientific front. Here the distinction between races and species was fundamental. Morton in the USA (1847) had set the stage:

> It was taught by Buffon, John Hunter, and other naturalists of the past century, as is yet assumed by some learned men of the present day, that the hybrid offspring of two distinct species of animals, are incapable of reproducing their kind; thus making hybridity the test of specific character [the test of belonging to a distinct species]. It follows, according to this supposed law of nature, that if mankind embraced [consisted of] several species, the intermixture of these would go no further than to produce a sterile variety. But since all races are capable of producing, with each other, a progeny more or less fertile, it is inferred that they must all belong to one and the same species. This is the question at issue.[40]

After extensively reviewing the evidence from various animals and plants – such as the sterility of the hybrid offspring (mule) between a horse (one species) and an ass (another species) – Morton concluded that "the mere fact that the several races of mankind produce with each other, a more or less fertile progeny, constitutes, in itself, no proof of the unity of the human species."

While Charles Darwin in 1847 was critical of Morton's analysis,[41] he did not contradict it. For much of his life Darwin was hesitant in drawing a distinction between races and species, tending to see a continuum with one leading to the other.[42] Thus, when reproductively isolated by some external physical barrier, two races would independently vary in characters that we would today refer to as "genic" (i.e. they were encoded by genes). The resulting differences in form or function (phenotypic differences) would cumulate, generation by generation, to an extent that eventually members of the two races would be unable to cross and produce offspring; or, if there were offspring, that offspring would be sterile, and hence unable to continue the line. There are here three sequential steps: first, external reproductive isolation (geographical), then an internally

imposed character differentiation that leads, finally, to an internally imposed reproductive isolation – a new barrier. If the original external barrier (step 1) were then removed, there would still be reproductive isolation due to this new barrier (step 3). Variations of this scenario, with steps 2 and 3 both deemed "genic," or "multigenic," still hold sway.[43,44]

Thus, the nature of the barriers to successful reproduction (i.e. resulting in a long and abundant lineage), can vary with time, in an ordered fashion. The barrier that today prevents a mouse crossing with an elephant is likely to differ from the barrier which initially secured their divergence from a common ancestral line some 80 million years earlier. After Darwin's death in 1882, an alternative scenario, requiring no prior external barrier (step 1 above), was developed by his research associate, George John Romanes (1848-1894). There were just the above steps 2 and 3, and their order was reversed. The first to appear would be the sterility-of-offspring barrier. Observation of a sterility-of-offspring barrier requires that the parents first produce that offspring, so their prior crossing (gamete union) and the development of the resulting zygote (embryo), must be unimpeded (i.e. there are no barriers to crossing and development). Likewise, observation of a developmental barrier requires that there be no prior crossing barrier. Thus, internal barriers with the potential to bring about reproductive isolation, be they of genic or non-genic origin, are of necessity temporally hierarchical (Fig. 3). Should a sterility-of-offspring barrier appear, then it can only be *followed*, not preceded, in members of the emerging species, by the appearance of other internal barriers. Although in theory (and sometimes fact) any of these barriers can be primary, observation of a crossing barrier in one generation does not exclude the possibility that there had been developmental or sterility-of-offspring barriers in earlier generations. On the other hand, an observed sterility-of-offspring barrier *must* be primary.

But it can later be superseded by the other barriers. In such cases, evidence that there had once been an earlier barrier may be difficult to obtain.[45]

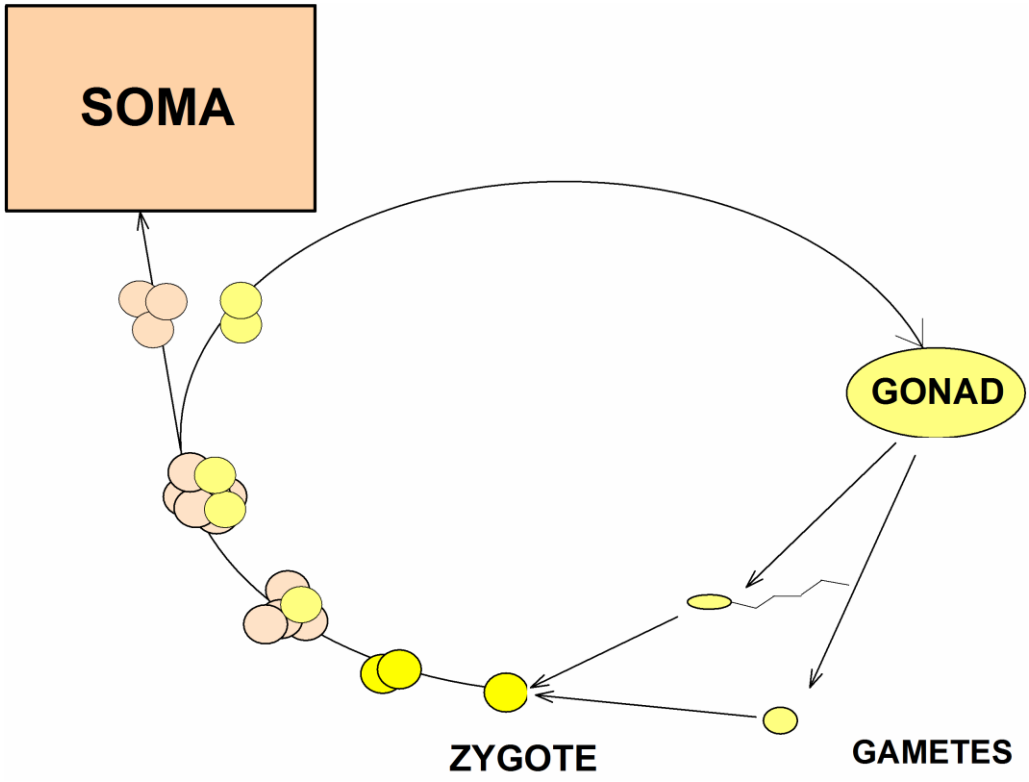

Figure 3. A sterility-of-offspring barrier must be primary. The mortal body (soma) provides support to the gonad (testis or ovary), but is discarded in each generation. The germ-line circulates eternally from generation to generation. For simplicity, male and female forms are here considered in one cycle. The forms become reproductively incompatible (i.e. they are reproductively isolated from each other) when a barrier, which can reflect a difference in parental DNAs, affects *any part* of the cycle. If a child (hybrid) is produced, but its adult form is sterile (hybrid sterility), then gametes cannot be made. The line cannot continue. Thus the parents of that child, although they were able to produce the child, are reproductively isolated from each other. With other partners they may produce fertile offspring and their respective lines

then have the potential to differentiate as new species – i.e. gametes can regularly unite to produce a fertilized egg (zygote). However, a barrier at this fertilization stage (geographical or internal) can again reproductively isolate potential parents. Such a barrier can *only* exist in the absence of a pre-existing sterility barrier. Thus, a sterility-of-offspring barrier preempts a gamete-union barrier. In the absence of sterility or gamete-union barriers, then a zygotic cell can be formed. This can multiply and develop into the adult form. However, an internal barrier to embryonic development can again reproductively isolate the parents. With fresh, compatible, partners, their respective lines again have the potential to diverge. The developmental barrier can *only* exist if there are no pre-existing barriers. Thus, sterility-of-offspring, and gamete-union barriers, pre-empt developmental barriers.

The proposal Romanes presented in 1886[46] would most likely correspond to what we would today refer to as a "non-genic," or "chromosomal" scenario.[47] Genic differences usually account for failures of crossing or of embryonic development; they less frequently account for the sterility-of-offspring barrier that most sensitively defines species, and can arise independently among certain members of a species, prior to the emergence of any other internal barriers, and in the absence of any geographically imposed barrier. The details of the non-genic scenario need not detain us, save that an internally arising inability to produce fertile offspring is central.[48] There are two sequential steps: first reproductive isolation (non-genic), then character differentiation (genic). In other words, differentiation of organisms as races (dependent on genic differences) is a consequence of, not a precursor to, their differentiation as species (dependent on non-genic differences). Thus, if a black person were to cross with a white person to produce

fertile offspring, then those parents, however different they might have appeared in form or function, are deemed members of the same species.

Bateson read Romanes' hypothesis with approval in 1886 while on field work in the Russian Steppes.[49] Through subsequent breeding studies, carried out by himself and his fellow Mendelians, Bateson was able to greatly extend Romanes' work. But an essay prepared for the Darwin Centenary celebrations in 1909,[50] which could have been recognized as a major *tour de force*, went unnoticed or was misunderstood.[51] After Bateson's death in 1926, the mathematical biologists regained the high ground and, as has been frequently told, supported an essentially genic 'modern synthesis' that dominated evolutionary thinking for much of the twentieth century.[52] The misunderstanding of Bateson even went to the extent of attributing to him the very genic viewpoint that he opposed.[53] However, this attribution has been questioned.[54,55]

At present Bateson can be seen to have lost the second scientific battle, the resolution of which awaits general scientific agreement that the sparks that ignite new species can be struck by internal differences that arise randomly between otherwise reproductively compatible members of the same species – the critical differences being usually non-genic. This excludes the many genic characters associated with differences deemed racial. But happily, more by serendipity than deliberatively, there is now a strengthened consensus that when a cross between members of two groups of organisms consistently produces a sterile offspring – be the cause of that sterility non-genic or genic – those groups constitute distinct species. Morton's conclusion is not supported. There is unity of the human species.[56]

One factor contributing to Bateson's defeat was that, despite the chidings of zoologist Joseph Cunningham (1859-1935), he never formally connected his own work with that of Romanes, so

bringing some order to a very complex period in the development of evolutionary ideas.[57] A possible reason for this has emerged. Briefly put, in a letter (September 2nd, 1888), Romanes related that the Professor of Zoology and Comparative Anatomy, Alfred Newton, whom he would have known as a Cambridge undergraduate, "hates me with a deadly hate".[58] Newton was of the utmost importance for Bateson's professional advancement, permitting him eventually to ascend from the Stewardship of St. John's College kitchens, to becoming his Deputy in 1899. Thus, it is understandable that Bateson, either consciously or unconsciously, would have been led to downplay Romanes' work.

Furthermore, while the Romanes-Bateson view on the origin of species challenged the continualist thinking of Darwin, Romanes remained a Darwinian continualist regarding the gradation of intellectual powers among animals and man. The continuum extended both to the races of man, among which blacks were considered inferior,[59] and to gender, where "the missing five ounces" of the brain size of women were considered an obvious handicap.[60] Bateson would almost certainly have disagreed.

CONCLUSION

William Bateson's attempts to influence the eugenics debate now appear to have been in vain. He won much of the scientific battle, but not the political. And, as discussed elsewhere, although detailed in his mentor's book,[61] Bateson, like Romanes, never fully grasped the informational ideas espoused by Ewald Hering and Samuel Butler, the grandson of the above mentioned classicist.[62-64] Yet, as we approach the sesquicentennial of Mendel's seminal 1865 paper, we have reason also to celebrate Bateson. Through his relentless support for Mendel, we now know that within-species differences, such as in skin colour, are determined by particulate entities –

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genes – that are capable of independent segregation. Furthermore, Bateson recognized that Darwin's great question – that of the origin of species – might have a non-genic solution that did not involve conventional natural selection acting on genic differences. While genic differences alone distinguish groups that we consider to be subtypes, varieties, or races, such differences do not necessarily provide initiating steps on the path to new species. Schiller's "Alle Menchen warden Brüdern" – we are one reproductively isolated population, the human species – is now yielding to analyses, both cytogenetic[65] and bioinformatic.[66]

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