FIRST LECTURE

CHARLES DARWIN

"Let him, therefore, who would arrive at a knowledge of nature, train his moral sense; let him act and conceive in accordance with the noble essence of his soul; and, as if of herself, nature will become open to him. Moral action is the great and only experiment in which all riddles of the most manifold appearance explain themselves."

NOVALIS.

DARWIN AND OTHER ENGLISH THINKERS

I

CHARLES DARWIN

THE year 1809 was the *annus mirabilis* of the nineteenth century for both Europe and America. It witnessed the advent of Lincoln, Wendell Holmes, and Poe on this continent; on the other, of Gladstone, Tennyson, FitzGerald, Chopin, and Mendelssohn. Last, but not least, Charles Darwin was born in the ancient and historic town of Shrewsbury, England, on February the 12th of that remarkable year. The visitor to his birthplace cannot fail to be struck by the configuration of the town, standing as it does on the crest of a bold eminence encircled by the River Severn, and commanding a wide and varied view of the surrounding country. It is a quaint and beautiful borough, with winding lanes and narrow streets, cloistered retreats, half-timbered and Jacobean houses, and stately churches which cherish with a proud regret the days that are no more. In the seventeenth and eighteenth centuries "to go to town" meant for the gentry of the Midland shires to go to Shrewsbury. Its civic importance is still considerable, and the remains of the Castle with the venerable

and flourishing Grammar School are links between the past and the present.

Dr. Robert Waring Darwin, the father of Charles, was the leading physician of the community; a man of stalwart physique, noted for his professional skill and practical sagacity, and esteemed by rich and poor alike for the wisdom of his counsel and the helpfulness of his disposition. His father, Erasmus Darwin, grandfather to Charles, was also a physician, well known as the author of *Zoönomia, or The Laws of Organic Life* (1794), a minor attempt to follow the lead of Lucretius in his *De Natura Rerum.* The production was marked by excessive generalization and a tendency to indulge too freely in theoretical speculation. These features found a robust but more restrained expression in the works of his grandson. Darwin's mother was a daughter of Josiah Wedgwood, whose artistic achievements in pottery rank with those of Palissy. His maternal grandmother was one of a remarkable bevy of sisters — the Allens of Cresselly — of whom two married Wedgwoods; one, Sir James Mackintosh the philosopher; and another, Sismondi the historian. Darwin's aptitude for reflection, his patient fidelity, his absence of self-assertion, his magnanimity and sweetness of disposition, were in large measure inherited from his mother.

The Darwin home, known as "The Mount," was built by his father in 1800, and stands on

the high ground overlooking the town. It is a plain substantial mansion with terraced walks on the western front descending to the river. From its elevated position there is an unequaled prospect of the scene of the Battle of Shrewsbury, fought in 1403, and the dim blue hills of Wales beyond. In the distance are the gray, crumbling walls of Haughmond Abbey; and behind them the woods of Attingham, skirting the landscape with stretches of somber green. The Severn turns abruptly toward the south, and flows through one of the loveliest valleys of England, past the castellated rocks of Bridgnorth and the cathedral cities of Worcester and Gloucester, until it meets the tidal waters of the Bristol Channel. From below the house ascend the hoarse murmurs of the traffic of the town, the hum of busy marketers, and the chiming of bells from many steeples.

When a child, Darwin was taken by his mother to the Unitarian chapel where Samuel Taylor Coleridge once held forth with Hazlitt as one of his hearers. From 1818 to 1825 he was a scholar of the Grammar School, a royal foundation of King Edward VI. He would frequently run the mile or more between his home and the school, praying Heaven's aid that he might arrive punctually. Possibly he stayed too long in the amateur laboratory he and his brother had fitted up in the garden tool-house, or tarried over his growing col-

lections, which at first included seals and foreign coins, stones and minerals, and later beetles and other insects. When he was ten, he studied the pebbles in front of the hall door, and wondered how a glacial boulder of local fame had been deposited in a place near at hand. It is easy to understand how the narrow and pedantic system of education which then prevailed in English secondary schools repelled this shy and retiring lad of opposite tastes and predilections. The severely classical atmosphere was so uncongenial to his desire for natural pursuits that he was provoked into rebellion. Dr. Butler, then head master, and later bishop of Lichfield, referred to young Darwin in the most unappreciative terms, because he preferred to dabble in chemical experiments rather than conjugate Latin verbs and memorize Greek paradigms. One picture of his schooldays shows him curled up in an embrasured window of the Elizabethan building, reading Shakespeare by the hour. "Nothing," he confessed in later years, "could have been worse for the development of my mind than Dr. Butler's school, as it was strictly classical, nothing else being taught except a little ancient geography and history. The school as a means of education to me was simply a blank." [1]

As he approached his majority he evinced a liking for field sports which unnecessarily dis-

[1] Darwin's *Life and Letters* (N. Y., 1893), Vol. I, p. 28.

turbed his father; for after all it was at bottom a nature interest, just as were his long walks in the rural lanes of the vicinity. These were intercepted by his enrolment at Edinburgh University to prepare himself for the family vocation of physician and surgeon. Here he remained two years. Among his fellow students were his elder brother, Erasmus, and his friend Robert Grant, afterward professor of zoology in University College, London. He again followed his own course. Most of the lectures were to him "intolerably dull," — even geology, the science to which in after life he was deeply attached, was viewed with violent aversion. Indeed, he vowed that never again would he read a book on the subject. Biological research chiefly occupied his attention, and it became increasingly evident that he had no liking for his father's intentions. Realizing this, the good Doctor made the ill-starred suggestion that he should enter Cambridge and qualify for Holy Orders. The project was entered upon; but as theology was more repugnant to him than medicine or the classics, it speedily came to grief. Nevertheless his residence at Cambridge, though brief, secured for him the friendship of men of mark whose recognition encouraged him to have confidence in himself, and whose kindly sympathies stimulated his enthusiasm for the study of the general order of nature. Among these

were Professor Henslow (the first man to take the measure of Darwin's great possibilities), Dr. William Whewell, Professor Ramsay, and his uncle Sir James Mackintosh. Darwin was known among the undergraduates as "the man who walks with Henslow."[1] From this unusual circle of social and learned intercourse accrued the main benefits of his Cambridge period. Not that he shirked other work; he was tenth in the list of candidates of 1831 for the degree of Bachelor of Arts, he studied and enjoyed the arguments of Paley, and was fairly proficient in mathematics, while even in the despised classics he obtained tolerably good results. If Darwin's education did not give him a full mind, it certainly gave him an eagerness for unraveling complex subjects and the power of reasoning out his own conclusions. His scientific proclivities were accentuated by reading Baron Humboldt's *Personal Narrative* and Herschel's *Introduction to the Study of Philosophy*. These volumes stirred in him the ambition to add "even the most humble contribution to the noble structure of natural science."[2] He was introduced to the eloquent and influential Sedgwick, who persuaded him to revoke his hasty decision respecting the study of geology. Ultimately it became apparent that he was not entirely satisfied with the orthodox view of the earth's formation, and he did not

[1] Darwin's *Life and Letters*, p. 44. [2] *Ibid.*, p. 47.

hesitate to oppose some conclusions Sedgwick entertained. Their tour in North Wales for the purpose of examining certain strata led to an amiable but decided difference of opinion as to the validity of the current method of geological interpretation. At the conclusion of their investigation he found awaiting him an offer to join the *Beagle*, due to the friendly interest of Henslow, and which combined recreation with suitable work. From the moment he accepted it, his personal achievements became a necessary and important part of the history of mankind.

II

The voyage of the *Beagle*, now a familiar story, was by far the most important event in Darwin's career. It set the seal upon the nature of his life-work, and molded his mental gifts for the onerous tasks that awaited them. The first genuine discipline of his mind was due to his enforced solitude and detachment on board ship, necessitating steady industry and concentrated attention — habits which, though tardily acquired, served him well and made possible the marvelous results he afterward obtained. On his return home his father viewed with astonishment the changes wrought in him, and excitedly exclaimed, "Even the shape of his head has altered!"

The official record of the cruise, entitled *The Journal of a Naturalist's Voyage Round*

the World, appeared in 1839, and was respectfully dedicated to Sir Charles Lyell. Darwin was always conscious of his indebtedness to this distinguished thinker, and throughout their long and intimate intercourse he subscribed himself as Lyell's "affectionate pupil." "I always feel as if my books came half out of Lyell's brain," he says, "and that I never acknowledge this sufficiently."[1] Henslow had placed a copy of the first volume of Lyell's *Principles of Geology* in Darwin's hands when he embarked on the *Beagle*, with the warning that, while he should by all means read it, he should pay no attention to its wild theories and conclusions. The young naturalist, however, was rapidly becoming a self-reliant student, and now and afterward Lyell's works and their far-reaching implications altered the whole tone of his thinking. They so strongly influenced his own conclusions that but for their inspiration the *Origin of Species* might never have been written. In 1845 he again addressed himself in a letter to his master, "I have long wished, not so much for your sake as for my own feelings of honesty, to acknowledge more plainly than by mere reference how much, geologically, I owe you. Those authors, however, who, like you, educate people's minds as well as teach them special facts, can never, I should think, have full justice done them except by

[1] *More Letters of Darwin*, p. 117.

posterity; for the mind thus insensibly improved hardly perceives its own upward ascent." The *Journal* met with high consideration from the first; men of learning, in both Europe and America, accorded it their hearty praise as a unique record of travel and research. The *Quarterly Review*,[1] the magazine of scientific progress, dealt at length with its observations and declared they contained valuable material for constructive thought. The style was simple, yet vivid; the descriptions were those of a devotee who scrutinized every curious phenomenon; the facts, many being entirely new, were all carefully detailed. While possessing the romantic interest attached to an excursion in hitherto unknown fields, the volume has been conspicuous for its impressiveness and intellectual integrity.

Darwin did not, as many have supposed, discover the doctrine of evolution. Nor was he by any means the first exponent of the origin of species, or of the notion that species became changed in the course of time. The conception of biological development prevailed long before his day. It was known to the classical writers, and persisted more or less throughout the periods following on the progress of Humanism and the Revival of Learning. Among moderns, Goethe, De Candolle the Elder, Lamarck, Buffon, and Chambers had foreshadowed some of the conceptions that Darwin's discoveries

[1] Vol. LXV, p. 224.

afterward placed on a sound basis. An eminent authority, Professor Judd, relates an amusing conversation he had with Matthew Arnold in 1871. "I cannot understand," said Arnold, "why you scientific people make such a fuss about Darwin. It's all in Lucretius." To which Judd replied, "Yes, Lucretius guessed what Darwin proved." Whereupon Arnold rejoined, "Ah! that only shows how much greater Lucretius really was, for he divined a truth which Darwin spent a life of labor in groping for." [1] The author of *Culture and Anarchy* underestimated the real worth of Darwin, not only in placing a poet's intuition over against a scientist's discovery, but in failing to appreciate the herculean toil of more than thirty years devoted to the application and illustration of a thesis which many had surmised yet could not demonstrate.

Previous to his time there had been constant discussions among men of science as to the possibility of substantiating the prevailing views regarding the immutability of species. Students were tempted to exclaim concerning Mosaists and evolutionists, "A plague on both your houses!" Debates were endless and fruitless; the theological thought of the day, which was also the thought of many scientists, stood directly in the path of investigation. Geological formations were attributed

[1] *Coming of Evolution*, pp. 3–4.

to a series of cataclysms of which the Deluge was the last and most important. With each of these catastrophes all living creation was completely destroyed and the planet retenanted by an act of special and direct creation. This position was meant to conform with the biblical narratives, and seemed to clinch the claim for their divine inspiration. The fatal objection, however, was the lack of uniformity and continuity, which unprejudiced men felt were essential to any true interpretation of the natural order. Violent interferences and new creative acts were, in their opinion, poor substitutes for the reign of law, and there was a growing tendency among the "Uniformitarians," as they were called, to seek the method of divine operation in something more stable and capable of rational explanation. But the absence of a determinative principle dealing with the evidence on the crucial point bewildered these advocates. They were silenced in the presence of a mystery which both attracted and repelled them.

Darwin's attempt at solution was not a conscious effort. When he excavated the fossil remains of animals from the South American pampas, he saw how closely they resembled their living progenies around him, and grave doubts touching the accuracy of the catastrophic theory flitted through his mind. The same striking correspondences existed else-

where, and he began to grope for an adequate explanation of these strange analogies. While on the *Beagle* the task of collecting and describing specimens consumed his time and prevented his theorizings from reaching maturity. After his return home he spent some years in arranging these facts according to the best known systems of classification. Even when this was done he hesitated long before arriving at the most tentative conclusions. Yet the saliency of his ordered materials was such that he began to drift from the moorings of traditional opinion. In this dissatisfied state of mind he chanced to read for relaxation Malthus's *Essay on the Principle of Population.* The immense struggle for existence with which it deals had already painfully impressed Darwin. Malthus's main argument was that nature has self-restraint, and when life increases beyond the proper means of subsistence competition ensues, the weak go to the wall, and the strong are established. It instantly occurred to Darwin that a similar principle operated in the organic world, resulting in the formation of new species, and these preventive checks would also account for the destruction of unfavorable variations. In this association between the struggle waged by individual types and the succession and disappearance of species, we have the key to Darwin's interpretation of evolution. The germinal idea of his theory flashed upon him

with the suddenness of intuition. Plato's plea that such intuition is the highest form of reasoning — and such it is since it depends on previous and thorough preparation — has seldom received better support.

Always cautious and critical, Darwin was still anxious to avoid precipitate action. He did not commit his theory to writing until 1842, when he prepared a brief abstract of thirty-five pages, which he expanded during the summer of 1844 to two hundred and thirty pages, and finally published in 1859, after an interval of seventeen years. He was repeatedly admonished by his brother Erasmus, Sir Charles Lyell, and others, that some one would forestall him; but he persevered in his reticence, until their fears were realized. Mr. Alfred Russel Wallace, a young traveler and naturalist, sent him an essay on *The Tendency of Varieties to Depart Indefinitely from the Original Type*, which Darwin saw at a glance contained the gist of his own theory. In the spring of 1858 Wallace lay sick with fever at Ternate in the island of Celebes. In lucid intervals his thoughts recurred to the ever-present problem of species; and the writings of Malthus, which he had read twelve years before, suggested to him, as they had to Darwin, the theory of natural selection. As soon as he was able, he sketched an outline and forwarded it to Darwin by the next mail. It was a singularly clear and comprehensive

presentment of the hypothesis now known to both, and he accompanied it with the unwittingly naive suggestion that he believed it to be entirely original. Darwin was struck as with "a bolt from the blue." Distracted by domestic affliction, and himself a sufferer from precarious health, he wrote at once to his confidant, Sir Charles Lyell, enclosing Wallace's document with the comment, "I never saw a more striking coincidence; if Wallace had had my manuscript written out in 1842 he could not have made a better short abstract. . . . So all my originality, whatever it may amount to, will be smashed, though my book, if it ever have any value, will not be deteriorated, as all the labor consists in the application of the theory."[1]

Grave issues were at stake. The merit of enunciating an illuminating principle was about to be assigned. Any personal bickerings regarding priority might have engendered animosity such as that which, in 1846, threatened to arise between Adams and Leverrier with reference to the discovery of Neptune. Wallace had anticipated Darwin in writing, as Darwin had anticipated Wallace in conceiving and amplifying the main features of the principle. This was an unfortunate complication which had in it the seeds of acrimony. But it was handled with mutual forbearance and consummate justice. There has never been a more chivalrous rivalry

[1] Darwin's *Life and Letters* (N. Y., 1893), Vol. I, p. 473.

than this which arose so inadvertently for Wallace, so unexpectedly for Darwin. The conduct of the interested parties was unimpeachable, and reflected credit on them and their supporters. Their papers were read together at a special meeting of the Linnæan Society on July 1, 1858. The absent Wallace entirely acquiesced in the decision of the council, which awarded the precedence to Darwin. As proof of this, his letter to Mr. George Silk may be quoted: "I have read the *Origin of Species* through five or six times, each time with increasing admiration. It will live as long as the *Principia* of Newton. Mr. Darwin has given the world a new science, and his name should in my opinion stand above that of every philosopher of ancient or modern times." [1] Fifty years later he reiterated his earlier praise in a memorial address he delivered on July 1, 1908, and protested against the honor which he believed had been too freely accorded to him. "*I* was then (as often since) 'the young man in a hurry'; *he*, the painstaking and patient student, seeking ever the full demonstration of the truth he had discovered, rather than to achieve immediate personal fame. . . . It was really a singular piece of good luck that gave me any share whatever . . . [or] allowed me to come in, as a very bad second, in the truly Olympian race in which all philosophical biol-

[1] Wallace's *My Life*, Vol. I, p. 372.

ogists were more or less actively engaged." [1] The force of admiration cannot go farther. Whatever doubts may exist as to the justice of the estimate — and Wallace would appear to depreciate unduly his own share in the achievement — there can be none as to its generosity. No nobler example of self-abnegation adorns the history of science or philosophy.

III

While it is impossible within the limits of a single lecture to give an extended exposition of the Darwinian theory, its main outline, and the revolution it wrought in the scientific world, can be briefly stated. Huxley's incisive putting of the evolutionary thesis has no superior for completeness and lucidity. "All species have been produced by the development of varieties from common stocks; by the conversion of these, first into permanent races and then into new species, by the process of *natural selection*, which process is essentially identical with that artificial selection by which man has originated the races of domestic animals — the *struggle for existence* taking the place of man, and exerting, in the case of natural selection, that selective action which he performs in artificial selection." [2]

This theory involved an amazing transition,

[1] *Fifty Years of Darwinism*, pp. 19–20.
[2] Huxley's *Collected Essays: Darwiniana*, p. 71.

which was indicated both by Darwin's solemn declaration concerning it and the controversies it aroused. He had been at infinite pains, by repeated tests and experiments, to verify every conclusion he advanced. He admitted that much was obscure and would long remain obscure, but his statement on the issue was couched in terms that preclude any misgiving as to the depth and sincerity of his conviction. "I can entertain no doubt, after the most deliberate and dispassionate judgment of which I am capable, that the view which most naturalists until recently entertained, and which I formerly entertained — namely, that each species has been independently created — is erroneous. I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, I am convinced that natural selection has been the most important, but not the exclusive, means of modification." [1]

Darwin held that in nature there was an inherent and self-acting power which produced the absence of trees in Southern Continental America, the adaptation of animals to their environment, and also that of the smaller species

[1] Introduction to *Origin of Species* (London, 1902), p. 6.

abounding in the regions formerly occupied by their huge and extinct ancestors. Thus he accounted for differences in breed, and the coming in of the new and the going out of the old types, which had hitherto been the insoluble problems of animate creation. The central idea of the *Origin of Species* is that every form of organic life, high and low, is derived from a very small number of original forms. Every variety of vegetable and animal organism, now extant, or having formerly existed, owes its origin to the slow and gradual operation of the modifying influences of local and special causes transmitted by heredity. Whatever forms were best suited to any particular time and locality were selected and adapted by the working of natural laws. Many illustrations of the working of these laws are to be found in Darwin's pages. His patience and care in arranging and explaining with exactitude a multitude of facts, his candor in modifying and retracting hasty or incorrect inferences, his unfailing intellectual poise when surrounded by difficulties, were marks in him of the true scientific spirit, "the spirit in which to acquire lessons from nature, whether in the world of mind or in the world of matter." [1]

The reception which Darwin's first volume received from the scientific community has been mentioned. It is now in place to speak

[1] Cf. John Fiske's *Darwinism and Other Essays, p. 35.*

in some detail of the hostility it excited, how this arose, and what it contained. The prevalent views of creation were based either on Moses or on Milton. If an orthodox naturalist of the pre-Darwinian epoch had been required to give a satisfactory account of the immense number of varieties of organic life, probably he would have taken refuge in the doctrine of immediate creation as authorized by the common interpretation of the Book of Genesis. Even those who admitted evolution as a possible alternative, as did the Huttonian School, were completely in the dark concerning the *modus operandi.* The intelligent people who were not scientists had no concern with these difficulties. They did not even know of their existence. For them the conceptions of the past ages as embodied in Milton's poetry were all-sufficient, and the adaptation of the creation epic in *Paradise Lost* gave permanence and dignity to the "revealed" truth of Hebrew tradition. Curiously enough this was the only poetry Darwin read while on the *Beagle.* At the moment when he first questioned the doctrine of direct creation, the familiar lines in which it is so tersely described were before his eye:

> "The earth obey'd, and straight
> Op'ning her fertile womb teem'd at a birth
> Innumerous living creatures, perfect forms,
> Limb'd and full grown. Out of the ground up rose
> As from his lair the wild beast, where he wonns

In forest wild, in thicket, brake, or den;
Among the trees in pairs they rose, they walk'd;
The cattle in the fields and meadows green:
Those rare and solitary, these in flocks
Pasturing at once, and in broad herds upsprung.
The grassy clods now calved; now half appear'd
The tawny lion, pawing to get free
His hinder parts, then springs as broke from bonds,
And rampant shakes his brinded mane." [1]

An indication of the hold this glowing imagery had on the imagination of all classes is found in the preference of Professor Agassiz, the foremost American scientist of his day, for Milton's presentation over Darwin's theory, and his assertion that not only was each species specially created, but created in the proportions and the locality in which it was found to exist. Old controversies were renewed and new ones generated around these opposing theories. The significance of Darwin's contribution aroused a regrettable acerbity. The insularity of English life had conserved its prejudices, and these in turn gave birth to some pronounced tendencies in radical directions. The reactionaries practically controlled science and theology; anything that savored of liberalism was strongly denounced, and its manifestoes were either repudiated or treated with ridicule and misrepresentation. The Universities were under the sway of the Anglican Church, which was then well on into the first phase of the

[1] Milton's *Paradise Lost*, Book VII, lines 453–466.

Oxford Movement; scientific professorships were held by clergymen, and Cuvier's theories of "world catastrophes" and the immutability of species were cordially received because they afforded a supposedly scientific basis for the Mosaic account of the Flood. Dr. Buckland, a prominent and energetic scientist of the clerical order, uncompromisingly asserted that all scientific teaching must be forever subordinated to the cosmogony of Genesis.

In the heat of fervid disputation men forgot that Darwin was a specialist in his own department of science; they ignored the expert skill and tempered judgment of his discussion; and they did not allow for his own admission that many things would long remain obscure. His assumptions were as well known to him as they were to his critics. He was fully aware that he began with them and depended on them. If he were allowed to premise a world and in it a first or a few created forms, in a suitable environment, and with certain capacities, he would show how that world was tenanted with living beings. These were tremendous assumptions, and his deductions from them aroused a storm which at one time rose so high that it seemed as though his voice would be lost in the clamor and he would not obtain a hearing. The opposition was purer in motive than in practise. Many scientists and theologians were chiefly anxious to conserve

the spiritual principles which for them were inextricably woven into the dogma of direct creation. Natural Selection appalled them as a dangerous novelty which threatened to substitute mere physical force for the operative and beneficent wisdom of God. Sentiment lent its powerful aid to their forebodings. It was exceedingly hard for them to throw away the old wine-skins, and the strength of their religious convictions was against such a stroke of temerity.

Nor can it be said that their protestations were groundless. Questions that demanded the most careful handling suffered from the recklessness of those materialistic evolutionists who entered into the new teaching with such ardor that they overran all boundaries. Haeckel, Büchner, and Clodd were the prominent representatives of this school. They were unwilling to admit that evolution could be thwarted by ultimate origins; it was so absolute that if it did not account for everything it accounted for nothing. Granted "a fortuitous concourse of atoms" as a beginning, the theory needed no assistance and left no gaps between those atoms and man himself. The idea of a directing Creator was a figment of the brain, and matter in motion the all in all. This unwarranted extension of Darwinism was really a decaying philosophy which used the evolution theory as a mold in which to recast its worn-out

conceptions. Darwin lent no direct encouragement to such spurious notions, and it would be unjust to charge their raw rationalizing and philosophical improprieties against him. Every notable man has to run the risk incurred by the vagaries of his disciples, and to them must be assigned much of the persistency of the later opposition to Darwin's theory. Materialistic evolutionists felt confident that by reducing everything to their mechanical system they could eventually conduct the Deity to the verge, and, in the language of Comte, "bow Him out with thanks for His provisional services."

Another source of confusion was that which arose out of the use of terms, a confusion frequently more mischievous than actual error. The controversialists failed to remember that terms like "force" and "cause" were employed metaphorically and not metaphysically — that is to say, with no direct reference to ultimate origins. All truth is relative, and so vital a theory as evolution was found to have many far-reaching consequences; but specifically considered, it is no more than a description of the Creator's methods of creation. "Material phenomena, so called, are not material at all; they are the expressions for complicated psychical states." Extremists on both sides neglected these important qualifications, while some were malicious and kindled their fires not so much for the radiance as for the smoke they would diffuse.

It is unnecessary to dwell at length upon Nietzsche's doctrine of the Superman — a wild and atrocious alienation of the Darwinian hypothesis which subverts the moral order — for we do not achieve true moral progress by surrendering to a struggle for existence, but by combating and finally abolishing it. Nietzsche was a severe critic of Darwin, and he argued against him on behalf of "an inner creative will in living organisms which ultimately makes environment and natural conditions subservient and subject." [1] In this sense the German philosopher is on "the side of the angels"; but his bitter attack on Christian morality, and his anxiety to produce a society by means of an unregulated struggle for power in which might is the only right, constituted him a prophet who was born thousands of years behind his time. His favorite conception of life, in *Beyond Good and Evil* (p. 226), is really a plea for rampant cruelty, and his favorite moral conception is that of a filibuster.

In the theological realm writers emphasized the miraculous interferences manifested in direct creation, and clung tenaciously to the doctrine of the immutability of species. A universe produced and maintained by natural laws was for them hard of belief. Guidance and purpose seemed to have disappeared from the creative scheme. The Hebrew Scriptures

[1] A. M. Ludovici's, *Nietzsche, His Life and Works*, pp. 69–70.

fostered credence in a special creative providence, and Christian people generally were wont to regard unusual expressions of divine power as alone worthy of God. If no such interruptions occurred, they hastily assumed that the scheme must be self-originating, self-sustained, and moving blindly to no end. But to presume that whatever happens in natural order is to no purpose is not reasonable. It has been pertinently observed that "if an event represents a divine purpose, it is as truly purposeful when realized through natural means as it would be if produced by fiat."[1] To say God created everything, and to leave the matter there, counts for nothing, save as evidence of a desire to deprecate inquiry and fortify tradition in a monastic seclusion of the mind. Intellectual peace purchased at the price of strangled thought is a delusion and a snare. No one can for long escape the vibrant movements of the times by refusing to deal with the inevitable results of advancing knowledge. If he can, and if he does, it is only the postponement of a battle which becomes the more disastrous for him the longer it is delayed. The sole function of science is to address itself to the questions springing out of the manifold activities of the visible universe; and if, in its attempts to answer these, there is a breach of intellectual harmony, it can be healed only

[1] B. P. Bowne's *Immanence of God*, Chap. I, p. 13.

by a steady conformity to the authority of truth, and an unwavering faith in its ultimate right to prevail. Nor should it be forgotten that evolution, natural selection, and kindred terms describe a process for which they do not and cannot account. As a mode of operation that process is the best yet disclosed; but as a doctrine of mechanical causality it is altogether impossible.

The late Professor Borden P. Bowne confronted the issue in a manner at once courageous and scholarly. From the first, he took the position that evolution as a theory of causes is worthless, as a theory of the order of progress it is harmless. He had profound respect for Darwin as a scientist, but he carefully distinguished between the description and formulation which science gives and the causal and purposive interpretation which philosophy and theology seek. When this distinction is observed — and it is the distinction between a process on the one hand and its origin and aim on the other — confusion ceases to exist. Darwin had no marked gifts for metaphysics. His mind was essentially analytical, and tended toward the minute observation of separate organisms. Beyond framing hypotheses for facts he did not care to go, considering it outside his province to speculate on the origin of life or matter. He refused to venture into regions requiring methods of investigation with which he was

not familiar. Fully aware of the splendor of this theory of life which he advocated, a splendor that came into mental view during moments of calm contemplation, he expatiated on the several powers of sentient existence, and how these had been originally breathed by the Creator into a few forms, or even only one. While the planet had pursued its ageless cycles, according to the fixed law of gravity, endless species of beauty and wonder were continually being evolved from so simple a beginning. Lyell, so far back as 1836, writing to his friend, Sir John Herschel, who shared his belief in the derivation of new species from preëxisting ones by the action of secondary causes, asserted that the conception appealed to him as "the grandest he had ever known so far as regards the attributes of the Presiding Mind." [1]

There is nothing in evolution derogatory to the Eternal Being or His designs when thus considered. On the contrary, there is much to be gained by a frank admission of the majesty and lawfulness contained in this exposition of the Creator's handiwork. And when it is clearly understood, and the fatal obstacles of ignorance and misapprehension have been removed, it will contribute increasingly to the honor and glory of God. Modern science has carried the idea of uniformity into

[1] Lyell's *Life and Letters*, Vol. I, p. 468.

every realm of the universe. In this sense it is the special illumination of our age, and after fifty years the mists of misunderstanding are being scattered, while the proportion and value of conflicting claims are more quickly discerned. When Weismann said that the wonderful results of evolution were brought about as though they were guided by a supreme intelligence, he spoke better than he knew. Theologians and men of faith need no longer be afraid of science. They can accept the reign of law, and they can rejoice in it. It is confirmatory in many ways of the greatest and most distinctively Christian ideas they can entertain concerning the workmanship of the All-wise God.

IV

When Darwin published the *Origin*, he had already accomplished enough original research to place him in the front rank of scientific investigators. The equally well-known volume on *The Descent of Man* was not issued until 1871, though the interval between the two treatises was filled with prodigious labor. He had purposely refrained from discussing the place man held in his system, because he was anxious to avoid needless friction, and felt that nothing was to be gained from an unsympathetic disregard for the religious susceptibilities involved in the theme. He was the most courteous of men, and he showed it by

his efforts to avoid any outrage of these devout feelings. At the same time he was equally honest, and in the *Origin* he had hinted that light would be thrown on the beginnings and history of man. But he believed that it was useless and injurious to parade his convictions prematurely or without offering convincing evidence for their support. *The Descent of Man* excited more interest and less opposition than the *Origin of Species*, thereby justifying the wisdom of the delay. His general position may be stated as follows: he could not admit of any break between man and the rest of animal creation, for the physical affinities of the human race with lower forms of like structure were so marked that they compelled him to push his evolutionary theory to its logical conclusion.

It is interesting to note, however, that Wallace, in his explanation of the origin of man, introduces other important factors into the process. He does not deny the development of man's moral and intellectual faculties from animals, yet he affirms that they have not been evolved by natural selection. Their operating cause cannot be discovered in the realm of natural law, but are to be found in the unseen kingdom of spirit. Three stages, containing much besides the human, exist in the unfolding of organic life. At each of these stages some superior power must necessarily have entered into action. The first marks

the change from the inorganic to the organic, when the earliest vegetable cell was a new thing in the world. The second is still more marvelous, for it heralds the dawn of consciousness — the fundamental distinction between the animal and vegetable kingdoms. The third is the appearance in man of those noble faculties and primary moral characteristics which raise him forever above the brute and open up possibilities of almost infinite advancement. These higher powers could not have been developed by the same laws which ruled the organic world. They are so distinctively different in quality from purely biological results that they suggest a world of spirit to which the world of matter is altogether subordinate. Conscious life is a progressive manifestation dependent upon different forms of spirit influx. If this ascensive scale of reasoning is valid, evolution is homocentric, and not only does it not degrade man, but man confers purpose and honor on evolution. He is the crown of its ageless and infinite processes, and he is equipped with spiritual powers that make him the one supernormal fact before which ordinary explanations are inadequate. He reflects the moral nature of the Deity and discloses the moral meaning of the universe, while his destiny gives worth to the drama of existence as enacted on this planet.

The only way of escape from these conclu-

sions is by disregarding the evidence adduced, and defining the whole creation as an aimless process, which has no conscious reason for its existence, indicates no aim, and simply moves in blind obedience to inexorable and soulless law. This way is barred by the truth, now widely recognized, that mechanism cannot produce mind, nor can matter be ultimately permuted into thought. Lord Kelvin, the greatest philosophical scientist of the closing days of the last century, wrote to the London *Times:* "Scientific thought is compelled to accept the idea of Creative Power. Forty years ago I asked Liebig, walking somewhere in the country, if he believed that the grass and the flowers which he saw around us grew by mere chemical forces. He answered, 'No, no more than I could believe that the books of botany describing them could grow by mere chemical forces.' Every action of human free will is a miracle to physical and chemical and mathematical science." [1]

The theistic conception of the universe has been held by many scientists, some of whom deemed it not only morally desirable but philosophically and scientifically necessary. Their change of attitude is indicated by the statement of Lord Kelvin that behind all phenomena there is the power of a Supreme Intelligence. The knowledge of God can be

[1] Cf. Bowne's *Immanence of God*, Chap. I, p. 21.

obtained by an inductive process of reasoning from known data, and the revelation of His character must then be discerned in the person and teaching of Jesus Christ. Such is the general course indicated by theological thinkers like Martineau, Fairbairn, Walker, and Gwatkin. According to them we can proceed from philosophy through metaphysics to a broad and sufficient theological basis. The natural phenomena science discerns, philosophy unifies under the governance of certain principles; metaphysics weaves those principles into a higher unity, and Christian theology concentrates and clothes them in the doctrine of the Divine Fatherhood. Professor Henry Jones of the University of Glasgow has appositely said that "the scientific investigator who, like Mr. Tyndall, so far forgets the limitations of his province as to use his natural data as premises for religious or irreligious conclusions, is as illogical as the popular preacher, who attacks scientific conclusions because they are not consistent with his theological presuppositions. Looking only at their primary aspect, we cannot say that religious presuppositions and the scientific interpretation of facts are either consistent or inconsistent; they are simply different. Their harmony or discord can come only when the higher principles of philosophy have been fully developed, and when the departmental ideas of the various

sciences are organized into a view of the world as a whole."[1] This task has still to be accomplished; the forces from below and above have yet to meet; and when they do, it will be as friends and not as foes. Moralists and scientists will not always treat each other with scorn and misunderstanding. A more comprehensive view of the movements of human knowledge will show that not one of these has labored in vain. The growth of that knowledge is toward unity by the perception of differences, differences which, duly considered, constitute a final harmony. The poets have seen this. Their prescience rebukes the disputes which have hindered its coming; and though their dreams may not be admitted by hard-and-fast rationalists, they are a prophecy and an inspiration. Those who would purify themselves by observing and thinking upon the ways of Deity must accept the lessons science has to teach, remembering that its ultimate movement is up and not down, forward toward idealism, and not backward to mere beginnings. The theistic view can have no quarrel with the proven results of scientific research; it can have no alliance with the reactionary obscurantism which opposes such results without reason or proof to the contrary.

Speculative reflections on the course of nature have shaken the convictions of many

[1] *Browning as a Philosophical and Religious Teacher*, p. 36.

in regard to the benevolence therein displayed. The cosmic process is so unlimited, the organic world so mysterious and replete with pain and death, that the older theistic arguments have failed to deal with the situation. They cannot cope with the groaning and travailing of creation. In this intellectual chaos man finds himself endowed with certain capacities which can eventually win the mastery over death, and he sees in Christ one who actually was its Master, whose very being was the incarnation of truth, whose claims have been supported by His achievements. He stands forth in time, a solitary figure, the conscious regenerator and representative of a new humanity, the redeemer, whose person was the source of immortality, whose teaching transfigured the life that now is and revealed that which is to come. He bade all who yearn for these consummations to come unto Him. He expressed the character of the otherwise unknown Deity and the potentialities of His offspring. This gospel of God as the universal Parent, who made heaven and earth, who, while immanent in all that is, is yet transcendent, who is soul and circumference of the whole, has changed the visible world into a pellucid garment behind which throbs the life and love divine. In Him the creation is spirit-woven; thought and sense, spirit and matter, are reconciled. Thus believing, as Christ has taught us, God is no longer a

hidden God, nor yet a vague and shadowy impersonality encompassing the infinitudes. He is seen, as Archbishop Fénelon said, "in everything, and everything in Him; all that exists, existing only by the communication of His exhaustless being; all that has intelligence having it only by derivation from His sovereign reason; all that acts, acting only from the impulse of His supreme activity."[1] In this faith we can await with confidence the time when the region of a true religion will include the interpretations of a complete science. There have been and there are periods of struggle and sacrifice; and the sufferings these involved have shaken many hearts. Without denying their reality or extent, it is possible to exaggerate them, and Wallace went so far as to argue at some length that the popular conception of pain and misery in the animal world is the reverse of the truth. The entire scheme accomplishes the maximum of life and of life's equipments with the minimum of pain and misery. Indeed, it would be difficult, according to him, to imagine a system by which a greater balance of happiness could have been secured.[2] We can leave the apportionment of pain and joy in creation to a future assignment. As for progress itself, we know it is based on the law of sacrifice; everywhere and always the

[1] Cf. Illingworth's *Divine Immanence*, p. 24.

[2] Wallace's *Darwinism*, p. 40.

two are coëxtensive. Suffering among civilized peoples is an element which we try to banish yet we are not blind to its educative uses. Man's immortality and perfectibility beckon us forward despite the cost, because in them the spiritual secret of the entire universe is revealed. And what is true in religion is also true in ethics. Justice, mercy, and charity have been strengthened by their conflict with the evils they oppose and destroy, and the history of these virtues signifies for them a higher and more permanent rule in the future of the race.

V

Throughout life Darwin was subject to violent paroxysms of pain, which often occasioned great alarm to his friends. He was never able to work consecutively for more than twenty minutes without interruption from these infirmities. The extent of his afflictions was never known to any save his faithful and devoted wife, who gave her entire time and strength to the care of his health, and the beautiful correspondence of their domestic life was the explanation of much he was able to accomplish. He could have been the center of social life among all ranks; but he was seldom seen beyond his own home at Down, for he was never sure of freedom from one of these sudden visitations. They so enfeebled him that even a brief journey

to London was exhausting. Burdened with extraordinary difficulties, he achieved his results by the exercise of the sternest resolution. Every moment he could gain was spent in methodical and laborious studies, and the list of his various publications testifies to this unremitting energy. His modesty was almost a weakness; and when he confessed, with touching simplicity, that he believed he had acted rightly in steadily following and devoting himself to science, those who revered him knew not which to admire the more, his great gifts or his incurable humility. He was fortunate in his friendships. The names of Wallace, Hooker, Scrope, and Lyell are associated with his fame; and the really impressive worth of these men was not so much their intellectual greatness as the grandeur of character, the unexampled forbearance, and the mutual assistance which distinguished them as coadjutors in a notable cause. Some votaries of science have shown themselves disastrously prejudiced and jealous; they have been more anxious for the priority of their personal claims than for the purity of their motive or the progress of knowledge. But this band of giants dwelt in a fellowship marred by no regrettable incidents, and strove toward the attainment of a great ideal, hand in hand and conjoined in heart, in honor preferring one another.

It is interesting to note the effect of Darwin's

inquiries on his personal religious life. As a boy he was very susceptible to spiritual impressions, and after he began his scientific career he was still a Theist, though gravely perplexed by the pain incident to animal existence. When he published the *Origin* he still believed in a personal God, and considered that the grand and wondrous universe, with our conscious selves, was the chief argument for such a faith. Later in life he stated that the theory of evolution was quite compatible with belief in that God, but added that different persons have different definitions of what they mean by God. His confessions were never meant for the public eye. He felt strongly that a man's religion is a matter concerning himself alone. Yet the fluctuations of his religious moods are now public property, and they show that in the extremes of doubt he was of an agnostic tendency, but never an atheist in the sense of denying a Supreme Being. In the autobiography he wrote for his family, occurs a passage describing his solitariness in a Brazilian forest, his spirit resurgent with the higher feelings of wonder, almost worship which elevate the mind. "Now," he continues, "the grandest scenes would not cause any such convictions to arise in me. It may be truly said that I am like a man who has become color-blind, and the universal belief by men in the existence of redness makes my loss of perception of not the

least value as evidence."[1] If Schleiermacher is correct in stating that the home of religion is in the emotional nature of man, there may here be a better explanation than has been surmised for the waning of religious faith and sentiment in Darwin. His æsthetic tastes and propensities were atrophied by reason of his absorption in the study of the laws of nature. Until he was thirty years of age the poetry of Milton, Gray, Wordsworth, Coleridge, and Shelley gave him pleasure. He read the historical plays of Shakespeare with delight, and music and art were also sources of recreation. But in later life they nauseated him, and he secured a temporary respite from his toils by listening to the reading of books that did not call for the exercise of much concentration. His mind had become a machine for grinding laws out of large collections of facts, and he deplored the injury thus inflicted upon his mental and moral capacities.

A hundred years have passed away since Charles Darwin was born, the last fifty of which have been dominated by him more than by any other man of science. A great soul is the epitome of the race, and in so great a soul as his, dedicated to the search for truth, the race was born to larger opportunities. He was the first to catch and reflect a light, the conscious advent of which, without him, might have

[1] Darwin's *Autobiography and Letters* (N. Y., 1893), p. 65.

been indefinitely postponed. He created a revolution which has had no equal in the intellectual history of the modern world since the Renaissance and the Reformation. His mind, like an artesian well, was pierced deeply by his constant meditations, and a stream of clear truth sprang forth which washed away the barriers that restrained scientific and even religious thought. He gave coherence and meaning to the inchoate accumulations of natural knowledge. He stimulated research and mapped out the lines on which it could intelligently proceed to ascertainable ends. Nor is it too much to say that his work "chastened and refined"[1] not only the intellectual but "the moral aspects" of science and philosophy. The entire field of human effort has acquired new promise and dignity. For although biology was the cradle of the movement, its ramifications have spread into many other fields which have become abundantly fertile. To Darwin belongs the unspeakable merit of inoculating his own and future generations with the idea of progressive development. The statesman, the social reformer, and the theologian have been touched with a new enthusiasm born of the hope of better things. They determined to parallel the story of progress in nature by effecting a like unfolding in the realms of politics, ethics, and religion. In

[1] *Fifty Years of Darwinism*, p. 4.

directing the eyes of the world toward an ideal, all the more attractive because its outlines are lost in the bright faith of a possible perfectibility, Darwin did the greatest service man can render to his fellows.

A day dawned when controversy was hushed in the presence of death; criticism gave place to tribute; and all vied with each other in their eulogies on the departed scientist. Huxley, who knew him intimately, voiced the common sentiments when he referred to the extraordinary affection and esteem for his character as a man, and the veneration for his endowments as a scientific philosopher, which were felt throughout the world. Intellectually he had no superior, and his infinite variety and accuracy of knowledge attracted the best minds. "Acute as were his reasoning powers, vast as was his knowledge, marvelous as was his tenacious industry, brave as was the struggle he waged against ill health, these were not the qualities," continued Huxley, "which impressed those who were admitted to his friendship; but a certain and almost passionate honesty, by which all his thoughts and actions were irradiated as by a central fire, was the rarest and greatest endowment."

Darwin died suddenly on the 19th of April, 1882, and on the 24th was buried in England's great Abbey at Westminster, in accordance with

[1] Huxley's *Darwiniana*, pp. 245–246.

the general feeling that such a man should not go to the grave without the chief recognition the British nation can bestow on her elect sons. The body rests by the side of that of Sir Isaac Newton, who did for the heavens what Darwin did for the earth. "For just so surely as the discovery and demonstration of the law of gravitation established order in the place of chaos, and laid a lasting foundation for all future study of the heavens, so surely the discovery of the law of natural selection established a firm basis for all future study of nature."