



CHARLES DARWIN.

THE LIFE OF

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CHARLES DARWIN

WITH

BRITISH OPINION

ON

EVOLUTION.

COMPILED BY

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P R E F A C E .

ON the death of the greatest naturalist, if not the most eminent man of the century, it has been thought desirable to publish in a cheap, popular form a short account of his life, and more especially of the doctrine of Evolution — with which his name is inseparably connected; and at the same time to give some idea of the opinions entertained of the great thinker, by bringing together the comments of those best qualified to judge.

There is probably no author concerning whose views and statements so much misapprehension has been current in the popular mind. Indeed, although the name of Darwin is familiar wherever civilization has spread, the real nature and value of his work, and the simple dignity of his life, were known only to the cultured few: the attention of the great mass of the public was only fully awakened by his death; it then became universally known for the first time how remarkable a man had been living unassumingly in our midst, and every one eagerly desires to glean particulars of his life and labours.

This want it is sought, as far as possible, to supply in this volume, pending the issue of an authoritative biography, and it is hoped that a real advantage is thus offered; for, if we would understand our age, it is essential that we should know what is meant by "Darwinism." This knowledge will become more and more necessary as time goes on, for though the grave has closed over the remains of the discoverer, the real work of his life may be said to have only just begun. The thoughts which he originated are now at once the guides and beacons of men of science, who are pursuing their explorations where he has shown a path to be possible; and only when the vast scheme (of which his master hand has sketched the outline) is filled in, by long and patient study, will the full scope of his teaching be realized.

CHARLES DARWIN AND EVOLUTION.

ON April 19th, 1882, at his quiet Kentish home, one of the greatest of our countrymen passed away. Suddenly and almost without warning the long and noble life of CHARLES DARWIN came to an end. He had reached the age of seventy-three, and though his health, always delicate, had lately shown signs of giving way, he died almost literally in harness, working to the last. For a long time to come, he will be mourned by all those in every land who can appreciate his vast services to knowledge, and who honour a lifelong devotion to truth; but with the mourning there will be joined the thought that he was happy in living so long, surrounded by devoted friends, and spared not only to do the work that he had set himself to do, but to see it accepted on every side.

The storm which howled around *The Origin of Species* at its first appearance has subsided. Even the orthodox are "adapting themselves to their environment," and are beginning to regard Evolution as a hypothesis which may in a measure be harmonized with their first principles. The story of such scenes as those which took place at the celebrated meeting of the British Association at Oxford, in 1860, and of the battle royal between Bishop Wilberforce and the young and ardent Mr. Huxley, reads at the present day like a scene from ancient history; like an episode in the persecution of Galileo, or a preliminary to the excommunication of Spinoza. The time has gone by when it was conceived possible to extinguish a scientific hypothesis by authority.

Moreover, in little more than twenty years, that which is called the Darwinian hypothesis has established itself as, practically speaking, one of the accepted generalizations of science. It is not too much to say that there is no man of real scientific eminence in Europe or America who does not now hold to it in the main. In Germany, in England, in the United States, all that even its former opponents now venture to do is to deny its applicability to certain cases; and in France, though official science still struggles against it, the attitude of the independent workers is rather that of accepting Mr. Darwin's views, while

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giving as much as possible of the credit of them to the Frenchman Lamarck.

Nor is it only in the province of exact thought that this fertile idea has taken root. All the world now uses Darwinian phrases, which have passed into the language of every day. We talk familiarly of "development," of "the struggle for existence," of the "survival of the fittest." Those who would be at a loss to formulate the theory, or to find any facts in support of it, still employ the terms of the new biology with a certain vague understanding of them, and are dimly conscious that what the naturalists have proved of plants and animals is equally true of all other spheres of existence, and all other phenomena.

This rapid victory of an idea which at its first appearance was condemned by the unanimous voice of traditional opinion, is in itself a very remarkable fact, and well deserves attention. What are the reasons of it? Do they lie in the inherent force of the idea itself, or in changed social conditions, or in the converging of many causes?

The violent attacks on what is called Darwinism were not unnatural; on the contrary, the wonder is that they were not more prolonged and more determined. The professional theologians may be excused for the animosity which they displayed; for, on the one hand, it has always been their way, when they have fancied that the accepted views of the origin and destiny of man have been in danger, and, on the other hand, as those whose memory goes back to 1859 will recall, they were simultaneously threatened and exasperated by what they fancied to be a treacherous movement from their own camp, the publication of *Essays and Reviews*.

It is no wonder that they rallied vigorously to the defence of ideas and principles thus imperilled. They said many hard things and many unwise things; but taken altogether, their utterances were moderate as compared with those of the champions of the same cause a little earlier. Not only did nobody propose the faggot and the stake for Mr. Darwin, but nobody of repute treated him with the brutal violence—no other words describe the fact—with which, a few years before, the mild and amiable Professor Sedgwick had dealt the author of the *Vestiges of Creation*.

Happily, great as were the improvements that had come over the spirit of controversy between the days of Sedgwick and of the opponents of Mr. Darwin, the improvement during the past twenty years has been far greater. It would be too much to suppose that the spirit of theological odium has materially

softened ; but there is more caution and more decency in controversy, and somewhat more scruple either in imputing motives or in condemning a book unread and unconsidered.

And, as far as concerns the judgment of the world at large, the growth of the scientific temper itself has wrought the change and has secured a fair hearing for any new doctrines, however unpalatable at first sight. The world is beginning to decide not by considerations of what a theory may possibly lead to, not by a calculation of what is to be gained or lost by believing, but by a comparison of the evidence for and against. Within a few weeks of the appearance of *The Origin of Species*, there appeared in the *Times* a review of the work, which may now be admitted to have been written by one of the most able of the young men of science of that day, a man who has since that time risen to high eminence. In that review there occurred the following sentence : “ The sufficiency of a hypothesis must be tried by the tests of science alone, if we are to maintain our position as the heirs of Bacon and the acquitters of Galileo.”

The remark sounds almost a commonplace to-day ; but even so recently as twenty-one years ago a professional defender of tradition, whether or not he admitted it in theory, would certainly have declined to act upon it in practice. But during these years the methods of the physical sciences have forced themselves into every branch of thought. In critical scholarship, in historical scholarship, in all the sciences which deal with man himself, a more exact, literal, and disinterested attention to the facts has come to be demanded. Positive truth is asked for more and more ; and where it seems to be a question between rival hypotheses, neither of which is strictly demonstrable, that is sure to win which is best supported by the evidence.

How the evidence in favour of Darwin's theory has grown and multiplied is best shown in Prof. Huxley's essay on the *Coming of Age of the Origin of Species*, which we quote on another page. In 1859, most geologists believed that “ the past history of the earth was catastrophic ”—that is, that frequent and sudden physical revolutions had taken place, and that the ordinary course of nature had been to proceed by periodic destruction and re-creation of the whole animal world. Now, no one dreams of a theory of this kind. Scientific geology regards the history of the earth's crust and of the fossil remains which it conceals as a perfectly continuous history, and considers the animals now existing as the direct descendants of the fossil species.

Again, many facts discovered since 1859 have justified the

much-ridiculed assertion of Mr. Darwin that the gaps which we observe in Nature were once filled up with links now unknown. The gap between the bird and the reptile has been bridged over by the discoveries of the last ten years; and much the same may be said of the gaps between vertebrate and invertebrate animals, and flowering and flowerless plants. The astonishing revelations of recent research in palæontology have done still more to turn what twenty years ago was a brilliant speculation into an established and unquestionable truth.

With this truth Mr. Darwin's name will in future be connected; and at least for the next century it may confidently be predicted that biological science will do little more than work upon his line. But for us who are his contemporaries, his life has other lessons than those left by one who has given a great and fertile idea to the world. Great as he was, wide as was the reach of his intelligence, what endeared him to his many friends and what charmed all those who were brought even into momentary contact with him, was the beauty of his character. There never was a more honest man. Not only was he superior to the ordinary pettinesses and jealousies of the discoverer—as is shown by the well-known story of his conduct with regard to Mr. Wallace's simultaneous statement of the evolution hypothesis—but he was incredibly scrupulous in verifying all his facts, in listening to every objection, in balancing every consideration that was brought before him. The charm of his conversation was great, though his ill-health made it necessary for him to spare himself and to mix little in society, just as it prevented him from accepting some of those public marks of distinction which were his due. He was kindness itself, and many a young student keeps among his treasures some little note of encouragement that the veteran discoverer had sent him to help him on his way. He was for ever observing, comparing, thinking, from the early days in South America when, as he himself tells us, the idea of the origin of species first struck his mind, down to the very end of his life.

If *The Origin of Species* had never been written, if there had been no "Darwinian hypothesis," the actual work he did would have been enough to gain him a reputation among the highest. His books on coral reefs, on the voyage of the "Beagle," on minute vegetable anatomy, on domestication, on climbing plants, on the movements of plants, and, lastly, that marvellous book on earthworms which he published only last winter, form a list that would of themselves adorn the name of any other man of science. Joined to his great philosophical achievement, they place him beyond rivalry among the men of

to-day, and side by side with two or three great discoverers of the past, whose names are household words.

On the great principle of hereditariness, of which he himself was the prophet and expounder, Mr. Darwin could not help being a remarkable man. Through his father descended from Erasmus Darwin, one of the most remarkable and original men of his age, and through his mother from Josiah Wedgwood, a man in his own line of scarcely less originality, Mr. Darwin was bound, under favourable surroundings, to develop powers far beyond the average. Charles Robert Darwin (he seldom used the second name) was the son of Robert Waring Darwin, the third son by his first marriage of Erasmus Darwin, best known to the general reader by his scientifico-poetic work *The Botanic Garden*. The late Mr. Darwin's father was a physician at Shrewsbury, who, although a man of considerable originality, devoted his powers almost entirely to his profession; his mother was a daughter of Josiah Wedgwood.

He was born at Shrewsbury, on February 12th, 1809, so that he has died in his seventy-fourth year. Mr. Darwin was educated at Shrewsbury school under Dr. Butler, afterwards Bishop of Lichfield. In 1825, he went to Edinburgh University, therein following the example of his grandfather, where he spent two sessions. Here, among other subjects, he studied marine zoology, and at the close of 1826 read before the Plinian Society of the University two short papers, probably his first, one of them on the Ova of Flustra. From Edinburgh Mr. Darwin went to Christ's College, Cambridge, where he took his Bachelor's degree in 1831, proceeding to M.A. in 1837. The interval was of epoch-making importance.

In the autumn of 1831, Captain Fitzroy having offered to give up part of his own cabin to any naturalist who would accompany Her Majesty's ship "Beagle" in her surveying voyage round the world, Mr. Darwin volunteered his services without salary, but on condition that he should have entire disposal of his collections, all of which he ultimately deposited in various public institutions. The "Beagle" sailed from England December 27th, 1831, and returned October 28th, 1836, having thus been absent nearly five years. In more ways than one these five years were the most eventful of Mr. Darwin's life. During these five years the "Beagle" circumnavigated the world, and it is not too much to say that single-handed, Mr. Darwin during the voyage did more for natural history in all its varied departments than any expedition has done since; much more when we consider the momentous results that followed.

No one can read the simple, yet intensely interesting *Naturalist's Voyage Round the World*, without tracing in it the germs of all that Mr. Darwin has subsequently done in natural science. Simplicity and freedom from technicality have been the leading characteristics of all Mr. Darwin's best known and most influential works; and in this volume on the *Voyage of the "Beagle"* there is scarcely a page that will not interest any ordinarily intelligent man, and many pages that must claim the attention of the mere reader of stories of adventure. Full of incident it is, especially during the author's long sojourn in South America and in the vicinity of Magellan's Straits. Mr. Darwin's phenomenal genius as a scientific observer is seen throughout—when watching the method of catching and taming the wild horses of the Pampas, as when investigating the structure of the coral reefs of the Pacific.

The first edition was published early in 1845, and the second was dedicated to Sir Charles Lyell, who, with his usual acuteness, early perceived the remarkable originality of the young naturalist, and to whom the latter was indebted for much wise counsel and help, as is evident from the recently published *Life and Letters of the great geologist*.

That was not the only immediate result of this great voyage; under the superintendence of Mr. Darwin, and with abundant description and annotation by him, the *Zoology of the expedition* was published before the narrative, in 1840, with Professor Owen, Mr. Waterhouse, the Rev. L. Jenyns, and Mr. Bell as contributing specialists. Not only so, but still also before the general narrative, Mr. Darwin published his first original contribution to science in his *Structure and Distribution of Coral Reefs* (1842). This work for the first time shed clear light upon the method of work of the tiny creatures whose exquisite fabrics are spread over the face of the Pacific. True, quite recently Mr. Murray has broached a new theory, or rather modification of Darwin's theory, which is beginning to find acceptance; but even if universally accepted it will not detract from the original estimate of the work of the "Beagle" naturalist.

Still further, we have as direct result of the voyage in a volume, published in 1844, on the *Volcanic Islands visited during the Voyage of the "Beagle";* and in 1846, *Geological Observations in South America*. Both these works are even now referred to by geologists as classical, and as having suggested lines of research of the highest fertility. In the *Transactions of the Geological Society*, moreover, other memoirs suggested by the results of the voyage will be found, one as early as 1838.

But even that is not the earliest important paper of the great observer. Just a year after his return, in November, 1837, he read to the Geological Society a paper, to be found in its Transactions, *On the Formation of Vegetable Mould*. This paper gave the result of observations begun some time before, observations only completed in his latest published work, that on *Earth-worms*. Experiments were arranged for, which took forty years to ripen. Such far-seeing deliberation can only be the attribute of the greatest minds, which can see the end from the beginning. Other results of the voyage in botany and entomology we could refer to were it needful.

But the greatest result of all was probably that on the mind of the naturalist himself. Passing over a generation, the spirit of his grandfather seems to have re-appeared in Charles Darwin with intensified power and precision. We need not here enter into the delicate distinctions which exist between the developmental theories of Erasmus, which were prematurely sown in unfruitful and unprepared soil, and those of his greater grandson, which have revolutionized research and thought in every department of human activity. The inherited germ was doubtless rapidly and fully developed during the splendid opportunities presented by the voyage of the "Beagle." Throughout all his subsequent work the influence of this voyage is apparent, and continued reference is made to the stores of observation laid up during those eventful five years.

Three years after his return, in the beginning of 1839, he married his cousin, Emma Wedgwood, and in 1842 he took up his residence at Down, Beckenham, Kent, of which county he was a magistrate, and there he has since lived. It is known to his friends that Mr. Darwin never quite recovered from the evil effects of his long voyage. He himself tells us that during nearly the whole time he suffered from sea-sickness, an affliction which no constitution could altogether withstand. And it has only been by the quietest living and the greatest carefulness that Mr. Darwin was able to keep himself in moderate health and working order.

His habits and manners were of child-like simplicity, his bearing of the most winning geniality, and his modesty and evident unconsciousness of his own greatness almost phenomenal. In sending a letter or contribution to a journal, he asked for its insertion with a doubting hesitancy, rare even in a tyro. His personal influence on young scientific men can with difficulty be calculated; his simple readiness to listen and suggest and help has won the gratitude of many an aspiring observer.

Since he took up his residence at Down, Mr. Darwin's life has

been marked mainly by the successive publication of those works which have revolutionized modern thought. In 1859 was published what may be regarded as the most momentous of all his works, *The Origin of Species by Means of Natural Selection*. No one who had not reached manhood at the time, can have any idea of the consternation caused by the publication of this work. We need not repeat the anathemas that were hurled at the head of the simple-minded observer, and the prophecies of ruin to religion and morality if Mr. Darwin's doctrines were accepted. No one, we are sure, would be more surprised than the author himself, at the results which followed. But all this has long passed. The work, slowly at first, but with increasing rapidity, made its way to general acceptance, and its anathematizers have been bound to find a *modus vivendi* between their creeds and the theories propounded in *The Origin of Species*. The revolution in scientific doctrine and scientific method brought about by the publication of this work, was ably pointed out by Professor Huxley two years ago in his lecture on *The Coming of Age of the Origin of Species*. Mr. Huxley says:—

“In fact, those who have watched the progress of science within the last ten years, will bear me out to the full when I assert that there is no field of biological inquiry in which the influence of *The Origin of Species* is not traceable; the foremost men of science in every country are either avowed champions of its leading doctrines, or at any rate abstain from opposing them; a host of young and ardent investigators seek for and find inspiration and guidance in Mr. Darwin's great work; and the general doctrine of Evolution, to one side of which it gives expression, finds in the phenomena of biology a firm base of operations whence it may conduct its conquest of the whole realm of nature.”

But it is not only in physical and natural science that the revolutionary influence of *The Origin of Species* is seen. It is not too much to say that the doctrines propounded in this volume on *The Descent of Man*, and other subsequent works, have influenced thought and research in every direction. It has been said, perhaps prematurely, that one must seek back to Newton or even Copernicus, to find a man whose influence on human thought and methods of looking at the universe has been as radical as that of the naturalist who has just died. Of course Mr. Darwin's originality has been assailed. Kant, Laplace, Buffon, Erasmus Darwin, and others, and of course, Lucretius, have been brought forward as the real originators of the fertile idea which has taken its name from Mr. Charles Darwin. Give these old-world worthies all the credit which is justly their due, and it is not little; let it be granted that Darwin received the first initiative in his fertile career of re-

search from a study of what had been done by his predecessors ; and yet how comes it that these old theories fell comparatively dead and bore no substantial fruit ?

One reason must be that, as propounded by Mr. Darwin, the theory of evolution had a mature vitality which compelled acceptance, and the phenomenal vigour of which is seen in the results. Mr. Darwin's great theory, in some of its parts, may require modification ; he himself latterly, we believe, did not seek to maintain it in all its original integrity. As has been suggested, some greater law may yet be found which will cover Darwinism and take a wider sweep ; but, whatever development science may assume, Mr. Darwin will in all the future stand out as one of the giants in scientific thought and scientific investigation.

All Mr. Darwin's subsequent works were developments in different directions of the great principles applied in *The Origin of Species*. Between 1844 and 1854 he published through the Ray and other societies, various monographs, which even his greatest admirers admit do not do him the highest credit as a minute anatomist. His next great work, published in 1862, was that on the *Fertilization of Orchids* ; this, with the work on *Cross and Self-Fertilization of Plants* (1876), and that on the *Forms of Flowers* (1878), and various papers in scientific publications on the agency of insects in fertilization, opened up a new field which in his own hands and the hands of his numerous disciples, have led to results of the greatest interest and the greatest influence on a knowledge of the ways of plants. Other works belonging to this category are those *On the Movements and Habits of Climbing Plants*, *Insectivorous Plants*, and *The Movements of Plants* (1881), all of which opened up perfectly fresh fields of investigation, and shed light on the most intimate workings of nature.

Mr. Darwin's influence in these, as in others of his works, has acted like an inspiration, leading men to follow methods and attain results which a quarter of a century ago were beyond the scope of the most fantastic dream.

But perhaps the works with which the name of Mr. Darwin is most intimately associated in popular estimation, and indeed, the works which have had the deepest influence on the tendencies of modern thought and research in those departments in which humanity is most deeply interested, are those bearing on the natural history of man. Nine years after the publication of *The Origin of Species*, appeared (1868), in two volumes, the great collection of instances and experiments bearing on the *Variation of Plants and Animals under Domestication*.

We have called this a collection of facts, and the same term might be applied with greater or less exactness, to all the other works of Mr. Darwin. This is the characteristic Darwinian method. Years and years are spent in the accumulation of facts with open-minded watchfulness as to the tendency of the results. The expressed inferences in Mr. Darwin's works are few; he piles instance on instance and experiment on experiment, and almost invariably the conclusion to which he comes seems but the expression of the careful and unbiassed reader's own thought. Nowhere is this more signally evident than in the work on Domesticated Animals and Plants. The results which were brought out in those volumes were full of significance, while at the same time they afforded abundant occasion for the opponents of Darwinism to scoff and pour harmless contempt on the whole line of inquiry; forgetting or wilfully shutting their eyes to the fact, that the results which Mr. Darwin showed were possible *in petto*, bore no proportion to the gigantic efforts of nature through untold ages.

The chapters on Inheritance in this work were full of significance, and seemed a natural transition to the work which followed three years later (1871)—*The Descent of Man and Selection in relation to Sex*. Even greater consternation was caused in many circles by the publication of this work than by *The Origin of Species*. And the reason of this is obvious. Not only did it seem directly to assail the *amour propre* of humanity, but to imperil some of its most deeply cherished beliefs. With wonderful rapidity, however, did men of all shades of belief manage to reconcile themselves to the new and disturbing factor introduced into the sphere of scientific and philosophical speculation. All sorts of halfway refuges were sought for and found by those whose mental comfort was threatened, and again, as before, there was little difficulty in finding a *modus vivendi* between two sets of doctrines that at first sight seemed totally irreconcilable.

After all, what have the highest aspirations of mankind to fear from the investigations and speculations of a man who is capable of writing as Mr. Darwin does in the concluding pages of his *Descent of Man*, from which the following is a quotation:—

“Important as the struggle for existence has been, and even still is, yet as far as the highest part of man's nature is concerned, there are other agencies more important. For the moral qualities are advanced either directly or indirectly, much more through the effects of habit, the reasoning powers, instruction, religion, &c., than through natural selection; though to this latter agency may be safely attributed the social instincts which afforded the basis for the development of the moral sense.....

“For my own part, I would as soon be descended from that heroic little monkey who braved his dreaded enemy to save the life of his keeper, or from that old baboon who, descending from the mountains, carried away in triumph his young comrade from a crowd of astonished dogs—as from a savage who delights to torture his enemies, offers up bloody sacrifices, practises infanticide without remorse, treats his wives like slaves, knows no decency, and is haunted by the grossest superstition. Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale; and the fact of his having thus risen instead of having been aboriginally placed there, may give him hope for a still higher destiny in the distant future.

“But we are not here concerned with hopes or fears, only with the truth as far as our reason permits us to discern it; and I have given the evidence to the best of my ability. We must, however, acknowledge, as it seems to me, that man, with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men, but to the humblest living creature, with his godlike intellect which has penetrated into the movements and constitution of the solar system—with all these exalted powers, man still bears in his bodily frame the indelible stamp of his low origin.”

Among scientific men themselves, among those who welcomed the Darwinian method and the distinctive doctrines of Darwinianism, none of the master's works have probably met with more criticism than that on the *Descent of Man*. Not that the naturalists of the highest standing have any hesitation in accepting the general principles illustrated in the *Descent of Man*; the ablest and most candid biologists admit that in that direction the truth seems to lie; but that the various stages are so incomplete, the record is so imperfect, that before stereotyping their beliefs it would be wise to wait for more light. The general conclusion is not doubted, but how it has been reached by nature is by no means evident. And in this connection we cannot do better than quote the words of Professor Huxley in the lecture already alluded to, and which, we are sure, Mr. Darwin himself would have endorsed with all his strength:—

“History warns us, however, that it is the customary fate of new truths to begin as heresies and to end as superstitions; and, as matters now stand, it is hardly rash to anticipate that in another twenty years, the new generation, educated under the influences of the present day, will be in danger of accepting the main doctrines of the *Origin of Species* with as little reflection, and it may be with as little justification, as so many of our contemporaries twenty years ago rejected them. Against any such a consummation let us all devoutly pray; for the scientific spirit is of more value than its products; and irrationally-held truths may be more harmful than reasoned errors. Now, the essence of the scientific spirit is criticism. It tells us that to whatever doctrine claiming our assent we should reply, Take it if you can compel it. The struggle for existence holds as much in the intellectual as in the physical world. A theory is a species of thinking, and its right to exist is co-extensive with its power of resisting extinction by its rivals.”

As a sort of side issue of *The Descent of Man*, and as throwing light upon the doctrines developed therein, with much more of independent interest and suggestiveness, *The Expression of the Emotions in Men and Animals* was published in 1872. This is, perhaps, the most amusing of Mr. Darwin's works, while at the same time it is one which evidently involved observation and research of the most minute and careful kind. It is one, moreover, which shows how continually and instinctively the author was on the watch for instances that were likely to have any bearing on the varied lines of his researches.

To attempt to reckon up the influence which Mr. Darwin's multifarious work has had upon modern thought and modern life in all its phases, seems as difficult a task as it would be to count the number and trace the extent of the sound-waves from a park of artillery. The impetus he has given to science, not only in his own, but in other departments, can only find a parallel in Newton. Through his influence the whole method of seeking after knowledge has been changed, and the increasing rapidity with which the results are every day developed becomes more and more bewildering. To what remote corners in religion, in legislation, in education, in every-day life, from Imperial Assemblies and venerable Universities to humble board schools and remote Scotch manses, the impetus initiated on board the "Beagle" and developed at the quiet and comfortable home at Beckenham has reached, those who are in the whirl and sweep of it are not in a position to say.

Mr. Darwin's elder brother, the faithful friend of Mrs. Carlyle, died about a year ago, leaving his younger brother his principal heir; the latter, however, has all along been in comfortable circumstances. It goes without saying that honours and medals were showered upon Mr. Darwin by learned societies all the world over: from Germany, where his disciples, led by Hæckel, have out-Darwined Darwin, he received a Knighthood of the Prussian Order of Merit.—*The Times*.

FAMILY HISTORY.

The Darwins trace their origin to an ancestor who was Yeoman of the Armoury of Greenwich to James the First and the first Charles; he possessed an estate at Cleatham, which has passed out of the family, but one field is still called by the name, as it is subject to a yearly charge made by his second wife for buying gowns for four old widows. The son of this yeoman, born in 1620, was also named William, he became captain in Sir W. Pelham's troop of horse, and fought for the king against the

Parliamentary forces, in consequence of which his estate was forfeited and he was reduced to great poverty; he afterwards became a barrister, and married the daughter of Erasmus Earle, Serjeant-at-Law. His eldest son, the third William, was born in 1655, and married the heiress of Robert Waring. This lady inherited the manor of Elston, which has since remained in the family. The second son of this third William Darwin was called Robert, he inherited the Elston estate and resided there as a country gentleman, having some taste for science and verse making; his wife was a very learned lady—a point in her character not apparently fully appreciated by her husband, who, in a sort of Litany he composed, wrote:

“From a morning that doth shine,
From a boy that drinketh wine,
From a wife that talketh Latine,
Good Lord deliver me.”

From this couple descended four sons, of whom the youngest, born in 1731, became by far the most celebrated. He was the well-known Erasmus Darwin, the author of numerous poetical works of a very remarkable character, such as *The Loves of the Plants*, *Zoonomia; or, the Laws of Organic Life*, *The Botanic Garden*, etc., which created a great sensation at the time of their publication in the latter half of the last century. Erasmus Darwin was not a man of poetical appearance, being unwieldy in size; he stammered in his speech, and living chiefly on vegetables, was a huge eater. Nevertheless, his life, that of a successful practising physician, was by no means free from romance. At twenty-six he married a very beautiful young lady, Miss Howard, who was under eighteen, with whom he lived most happily for thirteen years, her death leaving him a widower with three sons, the youngest of whom—Robert Waring Darwin, born in 1766—was a physician in practice, at Shrewsbury, where his son, the late Charles Darwin, was born on Feb. 12, 1809.

Of Erasmus Darwin, the grandfather of the late lamented philosopher, many very singular stories are told. Some of these were related by Miss Seward, a literary lady, who wrote his life, but many of whose tales respecting him are supposed to have been coloured by the fact that he refused, after the death of his first wife, to avail himself of the opportunity of securing her hand.

After remaining eleven years a widower, in 1781 he married the relict of Col. Chandos Pole, to whom he was strongly attached even during the life of her first husband, and by whom he afterwards had several children.

On his mother's side the late Mr. Charles Darwin was also descended from a family of far more than average intellectual powers. His mother was a daughter of Josiah Wedgwood, of Etruria, the inventor of the celebrated pottery which bears his name. He was christened Charles Robert Darwin, but with that love of simplicity which was one of his most striking characteristics, he rarely used even the initial of the second name.

Three years after his return—viz., in 1839—he married his cousin, Miss Emma Wedgwood, and in 1842 he removed to Down, near Bromley, in Kent, of which county he was a magistrate. In this residence, with occasional excursions to Cornwall, Derbyshire, etc., in search of health, he resided until his death. Attached as he was to scientific pursuits, his health was not sufficiently vigorous even to allow him, except on rare occasions, to attend the meetings of the Royal, Linnæan, and other societies of which he was a member, but his contributions were not unfrequent; and it is remarkable that on the evening preceding the morning of his decease a long and most interesting letter from him was read to the members of the Zoological Society; at this time he was dying, but so rapid had been the fatal character of the attack that the serious nature of his illness was not even suspected.—*The Queen*.

Mr. Darwin has led one of the happiest of domestic lives. Rarely mingling in general society, he lived for science, his friends, and his family. Of his sons, three are more or less distinguished in science. One is an officer of Engineers, another was a high wrangler in Cambridge, and a third practises medicine, and was his coadjutor in his father's last work. Mr. Darwin's habits were to retire to bed at ten and rise at five. His recreations were his garden and a steady course of novel reading aloud by Mrs. Darwin, or social intercourse with his younger friends, who, like Sir John Lubbock, looked up to him with the affection of the pupils of the old Greek philosophers to their masters. In politics he took no active part, though he felt an eager interest in every public event, and was understood to be a sincere Liberal of the advanced school. On his seventieth birthday he received an affectionate address from all classes of his admirers.

THE FUNERAL.

At noon on Wednesday, the 26th of April, the mortal remains of Charles Darwin were laid to rest in the nave of Westminster Abbey, in the presence of a concourse such as has rarely been gathered within the walls of the Abbey in the memory of living men. At twelve precisely the first notes of the singers were heard, and slowly the procession wended its way through the nave and the choir to the front of the altar steps, where the white oak coffin, which was covered with choice wreaths of flowers, was deposited. On the one side as pall-bearers walked Canon Farrar, Prof. Huxley, Mr. Spottiswoode (President of the Royal Society), and the Earl of Derby; on the other the Duke of Argyll, Mr. Lowell, (U.S. Minister), Sir John Lubbock, Mr. A. R. Wallace, and Sir Joseph Hooker. Following the members of the family was a lengthy procession of men distinguished either in science, literature, art, or politics. It seemed as though all that was greatest and noblest in England had united to pay the last tribute of respect to the departed. The choir rendered Dr. Bridge's anthem specially composed for the occasion. No words could have been more appropriate:—

“Happy is the man that findeth wisdom, and getteth understanding.

“She is more precious than rubies, and all the things thou canst desire are not to be compared unto her.

“Length of days is in her right hand, and in her left hand riches and honour.

“Her ways are ways of pleasantness, and all her paths are peace.”

As the last notes of the anthem died away the bearers again took up their burden and bore the body back through the choir to the north aisle, where at the eastern end, just beneath the window on which are blazoned the triumphs of Robert Stephenson, the great engineer, the grave had been prepared.

By a simple arrangement, all external show of black coaches, horses with velvet clothing and nodding feathers, and men with sable scarves and hat-bands, in short all the hackneyed symbols of woe, were cast aside. As the coffin rested on its temporary support, the masses of flowers heaped upon it suggested that many of the donors had intended a most graceful and significant appropriateness in their choice of blooms. Orchids of all the special varieties that were the subjects of invaluable research, experiment, and deduction, by the departed labourer in the fields of nature and of science, were distinguishable among these perishable emblems of work that will long outlive their tender memories. Beethoven's Funeral March was played for the procession to the grave, just outside the choir, on the right or north side of the church

At the grave, where the prayers were read by Canon Prothero, the choir sang, "Man that is born of a woman," the music of which is by Croft; "Thou knowest, Lord," and "I heard a voice from Heaven," both by Purcell. Before the benediction, Handel's Funeral Anthem, "His body is buried in peace," was as usual introduced, as a customary and always welcome interpolation at this concluding part of the service; and, as the mourners and general congregation passed round the grave, to take their last look at the flower-laden coffin, the organist played, with all sweetness and solemnity of feeling, the Dead March in "Saul."

Science and the Church were in accord with all intelligent humanity to honour the name of Charles Darwin. Near the grave and just beneath the monument to Sir Isaac Newton stood a remarkable and representative crowd of distinguished men, such as only an occasion of deep and general interest would bring together; leaders of men and leaders of thought, political opponents, scientific co-workers, and eminent discoverers, united to render homage to the exalted thinker who had found rest; and in so doing they only typified what universal expression has shown to be the feeling of the whole civilized world.

The kind and truth-seeking character of the man has done much to remove [the hostile criticism with which his works were received on their first publication, and many of those who had been the strongest opponents of his views followed with reverence his body to its final resting-place in Westminster Abbey.

DARWIN'S WORK.

Among his works there is one which must be specially dwelt upon, namely, that entitled *The Origin of Species by Natural Selection*. No competent physicist now doubts that—whatever may hereafter modify, complete, enlarge, or even correct the main theories of its author—the book itself was "epoch-making," and must ever form a landmark in the annals of human inquiry, not inferior in importance to the *Principia* of Newton in astronomy, or in metaphysics to the *Critique of Pure Reason* by Kant.

Like all great inventions and discoveries, Darwin's doctrine was not absolutely original. No triumph of science or art is ever entirely detached from previous human labours, for evolution holds good of genius as of all else. Goethe had hinted, and Lamarck at the beginning of this century had actually formulated the chief points of a scientific and natural view

of the developments of animal and vegetable life. These suggestions, however, lay neglected until the sudden apparition of that wonderful work of Charles Darwin, which put life and soul into the imperfect ideas, and placed before the astonished generation a new view of Animated Nature; fortified at all points with lavish facts; clear, eloquent, decisive, piercing, and convincing; marked as much by conspicuous love and pursuit of truth as it was by a perfect candour of statement, and a fearless courage of opinion.

It had been universally accepted that the innumerable species of animals and vegetables, as geology reveals or as nature displays them, were separately created.

Custom had stamped this view with a religious sanction, and it had become all the more unquestioned because it ministered to the pride of the race. It was agreeable as well as orthodox to believe that Man was a special creation, made in the image of the Highest, and set from the first at the head of all things; while that strange mystery of the likeness and unlikeness of species, their vast variety and yet apparent immutability, were glibly disposed of under such phrases as "plan of creation," and "unity of design." Darwin, sitting for ever at the feet of the "Great Mother," and gazing so constantly at her countenance that he came at last to read in it the secrets of her hidden heart, perceived good evidence of a miracle grander and more sublime than that so firmly but erroneously established. Far more marvellous and more divinely subtle must it seem to bestow upon the material of life—physical and mental—gifts which will evolve from low and little beginnings the countless visible forms of beauty and use and power, than merely to invent this or that shape and creature, fixed thenceforward for all time in configuration and character.

The all-comprehending doctrine announced by Darwin was the unity or quasi-unity of the animated creation. Its vast and numerous divisions had sprung, he said, from a few roots, perhaps from one vital root. In the long lapse of time individual divergences, favoured and preserved by natural selection under the law of inheritance of qualities, and in face of the sharp struggle for existence, had produced all the multiplied variety of life and function seen around us. Such an operation—always in progress in the past and present, and destined to continue indefinitely—showed Nature to us as ever improving upon her work, ever eliciting life from death, and order from conflict.

No other theory explained the thousand puzzles which embarrassed the old view. With exquisite illustrations, unailing

research, and experiments of the most ingenious kind, Darwin enforced the vast conception of his intellect. This alone explained such facts as the ground-feeding woodpeckers, the upland geese which never swim but have webbed feet, the thrushes which dive and feed on aquatic insects. The beautiful and brilliant forms and plumages of birds were seen to have slowly come about under the stress of natural selection; the lovely floral world had reached its perfection in active obedience to the law which links the life of plants with insects and birds. The imperfections of Nature also became at last accounted for; a Creator would hardly have made the bee to perish when once it uses its sting, the drones to be produced in such numbers for a single act and then to be slaughtered, or the ichneumonidae feeding within the living bodies of caterpillars.

Darwin did not pretend to explain the primæval and ever-sacred mysteries at the beginning of all these processes—the vital force; the capacity for individuation; the magic of inheritance; and the source of that love and perfection of beauty in colour, shape, or song which makes the animal, the bird, and the insect seek out conspicuous, lovely, musical, or fragrant companions and forms. He did not conceal the difficulties of his theory; indeed, no man of science was ever so candid, frank, and faithful in the statement of an opponent's argument or the confession of weakness in his own. His great book—like all his other works—was a model of noble truthfulness in style and manner; nor was ever any discoverer more just and generous to those whose labours preceded or assisted his own. Modest, gentle, and even diffident to the last, he was never deaf to an adverse argument—never too old or too wise to be corrected: and dying as he does crowned with the admiration of the age, and conqueror of almost a whole domain of scientific belief, he bore his honours so meekly that it may be doubted if he realized what Europe is to-day ready to proclaim—that this century will be named after him as the "Age of Darwinism."

That the doctrine of Evolution must prove in the main a true and enduring one is doubted to-day by few really competent minds. We should be the last to say this with rejoicing, if it diminished the sublimity of Creation, or degraded man. But those who have felt pain at the prevailing spread of Darwin's views forget that Leibnitz was similarly led to declare Newton's law of gravity "irreligious;" nor have they appreciated the grandeur and the promise of evolution. If the "*Descent of Man*" links him with the arboreal ape, and even farther back, perhaps, with the obscure ascidian, be it remembered that it forecasts an "*Ascent of Man*," whereby under the action of

“Selection and Struggle,” the race may and will rise to the very noblest physical, intellectual, and moral heights.

Darwin's voyage in the “Beagle” did more for his scientific education than school or college; it taught him how the forces of nature were gradually at work re-moulding and chiselling the face of the earth—as Lyell was at that very moment demonstrating in his memorable work—he saw how the earthquake forces on the one hand were, on the coast of South America, here sinking and there raising coast lines; while in mid-ocean tiny insects, insignificant creatures in themselves, were building coral islands and archipelagos.

All great things, says Tyndall, come slowly to birth. Copernicus pondered his great work for thirty-three years; Newton for nearly twenty years kept the idea of gravitation before his mind; for twenty years also he dwelt upon his discovery of fluxions; Darwin for two-and-twenty years pondered on the problem of the origin of species, and doubtless he would have continued to do so had he not found Wallace upon his track.

When his great work, *The Origin of Species*, appeared, it re-created natural history, gave a new impetus and a fresh direction to research in everything relating to plant and animal life, and profoundly modified men's thoughts and beliefs. Buckle, in his *History of Civilization*, attributes to Adam Smith's *Wealth of Nations* greater and more beneficent effects than have flowed from any other production of man's pen; but those effects he admits took a long time to make themselves felt, the ideas filtering slowly through the minds of statesmen and economists. It would certainly be hard to name a book that in the same short space has produced equal effects to *The Origin of Species*. At first derided and treated with easy ridicule, then seriously attempted to be confuted, it has in three-and-twenty years made a mark on the intellectual world, if not, indeed, a conquest of it, which is without a parallel.

And what is the theory it propounds? Broadly this—the unity of all organic nature; that all animals now living—and similarly all plants—are connected, forming one great family; and, not only so, but that they are connected with those of all past ages, and are, in fact, derived from them. If we trace animal and plant life downwards in the scale and backward in point of time we are always coming to simpler forms, which, nevertheless, are all connected with the higher. The most marvellous thing in the world is the human brain; but there are two self-evident things about it; first, that its wondrous

faculties are derived from previous brains running back for countless generations; secondly, that, if it be compared with the brains of apes and other mammals, with the cephalic organs of birds, reptiles, and fishes, with the curious *ganglia* distributed through insects—nay, further, with that strange, structureless little point of jelly, the *amœba*, which somehow, though it has neither brain, nor nerve, nor stomach, nor appearance of any separate organ of any kind, yet apparently can feel and select its proper food—if this long-drawn out comparison is made there is something in common besides that mysterious thing we call life. The naturalist shows that the most complex structure is built up from the simplest, and that the work of the new natural history is to trace this building up during the two hundred odd million of years in which Nature has been at work on this planet.

With the modesty which is the characteristic of all true greatness, Mr. Darwin did not pretend that this unity of Nature was his discovery. In the *Historical Sketch* prefixed to the late editions of his work he enumerates Lamarck, Geoffrey Saint Hilaire, Dr. W. C. Wells, Dr. Herbert (Dean of Manchester), Professor Grant, Mr. Patrick Matthew, Von Buch, the anonymous author of the *Vestiges of Creation*, Mr. d'Halloy, Professor Owen, Mr. Wallace, Mr. Herbert Spencer, M. Naudin, Professor Huxley, Dr. Hooker, and others who had distinctly foreseen that the theory of the *separate creation* of the varieties of animal and plant forms was incredible; that the types of past ages had been by gentle gradations merged into the present; and Mr. Herbert Spencer had gone so far as to suggest that the animals and plants of any age and place are the "survival of the fittest," and that life once planted on the globe in its simplest forms has an almost infinite power to multiply and to adapt itself to its surroundings. The age, therefore, was ripe for the doctrine of development and descent. Mr. Darwin's merit was to give form and coherence to this great speculative idea, to show that the law by which Nature works is that of "selection of the fittest"—or, "of the most favoured races—in the struggle for existence."

Some of the views of Darwinians, especially the pedigrees of animals, must appear strange till the world becomes familiar with them, but the great merit of the new doctrine is that it has re-created Zoology, Botany, Embryology, and Geology, and their kindred sciences. Everything connected with the past and with the future of man and of society is seen to be more or less bound up in the question of evolution, development, and descent.—*Daily Telegraph*.

A writer in the *Standard* says:—Darwin, by universal consent, was regarded as our greatest naturalist. Full of years and honours, beloved for his personal qualities by many who differed from him on scientific questions, with a reputation such as no worker in the same field has obtained since the time of Linnæus, the kindly Kentish Squire who, for more than half a century has been a familiar name in the Academies of Europe, has left many pupils, but no successor. Happier than most founders of a school, he lived to see the theory so extensively known as the “Darwinian” come of age, and take its place almost unchallenged among the views permitted even to those who would scorn the imputation of heterodoxy.

In the twenty-three years which have elapsed since the *Origin of Species* first appeared, the temper of the reading public has undergone a wonderful revolution as regards that classical work. It is no longer shunned as a banned treatise. Years ago it was removed from the *Index Expurgatorius*, for whatever may be our opinions regarding the ultimate vitality of the doctrine of Natural Selection and the Survival of the Fittest, it is impossible for any one who aims at a loftier plan than that of an anachronism to avoid mastering not only the facts of that book, but also its conclusions.

But the *Origin of Species* was only the preface of a long series of other works, some of them only an amplification of the “theory,” but all of them containing a wealth of data more or less bearing on it. No one nowadays can afford to be ignorant of the main facts concerning the “good effects of intercrossing,” the method by which orchids are fertilized, the curious ways of climbing plants, the manner in which *Drosera* and *Dionæa* absorb organic matter, the uncomfortable traits of face, disposition, and vice which we share with the brutes, the alterations undergone by animals and vegetables under domestication, the almost intelligent motions which the rootlets and tendrils of plants display; or those useful habits of earthworms about which thousands have been talking during the last year. Yet even this long category of his salient labours by no means exhausts the roll of Mr. Darwin’s achievements.

Long before the memorable 1st of July, 1858, when his paper containing the outline of the theory of Natural Selection was read to the Linnæan Society, he was a man of mark, but it was not until his fiftieth year that the fame of Darwin first burst on a world which did not then know whether to be angry or to be amazed, but finally agreed in according him the place from which, in our day at least, he is never likely to be deposed.

Mr. Darwin was ever the most cautious of observers, the most tentative of theorists. Some of his speculations were so captivating that younger heads, less judicial than his, were carried away by the easy solution of a difficulty which he foreshadowed. It required his warning voice before they unwillingly drew rein in their headlong course. They would be told that such and such a remark "is only a suggestion"—it is unsupported by the necessary facts, or logically weak in this or in that important point. "Better, therefore, go on observing and gathering data, before accepting the idea for more than its true value."

Mr. Darwin's "hypothesis"—to use the now almost abandoned name which the men of little faith first applied to it—is backed up by such an astounding series of data that, though many of its conclusions must for ever remain unconfirmed, it almost deserves the position claimed for it as a sound deduction, the main inferences from which no future discoveries can ever shake.

The deep sea dredger at one time believed that he had shot his arrow between the joints of the Darwinian harness; but, as the master himself demonstrated, Sir Wyville Thomson, by not quite understanding the ideas which he had attacked, only confirmed instead of refuting them. The Geologist was to have put an end to Darwinism. But, as Mr. Huxley proved so conclusively in his lecture on the "Coming of Age of the Origin of Species," every fresh find of the Palæontologist only strengthens more thoroughly the chain of evidence by supplying the long-sought-for missing links. Darwinism was, indeed, no hasty inspiration of a clever man. A score of failures led up to it. The labours of a lifetime devoted to research were the foundation on which it was built. The author of it first vaguely formulated his great thought while studying on board the "Beagle;" he matured it during thirty years of fact-collecting and reflection, and it added much to the confidence with which his startling inferences were received that another eminent observer, Mr. Alfred Russel Wallace, struck upon identically the same ideas, though without any communication with Mr. Darwin.

This curious circumstance he was ever anxious to explain, and it affords a pleasing contrast to the unbrotherly kindness which too often prevails in the ranks of Science, to see the entire want of jealousy which animated the intercourse of these fellow-workers. Mr. Darwin could well afford to spare a little on his superabounding reputation to Mr. Wallace, Mr. Wallace, of the other hand, was never weary of declaring that, without the co-operation of his greater colleague, he could never have

gained or kept the ear of the world. He had tried his strength, and knew his weakness. Mr. Darwin was, indeed, fortunate in his disciples. Lyell, Hooker, Huxley, Haeckel, Asa, Gray, Carus, Delpins, and Fritz Mueller, are great names to call at random out of the roll of his followers. His modesty, kindness, and consideration for every one, friends or foes, won him warm advocates, and disarmed bitter opponents; and, to-day, no man is more mourned throughout the world. His theory may die after having served its purpose, as a flag round which to fight. But his facts must live, and his teachings will forever influence the thoughts of mankind.

In the village of Down, Mr. Darwin was scarcely ever seen, as he confined himself almost exclusively to the grounds adjoining his home, in which most of the experiments of which the world have had the advantage were made. It was here that he pursued his close study of the habits of worms which formed the subject of his latest work, minutely adjusted frames of three feet square being fixed in various places to enable him to follow their exact habits under varying circumstances, and here it was also that he pursued those researches the results of which were afterwards given in his remarkable book on *The Movements of Plants*.

Inheriting early in life an ample fortune, Mr. Darwin lived the life of a country gentleman, never holding or seeking any appointment which might entail duties incompatible with the pursuit of original and independent observation. Hence, from the age of twenty-two, his whole existence may be said to have been devoted to research, which brought him a great accession of fame, and, latterly, to the composition of the works in which his observations were recorded, and that secured to him some of those pecuniary rewards which, in consecrating over half a century of laborious work to the enlightenment of the world, he valued but little. It is, indeed, scarcely possible to point to a career more entirely disinterested. Newton and Herschel spent lives even longer in the service of Science. But each also served the State as Master of the Mint, while the only other naturalists with whom Mr. Darwin is comparable—viz., Linnæus, Cuvier, and Owen—were compelled by necessity, or induced by choice, to spare a part of their time to duties which, though of a highly honourable description, cannot be strictly described as the unpaid pursuit of learning and discovery.

The fundamental principle of the famous "Darwinian Theory" is that all the varieties of plants and animals which we see in the world were not created, but were "evolved" from a few, or

even from one simple organism, by a system of natural selection, by means of which any species, instead of being immutable, is always liable to change, owing to some one of its individuals, being better fitted for adaptability to its surroundings, gaining a start of the others, and multiplying at their expense. Every plant and animal tends to increase in numbers in a geometrical progression, and every species transmits its general likeness with individual differences, to its offspring. But, the Darwinian argues, any individual may present minute variations "of any kind and in any direction," and "that part being practically indefinite," these differences may in time assume the form of specific differences. This Theory—of which only the crudest outline, in the briefest space, has been given—was enunciated with a logical clearness, a mastery of the sciences necessary to its elucidation, and a wealth of curious little-known facts, applied with a captivating literary power, moderation, and courtesy to all possible opponents, that fairly took the world by storm.

The Origin of Species was the book of the season. Every newspaper and magazine devoted long columns of reviews to it, while from platforms and pulpits, and University rostra, it was the subject either of the most unstinted adulation or of the most intemperate invective. The Continent was equally enthusiastic over it, and in the course of a short time the work was translated—sometimes more than once—into every civilised European language; while the author's portrait appeared in all the illustrated journals, photographers' cases, and print-shop windows. In brief, he awoke one day to find himself famous far beyond the comparatively circumscribed circle in which his reputation had hitherto been confined. The book was fortunate in its support, for from the first it received the warm applause and able advocacy of Mr. Huxley, Sir Charles Lyell, and Dr. Hooker.

In the twenty-one years that had elapsed since the publication of *The Origin of Species* a wonderful change had passed over public opinion. Its author was no longer regarded as an iconoclastic ogre, but as a quiet, modest, eminently religious, reverent, and cautious gentleman, aiming at the truth and the truth only.

While in Germany, Sweden, Italy, and even France, he was regarded as a sort of prophet, of much the same nature as Goethe in the last age and Carlyle in ours. Enthusiastic pilgrims came from all parts of the world on the chance of speaking to him, and so affably were they received, that if they arrived doubters, the chances were that they left him Dar-

winians. The terms which he had introduced—"the survival of the fittest," "the struggle for existence," and "natural selection"—have become familiar phrases in our literature and ordinary conversation; and in the Austrian Parliament, the President, in introducing the business of the day some years ago, referred to this theory as one of the main points which now concerned the world. In twenty-one years the literature of the subject had become extensive enough to fill a library, and already the German booksellers have appropriated a separate section of their catalogues to "Darwinismus"—the publications treating of Darwinism.

In plays, caricatures, poems, novels, and essays on both sides of the Atlantic the doctrine of men having descended from monkeys has been repeatedly referred to in jest or earnest, until probably every educated person in Europe and America is more or less familiarly acquainted with Mr. Darwin and his works. By many both are still regarded with horror. But when Universities and Academies heap their honours on the author, it is evident that the opposition to Darwinism is only of a passive type.

MR. DARWIN'S name may be ranked without fear with the names of the most famous philosophers. His place, it is almost impossible to doubt, must be where Newton and where Kepler are, with Aristotle and Copernicus. Perhaps no student since man first began to speculate on the world which surrounds him ever attained ideas so far in advance of what had been deemed true, and saw these ideas find acceptance with his contemporaries. Mr. Darwin was fortunate in the period of his birth. Had it been possible for a philosopher to arrive by his steps at his conclusions in any period more remote than the last two hundred years, he would have had but two courses before him. He might have held his peace, or he might have accepted the fate of Bruno and Vanini, not to say of Campanella. But Mr. Darwin lived at a time when, for good or evil, "a man may say the thing he will."

Mr. Darwin was thus born into an age which was already aware of the value of method, and he, above all men of our age, illustrated and made conspicuous the merit of patience and caution. Had he done no more than this, he would have deserved eternal gratitude, but he did much more. He proved, at least within limits beyond which only conjecture exists, the presence of certain constant laws of evolution. The knowledge and acceptance of these laws have revolutionized science.

He busied himself with studying the life and natural growth of plants and animals, but the laws which he showed to prevail in that life also govern human activities. The slow processes of development can be traced at work in the thought and mind of man, in his religion, his politics, his morals, his society. Beginning with a nebulous state of confusion, in which, among undeveloped men, politics are scarcely to be distinguished from religion, and religion is almost the same as science, and all the objects in the world are regarded as practically the equals and kinsfolk of man himself, we arrive, by a series of differentiations at modern society, with its manifold well-marked definitions and divisions. Thus philosophy, with its old theories of innate ideas and prenatal memories, is becoming nothing more than the history of man as determined by the laws of evolution. We no longer "move about in worlds not realized" since Mr. Darwin completed his task. Socrates bade the philosopher "learn some charm to still the child within us." Mr. Darwin has taught us the charm, and it proves to be no "mystic chain of verse," but the application of reason, of organized common sense, to the facts of the world.

In his voyage his chief ideas probably came to him; but he refused to speculate on what Bacon (himself a most conjectural philosopher) would have called an insufficient collection of instances. He worked at accumulating and reflecting on facts for five years before he allowed himself the luxury of deliberate speculation.

Mr. Darwin's character was a noble one, and free from the jealousies common among people of science, art, and letters. He was incapable of malevolence. He was scarcely capable of even momentary anger at the grossest calumny and misrepresentation. He never aimed at cheap popular successes. He did not even lecture on science made easy; he provided no philosophic pap for the devourers of magazines and primers. His health never recovered the tribulations suffered during the voyage of the "Beagle," and Mr. Darwin had to husband his strength. He showed himself little in public; he was not found at lectures, nor on platforms. He built no flimsy house of bricks for one generation, but a lasting mansion of reasoned truth.

Mr. Darwin's speculation in the end led him to derive man from lower animal forms. There has never been an age or country, perhaps, except in the ages of faith in Europe, when men did not hold this idea in the rough. The Red Men of America tell how at first we all had tails, and wore them off by sitting on them—a thing they greatly regret. They also invert

the evolutionist theory of the horse's hoof, which, it seems, is really the representative of a commonplace set of toes. The Red Men, on the other hand, say we started with a solid hand, and developed five fingers. The Ojibbeways say Adam and Eve were covered with scales. These dropped off, leaving but twenty—the finger nails and toe nails. Australians, Africans, Americans, all trace their origin, as a matter of course, to various beasts, birds, and fishes. But all these were conjectures founded on scattered analogies, and not careful about demonstrating the existence of various grades and processes of development. It was Mr. Darwin's colossal task to work the idea out in reasoned detail.

The voyage in the "Beagle" has been described by himself in one of the most delightful works in the English language. The charm of foreign travel to a mind imbued, as Darwin's was, with a sense of the significance of all Nature's teachings, is graphically presented in the *Journal of Researches into the Geology and Natural History of the Various Countries visited during the Voyage of H.M.S. "Beagle" Round the World*. We see the master searching thoughtfully into Nature's secrets, attempting in particular to pierce the veil which hangs over the great mystery which it was to be his work partially (at least) to solve, but leaving unexamined no subject of inquiry which suggested itself to his consideration.

It would be impossible even to mention here all the matters treated of in this charming work. At one page we find the great naturalist dealing with the habits of sea-slugs and cuttle-fish, while at another he is inquiring into the manners and customs of spiders; frogs and phosphorescent insects; conferva and infusoria; butterflies and birds; wild horses, cattle, and rabbits; every order, in fine, of living creature, attracts the thoughtful consideration of the future discoverer of the great law of the origin of species.

Animals, but not only animals, occupy his attention. Botany had a special charm for Darwin. He considered, indeed, that no traveller could thoroughly appreciate the scenery of foreign lands who was not a botanist. "A traveller," he said, "should be a botanist, for in all views plants form the chief embellishment. Group masses of naked rock even in the wildest forms, and they may, for a time, afford a sublime spectacle, but they will some day grow monotonous. Paint them with bright and varied colours, as in Northern Chili, they will become fantastic; clothe them with vegetation, they must form a decent, if not a beautiful picture."

With such tastes we cannot be surprised that the wonderful botanical forms which exist in tropical countries had an irresistible charm for Darwin. In speaking of his travels he dwells (as Humboldt does) on the impressive character of the tropical flora. "Among the scenes which are most deeply impressed upon my mind," he wrote in after years, "none exceed in sublimity the primeval forests undefaced by the hand of man; whether those of Brazil, where the powers of life are predominant, or those of Tierra del Fuego, where death and decay prevail. Both are temples filled with the varied productions of the God of Nature, and no one can stand in these solitudes without feeling that there is more in man than the mere breath of his body."

But, besides botany and zoology, Darwin made geology a subject of special study. Dwelling thoughtfully on the wonderful lessons to be learned from the qualities of the earth's crust, he was led to recognise how closely the aspect of the various regions of the earth is associated with the nature of the flora and the fauna which inhabit them. Other branches of physical research also occupied his mind. We find him studying the laws of electric phenomena, the motions of clouds, and a variety of other subjects which many naturalists would regard as little associated with their special work. Yet it is always easy to trace the associations which in Darwin's mind brought such inquiries into correlation with the great question of natural history he subsequently made his own. With all the wideness of view characterising the man who is to be the interpreter of Nature we yet find that power of concentrating the thoughts and labours of a lifetime on one chief object of research, without which the student of Nature cannot hope to detect the presence of great and general laws.

It is impossible to read without pain the "retrospect" which closes the last chapter of Darwin's narrative of the voyage. Uncomplaining as is its tone, there yet runs through it a feeling of sadness, showing that the writer was not unaware of the lasting nature of the injury which the long journey had done his health.

The new theory of the origin of species by natural selection was published on November 24th, 1859. It will be in the recollection of most of our readers with what a storm of mingled ridicule and indignation the new theory was received. Wild views spread on every hand as to its nature, and even those who had the means of mastering Darwin's reasoning joined in misrepresenting and ridiculing his doctrines. A considerable time elapsed before the general public would

consent to inform themselves as to the real nature of the theory which they had been all but unanimous in abusing. Yet of this self-same theory, Professor Huxley said ten years later before the Royal Institution of Great Britain, that so rapidly had it established itself in favour that he began to think it would shortly require for its welfare a little healthful opposition.

How far this doctrine of the modification of species extends, even Darwin himself has not claimed to assert with confidence; but he went very far. "I cannot doubt," he said, "that the theory of descent, with modification, embraces all the members of the same class. I believe that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number." He looked forward even farther, however. "Analogy would lead me one step farther," he said, "namely, to the belief that all animals and plants have descended from some one prototype." Daring as these views seem even now, it is difficult to recall how much more daring they were when Darwin first propounded them. When he announced his theory, there were not twenty living men who were likely to receive it with favour. It was in an especial manner on account of its supposed bearing on religious questions that the Darwinian theory when first propounded was repugnant to the feelings of many conscientious men. Gradually, however, it was felt that the new theory, rightly understood, tended to raise instead of to degrade, as was alleged, our conceptions of the scheme of creation. To quote the noble words with which Darwin concluded his treatise: "From the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been and are being evolved."—The *Daily News*.

CONSIDERING the strong words that have been used about the great treatise, the *Origin of Species*, it is strange to see how obvious and simple are most of the conclusions advanced in its pages. As Professor Fiske has pointed out in his profound *Cosmic Philosophy*, the whole book resolves itself into certain simple propositions, most of which are demonstrated truths. We present these propositions in order:—

More organisms perish than survive. No two individuals are exactly alike. Individual peculiarities are transmissible. Those individuals whose peculiarities bring them into close adaptation with their surroundings survive and transmit them to their offspring. The survival of the fittest thus tends to maintain an equilibrium between organisms and their surroundings. The environment of every group of organisms is steadily changing. Every group of organisms must therefore change in average character under penalty of extinction. A change set up in one part of an organism necessitates changes in another part. These changes are complicated by the law that structures are nourished in proportion to their use, and the changes thus set up must alter the character of any group of organisms. These are propositions which a child can understand. After they are granted, Darwin simply asks us to believe that since the appearance of life time enough has elapsed to produce all the variation of species now seen.

The volume closes with a beautiful and devout expression of belief in the divine wisdom that orders the life of the world. But, in spite of Darwin's simple faith, his views were twisted by unwise men. By some sad irony of fortune the most reverent of thinkers was injured by rash disciples who misunderstood him. The man who had done more than any other writer to show the marvellous design that runs through creation was represented as believing in mere anarchy. This error has long ago passed away, but it must have grieved Darwin much while it lasted.—The *Morning Post*.

MR. DARWIN'S theory on the origin of species, vegetable and animal, referred them to the operation of a general law of nature, in the universal struggle of living organisms for subsistence, and in the competition for opportunities of reproducing their kind, tending to the survival of the fittest types, and to the modification of their progeny, in the course of successive generations, by more and more distinctive peculiarities growing up in those organs or features which aided most effectually in the preservation of the race. Individual types of exceptional vigour, and with particular adaptation to surrounding circumstances, would thus become the progenitors of distinct species.

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beings in any general conclusion respecting his manner of appearance on this earth." But in the *Descent of Man, and Selection in Relation to Sex*, which was published in 1871, Mr. Darwin expressly dealt with this most interesting question. He presented man as co-descendant with the catarrhine or "down-nostrilled" monkeys, from a hairy quadruped, furnished with a tail and pointed ears, and probably a climber of trees. Nay, he traced back the chain of descent until he found as the progenitor of all the vertebrate animals some aquatic creature, hermaphrodite, provided with gills, and with brain, heart, and other organs imperfectly developed.

"He was," said Canon Prothero, at Westminster Abbey, "the greatest man of science of his day, but was so entirely a stranger to intellectual pride and arrogance that he stated with the utmost modesty opinions of the truth of which he was himself convinced, but which, he was aware, could not be universally agreeable or acceptable. Surely in such a man lived that charity which is the very essence of the true spirit of Christ."

Canon Liddon, in his sermon at St. Paul's, observed "that when Professor Darwin's books on the *Origin of Species* and on the *Descent of Man* first appeared they were largely regarded by religious men as containing a theory necessarily hostile to religion. A closer study had greatly modified any such impression. It is seen that, whether the creative activity of God is manifested through catastrophes, as the phrase goes, or in progressive evolution, it is still His creative activity, and the really great questions beyond remain untouched. The evolutionary process, supposing it to exist, must have had a beginning: who began it? It must have had material to work with: who furnished it? It is itself a law or system of laws: who enacted them? Even supposing that the theory represents absolute truth, and is not merely a provisional way of looking at things incidental to the present stage of knowledge, these great questions are just as little to be decided by physical science now as they were when Moses wrote the Pentateuch; but there are apparently three important gaps in the evolutionary sequence which it is well to bear in mind. There is the great gap between the highest animal instinct and the reflective self-measuring, self-analyzing thought of man. There is the greater gap between life and the most organized matter. There is the greatest gap of all between matter and nothing. At these three points, as far as we can see, the Creative Will must have intervened otherwise than by way of evolution out of existing materials—to create mind, to create life, to create matter. But,

beyond all question, it is our business to respect in science, as in other things, every clearly ascertained report of the senses; for every such report represents a fact, and a fact is sacred as having its place in the Temple of Universal Truth."—*Illustrated London News*.

HIS work consisted in making it probable to civilized man that the history of animated nature on our globe had been different from that which it had been previously supposed to be—that it had been a history of very slow and very gradual change, and not a history of abrupt transition. Exactly the same lesson was being taught by contemporaneous labourers in the fields of geology, anthropology, and even astronomy. That the order of the universe is the order of a supreme mind working silently and closely through ages, and not spasmodically through centuries, is now as much an accepted idea of civilized man as the theory of gravitation. To the general acceptance of this idea no one contributed so powerfully as Mr. Darwin, although he contributed to it in a much less exclusive way than the way in which Newton contributed to the acceptance of the theory of gravitation. The idea of which Mr. Darwin was the chief exponent has commended itself as probable to the generation he addressed, not merely because it gave shape and consistency, but because it is an idea which forces itself on all who apply the modern method of investigation to the exploration of nature.—*Saturday Review*.

WITH the exception of certain honorary distinctions—granted somewhat late, it must be said, by Universities—Darwin received no recognition from sources whence marks of admiration of great powers and great deeds usually proceed. We cannot but regret that the greatest genius of our century was permitted to dwell in close retirement at the very doors of the State, without one single mark of national pride in his possession, while foreign countries not only accepted, and adopted, his teachings, but in many ways showed the honours which they would have delighted to shower upon him. Whether this was dictated by narrow, spiteful opposition to views which, because they were, to them, incomprehensible, were therefore unpalatable, or due to inability to perceive the important nature of the consequences of Darwin's work, detracts nothing from the conduct itself. It is well that the same little, ignoble feeling has not been permitted to influence the performance of the last act of tardy acknowledgment that is possible in this direction. There is but one appropriate

resting-place for the greatest naturalist in the world—the founder of the modern school of biology, the most illustrious scientific *savant* of the century—and that place is amidst those who are by right regarded as the creators of our intellectual superiority—in the national fane of Westminster.—*The Medical Press and Circular.*

WE may be asked, of course, what it is, after all, that Darwin has done? He has not invented an electric light, or a vacuum break, or thrown a viaduct across a valley, or tunnelled under a strait, or discovered some marvellous method by which to convert brewers' refuse into bread. He has done nothing for which he could have taken out a patent, or have started a joint-stock company with limited liability. But he has lived from the first in an air higher than that where money is made, and professorial chairs are given away. And living thus, purely, simply, and honestly, he has left his mark indelibly upon human thought; the history of human thought being, for each and for all of us, the history of the Universe. Peerages and decorations are conferred upon men who successfully conduct negotiations in the sugar trade, or wage war with the Martini-Henry rifle against naked savages. Darwin enjoyed no such distinction. Certainly he never coveted it. He was never made a Commissioner of anything. His whole life was one continued worship of truth for its own sake. He was incapable of jealousy, ambition, or self-seeking, and—though he himself knew it not—the moral lesson of his life is perhaps even more valuable than is the grand discovery which he has stamped on the world's history.—*The Observer.*

No man has so clear a right to share Sir Isaac Newton's place of rest as he. His great thought is as signal a simplification of man's conception of nature as the theory of gravitation itself. It is true that Darwin never meddled with theology as Newton did; but the chief result of Sir Isaac's religious speculations was to prove himself a heretic. In these days sciences are farther apart than they were; no man pretends to universal knowledge; it is permitted to every inquirer to pursue his own path of research, without a too curious regard to the accordance of his results with accepted theories and common beliefs. But it is worth while to point out that many sweeping generalizations, many negative conclusions announced in the name of a philosophy of evolution belong not to Mr. Darwin himself, but to some of the less judicious of his disciples.

Darwin's writings may be searched in vain for an irreverent or unbelieving word. Nothing was more remarkable in him than that rigid and conscientious allegiance to truth which, while it bid him hide no fact, nor fail to draw any inference, at the same time confined his deductions within the strict limits of logical cogency. He was the farthest possible from the easy sweep, the all-comprehending grasp of that fashionable philosopher of evolution, of whom it was once wittily said that he was ready to give a recipe for everything "from a kosmos to a rice pudding."

Sir Charles Lyell, in his *Antiquity of Man*, quotes a saying of Professor Agassiz "that whenever a new and striking fact is brought to light in science, people first say 'it is not true,' then that 'it is contrary to religion,' and lastly, 'that everybody knew it before.'" If a sermon delivered in St. Paul's by Canon Liddon may be accepted as evidence, the theory of evolution has passed through the two first stages of Agassiz' process, and is already on its way to the third. From the extracts from his sermon* it will be seen that the eloquent Canon accepts Darwinian theories only with reservations. His remarkable words only need to be carried to their legitimate issue to indicate the basis on which the long-looked for reconciliation between science and religion will be possible.—*The Church Review*.

THE name of Charles Darwin is emblazoned on the scanty roll of the few who have added a province to the empire of knowledge or quickened the march of intellect by the infusion of a fresh and fertile idea. His fame is European. France acknowledges in him the worthy heir of Buffon, Lamarck, St. Hilaire, and Cuvier; and Germany pays him her highest compliment by comparing him—less appropriately, for the character of their intellect was extremely different—to the great scientific hero of her race, Alexander von Humboldt.

The *Origin of Species by Natural Selection*, at once placed him on the first rank of the naturalists of all time. It is a work which has been much misapprehended by many who have thought themselves competent to attack it, but who do not seem to have qualified themselves for the purpose by taking the trouble to read or, at least, to understand it. It is often represented broadly as a statement of the universal progression from lower to higher forms of life, and the culmination of absurdity is thought to be reached when Darwin is accused of making man the grandson of a monkey.

* See page 33.

But his real theory is much more subtle and refined. In it the history of life is so far from being a history of universal advance that it presents many instances of degeneration; and the monkey which he places on the line of the ancestry of man is some hitherto undiscovered form, probably very different from any which exists at the present day. The two positions which his book really advocates, and which may be considered as almost universally accepted now by all naturalists of reputation, are first, that species are variable; and secondly, that their variation is brought about by the circumstances under which they are placed. The doctrine which previously prevailed, that all the forms which naturalists have dignified with the name of Species, were separately created at the beginning of the world and have remained ever since what they were at first, is scarcely now anywhere maintained, though it may still be a question whether there are no limits to the variability which Darwin assumed to be indefinite. And it can as little be doubted that *Natural Selection*, or the *Survival of the Fittest*, is a powerful factor in bringing about this variation. Obviously those forms which are least adapted to the surrounding circumstances, or "environment," will die the soonest or live with diminished vitality, and, therefore, reappear in fewer and fewer numbers in each successive generation, until at length they die out altogether, and leave their more fortunate fellows to represent an altered species.

But here again the question arises whether this cause, though plainly able to effect much, is sufficient to account for all; and that it is not equal to sustain this burden alone was admitted by Darwin when, in a subsequent volume—the *Descent of Man*—he added the principle of "sexual" to that of "natural" selection, in order, chiefly, to explain the problem, extremely difficult on his first theory, of the development of beauty and ornament as well as utility. But no additions or modifications of this kind will detract from the merit which belongs to Darwin, and which places him on the level of the few great original thinkers of mankind, of having produced an idea which has inspired Biology with a fresh life, and stimulated every branch of the science into renewed and hopeful activity.

That such speculations as these should create, when they were first broached, a wide-spread panic among religious minds, was nothing more than natural. They were certainly new, and they seemed to be in direct conflict with old and cherished beliefs. The new truths of biology have been gradually assimilated by religion and found harmless, as the new truths of geology were assimilated a generation ago, and the new truths of astronomy

in a more distant past. But it would be as vain as it is unnecessary to deny that our theology also has been influenced by the new truths thus brought to bear upon it.

They have in all these cases compelled us to discriminate more sharply between the divine revelation and its human interpretation; and they have in all of them driven us back more effectually from the letter to the spirit, from the outer husk to the inner kernel, from the shape and fashion of the clothing to the solid substance which it encloses. We have learnt from them to feel more and more that, while it is all-important to believe in a Creator and Ruler, it is of less moment to ascertain the precise methods by which His act of creation was accomplished, or by which His providence is now working; and that so long as we are convinced that "it is He Who hath made us and not we ourselves," and that He hath given to all His creatures "a law which shall not be broken," we may pursue without anxiety the speculations offered by science as to the manner in which we were made, or the laws by which the present aspect of the universe has been evolved.

The prevalence of this more wholesome way of regarding the apparent differences between religion and science is well illustrated in the many sermons which contained a graceful reference to the great philosopher we have lost. Addressing the vast congregation at St. Paul's, Canon Liddon in those clear tones which penetrate with such a wonderful power the long lines of distance that stretch away from him, put this point with extreme clearness. "The evolutionary process, supposing it to exist, must have had a beginning: who began it? It must have had material to work with: who furnished it? It is itself a law or system of laws: who enacted them?" The inevitable answer to these questions justifies the assertion which Canon Barry made the same evening in Westminster Abbey, that "the fruitful doctrine of evolution, with which Darwin's name would always be associated, lent itself at least as readily to the old promise of God as to more modern but less complete explanations of the universe."

Under the shelter of these eminent authorities we need not qualify our admiration for the high intellectual qualities of the great thinker who has passed away, by any anxiety about the legitimate result of his speculations, or by any misgivings lest the sacred pavement of the Abbey should cover a secret enemy of the faith. Let us rather see in the funeral honours paid within those holy precincts to our greatest naturalist, a happy trophy of the reconciliation between Faith and Science.—
The Guardian.

DARWIN'S great work, and the great idea which has remodelled scientific conceptions, seems to be that of showing the operation of grand general laws and exhibiting the universe as one organic whole. Previously, men of science were digging up, as it were, detached fragments. Darwin linked all together, and showed that all were a grand unity. It appears impossible to over-rate the gain we have won in the stupendous majesty of this idea of the Creator and creation. Some men cried out at what appeared to them the denial of special design, because this seemed to them ignored in those lesser things they had been accustomed to regard as proofs of it; forgetting the Divine grandeur of the one vast design—the only true omniscience—whose infinite wisdom could include all details within itself, and work them all out by its inscrutable laws.

Had Darwin been under training for perforce, as once intended, a professional man, it is probable his great work would never have been done. Yet how seldom do we see just such advantages similarly improved by any real *life work* at all!

See, again, how humbly and unobtrusively it was all done. Interrupted, and chained at home by constant delicacy of health, he was never found on platforms, or gaining renown by lectures; and never showed a sign of consciousness that he was a great man. And his special knowledge was not picked up out of learned books, nor did it deal in long names. In travel; in his own garden; from plants in pots, and humble worms fenced within small areas of ground; from such as these were the facts gathered, which were afterwards recorded in books, every word of which can be understood by every one; and from him did Sir John Lubbock learn how, in the same way, to study ants.

Lastly, let us learn from his placid temper and invariable kindly courtesy. To the abuse heaped upon him he never returned one vexed word; his composure was absolutely unruffled. And to the last, so long as he could write, any tolerable letter from any one would always bring an autograph reply. This broad charity inflicted upon him many queer correspondents; but on the other hand it brought its reward, for all over the world all sorts of people were eager to send him what he most cared for—facts. He always gave credit for these where due, in the most cordial manner; and nothing is more characteristic of the two men than the behaviour towards each other of Mr. Darwin and Mr. Wallace in relation to their common exposition of Evolution. How often do we see disputes as to "priority" in some petty discovery; in this case,

almost alone so far as I know, we have two co-discoverers almost competing as to which can speak most highly of the other.—*The Sunday School Chronicle*.

It is certain that Mr. Darwin's books contain a marvellous store of patiently-accumulated and most interesting facts. Those facts seem to point in the direction of the belief that the Great Spirit of the Universe has wrought slowly and with infinite patience, through innumerable ages, rather than by abrupt intervention and by means of great catastrophes, in the production of the results, in the animate and inanimate world, which now offer to the student of nature boundless scope for observation and inquiry.—*The Christian World*.

WHATEVER view may be taken of the philosophical theory that bears the name of Darwin, its strongest opponents freely acknowledge the candour of its author, and the force and ingenuity of the arguments by which it is supported.

The publication, less than a quarter of a century ago, of the *Origin of Species by means of Natural Selection*, may be said to have caused a revolution in the views held as to the origin of life. Fifteen years before that date the publication of the *Vestiges of the Natural History of Creation*, in which the Lamarckian doctrine, that existing forms of life have descended from pre-existing forms, was restated in an attractive form and gave rise to a long and bitter controversy.

This controversy had reached a comparatively mild stage when Mr. Darwin, avoiding the mistakes of the *Vestiges*, came forward with his now celebrated theory that existing forms have been gradually developed by "natural selection" and the "struggle for life," in which the strong overcome the weak, or, as Mr. Herbert Spencer puts it, "the survival of the fittest." The restatement of views that are as old as philosophy itself, supported as these were with great ingenuity of argument and by the aid of a vast store of scientific information most skilfully used, gave a fresh impetus to the controversy, and turned into a new and unexpected channel. It was seen and felt that Charles Darwin was a man of no ordinary power. His views at once commanded attention, and attention soon grew into admiration or alarm, according to the views of those who studied them.

Mr. Darwin's life has been remarkably uneventful so far as personal incidents of any special interest to the general public are concerned. But may it not be said of him that in the re-

cesses of his closets he was nevertheless turning the intellectual world upside down? The dates of the production of his numerous works are the principal milestones to mark the period of his long and laborious career.

The work he has accomplished could have only been got through by a most methodical devotion and the firmest determination of purpose. Perhaps even more than this was required, especially in the case of a man who had devoted his life to such studies as those on which Darwin's reputation rests. He could not have achieved the work with which his name is associated had he gone into the usual round and whirl of "society." This he did not do. This does not imply that he was unsocial—far from it; but only that he did not throw away his time and energies upon companions or companionships of a trivial or dissipating nature. A friend who knew him well writes: "Darwin has to a large extent eschewed general society, in which he had learned that there was more of noise and pretence than of calm wisdom and substance, and has almost wholly kept himself apart from public appearances; so much so, indeed, that you might search the journals of the last thirty years without often finding his name in connection with the so-called great causes or 'isms of that long stretch of time."

But, however Darwin may have been absorbed in his speculations, he was not left in undisturbed quietude. It could not be. He had to pay at least part of the price of greatness. If he would write and publish books which stirred the mind and heart of men in all parts of the world as with the sound of a trumpet, it was in the nature of things and inevitable that at least an echo should come back upon him. To say nothing of private praise from friends in all parts of the world, and not least from the United States, in 1853, the Royal Society awarded him their Royal medal, and in 1864 the Copley medal. In 1859 the Geological Society awarded him the Wollaston medal, while foreign governments and societies have at various times acknowledged his distinguished services in various departments of scientific research and knowledge. In the November of 1877 the University of Cambridge rather tardily conferred on him the honorary degree of LL.D.

On his sixty-ninth birthday he was presented with an album—a magnificent folio—bound in velvet and silver—containing the photographs of 154 men of science in Germany. These included many of the best known and most highly honoured names in Europe. He also received on the same occasion from Holland an album with the photographs of 217 distinguished professors

and men of science in that country. In returning thanks for these unique marks of appreciation, Darwin wrote: "I suppose every worker at science occasionally feels depressed, and doubts whether what he has published has been worth the labour which it has cost him; but for the remaining years of my life whenever I want cheering I will look at the portraits of my distinguished co-workers in the field of science, and remember their generous sympathy."

Probably no work on natural history ever called forth so much adverse criticism as did the first of this series. It was trenchantly criticised from two different points of view. Part of this criticism came from other naturalists, who, astounded by its boldness or novelty, were not prepared *ex animo*, or without further consideration, to accept the "Darwinian theory;" and for this they are entitled rather to commendation than to blame. Another part of it came from a different quarter; and here also judgment has to be tempered with respect for the best or deepest opinions or convictions of the human heart. This class of critics, without pretending to much scientific knowledge, considered the "Darwinian theory" to be in direct opposition to the teaching of the Bible.

We have to add that there is a sense in which Darwin has carried all before him. His theory has been generally accepted by the scientific naturalists of the day. The non-scientific or theological opposition is another and different thing; but even this has been remarkably modified in recent years. Knowing the strong opinions or convictions of the religious or theological world in favour of the view of at least the special or supernatural creation of the human race, Darwin contented himself, in his work on *The Origin of Species*, with discussing the derivation of the lower animals, leaving man's origin to be implied.

But all doubts as to his views on this subject were removed by the publication of his elaborate and most noted work on *The Descent of Man*. Here there is no mincing of the matter. In this work Darwin boldly contends that man is the descendant of an anthropomorphic ape, probably arboreal in its habits; and adds, that it is only natural prejudice and arrogance which made our forefathers assume and declare that they were descended from demigods. The same view was still further developed in a later work on *The Expression of the Emotions in Man and Animals*.

His book on worms gives a new idea of the importance of these creatures, and demonstrates the incalculable services which these seemingly insignificant creatures render to the human

race. To quote Mr. Darwin's own words: "When we behold a wide, turf-covered expanse we should remember that its smoothness, on which so much of its beauty depends, is mainly due to all the irregularities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such expanse has passed, and will again pass, every few years through the bodies of worms. The plough is the most ancient and most valuable of man's invention; but long before he existed the land was in part regularly ploughed, and still continues to be thus ploughed, by earthworms. It may be doubted whether there are many other animals which have played so important a part in the history of the world as have these lowly organized creatures."—*The Dundee Advertiser.*

No man of the present century—no man probably of any century in these islands—has brought us so much from the secret storehouses of nature, or has so enlarged the horizon of knowledge as Charles Darwin. His life was wholly devoted to scientific investigations, and how industriously these have been pursued the careful student of his works alone can understand. The mass of facts that Mr. Darwin collected—many of them facts that had never been observed before, many that received a new meaning from being differently associated, and many that threw new side-lights on topics with which it was supposed they had no connection—is perfectly marvellous. One wonders how it was possible for any single individual, however diligent he might have been, so to arrange his life as to find time to cover with his personal supervision such an extended area of phenomena. Darwin worked by methods of his own, and he had the happy faculty of enlisting others in various lines of investigation, all converging towards some great object which he had himself in sight. For with the true scientific spirit his opinions were formed from the widest possible induction of facts. As an observer of nature he was the prince of all scientific men since the days of Aristotle.

Darwin, however, would have filled a smaller space in the scientific history of his time had he been only the prince of scientific observers. He was something more. Behind the keen eye there was a keener mind, a large capacity, and a bold and venturesome imagination. He knew how and why to observe, and in what way to turn his observations to account. We may say, in fact, that the only good observer is he who is in search of something. Darwin had always an object in view, and that object the loftiest that could engage the human faculties. It was to reconstruct from nature a new history of

life in the world. That high aim has not been accomplished. It could not possibly be given to one man, starting with a new method, to have the happiness of filling in the great outlines which he had chalked out. But it is hardly too much to say that his method has been generally accepted, and that there are now hundreds of workers in the fields that he has left for ever. He gave the greatest impulse to the evolutionary doctrine which it ever received when his *Origin of Species* was published, fully twenty-two years ago. He raised evolution from a subordinate to a commanding position in scientific thought. And it was not merely in zoology and in botany that the fresh, powerful impulse was felt; it affected every realm of investigation. It set thinkers in theology, in philosophy, in morals, and in history to reconsider their views, and many of them do not hesitate to tell us that in the evolutionary doctrine they find the safest guide in the subtlest mazes of these interesting departments of human knowledge. Darwin has thus stimulated the whole range of thought in his time, and his force as an original thinker and observer is by no means spent. He was our greatest scientific man, and he was so because he seemed to centre in himself all the tendencies of modern scientific thought. He drew them to him, one might almost say, magnetically, and through him specially scientific thought has influenced all the best minds and the most devoted students of the age.

The due appreciation of Mr. Darwin's great work rests mainly upon the fact that his theory of the *Origin of Species* forms one special phase of the general doctrine of evolution. Mr. Darwin's title, in fact, bears that his work is an attempt to show how species originate by means of "natural selection." This latter term has therefore come to assume a place and value synonymous with "Darwinism" itself.

A brief sketch of Darwin's theory will best promote the understanding and comprehension of his work. Beginning with the proposition that every species of animals and plants exhibits greater or less "variation"—a statement fully proved, it may be remarked, by observation—Darwin held that these variations are transmitted to posterity by ordinary laws of heredity and reproduction. Directing attention in the next place to the fact that living beings tend to increase in geometrical progression, the Darwinian theory holds that this increase is far beyond the capabilities of the earth as a place of abode or as a source of food supply. Hence a severe competition must ensue for the necessities of life, this competition being known under the title of the "struggle for existence." In this struggle the weakest go to the wall and the fittest survive.

A special point in the theory is that which declares the nature of the "fittest." These latter are held to be the animals and plants which differ most widely from their neighbours. Nature thus sets a premium, so to speak, on variation, and encourages departures from the type of the existent species. Next in order comes the assertion that the surroundings of living beings are continually undergoing alteration and change. Hence the variation of the species is encouraged by the alteration of food, climate, and other surroundings, which are matters of geological detail. In this way, then, living beings vary; the variations favoured by nature survive; they appear in the offspring; "varieties" are first produced: these become permanent "races;" and in due time the variation becomes so great that a new "species" appears as the result.

Throughout this process nature is credited with "selecting" the varying races for propagation, much as man "selects" the animals and plants from which he desires to perpetuate his "races." The phrase "*natural selection*" thus becomes an appropriate term for the theory, which owes all its force and power to the illustration with which the genius of its promoter has surrounded it.—*The Glasgow Herald*.

THERE is nothing too mean from which to gather instruction, and nothing so low in the scale of creation as not to exercise an important function. These considerations were never more pertinently illustrated than in Mr. Darwin's latest volume, entitled *The Formation of Vegetable Mould through the Action of Worms*. That work treats of the share worms have had in the formation of the layer of vegetable mould which covers the whole surface of the land in every moderately humid country. Mr. Darwin's observations led him to conclude that the vegetable mould over the whole country has passed many times through the intestinal canals of those creatures. It might be supposed that little really interesting could be said of the worm; but Mr. Darwin has invested this humble theme with a peculiar fascination. Worms according to Mr. Darwin are great fertilizers. The part they have played in the history of the world being incomparably more important than most people imagine. Mr. Darwin has shown that in many districts of England a weight of more than ten tons of dry earth annually passes through their bodies, and is brought to surface on each acre of land; so that the whole superficial bed of vegetable mould passes through their bodies in the course of every few years.—*Newcastle Chronicle*.

TRUE, Mr. Darwin did not originate the great doctrine of descent with modification, any more than Shakespeare originated the story of "Hamlet." He himself has done full justice to his predecessors and to his great contemporary Wallace in the historical chapter prefixed to the *Origin of Species*. But, after all, it was Mr. Darwin who definitely lifted the idea from the region of mere conjecture, gave it form and substance, and impressed it upon the mind of the age as a working hypothesis.

And it will not be merely the naturalists who will feel conscious of the magnitude of his work now that death has removed him from our midst. Rarely in the history of science has a hypothesis had so wide an influence or proved so fruitful in results. In Mr. Darwin's own special department, that of natural history, it has been the means of adding vast domains to our knowledge. We have only to remember the results of deep-sea dredging, the disclosure of the remarkable analogies between ancestral and embryonic forms, to cast our eyes over any modern manual of cryptogamic botany, to feel how influential it has been in opening up new lines of investigation and throwing light on previously unknown regions.

Even those who have sought to modify Mr. Darwin's extreme conclusions have recognized the value of his fundamental conception by adopting his line of thought. The researches of Ray Lankester on degeneracy and of Semper on the influence of the environment, the latter emphatically opposed in many of their bearings to classification based on Darwin's theory of descent, rest on the principle of evolution. We see the fruitfulness of the same doctrine in archæological and geological science, and in astronomy we recognize its influence in the revival of the Kantian hypothesis of the origin of the universe. It is making medicine into a science; to those who are not content except with practical results we may point to the revolution it has effected in the study and treatment of zymotic disease. Nor has its influence ended here; in psychological, sociological, political, and even economic investigation its influence as a method has been equally apparent.

The example of scientific caution and accuracy which he set in an age when there is too great a tendency, in scientific investigation, to endeavour to make a sensation rather than to advance science, is not the least of his services. Only lately, in a letter to a German friend, he told again how long he resisted the theory of descent until forced against his own predisposition, by the constant accumulation of facts, to definitely adopt it; and no one who has read his latest books on the movements of plants and on earthworms could fail to be im-

pressed with the continued industry and carefulness of his later years.

It is doubtless in consequence of a recognition of these high qualities in the man that the subsidence of the religious animosity which greeted the appearance of his great work must be attributed. Truth has nothing to fear from the truth, and theologians may well feel that so painstaking and conscientious a worker could not at bottom be inimical to anything they need value. . . .

None of his works were published at popular prices or dealt with what can properly be termed popular subjects. Yet from first to last it may be estimated that between eighty and ninety thousand copies of his various books were issued from the press. His style was always clear and equally devoid of puerility and florid ornament. He never lost sight of his main object, the presentation of the fact or theory under discussion, but at times there was a strong but restrained power of picturesque description that added to the charm of his work. With all the profundity of his knowledge and the subtlety of his speculation, he was the most unassuming of men, and was always glad to receive information from the obscure student, or to direct the young and ardent into safe and fruitful fields of study. A giant in learning and in genius, he was modest, genial, and unobtrusive alike in public and in private.—*The Manchester Guardian*.

No one within the last fifty years, it may truly be said, has been so large a thought-creator in other men's minds, or played so prominent a part as the stimulator of inquiry as Mr. Charles Darwin. To him we owe it that hitherto unknown regions of biological research have been opened up; that the granary of our old knowledge has been winnowed; and that a fecund field of research has been suggested to the minds of those who cared to pursue the Darwinian theory from the point at which its author stopped. He was always suggestive, and never dogmatic. The facts which his patient investigation enabled him to place upon record were dogmatized upon by some of his disciples—by Haeckel, for example, and by a brilliant young Englishman who passed away some years before his master. The Evolutionist himself, however—though on this point, as on many others, he was sadly misunderstood—was reluctant to draw conclusions. He was content to set down the results of his painstaking investigations, and to leave to his readers the task of drawing deductions or forming a philosophy from the discoveries he had made.

Theologians and many secular critics attacked him bitterly; but they attacked him as a rule, on the score of doctrines which were not his, but those of his more ardent believers. Because he had set thought a-working, he was accused of being the antagonist of revealed truth; whereas he had simply set down in all his works that which he had seen to be true, and it was the "advanced school" among his followers who were responsible for that development of his philosophy which the Church regarded as especially dangerous.—*The Manchester Examiner*.

MORE than twenty years have passed since Mr. Darwin gave to those engaged in the exploration of the mysteries of nature a new working theory, and, at one stroke, revolutionized the ideas that had long been accepted as the foundations of natural science. Since that time his views have been subjected to incessant controversy. Few leaders of thought in modern times have been more vehemently denounced and bitterly criticised on the one hand, more ardently championed and revered on the other. Through it all, Mr. Darwin remained in the modest seclusion of the country home where he could devote all his energies to the work to which he had given himself. He has never held a public appointment, or appeared in any more public capacity than that of the reader of a paper at some one of the learned societies of which he was an honoured member. For fame and distinction he cared literally nothing; the one object he sought throughout life to attain was the truth, and for this he laboured with a single-mindedness, a freedom from the bondage of pet theories and preconceived ideas, that are almost unexampled. He had during his lifetime what to him was undoubtedly the highest reward that could be bestowed upon him, in the ever-increasing acceptance of the theory he was the first to formulate by those who were best competent to form a judgment. That it is a final or complete revelation he himself would have been the last to assert; but he has lived to see it accepted as a great step in advance on a path in which for many centuries no real progress had been achieved.

To Mr. Darwin unquestionably belongs the credit, not only of having thought out the doctrine for himself, but of having first presented it in a clear and formal shape. It is unnecessary to say more in explanation of the central idea of Mr. Darwin's book than that he holds that all forms of organic life are derived from a very small number of primitive forms—possibly from only one—and that all their successive modifications depend on a constant law of transformation, a regular choice of

racés and individuals best adapted to the circumstances of time and locality in which they are developed. The effect produced by the bold and uncompromising exposition of a theory so much opposed to the mass of accepted ideas was profound. Conservative scientists greeted the new teaching with derision; religious orthodoxy took up arms against it with energy. But many of the ablest men of science, in this and other countries, were prepared to receive it, and others to examine it in a calm and impartial spirit; and from that day to this it has been steadily gaining ground, until now there are few prominent writers and teachers in the various departments of natural science who are not, in whole or in part, adherents of the Evolution principle. Mr. Darwin himself did not formally take part in the controversy to which his book gave rise; he devoted himself to a more useful task—that of expounding the data on which his conclusions were based, and of testing those conclusions by further investigation.—*The Scotsman.*

It may not be out of place here to add a few extracts from Continental Papers:—

The *Gaulois* remarks that Darwin will remain one of the greatest glories of science. No other man has during the second half of this century exercised a more decisive and fruitful influence on the progress of natural science. No one else has so much honoured science by the nobility of his character, by the primitive simplicity of his life, and by his deep and sincere love of truth.

The *France* observes:—Darwin's work has not been merely the exposition of a system, but, as it were, the production of an epic—the greatest poem of the genesis of the universe, one of the grandest that ever proceeded from a human brain—an epic magnificent in its proportions, logical in its deductions, and superb in its form. Darwin deserves not only a place by the side of Leibnitz, Bacon, or Descartes, but is worthy to rank with Homer and Virgil.

The *Allgemeine Zeitung* of Vienna says:—We must apologize for touching on political matters on a day when humanity has suffered so great a loss. It seems to us that the world has

become gloomier, and grown greyer, since this star ceased to shine. Our century is Darwin's century. We can now suffer no greater loss, as we do not possess a second Darwin to lose.

The *Vienna Presse* says:—Darwin's *Origin of Species* caused a revolution second to none since the days of Copernicus—a revolution which soon extended far beyond the sphere of natural history, and is already making itself felt in our whole social system. Without knowing or intending it, we have become Darwinian in our politics, in our economy, and in our history, which have all resolved themselves into a struggle for existence. The Darwinian theory has absorbed all metaphysical and religious speculations.

The *Cologne Gazette* says he was a man of science who made a mark upon his times in a manner unparalleled by any of his contemporaries. He compelled every branch of science to acknowledge his revolutionising discoveries. The completion of his gigantic system will give abundant occupation to the remotest generations; but the memory of the founder of this prodigious scientific structure will remain imperishable to all time.

We cannot more fitly close this sketch than by quoting from an article in *Nature*, by Prof. Huxley:—

VERY few, even among those who have taken the keenest interest in the progress of the revolution in natural knowledge set afoot by the publication of *The Origin of Species*, and who have watched, not without astonishment, the rapid and complete change which has been effected both inside and outside the boundaries of the scientific world in the attitude of men's minds towards the doctrines which are expounded in that great work, can have been prepared for the extraordinary manifestation of affectionate regard for the man, and of profound reverence for the philosopher, which followed the announcement of the death of Mr. Darwin.

Not only in these islands, where so many have felt the fascination of personal contact with an intellect which had no superior, and with a character which was even nobler than the intellect; but, in all parts of the civilized world, it would seem that those whose business it is to feel the pulse of nations and to know what interests the masses of mankind, were well

aware that thousands of their readers would think the world the poorer for Darwin's death, and would dwell with eager interest upon every incident of his history. In France, in Germany, in Austro-Hungary, in Italy, in the United States, writers of all shades of opinion, for once unanimous, have paid a willing tribute to the worth of our great countryman, ignored in life by the official representatives of the kingdom, but laid in death among his peers in Westminster Abbey by the will of the intelligence of the nation.

It is no secret that, outside that domestic group, there are many to whom Mr. Darwin's death is a wholly irreparable loss. And this not merely because of his wonderfully genial, simple, and generous nature, his cheerful and animated conversation, and the infinite variety and accuracy of his information, but because the more one knew of him, the more he seemed the incorporated ideal of a man of science. Acute as were his reasoning powers, vast as was his knowledge, marvellous as was his tenacious industry, under physical difficulties which would have converted nine men out of ten into aimless invalids, it was not these qualities, great as they were, which impressed those who were admitted to his intimacy with involuntary veneration, but a certain intense and almost passionate honesty by which all his thoughts and actions were irradiated, as by a central fire.

It was this rarest and greatest of endowments which kept his vivid imagination and great speculative powers within due bounds; which compelled him to undertake the prodigious labours of original investigation and of reading, upon which his published works are based; which made him accept criticisms and suggestions from anybody and everybody, not only without impatience, but with expressions of gratitude sometimes almost comically in excess of their value; which led him to allow neither himself nor others to be deceived by phrases, and to spare neither time nor pains in order to obtain clear and distinct ideas upon every topic with which he occupied himself.

One could not converse with Darwin without being reminded of Socrates. There was the same desire to find some one wiser than himself; the same belief in the sovereignty of reason; the same ready humour; the same sympathetic interest in all the ways and works of men. But instead of turning away from the problems of nature as hopelessly insoluble, our modern philosopher devoted his whole life to attacking them in the spirit of Heraclitus and of Democritus, with results which are as the substance of which their speculations were anticipatory shadows.

None have fought better, and none have been more fortunate than Charles Darwin. He found a great truth, trodden under foot, reviled by bigots, and ridiculed by all the world; he lived long enough to see it, chiefly by his own efforts, irrefragably established in science, inseparably incorporated with the common thoughts of men, and only hated and feared by those who would revile, but dare not. What shall a man desire more than this? Once more the image of Socrates rises unbidden, and the noble peroration of the *Apology* rings in our ears as if it were Charles Darwin's farewell:—"The hour of departure has arrived, and we go our ways—I to die and you to live. Which is the better, God only knows."

The following tribute to the memory of Mr. Darwin is from *Punch*:—

Born February 12th, 1809; Died April 19th, 1882.

A studious porer over Nature's plan,
Calm tracker of her steps, keen, watchful, wise;
Recorder of the long descent of man,
And a most living witness of his rise:
Long o'er his life-work may the fight be fought,
Yet leave him still a leading light of thought.