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"On the Origin of Species": An Unpublished Version

The uncompleted draft of the longer work establishes new facts about the evolution of Darwin's thought.

Robert C. Stauffer

Charles Darwin's "big book" on evolution and natural selection is still generally unknown, except for what Darwin called "my abstract"—*On the Origin of Species*—published just 100 years ago this November. The long manuscript on "Natural Selection" was already twice the length of the *Origin* and was more than two-thirds completed when Darwin's receipt of Wallace's letter outlining the same theory of evolution by natural selection interrupted Darwin's progress in writing and led to an entire change of plans for publication, involving both a reduced scale and a simplified, more popular treatment.

Writers have often indicated that the amount of writing Darwin had done on his theory before the appearance of Wallace's letter was negligible, although there is a whole chapter in Darwin's *Life and Letters* entitled "The unfinished book." It has even been suggested that, without the stimulus from Wallace, Darwin would have procrastinated indefinitely about developing in detail, and publishing, his views on evolution. This seems far from reasonable in the light of the surviving manuscripts. Although the organization of the *Origin of Species* as first published in 1859 shows improvement over the manuscript, which is only a first draft, the long manuscript version contains considerable unpublished illustrative material of great interest in so far as it enlarges our understanding of Darwin's thought. Most valuable of all for everyone interested in the history of scientific ideas is the wealth of source references in the abundant notes which Darwin was too rushed to include in the abstract published in 1859.

The fact that the manuscript has survived seems even less well known than that of its original existence, yet as *Nature* announced in the middle of World War II (*1*), it is part of the magnificent collection of Darwin's scientific papers given to the University Library, Cambridge, by the Darwin family and the Pilgrim Trust.

This long manuscript, which Darwin entitled "Natural Selection," turns out to be version 3 of Darwin's book on species. Before we examine this large-scale treatment of evolution, we might consider briefly Darwin's earlier notes and sketches on the subject. Darwin had already had extensive field experience and opportunity to study the problem of the nature of species and varieties during the voyage of the *Beagle*, in particular the fossils of the Argentine and the peculiar tortoises, finches, and mocking thrushes of the Galapagos Islands. When he had returned and was working on his collections, he recorded in his personal diary (of which there is a copy in the Darwin scientific papers at Cambridge): "In July [1837] opened first notebook on 'Transmutation of Species'—Had been greatly struck from about month of previous March on character of S. American fossils—& species on Galapagos Archipelago.—These facts origin (especially latter) of all my views." Fifteen months later Darwin conceived his theory of natural selection as a mechanism of evolution when his reading of Malthus' "Essay on Population" reminded him of Lyell's discussion of population pressure and the struggle for existence. Early in the summer of 1842 he wrote out, in pencil, a sketch of his species theory in 35 pages. This was version 1. Two years later he expanded this to a draft of 230 manuscript pages. This version 2 was completed by July 1844. (These two earliest versions were edited by Francis Darwin and published by the Cambridge University Press in 1909 as the *Foundations of the Origin of Species.*)

Fear of Premature Publication

By this time Darwin was so convinced of the importance of his theory that he wrote out instructions that in case of his premature death version 2 should be published, and he directed that £400 or £500 be used for this purpose. But 1844 was the year in which the provocative and debatable *Vestiges of Creation* was first published. This bold popular speculation on the theme of evolution, with its amateurish blemishes and occasional crude errors of scientific fact, aroused hostile criticism among most English natural scientists. Darwin took this as clear warning of the dangers that would attend any premature or incompletely substantiated presentation of his own theory of evolution. This must have reinforced the caution about speculation on evolution with which Darwin had already been indoctrinated through his study of Lyell's exhaustive criticisms of Lamarck in the *Principles*. Darwin was not afraid

The author is on the staff of the department of the history of science of the University of Wisconsin, Madison.

of speculation as such, and he remarked: "I am a firm believer that without speculation there is no good and original observation." (*2*), but he had every reason to wish for his theory the unprejudiced consideration which could only be won by abundant new evidence carefully presented. A man of private means, he could afford to bide his time until his reputation was established as an able naturalist and a competent taxonomist, and until his evidence had mounted to such overwhelming proportions that his theory could not be dismissed or ignored so easily as those of Lamarck and Chambers had been.

By the middle 1850's the time was ripe. Darwin had been awarded the Royal Society medal in 1853 when his reclassification of the barnacles began to be appreciated. He had been on the council of the Geological Society for a dozen years and on the council of the Royal Society for several years. His *Journal of Research* of the *Beagle* voyage had gone into a second popular edition. He had supervised the publication of the zoology of the *Beagle* voyage in five volumes and had published three volumes of his own on the geology of the voyage. He had mastered the obscure anatomy and had reorganized the classification of a whole complicated order of invertebrates, in four extensive monographs on the barnacles, both fossil and recent. Besides these eight books, he had published several dozen articles on geology and zoology in scientific journals. He had already done much to justify the prediction which the Cambridge geology professor, Adam Sedgwick, had made when Darwin was still in South America, that "if God spares his life he will have a great name among the naturalists of Europe" (*3*).

Preparation of the Manuscript

When his taxonomic work was completed, Darwin was ready to resume intensive work on the species problem. He had read "whole series of journals and transactions," gleaning facts and taking notes until, in the summer of 1854 when he was finishing his long study of the barnacles, he wrote that his notes on evolution were of such bulk that "I cannot possibly lay my hands on any reference" (*4*). And so, on 9 September, he recorded in his pocket diary: "Began sorting notes for my species theory." When visiting the Wedgwoods at Maer in Staffordshire, he made careful observations of the effects of planting larch and Scotch fir on the balance of vegetation on the heath and noted the accompanying changes in insect and bird populations. To become familiar with variation under domestication, he kept every breed of pigeon he could obtain, associated with several eminent fanciers, and joined two of the London pigeon clubs. He sent out questions in all directions to correspondents who might supply facts useful for his work. He discussed his views with close friends, like Lyell, who urged early in 1856 that Darwin consider himself ready to start writing. Beginning his draft in May 1856, he soon found himself working on a large scale, "yet it was only an abstract of the materials I had collected" (*5*). Thereafter, with almost every chapter, he recorded the dates of his progress in his pocket diary.

Darwin's prudence about premature publication did not stand in the way of his writing friends about his belief that "species are not immutable." He had written this as early as January 1844 to Joseph Dalton Hooker, the botanist, and he also shared his views with Leonard Jenyns (later Blomefield), Charles Lyell, and Asa Gray. In his letter of 1 May, 1857 to Alfred Russel Wallace (*6*), he mentioned that for 20 years he had been collecting material on how "species and varieties differ," and that he had already written "many chapters" of his book. Thus, Wallace had a general knowledge of Darwin's interest in the species question, and it was not mere chance that led him to send Darwin his sketch of his own theory of natural selection early in 1858.

With the unwanted interruption occasioned by the receipt of Wallace's paper, which seemed almost like a précis of his own views, Darwin soon felt obliged to set aside his work on version 3 in order to write an abstract of his long manuscript which could be published without long delay. The abstract, version 4, he completed in eight months, and it was published in late November 1859 as the first edition of *On the Origin of Species.*

Unfinished Version

But what had Darwin accomplished in version 3, the form in which he had planned to present his theory? He had written 125,000 to 130,000 words. He had completed 11 chapters, covering about 70 percent of the topics which were treated in the published book. The order of these chapters differs slightly from that of version 4. The first two chapters cover in detail "Variation under domestication." Chapter 3 is "on the possibility of all organic beings occasionally crossing and on the remarkable susceptibility of the reproductive system to external agencies." Chapter 4 is on variation under nature. Chapter 5 is on "the struggle for existence as bearing on natural selection." Chapter 6 is titled, "On natural selection"; chapter 7, "Laws of variation: Varieties and species compared"; chapter 8, "Difficulties in the theory of natural selection in relation to passages from form to form"; chapter 9, "Hybridism"; and chapter 10, "Mental powers and instincts of animals." Finally there is an unnumbered chapter on geographical distribution. Thus, for only four of the 14 chapters that later appeared in the published version were drafts lacking.

The manuscript for all but the first two chapters of version 3 survives. The manuscript for these was presumably used in the course of Darwin's writing of his later book on the same subject, his *Variation of Animals and Plants under Domestication,* published in January 1868. But Darwin wrote out a full table of contents for the ten numbered chapters of his manuscript, so we have a good idea of the topics covered in the missing portions.

Parts of the chapter on instinct from version 3 were published in two books by George J. Romanes, *Animal Intelligence* (London, 1882), and *Mental Evolution in Animals—With a Posthumous Essay on Instinct by Charles Darwin* (London, 1883). The rest of the manuscript deserves further study. Darwin's handwriting is so difficult to decipher that such a study can best be made after the manuscript has been copied in full. I have transcribed and edited chapter 5, on the struggle for existence, which I hope to publish soon, and am now working on the rest of the transcription.

Darwin and Linnaeus

Initially I was interested in the manuscript because of the new light it throws on the development of Darwin's ideas on ecology. The ecological problems of adaptation, and of the relations of plants and animals to each other and to their environment led Darwin to have a deep interest in the "economy of nature"

Darwin at the age of 40. From a charcoal drawing. [Courtesy of the Smithsonian Institution]

as the setting for the struggle for existence and for natural selection. Here the manuscript offers new illustrative details. Moreover, it makes clear the prime influence of Linnaean essays such as the "Oeconomy of Nature," the "Police of Nature," "On the Increase of the Habitable Earth," "The Flora of Insects," and the "Swedish Pan." Darwin studied all of these and more in English translations, dug out many useful facts and ideas, and cited them in the notes of his manuscript chapters.

Thus we are led to a paradox. The conventional view is that Darwin overthrew the work of Linnaeus in so far as he replaced the orthodox dogma of fixity of species by his theory of evolution. But in regard to Linnaeus' ecological concepts of an economy of nature, Darwin used these ideas as major explanations of the working of natural selection. So Linnaeus was of major assistance to Darwin in the latter's formulation of his theory of evolution.

In conclusion, what can be said about the implications of Darwin's "Natural Selection"? It is tempting to speculate as to the historical outcome if Darwin had been left undisturbed and free to publish his theory in the form he originally planned. It would have been a detailed two-volume work with full documentation, appealing to an audience of specialists but probably not to a wider public. It might even have been ignored by Bishop Wilberforce and by other hostile critics in some of the great literary review journals. *Darwinism* might have been less subject to misuse by would-be scientific supporters of laissez-faire economy and of imperialism. Darwin himself, instead of having to devote months to frequent revision and qualification of the *Origin of Species*, for five more editions, might have been free to develop more extensively the concept of the economy of nature as a background for the struggle for existence, and to carry out the plan mentioned in 1859 in the *Origin of Species* in regard to the latter subject: "In my future work this subject shall be treated as it well deserves, at much greater length." In the late 19th century there might have been less "Social Darwinism" and more ecology (*7*).

References and Notes

1. *Nature* **150**, 535 (1942).
2. C. Darwin, in a letter to Wallace, 22 Dec. 1857.
3. S. Butler, Ed., *The Life and Letters of Dr. Samuel Butler*, vol. 2, p. 144 [volume 11 of S. Butler, *Works*, H. F. Jones, Ed. (London, 1924)].
4. Letter to Hooker, July 1854 (letter No. 36 in *More Letters*).
5. C. Darwin, *Autobiography*, N. Barlow, Ed., (London, 1958), p. 121.
6. F. Darwin, Ed., *Life and Letters of Charles Darwin* (London, 1888), vol. 2, p. 95.

7. The research for this article was made possible by research leave and travel funds for 1957 granted by the Graduate School Research Committee of the University of Wisconsin and supplemented for 1958 by a travel grant from the American Philosophical Society. I wish to thank the Cambridge University library for granting me permission to have Charles Darwin's long manuscript version of the *Origin of Species* microfilmed, and H. R. Creswick, university librarian, and Mr. Gautrey of the Anderson Room for their hospitable assistance.

Darwin or Spencer?

Why has Darwin's reputation risen, while that of Herbert Spencer has declined?

George Kimball Plochmann

The writings of Herbert Spencer, formerly so influential, now line the back shelves of second-hand bookstores. Yet the chief books of Darwin are forever being republished and are so much read that their author's name is virtually a synonym among ordinary folk for "evolution," and among sophisticates for "natural selection." I am speaking, of course, about the way these men are received now, in the 20th century; in his own day, which was that of Darwin too, Spencer was regarded as a giant, and his *Principles of Biology* was adduced as one of the chief evidences for this high estimation. Of course this could not be on literary grounds; Spencer is no more a first-class stylist than Darwin, and it must have been content and general arrangement rather than any niceties of diction that kept readers faithful through his dozen volumes, so stuffy in their confidence, so heavy in their repetitions and summaries. But then, there is also *The Origin of Species*, winding in its periodic sentences, replete with modifiers, disclaimers, and exceptions.

Had Darwin and Spencer been more tendentious men, they would doubtless have become embroiled in Newton-Leibniz disputes regarding priorities; as it was, both writers were eminently fair and shared with each other and with Alfred Russel Wallace their findings, hypotheses, and honors. It would be difficult to establish the interlocking priorities here: Spencer's preliminary essays were published some time before *The Origin of Species*, yet the definitive statement of his biological views was printed a dozen or so years after (*1*). For this reason it should be the implications of the theories, rather than their order in time, that concern us here. And for all these reasons, it is not my intention to trace the course of biologic history in the past hundred years to account for the disproportion in the respective influences of these outwardly rather similar thinkers. Rather shall I suggest a number of methodological and conceptual reasons why one man has been in good part forgotten, the other raised to such an elevation.

Principles and Their Extension

Spencer's *Principles of Synthetic Philosophy* begins with a kind of metaphysic of nature, then passes through biological principles, psychological, sociological, and ethical. Within the volume *First Principles*, Spencer exhibits the applications of each principle, with a glance at convenient facts in each of the sciences he is later to develop at length, thereby clarifying but neither proving nor intending to prove his primary generalizations. The account in the *Principles of Biology* follows a

The author is on the staff of the department of philosophy of Southern Illinois University, Carbondale. This article is adapted from a paper presented before the section on "Darwin and Evolution" at the April 1959 meeting of the American Philosophical Association, Western Division, in Madison, Wis.