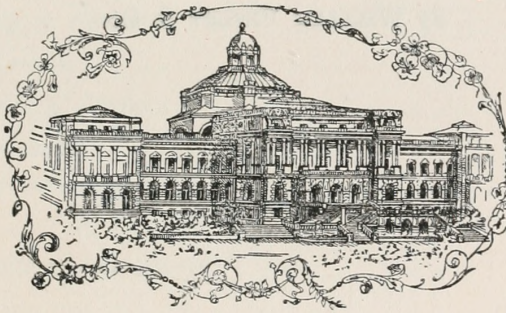


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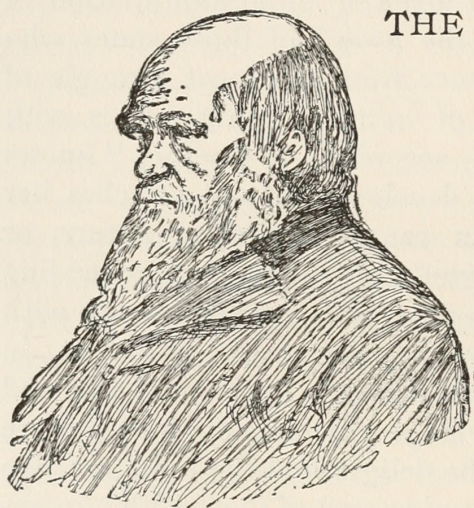
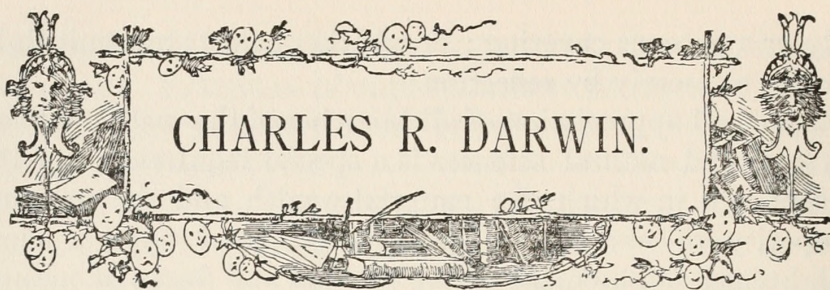
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THE century of unrest now nearing its end has witnessed many strange upheavals of supposedly established beliefs. Midway in its history there burst a sudden revolution in the hitherto placid realm of thought, the force of which has changed the very foundations of the old philosophies and is not yet spent. Though its advent seemed abrupt and its stroke swift, as in destructive cat-

astrophes, and consequently provoked the fiercest criticism and hostility, time has only changed antagonists into friendly helpmates in the unbiased search for truth. This is not meant to convey that Darwinism (using a convenient term) has outlived its critics. It has not even professed to explain the secrets of being; but when Darwin put forth in 1859 his work on the *Origin of Species* he proved to be a pioneer who had laboriously cleared a new track through the dark forest of the unknown, which now all scientists agree in adopting as the path that leads toward the light beyond.

Among all the illustrious scientists of our time, so fruitful of the genius of research, none rank greater in eminence than Darwin, and none, with the signal exception of his friend and co-worker Huxley, had so interesting a personality. Charles Robert Darwin was born at Shrewsbury on the 12th of February, 1809, the same year that gave to poetry Tennyson,

Elizabeth Barrett Browning, and Edgar Allan Poe; to statecraft, Abraham Lincoln, Gladstone, and Jules Favre; to literature and the healing art, Oliver Wendell Holmes. His grandfather, Erasmus Darwin, author of *Zoonomia* and *The Botanic Garden*, was an acute observer and philosopher, but was gifted with a poetic vein lacking in his more profound descendant. Born to a fortune, Darwin confesses that this fact took all interest out of his early studies, first for the medical profession and, later, for the Church. In his *Descent of Man* he insists on the advantage to the community at large of the inheritance of wealth, as enabling the most cultured class to develop trained minds for public service. "The presence of a body of well-instructed men, who have not to labor for their daily bread, is important to a degree that can hardly be over-estimated; as all high intellectual work is carried on by them, and on such work material progress of all kinds mainly depends—not to mention other and higher advantages." When the taste and the gift for scientific investigation developed in him, much to his own astonishment, he became perhaps the most notable example of his just quoted theory. This taste was awakened by intercourse with Professor Henslow, the botanist, when he was at Christ College, Cambridge. The only distinctive merit Darwin modestly claims for himself is, that he was a tireless observer of seemingly trivial facts, and a patient recorder of everything those facts, comprehensively considered, seemed to indicate. But for his ample means he could not have so laboriously accumulated the materials and experiments, nor have afforded the leisure to build up his book on Plant Fertilization during eleven years, nor that on Insectivorous Plants, which consumed sixteen years, nor the forty years of continuous experimentation upon a patch of ground, in which he qualified himself to discourse upon the habits and achievements of Earthworms.

He thought himself fortunate when, in his twenty-third year, he was allowed to accompany the Government surveying expedition, as naturalist, at his own charges, to Patagonia. His journals during five years' circumnavigation of the globe are still popular. They mark an epoch in the advance of

scientific knowledge. His health was permanently undermined by constant sea-sickness, and it is characteristic of the man that to his invalid condition, isolating him from temptations to social pleasures, he ascribes the merit of his lifework.

From his marriage in 1839, and removal to his country home three years later, he gave himself entirely to working out the theory which bears his name. His two books on *Coral Reefs* and *Volcanic Islands*, by their originality and soundness, had insured the more than respectful attention of the scientific world for whatever Darwin might utter, even if running counter to accepted doctrines. It was known that his pen would be kept well in hand, and that none but the sanest deductions would follow from masses of carefully gathered, skillfully assorted, and conscientiously weighed facts. Realizing this, Darwin had, for several years, been maturing his views upon the origin of species, loth to formulate them until fully assured of his strength to demonstrate his position in the completest way. "Early in 1856 (he says in his Autobiography) Sir Charles Lyell (the geologist) advised me to write out my views pretty fully, and I began to do so on a scale three or four times as extensive as that which was afterwards followed in my *Origin of Species*, yet it was only an abstract of the materials I had collected." But his original manuscript statement of his theory had been read and mutually discussed by Lyell and Sir Joseph Hooker, the botanist, as far back as 1844.

A singular thing happened. The eminent naturalist, Alfred Russel Wallace, Darwin's junior by thirteen years, had hit upon the same theory of Natural Selection, and submitted it in a manuscript form to Darwin for his judgment. The coincidence caused Darwin much pain, as, though he had been first in the field, Wallace's paper, soon to be printed, would give priority to him. Ultimately, and without a shadow of ill-feeling anywhere, their mutual friends presented a joint paper by the two authors to the Linnæan Society, and both were content. They remained close life-long friends and co-workers. Darwin's great book appeared in 1859. Its radical nature was quickly perceived, even by the non-scient-

tific public. With the impetuosity of incomplete knowledge many good men rushed into the unfamiliar arena, not so much to defend their inherited opinions as to demolish him who dared to bring them new light. The charge of atheism was easily, as of old, hurled at the teacher who unfolded more of the wonders of nature. Years pass, and this same teacher is found to merit the last honors of sepulture in Westminster Abbey amid the homage-yielding throng of illustrious men, poets and scholars, scientists and philosophers, clerics and the pious laity of all the churches.

The doctrine which will always be associated with Darwin's name cannot shortly be stated in his own words. It can be epitomized as an attempt to account for the diversities of life on our globe by assuming a continuous evolution from the lowest forms of life to the higher, without the intervention of any special creative act. This was not a new doctrine when Darwin took it up, but he made it his own by his novel grasp of principles and the thoroughness of his evidence. It declared for the derivative origin of all species, as against a separate creation. Under this law of evolution there is and has been everlastingly going on, in every particle of the surface of the earth, a struggle for existence among the forms of animal and vegetable organic life there existing. In this struggle the weaker succumb to the stronger, the stronger survive, mate with their equals and superiors, and multiply. According to conditions around them, these races vary and modify, these modifications increase, become distinct characteristics, and permanent. Thus we get the survival of the fittest, and by infinitely slow and ever-varying stages, we arrive at the superior species, of which man is the summit.

In 1871 Darwin carried his system further in the book on *The Descent of Man*. Defending his contention that man is but the outcome of a lower form of animal, his "reason" being much the same stuff as the "instinct" he condescendingly allows to his humbler kin, Darwin puts it that "the mental powers of man, though so different in degree to those of the higher animals, are yet the same in kind; while in the social instincts existing so strongly in many animals may be found the basis for the moral sense or

conscience of the human race. The following proposition seems to me in a high degree probable—namely, that any animal whatever, endowed with well-marked social instincts, would inevitably acquire a moral sense or conscience as soon as its intellectual powers had become as well-developed, or nearly as well-developed, as in man.”

The charm of simplicity, not merely of style, but of mind, the transparent honesty of a child uttering its very thought, marks everything that comes from Darwin's pen. He is read with equal delight by the learned and the unlearned, and his humility wins perfect confidence in his judgment. Darwin was the very last man to countenance the claims of Darwinism. His sole ambition was to gather, assort and offer suggestions upon hitherto neglected facts in nature, that others might supersede his generalizations by their own better insight or reasoning. This enviable simplicity of nature was the characteristic of his life as well as his writings. Haeckel, the eminent German biologist, describes his first visit to Darwin at home. He was welcomed on the doorstep by “the great naturalist himself, a tall and venerable figure, with the broad shoulders of an Atlas supporting a world of thoughts, his Jupiter-like head highly and broadly arched and deeply furrowed, his kindly, mild eyes looking forth under the shadow of prominent brows, his amiable mouth surrounded by a copious silver-white beard. The cordial, prepossessing expression of the whole face, the gentle, mild voice, the slow, deliberate utterance, the natural and naive train of ideas which marked his conversation, captivated my whole heart in the first hour of our meeting, just as his great work had formerly taken my whole understanding by storm. I fancied a lofty world-sage out of Hellenic antiquity, a Socrates or Aristotle, stood before me.” Darwin died on April 19, 1882, in the seventy-fourth year of his age.

THE ORIGIN OF SPECIES.

(Darwin's Account of his Discovery.)

From September, 1854, I devoted my whole time to arranging my huge pile of notes, to observing, and to experimenting in relation to the transmutation of species. During the voyage

of the "Beagle" I had been deeply impressed by discovering in the Pampean formation great fossil animals covered with armor like that on the existing armadillos; secondly, by the manner in which closely allied animals replace one another in proceeding southwards over the Continent; and, thirdly, by the South American character of most of the productions of the Galapagos archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of the islands appearing to be very ancient in a geological sense.

It was evident that such facts as these, as well as many others, could only be explained on the supposition that species gradually become modified; and the subject haunted me. But it was equally evident that neither the action of the surrounding conditions, nor the will of the organisms (especially in the case of plants) could account for the innumerable cases in which organisms of every kind are beautifully adapted to their habits of life—for instance, a woodpecker or a tree-frog to climb trees, or a seed for dispersal by hooks or plumes. I had always been much struck by such adaptations, and until these could be explained it seemed to me almost useless to endeavor to prove by indirect evidence that species have been modified.

After my return to England it appeared to me that by following the example of Lyell in *Geology*, and by collecting all facts which bore in any way on the variation of animals and plants under domestication and nature, some light might perhaps be thrown on the whole subject. My first note-book was opened in July, 1837. I worked on true Baconian principles, and without any theory collected facts on a wholesale scale, more especially with respect to domesticated productions, by printed inquiries, by conversation with skillful breeders and gardeners, and by extensive reading. When I see the list of books of all kinds which I read and abstracted, including whole series of Journals and Transactions, I am surprised at my industry. I soon perceived that selection was the keystone of man's success in making useful races of animals and plants. But how selection could be applied to organisms living in a state of nature remained for some time a mystery to me.

In October, 1838, that is, fifteen months after I had begun

my systematic inquiry, 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 favorable variations would tend to be preserved, and unfavorable ones to be destroyed. The result of this would be the formation of new species. Here then I had at last got a theory by which to work; but I was so anxious to avoid prejudice that I determined not for some time to write even the briefest sketch of it. In June, 1842, I first allowed myself the satisfaction of writing a very brief abstract of my theory in pencil in 35 pages; and this was enlarged during the summer of 1844 into one of 230 pages, which I had fairly copied out and still possess.

But at that time I overlooked one problem of great importance; and it is astonishing to me, except on the principle of Columbus and his egg, how I could have overlooked it and its solution. This problem is the tendency in organic beings descended from the same stock to diverge in character as they become modified. That they have diverged greatly is obvious from the manner in which species of all kinds can be classed under genera, genera under families, families under sub-orders, and so forth; and I can remember the very spot in the road, whilst in my carriage, when to my joy the solution occurred to me; and this was long after I had come to Down. The solution, as I believe, is that the modified offspring of all dominant and increasing forms tend to become adapted to many and highly diversified places in the economy of nature.

Early in 1856 Lyell advised me to write out my views pretty fully, and I began at once to do so on a scale three or four times as extensive as that which was afterwards followed in my "Origin of Species;" yet it was only an abstract of the materials which I had collected, and I got through about half the work on this scale. But my plans were overthrown, for early in the summer of 1858 Mr. Alfred Russel Wallace, who was then in the Malay archipelago, sent me an essay "On the Tendency of Varieties to depart indefinitely from the Original Type;" and this essay contained exactly the same

theory as mine. Mr. Wallace expressed the wish that if I thought well of his essay, I should send it to Lyell for perusal.

The circumstances under which I consented at the request of Lyell and Hooker to allow of an abstract from my MS., together with a letter to Asa Gray, dated September 5, 1857, to be published at the same time with Wallace's Essay, are given in the "Journal of the Proceedings of the Linnean Society," 1858, p. 45. I was at first very unwilling to consent, as I thought Mr. Wallace might consider my doing so unjustifiable, for I did not then know how generous and noble was his disposition. The extract from my MS. and the letter to Asa Gray had neither been intended for publication, and were badly written. Mr. Wallace's essay, on the other hand, was admirably expressed and quite clear. Nevertheless, our joint productions excited very little attention, and the only published notice of them which I can remember was by Professor Haughton, of Dublin, whose verdict was that all that was new in them was false, and what was true was old. This shows how necessary it is that any new view should be explained at considerable length in order to arouse public attention.

In September, 1858, I set to work by the strong advice of Lyell and Hooker to prepare a volume on the transmutation of species, but was often interrupted by ill-health, and short visits to Dr. Lane's delightful hydropathic establishment at Moor Park. I abstracted the MS. begun on a much larger scale in 1856, and completed the volume on the same reduced scale. It cost me thirteen months and ten days' hard labor. It was published under the title of the "Origin of Species," in November, 1859. Though considerably added to and corrected in the later editions, it has remained substantially the same book.

It is no doubt the chief work of my life. It was from the first highly successful. The first small edition of 1,250 copies was sold on the day of publication, and a second edition of 3,000 copies soon afterwards. Sixteen thousand copies have now (1876) been sold in England; and considering how stiff a book it is, this is a large sale. It has been translated into almost every European tongue, even into such languages as Spanish, Bohemian, Polish and Russian. Even an essay in

Hebrew has appeared on it, showing that the theory is contained in the Old Testament! The reviews were very numerous; for some time I collected all that appeared on the "Origin" and on my related books, and these amount (excluding newspaper reviews) to 265; but after a time I gave up the attempt in despair. Many separate essays and books on the subject have appeared; and in Germany a catalogue or bibliography on "Darwinismus" has appeared every year or two.

I have almost always been treated honestly by my reviewers, passing over those without scientific knowledge as not worthy of notice. My views have often been grossly misrepresented, bitterly opposed and ridiculed, but this has been generally done, as I believe, in good faith. On the whole I do not doubt that my works have been over and over again greatly over-praised. I rejoice that I have avoided controversies, and this I owe to Lyell, who many years ago, in reference to my geological works, strongly advised me never to get entangled in a controversy, as it rarely did any good and caused a miserable loss of time and temper.

Whenever I have found out that I have blundered, or that my work has been imperfect, and when I have been contemptuously criticised, and even when I have been over-praised, so that I have felt mortified, it has been my greatest comfort to say hundreds of times to myself that "I have worked as hard and as well as I could, and no man can do more than this." I remember when in Good Success Bay, in Tierra del Fuego, thinking (and, I believe, that I wrote home to the effect) that I could not employ my life better than in adding a little to Natural Science. This I have done to the best of my abilities, and critics may say what they like, but they cannot destroy this conviction.—C. R. DARWIN.

