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Wallace, Darwin and Southeast Asia: the real field site of evolution

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2.1 Darwin in the Galápagos

The Galápagos Islands are famous the world over as the supposed site of the discovery of the theory of evolution by natural selection. According to legend it was on these rocky islands 600 miles off the west coast of South America where in 1835 Charles Darwin, during the voyage of the *Beagle*, observed the gradually differing beaks of the Islands' unique finches and experienced a 'eureka moment'. Although this is a charming and widely believed story, historians of science have known since the work of Frank Sulloway (1982a) that there was no such eureka moment on the Galápagos islands. Indeed not only did Darwin not discover evolution or natural selection on the Galápagos, but his later *Beagle* notes reveal that he still believed in some form of divine creation of species after his visit there.

Even more importantly Darwin could not have experienced the Galápagos species in the way legend suggests. First of all, while in the Galápagos Darwin could not be sure that the Islands' birds were endemic because he had not visited the South American mainland at the same latitude. Furthermore, he did not even know that the famous finches which, since 1935 have been called 'Darwin's finches', were not true finches (family Fringillidae) at all (Lowe 1936). In fact, Darwin believed he had collected a number of different kinds of birds: finches, grosbeaks, American warblers, wrens and warblers (Barlow

1963, Steinheimer 2004). It was only after his return to London in 1836 that the expert ornithologist John Gould, with access to a worldwide collection, was able to identify the birds as both endemic to the Galápagos, some apparently specific to particular islands, and indeed as mostly belonging to a single genus, *Geospiza*. This is distinct from true finches, and this genus is now placed in the family Emberizidae (Steinheimer 2004). Only then, in London, did the 'finches' begin to strike Darwin as having evolutionary significance. Darwin was similarly struck with new identifications in London of his South American mammal fossils. Hence the theory of evolution by natural selection was first formulated in London between 1837–39. If the public is to be encouraged to associate an exotic field location with the discovery of evolution by natural selection, then the Galápagos are inadmissible.

Yet it is also true that while in the islands Darwin did note that some of the mockingbirds were distinct on different islands (Chancellor and van Wyhe 2009). It was the mockingbirds rather than Darwin's finches that were the basis of the famous passage in his ornithological notes written when the *Beagle* was almost home in 1836:

If there is the slightest foundation for these remarks, the Zoology of Archipelagoes will be well worth examining; for such facts undermine the stability of species. (Barlow 1963: 262)

In later life Darwin was occasionally asked about the origins of his theory. He never stated that he became an evolutionist while actually in the Galápagos. Instead he always listed three kinds of evidence found in the field as in this 1864 letter to German zoologist Ernst Haeckel:

In South America three classes of facts were brought strongly before my mind: 1stly the manner in which closely allied species replace species in going Southward.

2ndly the close affinity of the species inhabiting the Islands near to S. America to those proper to the Continent. This struck me profoundly, especially the difference of the species in the adjoining islets in the Galápagos Archipelago.

3rdly the relation of the living Edentata and Rodentia to the extinct species. I shall never forget my astonishment when I dug out a gigantic piece of armour like that of the living Armadillo. (Darwin in Burkhardt et al. 2001: 302)

Darwin's recollections tended, however, to leave the location where he made his conclusions ambiguous. Hence in later years it was possible for readers to conclude that he meant that the Galápagos facts had influenced him at the time, just as we can now read them as referring to retrospective importance. The point here is not to downplay the importance of the Galápagos fauna and flora for turning Darwin towards an evolutionary explanation, but to stress that these Islands were

not the locus of discovery or formulation of the theory – though it is precisely this notion that remains so widely believed.

During the latter half of the nineteenth century the Galápagos were associated with Darwin by many readers because it was his stirring account in *Journal of Researches* which had first made the wildlife of the Islands widely known (Darwin 1839, 1845). Yet it remains a little known fact that in the decades following the publication of *The Origin of Species* (Darwin 1859), and even after Darwin's death, the Galápagos were not closely associated with the origins of his theory. In fact, they were seldom even mentioned at all in accounts of Darwin's life, such as his obituaries and early biographies.

An exception is found in the monograph of ornithologist and entomologist Osbert Salvin (1835–98) on the birds of the Galápagos in 1876. He noted (Salvin 1876: 461) that the ornithological study of the Galápagos began with Darwin's visit:

Unfortunately, at the time of his visit, Mr. Darwin did not fully appreciate the peculiar distribution of the bird-fauna throughout the different islands, and the particular island where each specimen was obtained was not always noted at the time. Enough, however, was recorded to form a basis for deductions, the importance of which in their bearing upon the study of natural science has never been equaled.

Salvin's remarks were highly unusual, at that time, for attributing such importance to the birds of the Galápagos. Presumably, he had closely read Darwin's second edition of the *Journal of Researches* (Darwin 1845) with its famously suggestive passage about the finches:

Seeing this gradation and diversity of structure in one small, intimately related group of birds, one might really fancy that from an original paucity of birds in this archipelago, one species had been taken and modified for different ends. In a like manner it might be fancied that a bird originally a buzzard, had been induced here to undertake the office of the carrion-feeding Polybori of the American continent. (Darwin 1845: 380)

Perhaps Salvin concluded, as many subsequent readers have, that the passage added to the 1845 edition (by far the most widely available version of Darwin's *Journal*) was a record of impressions Darwin had had at the time (something Darwin never suggested). Or Salvin may have considered Darwin was spurred to his evolutionary views by the birds of the Galápagos.

Incidentally, the famous passage quoted above was not Darwin's first published remark showing his interest in the origin of species. This actually appeared in the conclusion of his coral reef paper (van Wyhe 2009: 37–9), where he says,

some degree of light might thus be thrown on the question, whether certain groups of living beings peculiar to small spots are the remnants of a former large population, or a new one springing into existence. (Darwin 1837: 554)

Salvin did not explicitly suggest that Darwin appreciated the evolutionary significance of the birds of the Galápagos while Darwin was actually in the Islands, though he had *sufficient records* to deduce important conclusions later. Salvin also did not lend any particular weight to Darwin's finches as opposed to the other kinds of birds collected. Although Salvin called the Galápagos 'classic ground', it was not because he believed it to be the site of Darwin's conversion or discovery. It was classic because it was so peculiar and made famous by the great naturalist. Similarly, Alfred Russel Wallace referred to Amboyna as 'classic ground' in his *Malay Archipelago*:

since it was there that I first made the acquaintance of those glorious birds and insects which render the Moluccas classic ground in the eyes of the naturalist, and characterise its fauna as one of the most remarkable and beautiful upon the globe. (Wallace 1869, volume 1: 477–8)

In the second and third decades of the twentieth century, with renewed scientific studies and expeditions to the Galápagos, the celebrated Darwin came to be more often associated with the Islands. Only after this stage-setting was a dramatic change to occur in 1935. This was the centenary of Darwin's 1835 visit to the Galápagos. The event was celebrated because the famous author of *The Origin of Species* had visited there during the voyage of the *Beagle*, not because it had long been believed that the Galápagos were the site of discovery of evolution. Indeed almost no writers had ever claimed this for the Galápagos before this centenary. A few celebrations and commemorations of various kinds were independently organised around the world. Proposals for founding a research station on the Galápagos were made, and the Ecuadorian government passed laws to protect wildlife. A monument to Darwin was erected on the islands by a specially formed Darwin Memorial Expedition led by the American travel writer Victor von Hagen. The monument read,

Charles Darwin landed on the Galapagos Islands in 1835 and his studies of the distribution of animals and plants thereon led him for the first time to consider the problem of organic evolution. Thus was started that revolution in thought on this subject which has since taken place.

The inscription itself is one of the earliest claims that something theoretically new had occurred to Darwin there in the field.

At the meeting of the British Association for the Advancement of Science in Norwich on 4–11 September 1935, the Zoological section discussed and heard papers under the heading 'Centenary of the landing of Darwin on the Galapagos Islands, and of the birth of the hypothesis of the "Origin of Species"' (BAAS 1935). Now, for the first time, Darwin was widely represented as discovering evolution *on* the Galápagos. The title of this section alone was reproduced in newspapers and journals throughout the world. What may have begun as a 'sexed up' section

heading in fact carried a version of the story: Darwin's belief in evolution, or discovery of natural selection (renditions naturally varied) occurred in the field – and specifically in the Galápagos Islands.

Nora Barlow, Darwin's granddaughter and historian, wrote an important letter to *Nature* published 7 September 1935 (i.e. during the BAAS meeting). She asked,

At what period during the *Beagle* voyage did [Darwin's] views crystallise? [...] I have [...] been fortunate in finding among the contemporary ornithological notes a passage bearing directly on the subject, where the significant phrase 'for such facts would undermine the stability of species' occurs. Here we have the earliest date yet obtained, I think, for an admitted upheaval of his thoughts along evolutionary lines. The ferment had already begun to work in September 1835. (Barlow 1935)

We now know that this passage was written on the *Beagle* around mid-June to August 1836 between South Africa and Britain (Sulloway 1982b). It is hardly surprising that Barlow took this passage about Galápagos birds to mean that Darwin had written it during his visit, especially as Barlow was writing in the year of commemoration of the Galápagos visit. It would take until 1982 for Sulloway (1982b) to dispel what became a widespread legend.

Thus the Galápagos are not the physical location where Darwin discovered evolution or natural selection. Hence it is a pity that they should be so often misrepresented as a pilgrimage site for nature lovers. South America, with its fossil mammals and geographical distribution puzzles, was probably just as important if not more so for Darwin's evolutionary conversion, although, like the Galápagos, retrospectively. Of course, the Galápagos present wonderful and rare examples of evolution in isolation and of adaptive radiation, but evolution was not discovered there, and it was not the Galápagos evidence alone that brought evolution to light.

2.2 Wallace in Southeast Asia

If not Galápagos, what other region might have a bona fide claim as a field site of the discovery of the theory of evolution by natural selection? Whereas Darwin's evolutionary conclusions were formalised and written down on reflection after his travels in London, Alfred Russel Wallace, who lived and worked in Southeast Asia between 1854 and 1862, had made his own brilliant independent discovery of natural selection in the field there. This is not entirely surprising considering the rich biodiversity and striking patterns of zoological distribution in Southeast Asia compared to the barren and comparatively scantily populated Galápagos.

Wallace was born in 1823 near the village of Usk on the Welsh borders. He is sometimes described as Welsh, though his parents were English and he regarded himself as English (Smith 1998) Even more commonly, Wallace is described by

some modern commentators as working class. This too is incorrect. Wallace was the son of a gentleman who gradually lost the family's wealth. Thus although Wallace attended a classical grammar school somewhat similar to Darwin's, the family's decline in fortune meant that Wallace received no further formal education after the age of 14. Although in his adolescence he moved among circles of working men, Wallace always observed them as an outsider. This is clear from the way he carefully noted their different language and habits in his autobiography. There is a vast scholarly literature on the meanings and definitions of social class in Victorian Britain which shows that class was by no means simply a product of financial wealth (see for example Cannadine 1999).

But for most of his life Wallace had to work for a living. Thus the hard-working, self-educated Wallace is often contrasted with the extremely affluent and Cambridge-educated Darwin who never had to work a day in his life for pay. Yet the important thing about Wallace is not that he was disadvantaged. While it is widely recognised that Wallace was mostly self-taught in science, the same can be argued for Darwin too, because he derived only a small proportion of his scientific knowledge and skills from his formal education. Wallace was remarkably intelligent and talented – and he put these talents to good use in his committed pursuit of natural history. After a series of jobs, mostly land surveying in England and Wales, Wallace began his real career in natural history when he set out for the Amazon Basin in 1848 along with his friend Henry Walter Bates. After 4 years of collecting and observing, Wallace set sail for Britain in 1852. Tragically his ship caught fire and almost all of his collections and notes were destroyed. Fortunately the collection was insured by Wallace's agent, Samuel Stevens, for £200. If Wallace collected any notes or material for his interest in the origin of species, none has survived and he never referred to any in his later writings.

Wallace's subsequent publications therefore suffered from the dearth of data he was able to bring home. His first book, *Palm Trees of the Amazon* (Wallace 1853a), described the distribution and uses of the palms he had observed and was illustrated from his own sketches. The book was criticised by some contemporaries because of its scanty detail, inaccuracies in some of the drawings and sometimes amateurish descriptions, all resulting from his lack of formal training as a botanist. His other book fared better. *A Narrative of Travels on the Amazon and Rio Negro* (Wallace 1853b), although also criticised for its paucity of particular details, was better received and sold better. Wallace also read papers before scientific societies and made important connections in the London scientific community.

After only 18 months in England, Wallace again set off for the tropics to work as a specimen collector. As he recalled in his autobiography,

During my constant attendance at the meetings of the Zoological and Entomological Societies, and visits to the insect and bird departments of the British Museum, I had obtained sufficient information to satisfy me that the

very finest field for an exploring and collecting naturalist was to be found in the great Malayan Archipelago, of which just sufficient was known to prove its wonderful richness, while no part of it, with the one exception of the island of Java, had been well explored as regards its natural history. Sir James Brooke had recently become Rajah of Sarawak, while the numerous Dutch settlements in Celebes and the Moluccas offered great facilities for a traveller. So far as known also, the country was generally healthy, and I determined that it would be much better for me to go to such a new country than to return to the Amazon, where Bates had already been successfully collecting for five years, and where I knew there was a good bird-collector who had been long at work in the upper part of the river towards the Andes. (Wallace 1905, volume 1: 326)

Wallace used Singapore as a base for his early expeditions into the surrounding region. Over the next 8 years he visited all of the major islands of the region, travelling as far east as New Guinea. He collected 125 660 natural history specimens, of which there were over 80 000 beetles. He proposed a line of demarcation between the fauna of Australia and Asia, now known as the Wallace's Line. As he described it,

We have here a clue to the most radical contrast in the Archipelago, and by following it out in detail I have arrived at the conclusion that we can draw a line among the islands, which shall so divide them that one-half shall truly belong to Asia, while the other shall no less certainly be allied to Australia. (Wallace 1869, volume 1: 13)

It was some of the striking puzzles of geographical distribution like these, in addition to the scientific literature of the day, that prompted Wallace to revisit the questions of species origins.

In 1855, while living in Sarawak on the island of Borneo, Wallace wrote his first theoretical paper on species: 'On the law which has regulated the introduction of new species' which appeared in the *Annals and Magazine of Natural History* (Wallace 1855). In this essay Wallace argued that, 'Every species has come into existence coincident both in time and space with a pre-existing closely allied species.' The paper, however, did not explicitly state that species transmuted one into another. Therefore it was possible for some readers, such as Darwin, to conclude that Wallace referred to a series of creations. Hence only much later in *The Origin of Species*, Darwin (1859: 355) wrote, 'I now know from correspondence, that this coincidence [Wallace] attributes to generation with modification.' Others, less accustomed to accepting the evidence for transmutation, such as the geologist Charles Lyell, found the implications of the Sarawak paper hard to avoid. Lyell opened his own species notebooks (Wilson 1970). Lyell also urged Darwin to publish his views in outline first rather than continuing to complete his studies and publish on a very large scale (van Wyhe 2007). Hence on 14 May 1856 Darwin 'Began by Lyells advice' a more condensed version of his original plan (Darwin 1809–1881 in van Wyhe 2006). This condensed version is still known as the 'big

book' and would have extended to three volumes (Stauffer 1975: 11). By the spring of 1858 Darwin had completed more than 10 chapters, covering two thirds of the topics later discussed in *The Origin of Species*.

In 1858 Wallace was living in the Moluccas, then part of the Dutch East Indies. It was here that he conceived of an explanation for the origin of new varieties and species that was strikingly similar to Darwin's natural selection. Wallace was particularly preoccupied with the origins and relationships between local human races. According to his own much later recollections he was suffering from a recurrent bout of fever when the idea came to him. Years before he had read Thomas Malthus' arguments that inevitable geometrical population growth was prevented only by severe checks. Hence, remembering Malthus, Wallace conceived of 'a general principle in nature' that permitted only a 'superior' minority to survive 'a struggle for existence' (Wallace in Darwin and Wallace 1858). Wallace elaborated this theory in his so-called Ternate essay (February 1858) 'On the tendency of varieties to depart indefinitely from the original type'. As he wrote in the essay itself,

The numbers that die annually must be immense; and as the individual existence of each animal depends upon itself, those that die must be the weakest – the very young, the aged, and the diseased, – while those that prolong their existence can only be the most perfect in health and vigour – those who are best able to obtain food regularly, and avoid their numerous enemies. It is, as we commenced by remarking, 'a struggle for existence,' in which the weakest and least perfectly organised must always succumb. (Wallace in Darwin and Wallace 1858: 56–7)

Clearly Wallace's discovery was one made in the field itself, not in an urban study after returning to England.

2.3 Facts, fairness and conspiracies

Much of the subsequent part of this history has long been shrouded in controversy, wild speculations and even accusations of dishonesty and plagiarism. (Notably such views have come into existence only after all living participants died. Nothing so inconsistent with the evidence could have been put forward were any living protagonists still available.) It is sometimes claimed that Wallace wrote a publishable article on the theory of natural selection before Darwin did. Yet Wallace did not intend his essay for publication. At any rate, many commentators have claimed that Darwin's (1844 [1909]) essay was publishable and wondered why he did not do so (see van Wyhe 2007). So both men prepared theoretical draft essays not intended for publication, but of a standard that were considered publishable by others. Wallace sent the Ternate essay to Darwin whom he knew from correspondence was close to completing a large work on evolution. Wallace,

however, did not plan to publish on the subject until his return to England. In an 1857 letter to Darwin, Wallace indicated his intention to prepare a work on species after returning, when he would have access to essential English libraries and collections (Burkhardt and Smith 1990: 457). Wallace later wrote to Alfred Newton in 1887, 'I *had* the idea of working it out, so far as I was able, when I returned home' (F. Darwin 1892: 190). Wallace returned home in 1862 – an estimated 2 years after Darwin would have completed and published his big book on species, if not interrupted by Wallace's unexpected revelation in his letter with the enclosed Ternate essay in June 1858 (van Wyhe 2007).

The repeated attempts to impugn Darwin and elevate Wallace seem to be inspired by a sympathy for the apparent underdog, Wallace. Although thus nobly motivated, the archival documentation for the development of Darwin's theoretical work from 1837 is extensive and irrefutable. There can be no question about which man had the idea of common descent, struggle for existence, natural selection or the principle of divergence first.

The biggest mystery over the past half century is the date that Wallace sent the essay to Darwin. Here the evidence has appeared confusingly ambiguous. The Ternate essay is dated February 1858. The original manuscript and its covering letter do not survive. If the essay was sent to Darwin on the next monthly mail steamer after February, as Wallace recollected more than a decade later, this would have been 9 March 1858. A letter from Wallace to F. Bates sent on this steamer still survives and bears postmarks showing that it arrived in London on 3 June 1858 (see McKinney 1972). Davies (2008) has shown that all the intermediate mail steamer connections fit for these dates. Darwin's letter forwarding Wallace's essay to Lyell, which claimed receipt 'to-day', was dated '18' June 1858 (Burkhardt and Smith 1991: 107).

Therefore, several writers have asked, if both the Bates and Darwin letters left Ternate on the same steamer, how could Darwin receive his on 18 June and not 3 June? This supposed discrepancy has been the source of much confusion. These two weeks are of consequence because some commentators believe that Darwin delayed forwarding Wallace's essay to Lyell in order to appropriate, unacknowledged, ideas from Wallace's manuscript into his own (Brackman 1980, Brooks 1984, Davies 2008).

However, the conspiracy theorists have simply assumed that Wallace sent the essay to Darwin in March 1858 – but without any direct evidence. They have therefore failed to realise that Wallace wrote his lost letter *in reply* to one he received from Darwin on that very same 9 March steamer. There is no evidence from Wallace's surviving correspondence that he could reply by the same steamer while in the Moluccas and I suspect it was not possible for Wallace to respond before the following steamer. This letter from Darwin was probably the most flattering Wallace had ever received. Darwin reassured Wallace that he and even the great

Lyell were greatly impressed with the Sarawak paper. Wallace had heard nothing positive about his most ambitious paper (Wallace 1855) for 3 years. Suddenly the most eminent man of science he had ever corresponded with praised it very highly. Hence I believe that it was only after receiving Darwin's letter on 9 March 1858 that Wallace decided to send to Darwin, and through him, to the more famous and influential Lyell, the ambitious Ternate essay. Wallace must have left his letter and essay for Darwin at the Ternate post office before departing on his next expedition. We can be reasonably sure of this because the receipt date claimed by Darwin, 18 June 1858, is exactly the right day for receipt of a letter from the Dutch East Indies aboard a P&O mail steamer that docked at Southampton on 16 June. Her letters arrived in London on 17 June. This mail had an unbroken series of mail connections all the way back to Ternate, having departed in early April 1858. Hence the mystery is solved. It was always just an assumption that the letters to Darwin and Bates were sent on the same day, but in recent years some writers have begun to treat it as if it were a historical fact.

Apart from the February date on the Ternate essay, the only reason to conclude that Wallace had sent the essay earlier was Wallace's own recollections. Historians do not attribute the same kind of accuracy or reliability to recollections as to contemporary records. Wallace must have been mistaken to recall that he sent the essay to Darwin days after composing it. It seems clear from his correspondence, however, that Wallace did compose the essay in February 1858. Almost all writers on Wallace since McKinney (1972) have accepted that the Ternate essay was not actually written on Ternate but in fact on the nearby island of Gilolo, because Wallace's field journal appears to indicate that he was absent from Ternate during the entirety of February. In fact, the field journal was written retrospectively and conflicts with contemporary correspondence, so Wallace may have been on Ternate during part of February 1858. At any rate it is unfortunate how unanimous commentators have become in discounting the accuracy of Wallace's recollections of composing the essay on Ternate, but no similar scepticism has been applied to the detail that the essay was sent a few days later. There is no contemporary evidence for this point, and the earliest recollection by Wallace was written 11 years later.

The recurring accusations that Darwin did or could have borrowed ideas, namely the principle of divergence, from Wallace's writings were conclusively refuted by David Kohn (1981). Kohn showed that what many writers mistakenly refer to as 'divergence' in the writings of Darwin and Wallace is in fact two different concepts. Kohn called these 'taxonomic divergence' and 'a principle of divergence'. Taxonomic divergence is merely the observation that 'taxa can be arranged in a branched - hence diverging-scheme' (Kohn 1981: 1105). Darwin made this observation as early as 1837, and this is reflected in his famous family tree sketch ('I think') on p. 36 of his *Notebook B*, which depicts daughter varieties

diverging off a central ancestral trunk (CUL-DAR121 in van Wyhe 2002). Wallace also mentioned taxonomic divergence in one line of his Sarawak paper, but gave no explanatory principle for it.

A 'principle of divergence', according to Kohn, explains 'how divergence occurs'. Darwin developed this by the mid-1850s and explicitly described it in a letter to Asa Gray in September 1857 (Darwin and Wallace 1858). The same treatment of divergence appeared in Darwin's (1856–58) draft chapters for *Natural Selection* (Stauffer 1975). After these documents were written, Darwin received Wallace's Ternate essay. The essay contained only one statement on how divergence occurs:

But this new, improved, and populous race might itself, in course of time, give rise to new varieties, exhibiting several diverging modifications [...]. Here, then, we have *progression and continued divergence*. (Wallace in Darwin and Wallace 1858: 59)

As Kohn has demonstrated, there were differences between Wallace's 1858 principle of divergence and Darwin's 'principle of divergence' in his longer 1857 account in the letter he sent to Asa Gray, an abstract of which was published in the Darwin and Wallace (1858) paper. As Kohn explained,

[Wallace] offered an explanation that is ecologically static, where a new species forms only by the extinction of its parent. There is none of the creation of new evolutionary opportunities by the subdivision of the environment that characterised Darwin's principle of divergence. (Kohn 1981: 1106)

Kohn also addressed another area of contention amongst modern commentators, namely that there was something untoward about the arrangement of the joint publication by Darwin and Wallace (1858):

Darwin's friends acted to protect his interests by arranging simultaneous publication. [...] Darwin was sufficiently self-interested to encourage joint publication and produce both an extract of his 1844 Essay to prove the longevity of his claim to natural selection and the 1857 abstract prepared for Gray to prove the priority of his claim to the principle of divergence. But Darwin's claims were valid and the mere fact that his friends acted to defend them is not a conspiracy. Hooker and Lyell, however, did go one step further. [...] they manipulated the order of submission (without Darwin's knowledge) by putting Darwin's pieces before Wallace's paper. By placing the documents in the chronological order of their composition they favored Darwin's priority over Wallace's. No doubt they colored the judgment of history. (Kohn 1981: 1108)

Some modern commentators voice strong opinions about fairness and credit in the arrangement, opinions which are greatly misleading to readers without historical training. Many of the accusations and opinions are not only anachronistic judgements of the actions of Victorian men of science by current (or rather, a writer's own) standards, but also quite uninformed about acceptable practice at the

time. For example, the young Darwin too had early scientific writings published by a correspondent at home without his knowledge (Darwin 1835). When he found out, Darwin reacted similarly to Wallace, pleased that his writing was considered worthy of publication and discussion by his seniors, and a bit embarrassed he had not been able to correct the proofs. But it was perfectly normal practice and there were no grounds for complaint.

And at any rate, modern commentators greatly exaggerate the significance and import of the reading of the Darwin and Wallace papers at the Linnean Society in July 1858. The contemporary accounts do not suggest anything like the significance that has been retrospectively applied to the occasion, which indeed could only have been appreciated retrospectively. A great scientific theory does not shake the community because it has been outlined or proposed, but because it gradually convinces the majority of practitioners and successfully withstands criticism and questioning. All of this of course the theory did undergo – but not in the abbreviated and outlined form of the Darwin and Wallace publication which was largely overlooked, a few exceptions notwithstanding. It was instead Darwin's condensed 'abstract' of his big book, *The Origin of Species* (1859), which did the work, with an ever-growing group of prestigious converts, of convincing the international scientific community within the space of 20 years, that evolution was a fact. Indeed Wallace lamented the fact in a letter to Darwin after a meeting of the British Association for the Advancement of Science at Norwich in 1868:

The worst of it is, that there are no opponents [of evolution] left who know any thing of Nat. Hist, so that there are none of the good discussions we used to have. (Wallace in Burkhardt et al. 2008: 705)

Hence Darwin and Wallace deserve equal credit for the first publication of the theory of evolution by natural selection. So why does Darwin get so much more attention? He is not remembered for his half of the Darwin-Wallace paper at the expense of Wallace. Wallace himself addressed the question after Darwin's death:

Darwin's name and fame are more widely known than in the case of any other modern man of science [...] The best scientific authorities rank him far above the greatest names in natural science – above Linnaeus and Cuvier, the great teachers of a past generation – above De Candolle and Agassiz, Owen and Huxley, in our own times. Many must feel inclined to ask, – What is the secret of this lofty pre-eminence so freely accorded to a contemporary by his fellow-workers? What has Darwin done, that even those who most strongly oppose his theories rarely suggest that he is overrated? Why is it universally felt that the only name with which his can be compared in the whole domain of science is that of the illustrious Newton? [Wallace answered:] [...] [Darwin] has given us new conceptions of the world of life, and a theory which is itself a powerful instrument of research; has shown us how to combine into one consistent

whole the facts accumulated by all the separate classes of workers, and has thereby revolutionised the whole study of nature. (Wallace 1883: 420, 423–4)

Darwin is so celebrated because he convinced the international scientific community that evolution is a fact not only with *The Origin of Species* (Darwin 1859) and its five subsequent editions, 1860–76 (van Wyhe <http://darwin-online.org.uk>), but also with his detailed account of how natural selection could explain the most minute details of the reproductive structures of orchids (Darwin 1862), the massive compilation of evidence in the *Variation Of Animals And Plants* (1868), the *Descent of Man* (1871) and *The Expression Of The Emotions* (1872), his other botanical volumes, and many scientific papers (van Wyhe 2009). Wallace himself, on numerous occasions, insisted on the same point. He titled his own volume on the theory, published after Darwin's death in 1882, *Darwinism* (Wallace 1889). It was one of the best overviews of the evidence for the theory published in the nineteenth century.

It is sometimes claimed by Wallace's admirers that Darwin's reputation has somehow usurped that of Wallace with the passage of time. This is incorrect as the above quotation from Wallace attests. Darwin was vastly more widely known and overshadowing in his reputation during his and Wallace's lifetime. This has remained essentially unchanged ever since, as seen in the unprecedented succession of anniversary celebrations starting in 1909, 1959, 1982 and most notably of all, 2009.

True, Wallace was in his own lifetime a leading figure in science. Yet he was never considered by his contemporaries as of the same rank as Lyell, de Candolle, Hooker, Agassiz or Darwin. And as such, Wallace's reputation today is exactly what would be expected of a well-known figure from his time, becoming less and less remembered because there are so many other major figures from so many eras. And yet Wallace enjoys today a special following, not least in Southeast Asia. Few figures receive almost yearly book-length biographies a century after their death as Wallace does. And long may it continue. There is much yet to be uncovered and explained about the life and work of Wallace. With the welcome founding of a new Wallace correspondence project at the Natural History Museum, London, as well as my own Wallace Online project at the National University of Singapore, we can expect a new era in Wallace research in the coming years.

At any rate, Wallace clearly uncovered evolution by natural selection *in the field* in Southeast Asia. Hence it has a far better claim – indeed an undeniable one – to be the field site for the discovery of the theory of evolution by natural selection – something long mistakenly attributed to the Galápagos Islands. Perhaps in time the myth of the Galápagos discovery will recede, and hopefully the ever-increasing interest in Wallace will help restore the Southeast Asian region to its proper place in the history of scientific discovery, in addition to its unending importance for biogeography, biodiversity and much more besides.

References

Note: many of the cited references have also been reproduced and transcribed on the *Darwin Online* website edited by the author (van Wyhe 2002-). This is indicated by the abbreviation '[DO]' after the references, as applicable.

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