

Chapter 2

Utility vs Beauty: Darwin, Wallace and the Subsequent History of the Debate on Sexual Selection

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Abstract We examine the origins of the disagreement of Alfred Russel Wallace and Charles Darwin regarding the significance and mechanism of sexual selection and relate this to differences in their views of human evolution, and of cognitive ability and esthetic sensibilities of various human and nonhuman populations. We trace subsequent versions of these differing views into the twentieth century, and the controversy between R. A. Fisher's Darwinian "runaway" model of sexual selection by female choice (the "sexy son" model), and Wallacean models of sexual selection based on signs of greater fitness of males (the "healthy gene" hypothesis). Models derived from the latter, the "honest signal" and "handicap" models, are discussed, and we note that these different models, based on utility or beauty, are not necessarily mutually inconsistent.

Keywords Darwin, Wallace and sexual selection · Fisher's runaway model of sexual selection · "Good genes" versus "sexy son" models in sexual selection · Female choice in sexual selection · Darwin, Wallace and the evolution of the human mind

2.1 Introduction

The ideas of Charles Darwin (1809–1882) on the evolution of secondary sexual characters, noted in *The Origin of Species* (1859) and developed in *The Descent of Man and Selection in Relation to Sex* (1871, 1874), spurred an important controversy which has remained an area of passionate contention to the present: What does "sexual selection" mean? How does it interact with natural selection? Does it

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apply to humans? Regarding the definition of sexual selection, Darwin suggested that males were struggling with each other for mates and that females were able to choose. But he provided no explanation for the reasons why females as a whole were generally “the choosing sex”, and for why a definite female would choose a definite male rather than any of his competitors: instead, he suggested that females were endowed with an “aesthetic sense”, a mysterious taste for beauty, which was governing their choices. This idea was largely criticized, first and foremost by Alfred Russel Wallace (1823–1913), who doubted female animals might have the power to choose.

Wallace’s views can be viewed as a “utilitarian” approach that resolves sexual selection into natural selection: in this view, aesthetic traits are eventually always *useful* to their bearer, thus subject to being interpreted as advantageous to the general fitness of the individual. During the first half of the twentieth century, R. A. Fisher attempted to salvage Darwinian sexual selection with a run-away model: suggesting a mechanism for mere aesthetic preferences to develop traits, with no direct benefit. On the other hand, Wallacean utilitarian views have been considered the precursor to the good-gene model, for which wooing signals vigor. Later efforts to develop quantitative models of the early verbal suggestions have led to a controversy between the aesthetic and the utilitarian views.

Our paper is twofold. First we focus on the disagreement between Darwin and Wallace. We give an overview of its roots and its scale, showing how it involved not only sexual, but also aspects of natural selection, and we consider some differences in their understandings of how selection works. This analysis suggests that the classical theme of Wallace refusing “sexual selection” on grounds of his rejection of “female choice” is but a part of a larger picture. In particular we consider possible differences in their views on how the evolutionary principles apply to the human species. In the second part of this paper, we view Darwin and Wallace as rival scientists embodying two competing evolutionary principles, namely, Beauty and Utility, and how this has contributed to shaping the evolutionary debate of sexual selection throughout the Twentieth century and until today, as evidenced by several chapters of this book (see papers by Prum and Cézilly, this volume).

2.2 Darwin and Wallace: a Range of Disagreements

Sexual selection is Darwin’s second important concept. In 1871 (t. I, p. 256), he defined it in a rather general fashion, as “the advantage which certain individuals have over other individuals of the same sex and species, in exclusive relation to reproduction”. Darwin decomposed sexual selection in two classes of phenomena: in some species, male competition for females is evident while, in others, female choice of males is clearly shown (Darwin 1859, pp. 87–90). Males, particularly in polygynous species, might fight over females, leading to selection for physical size and weaponry, as in the case of the male elk’s antlers. Females, on the other hand, would choose among males, but on what basis? How does it help the peahen’s

posterity to choose a peacock with a splendid tail, for example? Darwinian female choice focuses on beauty for beauty's sake and does not emphasize the utility of exaggerated features, like ornaments. In contrast to this view, Wallace noted that Darwin attributed colors or courtship displays in birds and insects to sexual selection, but he thought that the 'greater vigor' and 'higher vitality' of males might somehow be associated with, or perhaps lead to their greater coloration or activity. He also attributed a role to the protective value of drab colors for females. Besides, he emphasized how elaborate male crests and erectile feathers might function as species recognition signals, or as a means to frighten away predators, not to attract females.

It can be said that Wallace emphasized both the protective and the signaling value of color while Darwin stressed its aesthetic value. But beyond the specific issue of sexual selection, Darwin and Wallace entertained different views on several issues, and not only on the mechanisms that account for sexual dimorphism.

2.2.1 *Darwin and Wallace as Codiscoverers*

When Darwin received Wallace's Ternate manuscript called "On the tendency of species to form varieties; and on the perpetuation of varieties and species by natural means of selection" on 18 June 1858, he immediately wrote to his friend and mentor, the geologist Charles Lyell: "Your words have come true with a vengeance that I should be forestalled. You said this when I explained to you here very briefly my views of "Natural Selection" depending on the Struggle for existence. I never saw a more striking coincidence. If Wallace had my M.S. sketch written out in 1842 he could not have made a better short abstract! Even his terms now stand as heads of my chapters". And, facing the future publication of Wallace's manuscript, Darwin concluded: "all my originality, whatever it may amount to, will be smashed" (Darwin to Lyell, 18 June 1858, in Darwin 1991, p. 107).

In fact, Wallace's letter was not the first, but the third that the self-educated collector had sent to the famous author of the *Voyage of the Beagle*: the two men were in touch since 10 October 1856, and Wallace knew that Darwin was preparing a big book "on species and varieties, for which he ha[d] been collecting information for 20 years". The young naturalist (he was only 35 at the time) thought that Darwin's work might save him the trouble of "proving that there is no difference in nature between the origin of species and varieties", as he wrote to his friend the entomologist Henry Walter Bates (Wallace to Bates, 4 Jan. 1858, in Marchant 1916, t. I, p. 67).

The convergences in the ideas of these two men were indeed remarkable. Especially both referred to a form of "struggle for existence" (Wallace 1858, p. 54). Nevertheless, as there were a number of points of differences between them, Darwin and Wallace have also been cast as rivals and competitors by others: some claim that Wallace was the true discoverer of the mechanism of evolution and that Darwin usurped the credit; others that Darwin was the true discoverer and Wallace's initial essay was not an adequate statement of the mechanism of evolution. Such claims no doubt generate a certain notice, but they are not well supported by the comments and attitudes of the two men themselves, each of whom referred to the other as

co-discoverer on many occasions, both privately and publicly. The two principals were friends and admired each other; and indeed there was much to admire: in addition to their writings on evolution, both made other, substantial contributions to science, and both would be remembered today, had they never written about evolution.

What were the main differences? First and foremost, Darwin viewed the modification of physical and behavioral traits in domestic animals and plants by selective breeding as a kind of metaphor, an indication of what selection by natural forces might be able to accomplish. Wallace, on the other hand, viewed domestic species as essentially abnormal, and considered that they would rapidly return to the ancestral type if released to the wild. In his initial essay of 1858 he sought to refute

the assumption that varieties occurring in a state of nature are in all respects analogous to or even identical with those of domestic animals, and are governed by the same laws as regards their permanence or further variation". In contrast, Wallace thought that "there is a general principle in nature which will cause many varieties to survive the parent species, and to give rise to successive variations departing further and further from the original type, and which also produces in domesticated animals, the tendency of varieties to return to the parent form. (Wallace 1858, p. 54)

Thus, Wallace never agreed with Darwin's frequent and prominent use of human artificial selection of domestic varieties as an argument supporting the possibility of nature selecting new varieties. He disputed the usefulness of domestication as a sound analogy for understanding the modification of species in the wild: the possibility that domestic breeds would revert to an original "type" when becoming feral was a stumbling block to Wallace (Gayon 1998; Beddall 1968). Consistently with this critique of Darwin's foundational analogy with the world of breeding, Wallace never fully accepted the phrase "natural selection", as it was based on and encapsulated the analogy between Nature and the breeders' "selecting" actively albeit unconsciously some traits over others. Wallace did not like the term at first, and examination of his copy of the *Origin* shows that he cautiously crossed the word (Beddall 1988). In several letters to Darwin, Wallace repeatedly denounced the "agentive" connotations of the word "selection" and he was constantly urging Darwin to state that nature is not a breeder capable of conscious choice (Gayon 1998; Hoquet 2011). Wallace was so concerned with a possible personification of "selection", that he was even responsible for Darwin's introducing Herbert Spencer's phrase "survival of the fittest" in the fifth edition of the *Origin* (1869). It's ironic that, in spite of his early reluctance to accept the term *selection*, Wallace later became a strong and convinced *selectionist*. His *Darwinism* (1889) reshaped Darwin's theory as a pan-utilitarianism, promoting an interpretation of Darwin that was so radical that George Romanes, another disciple of Darwin, accused Wallace of being "ultra-Darwinian" (see below sect. 2.1).

A third difference bears on what is now called "the levels of selection". Both Darwin and Wallace strongly believed in the causal power of natural selection, but they disagreed on the level at which competition occurs: Darwin referred to competition between individuals, while Wallace, though his initial statement referred to competition among individuals, tended to focus on competition between populations. This difference has been often noted, at least since the work of paleontologist

Henry Fairfield Osborn (1894) (for instance by Bowler 1976; Gayon 2009a; Bock 2009, Ruse, this volume). H.F. Osborn called the Darwin-Wallace moment “one of the most striking of all the many coincidences and independent discoveries in the history of the Evolution idea” (1894, p. 243). However, when Osborn compared Darwin and Wallace’s contributions to the 1st July 1858 meeting of the Linnaean Society, he concluded: “remarkable as this parallelism is, it is not complete. The line of argument is the same, but the *point d’appui* is different. Darwin dwells upon *variations in single characters*, as taken hold of by Selection; Wallace mentions variations, but dwells upon *full-formed varieties*, as favorably or unfavorably adapted” (1894, p. 245; emphasized by Osborn). The struggle is much more intense in the Darwinian world, so that the slightest difference in organization or instinct can have the most dramatic effect on individual survival; on the other hand, in the Wallacean world, environmental change occurs, and some varieties happen to be adapted to it. In contrast with Darwin’s focus on individual *variation*, Wallace’s 1858 paper focuses on *varieties*: “the very clear recognition of the importance of individual differences” came only later in his writings and “marked a significant development in his thought” (Bowler 1976, p. 17). Such difference in emphasis is somewhat reminiscent of a dispute that arose in the twentieth century among the 3 founders of the Modern Synthesis. R. A. Fisher and J. B. S. Haldane viewed evolution as proceeding through single gene selection, whereas Sewall Wright emphasized gene interaction and saw collections of genes as the unit of selection, giving rise to Haldane’s famous paper “A defence of beanbag genetics” (Haldane 1964).

So we have listed three disagreements of varying importance between Darwin and Wallace: on the value of the analogy with domestic breeds; on the appropriateness of the term “natural selection”; and perhaps on the levels of selection and the difference between variations and varieties. We come now to a major difference that forms the theme of this paper.

2.2.2 Disagreement on Sexual Selection

It should be added that, from the very outset, Darwin and Wallace disagreed about sexual selection, its importance in the development of secondary sexual characteristics, and its role in human evolution. The theme of sexual selection is treated in a short section in the chap. 4 of Darwin’s *On the Origin of Species* (1859, pp. 87–90), and is also briefly mentioned in an earlier essay published jointly with Wallace’s paper in 1858 (see below). Darwin later wrote an entire two-volume book on the subject (1871), revealing the importance he ascribed to this process. Between the publication of his two major works, and especially around 1867–1869, Wallace and Darwin were both working on the issue of sexual characters and had an extensive correspondence on the subject, trying to resolve their differences (collected and analyzed by Kottler 1980, 1985). It seems that once again, Wallace “still anticipated ideas in the most embarrassing manner” (Irvine 1955, p. 184) and Darwin was obviously annoyed by this new coincidence. He wrote to Wallace, 29 April 1867: “It

is curious, how we hit on the same ideas” (Marchant 1916, t. I, p. 184). But 2 days later, on May 1st, Wallace replied to Darwin:

I had thought of a short paper on The Connection between the colors of female birds and their mode of nidification—but had rather leave it for you to treat as part of the really great subject of sexual selection—which combined with protective resemblances and differences will I think when thoroughly worked out explain the whole coloring of the animal kingdom. (1st May 1867, <http://www.darwinproject.ac.uk/entry-5522>)

As this last quote shows, Wallace constantly showed unabashed deference to Darwin and sent him all his notes on the topic. But beyond his submission to Darwin’s priority, there were strong disagreements between the two men—and Darwin was trying his best to bridge the gap between them and have them come to an agreement. On 23 September 1868, Darwin restated the problem of their divergence between protection and sexual selection: “We differ, I think, chiefly from fixing our minds perhaps too closely on different points, on which we agree” (Marchant 1916, t. I, p. 225). Darwin tried to bring by all possible means closer agreement between him and Wallace. However, eventually, it turns out that Wallace did not think sexual selection was a significant evolutionary factor although he seemed, at times, to waver somewhat.

An early discussion of sexual selection appears in the portion of Darwin’s 1844 essay that was read to the Linnaean Society in July 1858, along with Wallace’s paper “On the Tendency of Varieties to depart indefinitely from the Original Type.” Darwin wrote:

Besides this natural means of selection, by which those individuals are preserved, whether in their egg, or larval, or mature state, which are best adapted to the place they fill in nature, there is a second agency at work in most unisexual animals, tending to produce the same effect, namely, the struggle of the males for the females. These struggles are generally decided by the law of battle, but in the case of birds, apparently, by the charms of their song, by their beauty or their power of courtship, as in the dancing rock-thrush of Guiana. The most vigorous and healthy males, implying perfect adaptation, must generally gain the victory in their contests. This kind of selection, however, is less rigorous than the other; it does not require the death of the less successful, but gives to them fewer descendants. The struggle falls, moreover, at a time of year when food is generally abundant, and perhaps the effect chiefly produced would be the modification of the secondary sexual characters, which are not related to the power of obtaining food, or to defense from enemies, but to fighting with or rivaling other males. (Darwin 1858, p. 50)

In this passage, as later in the *Origin*, sexual selection appears to be an umbrella term for two different kinds of phenomena: male-male rivalry leading to armaments; female preferences leading to ornaments. The first of these mechanisms, rivalry among males, was generally undisputed. Wallace accepted it (1905, t. II, pp. 17–18) and he considered “a very general fact that the males fight together for the possession of the females. This leads ... to the stronger or better-armed males becoming the parents of the next generation ... From this very general phenomenon there necessarily results a form of natural selection, which increases the vigor and fighting power of the male animal” (1889, p. 282). Vigor was a rationale for including male-male competition as part of natural selection.

What was really at stake was the idea that female animals have the capacity to choose their mates. Darwin had strongly supported the possibility of female aesthetic

choice. In the *Origin*, he wrote: “if man can in a short time give elegant carriage and beauty to his bantams, according to his standard of beauty, I can see no good reason to doubt that female birds, by selecting, during thousands of generations, the most melodious or beautiful males, according to their standard of beauty, might produce a marked effect” (1859, p. 89). For Darwin then, it was not unreasonable to invoke a rudimentary aesthetic sense on the part of the peahen as a factor in the selection of the peacock’s tail. Note that he invokes here the model of artificial selection by humans—a model that Wallace presumably would have rejected.

Wallace did not reject female choice *in general*, but he thought that female preferences targeted male vigor, not beauty. Accordingly, he endorsed two main objections that had been raised against females’ taste for the beautiful:

a/Female choice, if it seeks for sheer beauty (unrelated to the signaling of any quality), undermines the power of natural selection, as this mechanism is only concerned with benefits. Especially, female preferences for this or that trait would have no evolutionary foundation.

b/Assuming a sense of beauty in lower animals raises the broader question of animal faculties. As Gayon (2009b) puts it, female choice amounts to claiming “that many animals, from fishes to primates, have perceptive, emotional and cognitive abilities that make them able to discriminate and choose their sexual partners. This claim raised no more or less than the problem of the gradual evolution of the mind”.

Accordingly, Wallace thought that sexual selection (*sensu* female choice) was an unnecessary hypothesis (Gayon 2009b). Wallace could not accept the notion of peahens with an aesthetic sense and was seeking for usefulness of traits.

These points are now well-established in the literature (Cronin 1991; Milam 2010). But other elements should also be brought to the fore. First, as noted earlier, Wallace’s environmentalist conception of natural selection (Nicholson 1960) should be differentiated from Darwin’s own understanding of natural selection as “a competitive process within the species, which can change the species even under unchanged conditions” (Gayon 2009b). This may ultimately impact on their contrasted views on sexual selection: Wallace’s reluctance to accept sexual selection is linked to the fact that sexual selection is “a purely competitive process among the members of one sex within the species”; while, for Darwin, sexual selection “was based exclusively upon differential reproductive success among individuals of one sex” and “did not rely upon an adaptive advantage” (Gayon 2009b). For Wallace, sexual selection “was outside Darwinism”, while for Darwin, sexual selection, “because of its primarily competitive and individualistic nature, revealed something important about how selection in general works in nature” (Gayon 2009b).

Darwin’s sexual selection aims at explaining certain largely male traits: weapons and beauty, or sex differences “in structure, colour, or ornament”, as Darwin himself puts it. Darwin focuses, among other traits, on exuberant coloration in males. Wallace has a different take on this question. He is interested in the relatively plain or drab coloration of the females compared to the males in many bird species; he thinks it is the result of natural selection, to protect them from predation as they nested, while the males in those cases are less subjected to such selection. The focus on coloring shows the paramount importance of protection. Two positions are open: one (Darwin’s) claim that colouration results from female

preference for beautiful feathers in males; the other (Wallace's) stresses the protective value of coloration in females. Darwin himself was oscillating (Darwin to Wallace, 16 September 1868):

You will be pleased to hear that I am undergoing severe distress about the protection & sexual selection: this morning I oscillated with joy towards you: this evening I have swung back to old position, out of which I fear I shall never get. (Marchant 1916, t. I, p. 222–223)

Wallace took great pride in having shown the usefulness of phenomena which were previously regarded as non-adaptive. He was an extreme utilitarian and, as a result, a pan-selectionist. Wallace argued we should look at nature assuming that each feature we see is useful:

... other slight differences which to us are absolutely immaterial and unrecognizable, may be of the highest significance to these humble creatures, and be quite sufficient to require some adjustments of size, form, or color, which natural selection will bring about. (1889, p. 148)

Wallace also rephrased Darwin's "great general principle" as: "all the fixed characters of organic beings have been developed under the action of the law of utility", entailing for instance that "so remarkable and conspicuous a character as color, which so often constitutes the most obvious distinction of species from species or group from group, must [...] in most cases have some relation to the wellbeing of its possessors." (1889, p. 187–188).

Another important issue between Darwin and Wallace is sex-linked inheritance. On that matter, it should be noted that the first words of the section on sexual selection in the *Origin* provides us with an important key to understand Darwin's mechanism: peculiarities appear "in one sex and become hereditarily attached to that sex" (1859, p. 87). Darwin called Wallace's attention on their diverging views on inheritance in his letter dated 5 May 1867 (Marchant 1916, I, p. 185). As Kottler put it (1980, p. 204): "At the heart of their disagreement was a basic difference of opinion about the laws of inheritance." At the climax of the controversy (23 September 1868) Darwin wrote to Wallace: "I think we start with different fundamental notions on inheritance." Wallace believed that, as a rule, variations as they first appeared, were inherited equally by both sexes, and that, afterwards, natural selection had to convert equal inheritance into sex-limited inheritance. Whenever one sex is endangered more than the other (for instance by conspicuous coloration), natural selection would convert the equal inheritance of the variations sexually selected, into sex-limited inheritance, so that the sex in greater danger loses conspicuous coloration. Following his belief in the generality of equal inheritance, Wallace attributed the drab coloration of the less conspicuous sex to natural selection for the sake of concealment of the individuals in greater danger. On the other hand, Darwin was in favor of sex-limited inheritance of traits: in his view, female animals never had to "lose" bright coloration or to be modified for protection—as they never acquired gaudy feathers.

We now understand that it is a misconception to regard Wallace as opposed entirely to sexual selection. Besides, while Wallace thought that sexually dimorphic traits were initially the same in both sexes and natural selection *had to make* the sex

in greater danger less conspicuous, Darwin claimed that sexually selected traits are only present in one sex, and natural selection *has to keep* the sex in greater danger less conspicuous (Kottler 1980). Such disagreement reflects the fact that the actual (Mendelian) laws of genetics were of course unknown to both of them.

2.2.3 *The Riddle of Human Evolution*

The question of sexual selection was also closely linked to the question of human evolution. First, sexual selection was deeply tied with anthropomorphic views. The flavor of Wallace's thinking on the topic can be seen in a well-known passage from his book *Darwinism*:

It will be seen, that female birds have unaccountable likes and dislikes in the matter of their partners, just as we have ourselves, and this may afford us an illustration. A young man, when courting, brushes or curls his hair, and has his moustache, beard or whiskers in perfect order and no doubt his sweetheart admires them; but this does not prove that she marries him on account of these ornaments, still less that hair, beard, whiskers and moustache were developed by the continued preferences of the female sex. So, a girl likes to see her lover well and fashionably dressed, and he always dresses as well as he can when he visits her; but we cannot conclude from this that the whole series of male costumes, from the brilliantly coloured, puffed, and slashed doublet and hose of the Elizabethan period, through the gorgeous coats, long waistcoats, and pigtailed of the early Georgian era, down to the funereal dress-suit of the present day, are the direct result of female preference. In like manner, female birds may be charmed or excited by the fine display of plumage by the males; but there is no proof whatever that slight differences in that display have any effect in determining their choice of a partner. (1889, pp. 286–287)

But beyond these considerations, the genesis of Darwin's concept of sexual selection is, on a deeper level, intimately tied to the puzzle of human races. As Desmond and Moore have shown (2009, p. 282), Darwin's earlier notice of sexual selection was found in a manuscript note on Knox' *Races of man*. Darwin wrote to Wallace (March 1867): "...my sole reason for taking it up [i.e. the subject of man] is that I am pretty well convinced that sexual selection has played an important part in the formation of races, and sexual selection has always been a subject which has interested me much." (Marchant 1916, t. I, p. 182). And again, on 29 April 1867: "in my Essay upon Man I intend to discuss the whole subject of sexual selection, explaining as I believe it does much with respect to man." (t. I, p. 183).

Darwin and Wallace disagreed on the importance of sexual selection in the evolution of secondary sexual characteristics, and also on the question of human evolution.

Darwin sought naturalistic explanations for phenomena, including behavioral phenomena, and considered human capacities such as cognition, emotions, aesthetic feelings to be traits that had evolved, and thus could also exist in other species. He wrote a book about the expression of emotions in animals (1872). While there is still debate on the question of animal cognition, it is fair to say that modern neurology and studies of animal behavior have largely vindicated Darwin's basic viewpoint (e.g., Griffin 2001).

Wallace had a rather Cartesian view of human mental abilities. He believed that some perhaps mystical principle was involved in the generation of the human mind and its consciousness. As a result, the intelligent design movement has apparently adopted Wallace in recent years, claiming that his version of evolution anticipated their claims (Flannery 2008, 2011).

Darwin's view: A Gradation of Mental Powers It is particularly interesting that Darwin published his major discussion of sexual selection in the same book as his treatment of human evolution, which was also not treated extensively in the *Origin*. This juxtaposition may relate to a deeper division between him and Wallace, involving their views on human evolution, as well as their views on sexual selection by female choice: the two differences may in fact have been related.

Why should these two great intellects be likely to differ on the subject of human evolution, and also on the possibility of sexual selection by female choice? There is a strong temptation here to indulge in what is sometimes termed *whig history*—the application of contemporary norms to past historical events or figures. Both Darwin and Wallace were of course Victorians, with constant immersion in the racial, ethnic and gender biases of the period. However, let us note at the outset that Wallace was, among other things, a strong feminist, and it is thus difficult to see his opinion as simply the result of male bias. Similarly, Darwin was an abolitionist and a strong opponent of slavery, and indeed it has been argued that this was a major factor in his development of the theory of evolution by natural selection (Desmond and Moore 2009), so it becomes difficult to ascribe his views on human evolution to racism.

We will argue here that their disagreements about sexual selection as well as about human evolution probably did not arise primarily from Victorian biases, but rather had roots in fundamentally different conceptions about the evolutionary relations of humans to other species, and that this difference in turn reflected, at least in part, differences in their experiences as naturalists.

To understand this difference we need to consider the backgrounds of both men. A major difference in the personal backgrounds of Darwin and Wallace was their experience of non-European peoples and cultures. Darwin had traveled, of course, circumnavigating the globe for 5 years in the *Beagle*, with extensive inland excursions in South America and elsewhere, but he was usually either in the company of fellow Englishmen or in any case supported, protected and cushioned, directly or indirectly, by the great authority of the British Navy. According to all accounts, he was a very tolerant person, not given to aggression or autocratic assertion, and a Whig politically, strongly opposed to slavery. Nevertheless he was also a product of mid-Victorian British culture, with a strong belief in progress and little in-depth personal knowledge of non-European cultures (see Browne 1995, especially chap. 10, pp. 234–253; Desmond and Moore 2009). His expressed surprise when encountering the natives of Tierra del Fuego serves to illustrate this and makes a sharp contrast with the “domesticated” figure of the 3 natives transported back to South America on the *Beagle*:

The Fuegians rank among the lowest barbarians; but I was continually struck with surprise how closely the three natives on board H.M.S. *Beagle*, who had lived some years

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