

# Charles Darwin's Debt to Malthus and Edward Blyth

JOEL S. SCHWARTZ

*Department of Biological Sciences  
Staten Island Community College of the City University of New York  
Staten Island, New York*

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## INTRODUCTION

The traditional view of Darwin's development of the theory of natural selection is that Darwin was inspired to formulate his theory by reading Malthus' *Essay on Population*.<sup>1</sup> According to a different notion, Darwin overemphasized his debt to Malthus regarding natural selection in order to hide the impact of other writers, in particular Edward Blyth, on his own thinking.<sup>2</sup>

The purpose of this paper is to examine these conflicting ideas about the history of Darwin's thinking in the development of the theory of natural selection. By focusing on three basic questions, I will attempt to determine the relative merit of both positions. Was Edward Blyth's work an important prelude to Darwin's theory of natural selection? Was Darwin aware of Blyth's work before he read Malthus? How strongly was Darwin influenced by Malthus?

## EDWARD BLYTH

Edward Blyth (1810–1873) was an extraordinary naturalist, a persistent observer of nature, and a reader of books about zoology.<sup>3</sup> He was neither wealthy nor particularly healthy and in 1841 left England for the more salubrious climate of India, where he was offered the position of Curator of the Museum of the Royal Society of Bengal.

Although Blyth continued his activity there and became recognized as the founder of zoology in India, what is relevant to this paper is the

1. Charles C. Gillispie, *The Edge of Objectivity: An Essay in the History of Scientific Ideas* (Princeton: Princeton University Press, 1960); Marius J. Sirks and Conway Zirkle, *The Evolution of Biology* (New York: Ronald Press, 1964).

2. This is the view of Loren Eiseley and Gertrude Himmelfarb, among others. Eiseley will be discussed in a later section. Himmelfarb's *Darwin and the Darwinian Revolution* (New York: Doubleday, 1959), was reviewed by Leonard Wilson in *Archives internationales d'histoire des sciences*, 13 (1960), 343–351.

3. Arthur Grote, "Memoir of Edward Blyth," *Journal of the Royal Asiatic Society*, 40, part 2, extra number (1875), iii–xxiv.

contribution which he made in the 1830's in Great Britain. From 1833 on, the *Magazine of Natural History* published numerous items written by Blyth, often short descriptions of some phenomenon that had attracted his attention.<sup>4</sup> Frequently these zoological observations concerned a particular species of bird he had observed near his home in Tooting, Surrey. There is nothing remarkable about these series of observations except their thoroughness and the frequency with which they appeared in so short a period of time (1833–1840).

On the other hand, several of his papers in the *Magazine of Natural History* deserve much more attention.<sup>5</sup> In a paper published in 1835, Blyth recognized the principle of natural selection and its application to artificial selection or breeding, and showed an understanding of heredity and sexual selection as well:

It is a general law of nature for all creatures to propagate the like of themselves: and this extends even to the most trivial minutiae, to the slightest individual peculiarities; and thus, among ourselves, we see a family likeness transmitted from generation to generation. When two animals are matched together, each remarkable for a certain given peculiarity, no matter how trivial, there is also a decided tendency in nature for that peculiarity to *increase*; and if the produce of these animals be set apart, and only those in which the same peculiarity is most apparent, be selected to breed from, the next generation will possess it in a still *more* remarkable degree: and so on, till at length the variety I designate a *breed*, is formed, which may be very unlike the original type.

The examples of this class of varieties must be too obvious to need specification: many of the varieties of cattle, and, in all probability, the greater number of those of domestic pigeons, have been generally brought about in this manner. It is worthy of remark,

4. For example: Edward Blyth, "Instances of the Occurrence of Summer Migrant Birds in the Winter Months," *The Magazine of Natural History*, 8 (1835), 512: "Most probably all these birds passed the summer far to the north."

5. Edward Blyth, "An Attempt to Classify the 'Varieties' of Animals, with Observations on the Marked Seasonal and Other Changes which Naturally Take Place in Various British Species, and which do not Constitute Varieties," *The Magazine of Natural History*, 8 (1835), 40–53. "On the Psychological Distinctions between Man and All Other Animals; and the Consequent Diversity of Human Influence over the Inferior Ranks of Creation, from any Mutual and Reciprocal Influences Exercised Among the Latter." *The Magazine of Natural History*, n.s., 1 (1837), 1–9, 77–85, 131–141.

however, that the original and typical form of an animal is in great measure kept up by the same identical means by which a true *breed* is produced. The original form of a species is *unquestionably* better adapted to its *natural* habits than any modification of that form; and, as the sexual passions excite to rivalry and conflict, and the stronger must always prevail over the weaker, the latter in a state of nature, is allowed but few opportunities of continuing its race. In a large herd of cattle, the strongest bull drives from him all the younger and weaker individuals of his own sex, and remains sole master of the herd; so that all the young which are produced must have had their origin from one which possessed the maximum of power and physical strength; and which, consequently, in the struggle for existence, was the best able to maintain his ground, and defend himself from every enemy. In like manner, among animals which procure their food by means of their agility, strength, or delicacy of sense, the one best organised must always obtain the greatest quantity, and must, therefore, become physically the strongest, and be thus enabled by routing its opponents, to transmit its superior qualities to a greater number of offspring.<sup>6</sup>

Blyth went beyond artificial selection and applied the selection principle in natural habitats. Yet he applied it in an antievolutionary way:

The same law, therefore, which was intended by Providence to keep up the typical qualities of a species, can be easily converted by man into a means of raising different varieties; but it is also clear that, if man did not keep up those breeds by regulating the sexual intercourse, they would all naturally soon revert to the original type.<sup>7</sup>

In Blyth's thinking, then, there is in nature a conservative force which helps to maintain stability in living things and prevent change among them. In Blyth's view, it was the purpose of "Providence to keep up the typical qualities of a species."<sup>8</sup> Not only did Blyth soften the impact or meaning of his observations, but these observations themselves were not much more significant than Charles Lyell's had been.

6. Blyth, "Attempt to Classify", pp. 45–46.

7. *Ibid.*, p. 46.

8. *Ibid.*

## DARWIN AND MALTHUS

In his *Autobiography* Darwin told how he first encountered Malthus:

In October 1838, that is, fifteen months after I had begun my systematic enquiry, I happened to read for amusement "Malthus on *Population*," and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed. The result of this would be the formation of new species.<sup>9</sup>

The first of Darwin's four "Notebooks on the Transmutation of Species" shows that he had grasped the natural selection principle by 1837, before encountering Malthus, but did not see then how it operated in nature. In this first notebook, Darwin observed:

The father being climatized, climatizes the child? Whether every animal produces in course of ages ten thousand varieties (influenced itself perhaps by circumstances) & those alone preserved which are well adapted. This would account for each tribe acting as in vacuum to each other.<sup>10</sup>

Here Darwin recognized that well-adapted forms survive and reproduce.

Darwin further developed this point in his second notebook, written between February and July 1838. He wrote: "The constitution being hereditary and fixed, certain physical changes at last become unfit, the animal cannot change quick enough and perishes."<sup>11</sup> Also in his second notebook, Darwin showed that he understood the role of competition in nature:

9. Charles Darwin, *The Autobiography of Charles Darwin*, ed. Nora Barlow (New York: Norton, 1958), p. 120.

10. Sir Gavin de Beer, ed., "Darwin's Notebooks on Transmutation of Species." *Bulletin of the British Museum (Natural History) Historical Series*, part I, vol. 2, no. 2 (1960), 51 (Notebook I, p. 90). No specific date. Notebook written between July 1837 and February 1838. The transmutation notebooks appear as nos. 2-5 of vol. 2 of the *Bulletin*, designated as parts 1-4. Vol. 3, no. 5 of the *bulletin*, designated part 6, consists of passages Darwin excised from Notebooks I-IV. References to these will hereafter be given in the form "Darwin's Notebooks," part 1, p. 51 (Notebook I, p. 90); the information in parentheses gives Darwin's numbering.

11. "Darwin's Notebooks," part 2, p. 99 (Notebook II, p. 153).

Once grant that species and genus may pass into each other, grant that one instinct to be acquired (if the medullary point in ovum has such organization as to force in one man the development of a brain capable of producing more glowing imagining or more profound reasoning than other, if this be granted! ! ! ) & whole fabric [of special creation of species] totters & falls.<sup>12</sup>

In his third notebook, an item dated September 7 reveals that Darwin had noticed the parallel between the effects of artificial selection by man and the effects of natural selection. He observed:

I was struck looking at the Indian cattle with Bump, together with Bison of some resemblance as if the “*variation* in one was analogous to specific *character* of *other species* in *genus*.” Is there any law of this.<sup>13</sup>

Darwin wrote this passage three weeks before he first read Malthus. A later entry in the third notebook reveals precisely when Darwin first read Malthus' *Essay on the Principle of Population*. The entry dated September 28, 1838, states:

28th. We ought to be far from wondering of changes in numbers of species, from small changes in nature of locality. Even the energetic language of Decandolle does not convey the warring of the species as inference from Malthus. – [Increase of brutes must be prevented solely by positive checks, excepting that famine may stop desire.] – in nature production does not increase, whilst no check prevail, but the positive check of famine & consequently death. [I do not doubt every one till he thinks deeply has assumed that increase of animals exactly proportionate to the number that can live.]

Population is increased at geometrical ratio in FAR SHORTER time than 25 years – yet until the one sentence of Malthus no one clearly perceived the great check amongst men. – [Then in spring, like food used for other purposes as wheat for making brandy. – Even a *few* years plenty, makes population in man increase & an *ordinary* crop causes a dearth.] Take Europe on an average every species must have same number killed year with year by hawks, by cold &c. – even

12. *Ibid.*, p. 91 (Notebook II, p. 76).

13. “Darwin's Notebooks,” part 3, p. 137 (Notebook III, p. 65).

one species of hawk decreasing must affect instantaneously all the rest. [The final cause of all this wedging, must be to sort out proper structure, & adapt it to change]— to do that for form, which Malthus shows is the final effect (by means however of volition) of this populousness on the energy of man. One may say there is a force like a hundred thousand wedges trying to force every kind of adapted structure into the gaps in the oeconomy of nature, or rather forming gaps by thrusting out weaker ones.<sup>14</sup>

As Darwin's notebooks show, before he read Malthus Darwin knew that selection was the principle of change. What Darwin found in Malthus' *Essay* was a way to apply this principle. Darwin was impressed by "Malthus' mathematical demonstration of the results of the geometrical rate of increase of man and the arithmetical rate of increase of his available food supply."<sup>15</sup> Since Malthus made man his central theme in the *Essay*, Darwin was able to see the universal applicability of Malthus' theory to all living things. By giving Darwin the stimulus he needed to perceive "species" in a manner different from the traditional view of a fixed, unchanging unit, Malthus earned the credit he received from Darwin. Darwin's novel conception of population as a group of organisms systematically related to one another can be traced to the reading of the *Essay*.

Two sketches written by Darwin long before the publication of his *Origin of Species* in 1859 confirm that Darwin regarded Malthus' influence on his thinking as quite significant.<sup>16</sup> These early sketches, one written in 1842 and the other in 1844, were found in the Darwin home in Down, Kent, in 1896, and were published in 1909 together with an introduction by Darwin's son Francis as *The Foundations of the Origin of Species*.

Although Charles Darwin mentioned the importance of other authors such as Charles Lyell and Augustin De Candolle in the sketches, he did not mention them more frequently than he did Malthus, nor did he attach greater weight to their work than to that of Malthus.<sup>17</sup> In his later writings Darwin did not emphasize Malthus' contributions more

14. "Darwin's Notebooks," part 6, pp. 162–163 (Notebook VI, pp. 134–135). The passages given in brackets were excised by Darwin.

15. Peter Vorzimmer, "Darwin, Malthus and the Theory of Natural Selection," *J. Hist. Ideas*, 30 (1969), 538.

16. Francis Darwin, *The Foundations of the Origin of Species: Two Essays Written in 1842 and 1844* (London: Cambridge University Press, 1909).

17. *Ibid.*, pp. 87–88.

than he did in these two early sketches. In both these sketches Darwin mentioned Malthus and emphasized the importance of studying and understanding him:

If proof were wanted let any singular change of climate (occur) here (?), how astoundingly some tribes (?) increase, also introduced animals, the pressure is always ready . . . a thousand wedges are being forced into the economy of nature. This requires much reflection, study Malthus and calculate rate of increase and remember the resistance, — — — only periodical.<sup>18</sup>

Again Darwin stated:

Nature may be compared to a surface, on which rest ten thousand sharp wedges touching each other and driven inwards by incessant blows. Fully to realize these views much reflection is requisite; Malthus on man should be studied.<sup>19</sup>

In *The Origin of Species* Darwin did not minimize the importance of De Candolle and Lyell. In the first edition of the *Origin* Darwin remarked that "the elder De Candolle and Lyell have largely and philosophically shown that all organic beings are exposed to severe competition."<sup>20</sup> Thus, Darwin did not suppress the names of Lyell and De Candolle in his later works, nor did he emphasize Malthus more than he had previously done.

## DARWIN'S RELATION TO BLYTH

The first suggestion that Blyth had priority in the development of the theory of natural selection was made by the British naturalist H. D. Geldart twenty years after the publication of the *Origin*.<sup>21</sup> Quoting extensively from Blyth's 1835 paper on "Varieties of Animals," Geldart found it remarkable because Blyth, although lacking the advantages of

18. *Ibid.*, pp. 7–8 (1842 stretch). Material enclosed in parentheses is an insertion by the editor, Francis Darwin.

19. *Ibid.*, p. 90.

20. Charles Darwin, *On the Origin of Species: A Facsimile of the First Edition*, ed. Ernst Mayr (Cambridge, Mass.: Harvard University Press, 1964), p. 62.

21. H. D. Geldart, "Notes on the Life and Writings of Edward Blyth," *Norfolk and Norwich Naturalists Society Transactions*, 3 (1879), 38–46.

expensive travel and residence in favored and tropical climates, nevertheless anticipated Darwin and Alfred Russel Wallace. Geldart found it curious that when Blyth's paper was published, "no kind leading *savans* took up the new gospel; even the author's biographer [Grote] omits to notice this publication in his list of papers."<sup>22</sup> But Geldart did not try to explain this lack of attention.

Geldart himself evidently failed to recognize Blyth's conservative and nonevolutionary point of view. Moreover, Geldart was puzzled by Blyth's failure to follow up his brief initial venture in the study of species, particularly after he had obtained the opportunity to travel. As Geldart remarked:

It would have been most interesting to have traced the development of Blyth's views in the essay which he seems to have contemplated at the time of his death on the "Origination of Species," in which we would have had the benefit of his long and intimate acquaintance with the fauna of India; but of this it is stated in the memoir [by Grote] there was only found one paper, "On the Origination of the Various Races of Man," which contains nothing original, but brings together numerous points of resemblance and contrast observable in the several groups of the order Primates.<sup>23</sup>

Just as Blyth failed to pursue his investigations into species, so Geldart failed to pursue his investigation of Blyth's failure. In fact, it was not until 1911, when H. M. Vickers published an article on Blyth in *Nature*, that he was again submitted to scrutiny.<sup>24</sup> But this time the true nature of Blyth's thinking was correctly understood. For Vickers remarked:

Though Blyth seems to have recognized the principle of natural selection, he fails in its true application in that he regards his "principle" as operating for the conservation rather than the progression of the type, whereas the two really go hand in hand, the one being a complement of the other in the successive stages of evolution. Moreover, proof of Blyth's inability to recognize the logical issue of his theory is exhibited in some of his remarks, which appear to disagree, or are incompatible with, one another.<sup>25</sup>

22. *Ibid.*, p. 46. Grote's "Memoir" is cited in note 3, above.

23. *Ibid.*

24. H. M. Vickers, "An Apparently Hitherto Unnoticed Anticipation of the Theory of Natural Selection," *Nature*, 85 (1911), 510-511.

25. *Ibid.*, p. 511.



## Charles Darwin's Debt to Malthus and Edward Blyth

The relation between Darwin and Blyth was again ignored until Loren Eiseley reopened the discussion in 1959, a full century after the *Origin* was published.<sup>26</sup> Eiseley is quite certain of the relevance of Blyth's writings to Darwin's thinking. Eiseley's positive attitude stands in sharp contrast to the cautious tone of Geldart and Vickers. However, Eiseley also recognizes the critical weakness in Blyth's study:

Like Lyell somewhat earlier, Blyth had glimpsed the negative aspects of the struggle for existence and the way in which species were eliminated. He failed to see, however, that natural selection was a potentially liberalizing rather than conservative factor in life.<sup>27</sup>

Although he admits that Blyth's "conservative" point of view was non-evolutionary, Eiseley undertakes to make excuses for it. Like Geldart before him, Eiseley contends that Blyth was not a man of means and could not travel and thus had a provincial outlook which handicapped him. On the other hand, Darwin was a man of comfortable means and was able to expose himself to a broad range of experiences. Thus Eiseley reasons:

Blyth's youthful failure, it can now be realized, lay in his provincialism. Perhaps his species would have remained less fixed if he had had Darwin's experience of the new lands . . . Blyth saw about him, the hedge-constricted, precision-cultivated English landscape.<sup>28</sup>

Did Blyth have any impact on Darwin? In the written record left by Darwin and his contemporaries, there is certainly nothing substantial to indicate that Blyth had any influence on Darwin with regard to natural selection.

### *Loren Eiseley on Blyth's Relation to Darwin*

A contrary position is taken by Eiseley, who bases his argument on several circumstances. In the first place, an entry in Darwin's notebook dated July 19, 1835, contains the item "Smelling properties discussed of Carrion Crows, Hawks, Magazine of Natural History."<sup>29</sup> The

26. Loren Eiseley, "Charles Darwin, Edward Blyth, and the Theory of Natural Selection," *Proc. Am. Phil. Soc.*, 103 (1959), 94-158.

27. *Ibid.*, p. 101.

28. *Ibid.*

29. Nora Barlow, *Charles Darwin and the Voyage of the Beagle* (New York: Philosophical Library, 1946), p. 244.

references have to do with two articles by Charles Waterton in the *Magazine of Natural History*, volume 6 (1833), on the habits of the carrion crow and on scent in the vulture. It is evident that Darwin was acquainted with the *Magazine*, which later, in 1835 and 1837, published the significant Blyth articles. By his own admission, Eiseley does not furnish any proof that Darwin read these articles in the crucial years after his return to England in 1836. According to Eiseley, the absence of Blyth's name from Darwin's early work indicates that he was consciously or unconsciously concealing his knowledge of Blyth. "The two extensive and interesting papers in which Blyth treated of subjects directly pertaining to Darwin's greatest intellectual effort remain, as I have said, unnoted."<sup>30</sup>

This omission is very damaging to Darwin, Eiseley claims, because Darwin mentioned Blyth very favorably in the *Origin* and thereafter. Thus, in the *Origin* Darwin spoke of Blyth as one "whose opinion, from his large and varied stores of knowledge, I should value more than that of almost anyone . . ." <sup>31</sup> In quoting from the *Origin*, Eiseley chose to put a period here. But in the first edition of the *Origin* the sentence does not end at this point but goes on to state that Blyth "thinks that all the breeds of poultry have proceeded from the common wild Indian fowl (*Gallus bankica*)." <sup>32</sup> Thus the context in which Darwin praised Blyth's skill was his observations on fauna, not his grasp of fundamental theory. Eiseley observes:

Yet a man whose work he obviously valued, a man whose name Darwin appears to have taken pleasure in promoting before the public, is represented only by his comment upon specific faunal items. Blyth is restricted to the role of taxonomist and field observer,<sup>33</sup>

It is precisely as a taxonomist and field observer that Darwin valued Blyth. Darwin's lack of appreciation of Blyth as an early proponent of natural selection unfortunately does not indicate when he read Blyth's articles. Evidently Darwin viewed Blyth as an important taxonomist and observer but nothing more.

30. Eiseley, "Darwin, Blyth, and Natural Selection," p. 98.

31. Darwin, *Origin of Species*, pp. 18–19.

32. *Ibid.*

33. Eiseley, "Darwin, Blyth, and Natural Selection," p. 99.

*The technical term "Inosculation"*

In order to support his contention that Darwin received inspiration from Blyth before discovering Malthus, Eiseley produces another valuable observation. He cites the use of the word "inosculate" in the 1836 notebook which Darwin kept during the voyage of the *Beagle* as the spark which spurred him onto further investigation of Darwin's relation to Blyth.<sup>34</sup> According to Eiseley, the infrequently used word "inosculate" was employed by Blyth in two papers in the *Magazine of Natural History* in 1836<sup>35</sup> and 1837.<sup>36</sup> Somehow Eiseley failed to notice that Blyth's paper of 1837 could not have provoked Darwin's use of the word in 1836.

There is also a chronological question concerning Blyth's 1836 paper, published in August. During that month Darwin was still on the *Beagle*, and he did not arrive in England until October. The precise date of the final notebook entry in question is unclear because it appears in Darwin's final notebook of the voyage.<sup>37</sup> In *Charles Darwin and the Voyage of the Beagle*, Nora Barlow describes this final notebook as "a medley of varying date and content."<sup>38</sup> Barlow continues: "It was only on the last lap, sailing home after nearly five years, that he began to collect and compare facts in a written form."<sup>39</sup> The quoted passage in the final notebook was written while Darwin was still on board the *Beagle*, and therefore he could not have seen Blyth's 1836 article before he used the word "inosculate" in the final *Beagle* notebook. Besides, he had used the word "inosculating" in a letter to Professor J. S. Henslow dated November 24, 1832. In the letter Darwin observed: "There is a poor specimen of a bird, which to my unornithological eyes, appears to be a happy mixture of a lark pidgeon and snipe. Mr. MacLeay himself never imagined such an inosculating creature."<sup>40</sup>

34. *Ibid.*, p. 100.

35. Edward Blyth, "Observations on the Various Seasonal and Other External Changes which Regularly Take Place in Birds, More Particularly in Those Which Occur in Britain; with Remarks on their Great Importance in Indicating the True Affinities of Species; and upon the Natural System of Arrangement," *The Magazine of Natural History*, 9 (1836), 399.

36. Blyth, "On the Psychological Distinctions."

37. Barlow, *Darwin and the Voyage of the Beagle*, p. 263.

38. *Ibid.*, p. 260.

39. *Ibid.*, p. 262.

40. Nora Barlow, ed., *Darwin and Henslow: The Growth of an Idea. Letters, 1831-1860* (Berkeley: University of California Press, 1967), p. 62.

One of the meanings of the word “inosculate,” according to the *Oxford English Dictionary*, is to “interpenetrate” or “pass into each other,” and the noted English botanist, Nehemiah Grew (1641–1712), is credited there with the first use of the word. Grew used “inosculate” in *The Anatomy of Plants* in describing plant fibers: “Tis most probable, that none of their fibers are truly inosculated, saving perhaps, in the Plexures.”<sup>41</sup> Blyth used “inosculate” in his 1836 paper when he discussed bird varieties and opposed the principle of blending inheritance: “I must venture, however, to differ from the majority of them [systematists], in opposing the prevalent notion, that the extreme modifications of diverse types blend and inosculate by direct affinity.”<sup>42</sup> Here Blyth use “inosculate” to mean “merge.”

Blyth may have derived the word from the same source as Darwin. William Sharp MacLeay, referred to by Darwin in his 1832 letter to Henslow, was well known to naturalists because of his Quinary System of classification. This system is described in *Horae Entomologicae*, published in 1819–1821. In *Horae Entomologicae*, MacLeay represented the works of creation in the form of adjacent circles which are joined by small circles of “osculant” groups. MacLeay wrote of these groups: “These genera I propose to call *osculantia*, from their occurring as it were at the point where the circles touch one another.”<sup>43</sup> It was from MacLeay that Darwin must have derived the word “inosculating.” Darwin himself cited this usage in his second transmutation notebook. He wrote:

I fear great evil from vast opposition in opinion on all subjects of classification, I must work out hypothesis & compare it with results; if I acted otherwise my premises would be disputed. — According to principle of last page osculant groups between two equal circles of equal value must be so from characters of analogy. — See my notes on p. 37 of MacLeay.<sup>44</sup>

41. Nehemiah Grew, *The Anatomy of Plants with an Idea of a Philosophical History of Plants and Several Other Lectures, Read before the Royal Society*, reprinted from the 1682 edition (New York: Johnson Reprint Corporation, 1965), 1, ii, p. 14.

42. Blyth, “Observations on the Various Seasonal and Other External Changes,” p. 399.

43. William S. MacLeay, *Horae Entomologicae or Essays on the Annulose Animals* (London: S. Bagster, 1819), I, 37.

44. “Darwin’s Notebooks,” part 2, p. 107 (Notebook II, p. 202).

The copy of *Horae Entomologicae* used by Darwin at Cambridge University contains notations made by Darwin. MacLeay's principle was used in the classification of the scarab beetle at the time of Darwin's most prolific beetle collecting at Cambridge. Blyth also studied MacLeay's Quinary System and very likely derived the word "inosculate" from MacLeay. However, how the word became part of Darwin's vocabulary is of secondary importance.

Far more important is the substance of Darwin's entry in 1836. This item furnishes some information regarding Darwin's later thoughts on speciation and selection. Darwin noted in 1836:

In former case position, in latter time (or changes consequent on lapse), being the relation, as in first cases distinct species inosculate so must we believe ancient ones [did] . . . not gradual change or degeneration from circumstances, if one species does change into another it must per saltum — — — or species may perish.<sup>45</sup>

In this passage Darwin used "inosculate" to state that one species passes into another. He further pointed out that the species must change "per saltum" in producing variety. Thus, as early as 1836, Darwin had begun to think about the importance of "mutation" in producing variation in species.

Thus we see that, contrary to Eiseley, Darwin used the word "inosculate" before Blyth did; that consequently he did not derive this word from his reading of Blyth; and, furthermore, that Darwin's use of the word far transcends Blyth's in its importance for the history of biology because it was intimately related to Darwin's development of the theory of the formation of species.

#### EISELEY'S CHARACTERIZATION OF DARWIN

With obvious malice toward his subject, Eiseley remarks:

Here again one catches a momentary glimpse of Darwin's ambivalent psychological behavior — his curt dismissal of those who had come close to his pet theory, and yet again his remorseful praise of the "little man" in science.<sup>46</sup>

45. Barlow, *Darwin and the Voyage of the Beagle*, p. 263.

46. Eiseley, "Darwin, Blyth, and Natural Selection," p. 112.

But we have already seen that in using Blyth's faunal observations, Darwin gave him proper credit. There was no "curt dismissal" of Blyth. Blyth had not "come close" because he rejected the evolutionary approach to differentiation of species. Eiseley's reference to natural selection as Darwin's "pet theory" highlights his hostility to Darwin's great achievement.

Also unsubstantiated is another of Eiseley's charges regarding Darwin's behavior:

Some of Darwin's hesitations, long delays over publishing, and almost neurotic anxiety can now perhaps be better understood. He had his secrets, and, as I hope to show a little later, he had his justification for them.<sup>47</sup>

What are these secrets, and what is the justification for them?

In a paper published in *Daedalus* in 1965, Eiseley asserts: "We now know that Blyth stated the basic tenets of the theory of natural selection in two articles in *The Magazine of Natural History*."<sup>48</sup> No evolutionist has ever conceded this point. On the contrary, most evolutionists would agree with Gavin de Beer's conclusion.

Bearing in mind that Darwin was after only one thing: how species became modified, it may be asked what Darwin's debt to Blyth was? So far as the construction of his theory is concerned, the answer is probably nothing at all.<sup>49</sup>

De Beer explains: "Like Lyell before him, Blyth who believed in special creation used the principle of natural selection to prove that species were immutable."<sup>50</sup>

In his 1837 paper, after a section dealing with artificially induced selection, Blyth asked: "May not, then, a large proportion of what are considered species have descended from a common parentage?"<sup>51</sup> The context in which this line appears is crucial. Blyth answered the question as follows:

47. *Ibid.*, p. 108.

48. Loren Eiseley, "Darwin, Coleridge and the Theory of Unconscious Creation," *Daedalus*, 94 (1965), 589.

49. "Darwin's Notebooks," part 1, p. 36.

50. *Ibid.*

## Charles Darwin's Debt to Malthus and Edward Blyth

I would briefly despatch this interrogatory, as abler writers have often taken the subject in hand. It is, moreover, foreign to the proposed object of this paper.<sup>52</sup>

Thus by 1837, Blyth recognized that others had already expressed views similar to his own. De Beer says: "Already in 1832, the year in which the second volume of his *Principles of Geology* appeared, Lyell was familiar with the struggle for existence, ecological balance, and the extinction of species, and even with the principle of natural selection by which extinction was brought about."<sup>53</sup>

Blyth was of course unaware that by 1837 Darwin had assumed the variability of species and was viewing adaptation as the key to biological change. In his first notebook Darwin observed.

With respect to extinction we can easily see that variety of ostrich Petise may not be well adapted, & thus perish out, or on other hand like Orpheus being favourable, many might be produced. This requires principle that the permanent varieties, produced by confined breeding and changing circumstances are continued and produce according to the adaptation of such circumstances, and therefore that death of species is a consequence (contrary to what would appear from America) of non-adaptation of circumstances.<sup>54</sup>

Even if Darwin had read Blyth's paper published in 1837, it could not have had much impact on his thinking. Not later than 1837, as his "notebooks on the Transmutation of Species" clearly show, Darwin had rejected the notion of immutability of species. Besides, Blyth did not want to discuss the mutability of species, because he felt that this idea was "foreign to the professed object of this paper" and had already been dealt with by others.<sup>55</sup>

Since Blyth was a nonevolutionist and supported the status quo in biology, the issue whether Darwin read his 1835 and 1837 papers cannot be considered important. This question has remained an essential part of Eiseley's argument. He reports the discovery by Gerald Henderson of Darwin's personal copy of *The Magazine of Natural*

51. Blyth, "On the Psychological Distinctions," p. 135.

52. Ibid.

53. "Darwin's Notebooks," part 1, p. 33.

54. Ibid., p. 46 (Notebook I, pp. 37-39).

55. Blyth, "On the Psychological Distinctions," p. 135.

*History* of 1837, which contains annotations on Blyth's paper in Darwin's handwriting.<sup>56</sup> The fact that Darwin read Blyth's 1837 paper is thereby established. But when did Darwin read it? Did he read Blyth's paper before or after reading Malthus in October 1838? A passage in Darwin's second notebook provides the answer. In this passage he referred to Blyth's 1837 paper:

Study Mr. Blyth's papers on Instinct. — His distinction between reason & instinct very just; but these faculties being viewed as replacing each other it is hiatus & not saltus.<sup>57</sup>

Clearly, Darwin read Blyth's important 1837 paper before he read Malthus but apparently it was not crucial to Darwin's thinking on natural selection.

Eiseley suggests that Darwin cut out pages of his early notebooks to conceal his knowledge of Blyth: "Actually the missing fifty pages could have contained a great deal of information extending to Blyth's own views on these subjects."<sup>58</sup> However, de Beer points out that Darwin cut out of his notebooks those pages which contained material he felt most in need of for his more substantial writings.<sup>59</sup> De Beer discovered many of these excised pages and they contained only two direct references to Blyth.<sup>60</sup> They relate to Blyth's observations on birds and do not concern the 1835 and 1837 papers. There is also a reference by Darwin to the tailless cat of the Isle of Man and although Darwin did not mention Blyth specifically, he probably received this information by reading the 1835 paper. Darwin observed: "The case of the tail[less] cat of the Isle of Man mentioned in Loudon analogue of Bloodhound."<sup>61</sup> The excised pages confirm the view that Darwin relied heavily on Malthus in formulating the theory of natural selection, and they do not contain a greater number of references to Blyth than do the intact pages.<sup>62</sup>

56. Eiseley, "Darwin, Coleridge and the Theory of Unconscious Creation," p. 594. Unfortunately Gerald Henderson died on February 21, 1970, before he could publish his detailed findings.

57. "Darwin's Notebooks," part 2, p. 106 (Notebook II, p. 198).

58. Eiseley, "Darwin, Coleridge and the Theory of Unconscious Creation," p. 597.

59. "Darwin's Notebooks," part 6, p. 1.

60. *Ibid.*, pp. 137 and 153.

61. *Ibid.*, p. 136 (Notebook VI, p. 178).

62. The excised pages include the entry dated September 28, 1838, in which Darwin mentioned Malthus for the first time.



## CONCLUSION

It is not justifiable to accuse Darwin of conscious or unconscious plagiarism. This charge is contrary to the historical evidence and to the extensive information that we have about his character. When Darwin listed the writers on the origin of species by natural selection before himself, he did not mention Blyth, and this omission did not disturb the cordial relations between Darwin and Blyth. Blyth continued to supply Darwin with information which Darwin used in his later publications with due acknowledgment to Blyth. For example, in *The Descent of Man*, Darwin cited Blyth: "Mr. Blyth, as he informs me, saw Indian crows feeding two or three of their companions which were blind."<sup>63</sup> Blyth felt no resentment. If he did, he would have so informed Darwin. Blyth did not regard himself as in any sense a predecessor of Darwin and he certainly did not resent Darwin as a plagiarizer of himself. Moreover, Darwin went to a great deal of trouble to find his own predecessors and to give them proper credit.<sup>64</sup>

After Darwin had completed his work on natural selection, he wrote a letter to the Reverend Baden Powell in which he clearly showed recognition of the contribution of others to his own work:

No educated person, not even the most ignorant, could suppose I mean to arrogate to myself the origination of the doctrine that species had not been independently created. The only novelty in my work is the attempt to explain how species became modified, and to a certain extent how the theory of descent explains certain large classes of facts; and in these respects I received no assistance from my predecessors.<sup>65</sup>

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I am greatly indebted to Professor Edward Rosen of City College and

63. Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (New York: Appleton, 1898), p. 104.

64. Darwin listed his predecessors in the introduction of the second edition of the *Origin of Species* and all subsequent editions.

65. Sir Gavin de Beer, "Some Unpublished Letters of Charles Darwin," *Notes and Records of the Royal Society of London*, 14 (1959), 52-53.

JOEL S. SCHWARTZ

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