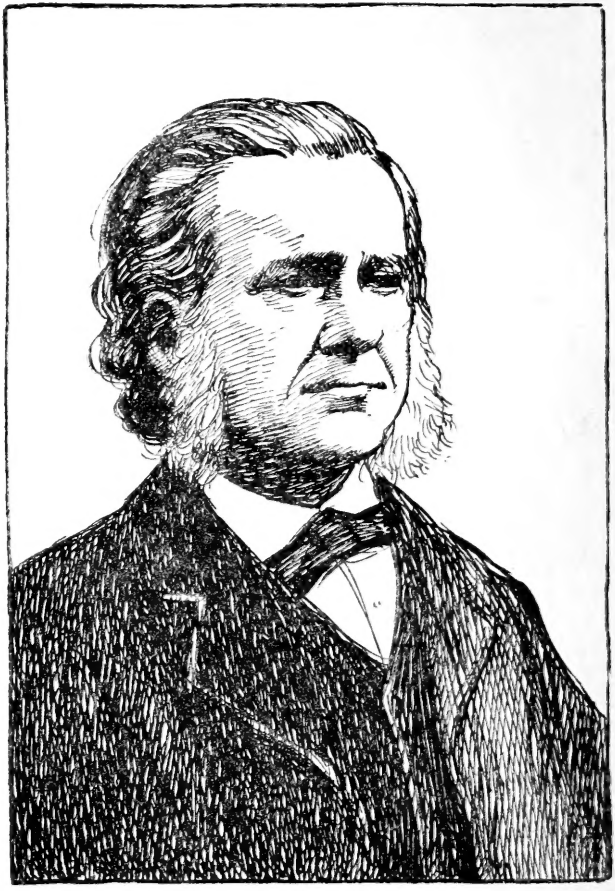
HUXLEY
LIFE·AND·WORK
ALD·LEIGHTON·M·D

THE·PEOPLE'S·BOOKS



HUXLEY

HIS LIFE AND WORK

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PREFACE

THE great French philosopher, M. Henri Bergson, in his recent Huxley Lecture at Birmingham University (May 29, 1911) asked: "What scientific question, what philosophic problem, is there which did not interest Huxley's luminous intellect—one of the broadest and most comprehensive that nineteenth-century England produced, fertile in great intellects as it was?" That being so, it can be well understood that no one volume could deal with all the varied aspects of his strenuous and crowded life. Here there is no such attempt. In these few pages the effort has been to show as clear a *portrait* as possible, to show the man as distinct from his contemporaries, and to indicate his place in the gallery of great British minds.

The quotations in these pages, unless otherwise indicated, are from the *Life and Letters of Thomas Henry Huxley*, by his son, Leonard Huxley—that delightful biography to which we trust these pages may draw our readers. The other references from Huxley's works are taken from "The Eversley Series" (Macmillan & Co.).

GERALD LEIGHTON, M.D.

EDINBURGH, 1912.

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HUXLEY

CHAPTER I

BIOGRAPHICAL (1825–1854)

THOMAS HENRY HUXLEY—the seventh son of a seventh son—was born at Ealing on May the 4th 1825. His father, George Huxley, was the senior assistant master in a large semi-public school. At the critical moment of his birth a beehive close at hand had just swarmed, and was about to make its way into the room in which Huxley was to make his first appearance in this world, when the nurse in charge promptly shut the window. Had it not been for this, he says, the swarm "might have settled on my lips, and I should have been endowed with mellifluous eloquence. . . . But the opportunity was lost, and I have been obliged to content myself through life with saying what I mean in the plainest of plain language, than which, I suppose, there is no habit more ruinous to a man's prospects of advancement."

In most of his physical characteristics Huxley resembled his mother—a brunette of emotional and energetic temperament, to whom Huxley in his early life was passionately devoted. His childhood does not seem to have given any great evidence of undue

precociousness, with the singular exception of a very marked talent for drawing, and this, curiously enough, he never developed to any great extent. Indeed, Huxley's education was strictly limited. He spent a couple of years—from eight to ten years of age—at a school the society of which, he himself says, was the worst he ever knew, and the only cheerful recollection of it was that of a battle with a bully of a schoolmate, whom Huxley, in spite of his more slender physique, effectively disposed of. His inquiring mind, however, led him to seek information for himself, and his taste for reading—an invariable accompaniment of such a mind—caused him to spend many hours a day over books, such as Hutton's *Geology*, which showed, even at that age, the trend of his mental tastes. The fact of his having a brother-in-law in the medical profession attracted him towards the study of human anatomy, and also gave him the opportunity of discussing many scientific topics with a man who was evidently interested in the boy of fifteen. He began to take an interest, about the same age, in metaphysics, to which study he was evidently attracted by his desire to get at the causes and reasons of things—a feature which characterises his whole life. The same tendency manifests itself in his desire to become a mechanical engineer, but, in spite of this, events decided that he should begin the study of medicine. For this, however, he never really cared, and he afterwards expresses himself as being horrified to think how little he knew or cared about the art of healing. What really interested him in it was the study of physiology—the mechanical part of the human machine. His intense curiosity was responsible for an unfortunate result of his at-

tendance at a *post-mortem* examination at the early age of about fourteen. In some way or other he absorbed some poison, or toxic agent, on this occasion, and was very ill after it, and, although he recovered quickly, he himself attributes his subsequent fifty years of dyspepsia to this event.

When quite a boy, too, he began the study of German, teaching himself, and this very soon led to his acquaintance with continental science. He was impelled to this study from his reading of Carlyle, the constant references to German literature stimulating him to acquire the language so that he could read the originals.

In 1841 he went as an assistant to Mr. Chandler, at Rotherhithe, where he had considerable experience among the poor population in the east of London. The poverty and struggle for existence which he found there made a great impression upon his mind. A little later he went to the north of London, being apprenticed to his brother-in-law, and here he began to study for his matriculation examination, gaining the first prize of his career, at Sydenham College, in the subject of botany.

He began his hospital course at Charing Cross Hospital on October 1, 1842, where, he says himself, he worked hard when it pleased him, and when it did not—which was very frequently—was extremely idle. The only instruction which he received which seemed of much real value was that from the lecturer of physiology, Mr. Wharton Jones, who impressed Huxley greatly. This teacher suggested to Huxley the publication of his first scientific paper, which appeared in the *Medical Gazette* of 1845. By a curious turn of events, Huxley's profound

regard for his old teacher was shown in later years, when he was instrumental in obtaining for him a pension. The scientific paper just mentioned is notable, for the reason that it contained an anatomical discovery made by a boy of nineteen, as Huxley then was. It described a membrane in the root of the human hair, hitherto unknown, which was named after him.

His career as a student, despite what he said of his idleness at times, was brilliant, and when, in 1845, he entered for his professional examination at London University, he won the gold medal for anatomy and physiology, and obtained honours. His college classes, however, did not give him the means of a livelihood, and in the spring of 1846 it was suggested to him that he should apply for an appointment in the navy. Rather to his astonishment, after making the application, he received notice to call at Somerset House on a given day. An examination followed, which he passed, and thus he entered her Majesty's service on the books of Nelson's old ship, the *Victory*, for duty at Haslar Hospital. Here his chief was Sir John Richardson, the naturalist and Arctic traveller. It was he who suggested to Huxley the position of assistant surgeon to the *Rattlesnake*, to which he was in due time appointed. The *Rattlesnake* was to go on an exploring expedition to North Guinea, with the object of bringing back a full account of its geography, geology, and natural history. While waiting for the ship to sail, Huxley attended his first meeting of the British Association at Southampton.

And so we find him on December 3, 1846, sailing on board the frigate *Rattlesnake* from Spithead, thus

beginning his scientific career in the same way as did those two other famous scientists, Charles Darwin and Joseph Hooker. The *Rattlesnake* called at the Cape, where a month's stay was made, and thence sailed for Mauritius, where they left for Sydney on the 17th of May, reaching the latter place on July 16, 1847—eight months after they left England. Here Huxley had his first chance of mixing with good society, his position in the navy securing him the necessary introductions, and for the first time in his life he began to form friendships for which his nature was evidently craving. Amongst these was William Macleay and William Fanning, at whose house he met his future wife, Miss Henrietta Anne Heathorn. These two rapidly became engaged, and looked forward to Huxley's promotion to the rank of full surgeon, when he hoped to marry.

The *Rattlesnake* remained in Australian waters for nearly three years, of which eleven months were spent in Sydney. Other cruises were made for the purpose of surveying the Great Barrier Reef and the "Inner Passage" as far as New Guinea, the Torres Straits, the Louisiade Archipelago, and other places. The full programme of the ship was cut short by the death of Captain Stanley, the commander, upon which the *Rattlesnake* sailed for England in May 1850, the whole cruise having thus lasted four years. It was not for five years after this that Huxley again saw his future wife, and when one thinks of the extremely limited means of communication of those early days, one can realise something of the depth of the affection which ultimately brought them together. The experiences and work which came to him as the result of the cruise of the *Rattlesnake*

caused Professor Virchow to remark that when Huxley returned to England he had become a perfect zoologist and a keen-sighted ethnologist.

The Government would not contribute towards the expense of publishing Huxley's researches and observations. But, thanks to the efforts of prominent men, he obtained an appointment for six months, in order to devote himself to preparing his work for publication. This gave him his first footing in the scientific world, and showed the very little he himself had known of the appreciation of others for what he had been doing. It, nevertheless, had found its place, and Huxley's return to England coincided with his entry into the first front of naturalists.

In 1851 he made the acquaintance of many of the scientists of the day, and especially Hooker and Tyndall, but, in spite of his already growing reputation, he soon found out that it was very hard to make a living out of scientific work. "To attempt to live by any scientific pursuit is a farce. Nothing but what is absolutely practical will go down in England. A man of science may earn great distinction, but not bread. He will get invitations to all sorts of dinners and conversaziones, but not enough income to pay his cab fare." Such was Huxley's comment on his life at this period, and, except for the fortunate few, the statement remains fairly true to-day.

Huxley was not yet twenty-six years old, and yet he finds himself at this time nominated for his F.R.S. There were thirty-eight candidates, and only fifteen to be elected. During the period of his year's leave repeated efforts were made to obtain a grant

to publish his work, but they were unavailing, and after some troublesome appeals from the Admiralty to the Treasury, and a request from Huxley to be permitted to remain on half-pay until the completion of the publication, he was ordered to join his ship immediately, or be struck off the navy list. This actually happened in March 1854, with the curious result that the Royal Society—Huxley no longer being in a Government department—assigned £300 towards the publication of his researches for this purpose, the remainder being undertaken by the Ray Society.

At this time Huxley was endeavouring to find some means to a livelihood which would allow him to marry, and both he and Tyndall applied for the Chair of Zoology at the University of Toronto. Neither of them, however, got it. At home, Aberdeen, Cork, and King's College, London, were all tried in vain. And there can be no doubt that his misfortune in these applications depressed him very much for a time, particularly when he thought of his future wife. As alternatives to science, he thought of practising medicine in Sydney, settling upon the land in Australia, or even keeping a store, yet knowing full well all the time that the pursuit of science for its own sake offered him the only possible intellectual happiness.

It must be remembered that it took from four to six months for a letter to reach Australia in those days, and one can easily understand how very keenly Huxley must have felt his position. Amidst all these disappointments, too, came the death of his mother in 1852, his father also being seriously ill. No wonder he wrote, "Belief and happiness seem

to be beyond the reach of thinking men in these days, but courage and silence are left." Nevertheless, he never entirely gave up hope, and we find him writing to his future wife as follows: "My course in life is taken. I will not leave London—I will make myself a name and a position, as well as an income, by some kind of pursuit connected with science, which is the thing for which Nature has fitted me, if she has ever fitted any one for anything. Bethink yourself whether you can cast aside all repining, and all doubt, and devote yourself in patience and trust to helping me along my path as no one else can." So the period of depression lasted until November 1853, to be dispelled by the loving trust and confidence of his betrothed. There is no doubt whatever that it was entirely due to her faith and constancy that his career was made possible, and when once he had been persuaded to go on in the line he had taken, his prospects seemed to brighten. He began to find a market for his literary work, and first one publisher and then another began to approach him with paid work, so that it was not long before he estimated he would make £250 a year from his pen.

CHAPTER II

BIOGRAPHICAL—*continued* (1854–1870)

It was thus 1854 before Huxley's career could be said to offer him an independence, and at this time two things occurred which marked a turning-point in his long road of disappointments. The first was Miss Heathorn's return to England, and the second was the occurrence of the vacancy in the Government School of Mines in Jermyn Street, consequent upon the appointment of Professor Forbes to Edinburgh. On July 30, 1854, he was appointed to a post of £200 a year, taking over one of the lectureships formerly held by Forbes. On August 11 he was ranked as Naturalist at the Survey, with an additional salary of £200. Then he was offered a lectureship on Comparative Anatomy at St. Thomas' Hospital for the following May and June, and was also requested to lecture for the Science and Art Department at Marlborough House. Consequent upon all this rapid success and promotion Huxley proposed to get married upon the arrival of the Heathorns from Australia. The only blot of that wonderful year in Huxley's life was the death of Forbes, who had been to Huxley a real friend. He refused to stand for the vacancy in Edinburgh, owing to the London authorities' favourable attitude, and, in spite of the fact that in the following spring he was again

approached from the northern capital, he had now quite determined to remain in London, even on a smaller income.

His marriage to Miss Heathorn took place on July 21, 1855, after a very anxious time owing to the serious state of her health during the last year in Australia and on her arrival in England. And thus, after no less than eight years of trouble and devotion, the great love and loyalty that characterised these two throughout their after lives triumphed.

The earlier part of Huxley's biological work had been almost exclusively directed to the study of the structure of invertebrates, and especially in the direction of working out the relationships between different species. Subsequently, in 1854, however, he devoted more attention to palæontology, and administrative work in connection with his various appointments also demanded much of his attention. As naturalist to the Geological Survey he had to undertake the description of great numbers of fossils, these descriptions being published in a series of papers, thirty-eight in number, and extending over a period of sixteen years. The knowledge thus gained proved of inestimable value to him in the battle that was shortly to rage round the publication of the *Origin of Species*.

In 1855 he began his regular lectures to working-men, which speedily attracted attention, and served as a model ever afterwards for that kind of work. Huxley's enthusiasm for these popular lectures was immense. He wanted the working-men to understand that Science and her ways are great facts for them, "that physical virtue is the basis of all other, and that they are to be clean and temperate and all the

rest—not because fellows in black with white ties tell them so, but because there are plain and patent laws of Nature which they must obey under penalties." About this time, also, he published some very important physiological papers, as well as one on the theory of the vertebrate skull, which was practically the challenge to the views held by Owen, with whom Huxley was now in a somewhat antagonistic position.

About this period (1851–1858) Huxley's health was anything but good, and in his letters he complained of frequent headache. The amount of energy that he put into his lectures left him very exhausted. Fortunately, however, his work for the Geological Survey took him into the open air, and a walking tour became his favourite method of recuperating.

In 1856 and in 1857 he spent his holidays in Switzerland, in the latter year studying the glaciers with Tyndall. Many honours came to him both at home and abroad at this time.

His first child, a son, was born on New Year's Eve 1857, and there is a very touching entry in his journal, written while he was waiting for the infant's arrival. It is a resolution—a New Year's resolution —and reads as follows: "To smite all humbugs, however big; to set an example of abstinence from petty personal controversies, and toleration for everything but lying; to be indifferent as to whether the work is recognised as mine or not, so long as it is done. . . . Waiting for my child. I seem to fancy it the pledge that all these things shall be." And then, in a foot-note, an entry of four years later: "And the same child, our first-born, after being for nearly four years our delight and our joy, was carried off by scarlet fever in forty-eight hours. . . . My boy is gone, but in

a higher and better sense than was in my mind when I wrote four years ago what stands above—I feel that my fancy has been fulfilled."

In 1859 Tyndall was appointed to the lectureship of Physics at the School of Mines, and this brought him into close contact with Huxley for the next nine years. This was the year that was to see the publication of the work which was to revolutionise the scientific thought of the world for all time, and incidentally to throw Huxley into the foremost ranks of those who were fighting on its behalf. In November of this year (1859) Charles Darwin published the *Origin of Species*—a book which had been eagerly anticipated since Darwin and Wallace had made a joint communication to the Linnean Society the previous year. Huxley was one of the few people to whom Darwin had submitted the book in manuscript, and although he had himself, before this time, assumed a more than doubtful attitude with regard to appearances of species, the occurrence of Darwin's work, nevertheless, clearly surprised him.

Darwin himself, with the true humility of the great thinker, was extremely anxious to secure the support for his views of Lyell, Hooker, and Huxley. Indeed, Darwin himself said, "If I can convert Huxley, I shall be content." There could hardly be a higher tribute to the position Huxley had already attained in the scientific world than that paid to him by Darwin in these words. Huxley accepted the book as a working hypothesis, and, although he did not see his way to agree on all points propounded, he, nevertheless, realised at once that it was an immense step forward in the explanation of problems otherwise inexplicable.

Huxley himself had by that time long given up the acceptation of orthodox teaching on the subject—teaching which, he says, has cost him many a struggle to get rid of. His own attitude towards the story of Creation is very well defined in a paragraph written in a chapter contributed to the life of Darwin, and we quote it here because it shows the very essence of Huxley's attitude to this cognate question. Not only does it show his attitude at the time, but it reflects very truly that of the whole school of thought of which he was the most distinguished exponent. "It seemed to me then (as it does now) that 'creation,' in the ordinary sense of the word, is perfectly conceivable. I find no difficulty in conceiving that, at some former period, this universe was not in existence; and that it made its appearance in six days (or instantaneously, if that is preferred) in consequence of the volition of some pre-existing Being. . . . Far be it from me to say that it is untrue because it is impossible. I confine myself to what must be regarded as a modest and reasonable request for some particle of evidence that the existing species of animals and plants did originate in that way, as a condition of my belief in a statement which appears to me to be highly improbable." That moderate statement, as we should regard it nowadays, is Huxleyism in a nutshell. But it was not regarded as moderate at that time, and for holding it with all the strength of his brilliant mind Huxley was called many hard names.

The effect upon most of the contemporary biologists of the publication of *The Origin of Species* was like "a flash of light which, to a man who has lost himself on a dark night, suddenly reveals a road

which, whether it takes him straight home or not, certainly goes his way." The great effect of Darwin's view was that it provided the biologist with an alternative answer to the question—"If not by special creation, then how did species originate?" Up to that time there had been no other accepted answer available, and the extreme reasonableness of Darwin's view is reflected in Huxley's thought: "How stupid not to have thought of that." Even before the publication of Darwin's great work, Huxley had been in very close association with the great evolutionist, and had in a measure paved the way for the acceptance of the theory by discussing various questions which bore upon it. Darwin describes Huxley's championship of himself, and his great assistance, by terming Huxley his "general agent."

The hottest part of the discussion which followed the year 1859 was that which centred itself around the application of Darwin's theories to the evolution of man himself. It was here, of course, that Huxley was most at home, because on his own ground of development and vertebrate anatomy. The discussion was carried on by all sorts and conditions of men, with prejudice and passion, with scorn, ridicule, misrepresentation, and abuse, and, in spite of suffering from all of these in turn, Huxley, unabashed, told Darwin that he would stop at no point so long as his clear reason took him further.

An excellent opportunity of helping Darwin came when the book was put into Huxley's hand to review for *The Times*. The review was not signed, but its authorship ultimately became known. It created considerable sensation, and Huxley hoped that it "may have made some of the educated mob, who

derive their ideas from *The Times*, reflect. And whatever they do, they *shall* respect Darwin."

Following upon this came the now famous meeting of the British Association at Oxford in 1860. Here Huxley came forward demanding a fair hearing for Darwin, and probably his fame as a debater dates from this time—certainly his prominence in the fighting line of science does so.

On the Saturday of the meeting Bishop Wilberforce, carrying out his intention to smash Darwin, addressed a meeting, probably the most sensational ever recorded in the annals of the British Association. It became famous, not merely because two great anatomists, Owen and Huxley, found themselves in conflict, but because it marked for the first time the absolute cleavage between science and the church which it has taken all these years to bridge. The paper was read by Dr. Draper of New York, the President of the section, Professor Henslow being in the chair, with Bishop Wilberforce on the right. After the paper came the discussion, prefaced by an announcement from the President that only those who had arguments to advance would be allowed to speak. After several more or less unimportant speeches, the Bishop was called upon to speak. He did so for half-an-hour, making finally that famous taunt which has since become historical. In the Life of Darwin it is described thus: "In a light, scoffing tone, florid and fluent, he assured us there was nothing in the idea of evolution; rock-pigeons were what rock-pigeons had always been. Then, turning to his antagonist with a smiling insolence, he begged to know, 'was it through his grandfather or his grandmother that he claimed his descent from a

monkey?'" But the Bishop's enthusiasm had landed him in a mess. Huxley immediately perceived the advantage given to him by the Bishop's descent to personalities, and, turning to Sir Benjamin Brodie, who sat beside him, quietly exclaimed, "The Lord hath delivered him into mine hands," the complete significance of which remark was not appreciated by Sir Benjamin until Huxley proceeded to make his famous retort.

A writer in *Macmillan's Magazine* thus describes what followed: "Mr. Huxley slowly and deliberately arose. A slight tall figure, stern and pale, very quiet and very grave, he stood before us and spoke those tremendous words—words which no one seems sure of now, nor, I think, could remember just after they were spoken, for their meaning took away our breath, though it left us in no doubt as to what it was. 'He was not ashamed to have a monkey for his ancestor; but he would be ashamed to be connected with a man who used great gifts to obscure the truth.' No one doubted his meaning, and the effect was tremendous." Another report of the speech is given by Mr. J. R. Green, which runs as follows: "I asserted—and I repeat—that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel shame in recalling it would rather be a man—a man of restless and versatile intellect—who, not content with an equivocal success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by an aimless rhetoric, and distract the attention of his hearers from the real point at issue by eloquent digressions and skilled

appeals to religious prejudice." The exact wording of the crushing retort has doubtless been lost in the excitement of the immediate moment, and from the thunders of applause from the audience at the point when Huxley referred to a man who used great gifts, &c. What was coming was so obvious, that the probability is the exact words of the sentence were lost. But there was no doubt as to their significance, nor the impression they made. The meeting closed with a speech from Hooker, who showed that the Bishop knew nothing whatever about botanical science, and still less about the principles of Darwin's theory, to which the Bishop made no reply. The discussion, of course, on the point at issue by no means ended at Oxford—indeed, it may rather be said to have begun there—and it was carried on with vigour over the next two years, and especially until Sir W. H. Flower's demonstrations at the Cambridge meeting of the British Association in 1862.

We have dealt with this incident at some length for two reasons. In the first place, it is one of the most dramatic in the whole of Huxley's career, and the one which, perhaps, of all others, stamped him as the great expounder of Darwinism; and, secondly, because it showed for the first time that there was going to be an open resistance to all authority in intellectual matters, and that the idea of belief in dogma, merely because it was stated, was one which, for many men, was not longer tenable.

At the Oxford meeting Huxley had stated that he would take every opportunity of putting the evidence of some of his opinions before the world, and in 1860 he proceeded to do this in his papers "On the Zoological Relations of Man with the Lower

Animals." He made this the subject of his popular lectures in 1861, lecturing every week to workingmen on this subject, the lectures being published in the *Natural History Review.*

Similar lectures were given in Edinburgh in January 1862, and concerning those in the northern capital Huxley says: "To my great delight, in saintly Edinburgh itself, the announcement met with nothing but applause." The announcement referred to was that Huxley himself entertained no doubt concerning the origin of man. These lectures brought him many attacks from all sorts of quarters, but the enthusiasm of his audiences, who were invariably impressed with his cogent reasoning, gave him great satisfaction, encouraging him to continue in his belief—a belief constantly expressed—that a man who speaks out honestly and fairly that which he believes will gain the goodwill and respect of his fellow-men, whether he convinces them or not.

The result of all this was to turn Huxley's attention more and more to ethnology, and the various portions of work which he did in this way were afterwards incorporated in his first published book, namely, *Man's Place in Nature.*

During 1860 and 1861, in addition to the prominent part Huxley took in the continued discussion over Darwin's book, he was instrumental in commencing a scientific quarterly magazine, although it was urged upon him by some of his friends that this would distract him from some of what was termed his proper work. Nevertheless, the *Review* appeared in January 1861, but Huxley found, as he had been told, that with all the extra work he

had on hand it was impossible for him to continue his interest in it. Thus in 1863 he ceased to be a contributor, and two years later the *Review* ceased publication.

In 1860 there fell upon him the sad blow of the death of his little son, which was followed by a prolonged illness of his wife's. This sad bereavement brought him a long letter from Charles Kingsley—a letter of such touching sympathy that it drew forth from Huxley a reply which his son describes as "a rare outburst at a moment of intense feeling, in which, more completely than in almost any other language of his, intellectual clearness and moral fire are to be seen uniting in veritable passion for truth." The letter itself is surely one of the most beautiful, as well as one of the most remarkable, ever penned in the English language. It displays the naked soul of one of the greatest of Englishmen, and lets one into the depths of his wonderful mind in a way that is as rare as it is remarkable. To quote any portions of the letter without the whole would be to do it injustice. It is an epitome of Huxley's creed, and it should be read from beginning to end by every one who wishes to gain a real grasp of what Huxley actually thought. (The letter will be found on page 13, Volume I., of the *Life and Letters of Thomas Henry Huxley*. By Leonard Huxley. Macmillan & Co.)

In March 1861—that is, the following year—his wife still being in very weak health, she and the children spent a fortnight with Darwin, Huxley himself visiting them there. But, in spite of this and other changes, Mrs. Huxley's recovery to health was extremely slow, and, partly with a view of removing her from the scene of her recent sorrow, they changed

their residence to that now known as 23 Abercorn Place.

About this time (1861), in addition to all his biological labour, Huxley devoted a good deal of his attention to philosophical study, in spite of protests from both Lyell and Darwin, who thought his time could be better occupied. As a matter of fact, however, it is quite clear that this was only another evidence of Huxley's intense desire to reach the bottom of things, which was by no means a new development in his life. In 1862 his own health was far from satisfactory, and in order to endeavour to get relief from rheumatism he went abroad to Switzerland. Returning in July of that year, he at once set to work, and was appointed on the Fishery Commission—the first of numerous Commissions upon which he afterwards served. He also became examiner in physiology at the College of Surgeons, in addition to saddling himself with an extra course of lectures in connection with the Hunterian Professorship. In fact, in 1863—the year in which his first book was published—we find him absorbed in all kinds of work. This year, too, was not without its sorrow, for in August his brother George died, making a gap in the family circle and leaving Huxley to look after his affairs. One of the results of this duty which Huxley took upon himself was that, in order to obtain the money he wanted, he was eventually compelled to part with the gold medal of the Royal Society, the intrinsic value of which was some £50.

The following year was much the same, as far as work was concerned, and included a course of lectures to working-men on the "Various Races of Mankind."

This year saw the foundation of the X Club, which began with eight members, and included Hooker and Sir John Lubbock (afterwards Lord Avebury), Herbert Spencer and Tyndall. What a galaxy of brilliant brains! A shorthand reporter of the conversations of their meetings could surely have formed one of the most successful books possible to publish. The club existed until 1892, and died simply because the reason of its original existence, namely, the personal attachment of its original members, was no longer completely operative, owing to the deaths of various members.

In 1865 we find Huxley taking a great interest in the American Civil War, which, indeed, he could hardly help doing, seeing that one of his own nephews was fighting with the forces of the south. The question of the emancipation of the negro suggested to him one of his famous articles, namely, that entitled "Emancipation—Black and White," to which we shall refer again later.

The year 1866 was marked by the publication of many scientific monographs, and on April 2 of that year Huxley received his first academic honour, as far as Britain was concerned, the University of Edinburgh conferring upon him the degree of LL.D. Curiously enough, Tyndall was also among the recipients on that occasion, and Carlyle was installed Rector. Huxley on many occasions has testified to his debt to Carlyle, who, in his very early youth, inspired him with that passion for absolute truth which marks his whole life, but Carlyle, on the other hand, never forgave Huxley for the views stated in *Man's Place in Nature*.

The same year found Huxley president of Section

D at the British Association meeting at Nottingham—a meeting which was remarkable, because of the discussion which took place on Dean Farrar's paper on "Science Teaching in Schools." This brought forth the complaint that men of science rarely condescended to such teaching. It was no doubt partly in answer to this criticism that many of Huxley's lectures were due, and also his course of training for science teachers, which he began in 1871. It was at a subsequent meeting with the British Association also, namely, in 1868, that he gave his now famous lecture to working-men "On a Piece of Chalk," and also other lectures are of this period and the following year, to which we shall again refer.

In 1869 the Metaphysical Society was founded, with the idea of bringing together men of very diverse opinions for the purpose of discussion on momentous questions of the day. The list of members is truly remarkable, including, as it did, the then Archbishop of York, Mr. Gladstone, the Duke of Argyll, Cardinal Manning, Dr. Martineau, Frederick Harrison, Huxley, Tyndall, and John Morley. After a while, in spite of the inevitable clash of opinions, it was actually possible for Huxley to write that "Charity, brotherly love, were the chief traits of the society. We all expended so much charity, that had it been money we should every one have been bankrupt."

In 1870 Huxley published his volume of *Lay Sermons and Addresses*, to which reference will be made again later. But we would point out here that this period in Huxley's life was that which marked him out as the specially prominent figure in British scientific thought which he then became.

The immense influence of Darwin's work upon Huxley's mind had now become very evident, and, dating from Huxley's famous speech at Oxford, he became increasingly known as the most strenuous champion of Darwin's views. To appreciate what this meant at that time, it must be recollected that to be a supporter of Darwin was tantamount to being held up to abuse and obloquy of the most virulent character, not merely to court unpopularity. So it came about that this man, whose intellectual and moral qualities were simply immense, was held up to the scorn of every orthodox household. It is difficult for us to realise at all adequately at this distant date the terrible injustice of the public persecution which Huxley suffered at the hands of the more ignorant and orthodox section of the public.

Nevertheless, the publication of *Lay Sermons* served very quickly to increase his power as a scientific teacher. In spite of the fact that he was dubbed sceptic and agnostic, it was perfectly obvious, even to those who hated his opinions, that here was a man to whom they were bound to listen.

This particular year of 1870 was a very strenuous one. Apart from all his biological work, he read many papers at various societies, and gave presidential addresses to the Geological Society and the British Association. The former was devoted to a review of the evidence in favour of Darwin's theory, especially from the palæontological evidence. He also addressed the Cambridge Y.M.C.A., and tried to show to what was presumably a Christian audience something of what the scientific and philosophical students of the time were thinking. His address

to the British Association was suggested by the experiments of Dr. Bastian, which were directed towards proving spontaneous generation. Huxley reviewed the evidence for this theory and that of precedent life, and expressed the view as his own opinion that probably at some remote age life had sprung from inanimate matter, at the same time stating that there was no evidence to show that this took place now.

CHAPTER III

BIOGRAPHICAL—*continued* (1870–1896)

It will probably be news to many to know that in 1870 Huxley became a candidate for the new School Board of London—a step which strongly indicates his immense personal interest in education, and his resolve to do all he could for it. In spite of the fact that he only addressed two or three meetings, he was returned second on the poll. He remained a member until 1872, when his health compelled him to resign. Needless to say, Huxley's presence not only added great interest to the doings of the Board, but also caused considerable apprehension on the part of some of the members. It was largely due to his advocacy that the late Mr. W. H. Smith's motion providing that the Bible should be read in the schools was carried; not that this was his ideal, but that he thought that, in dealing with such a population as they had to deal with, it was the only workable plan. In spite of the fact that he was only a member of the Board for fourteen months, other members have left on record their testimony to the continued influence of his words and acts while there.

In 1871, as if his life were not already sufficiently crowded, we find Huxley being appointed secretary to the Royal Society—a position which for the next ten years he held. Many lectures and publications

date from this time, including his *Manual of Vertebrate Anatomy*. In that year, also, a scheme of publishing a series of elementary science books took form under Huxley, Roscoe, and Balfour Stewart.

In 1872 his health was far from good, dyspepsia causing him great inconvenience. He was also worried with a lawsuit in connection with his house, and the combined physical and mental depression drew forth from his friends a most striking testimony to their opinion of his worth. This is contained in a letter from Charles Darwin, in which the writer informs Huxley that eighteen friends had placed £2100 to his account to enable him to take such a complete rest as was necessary to re-establish his health. Huxley accordingly went abroad for some time, visiting the Mediterranean and the Nile, and returning by Italy. He was, however, still far from well until treated by Dr. Andrew Clark. Towards the end of 1872 he had the honour of being elected Lord Rector of Aberdeen University. In a subsequent year (1874) he delivered his Rectorial address on "Universities Actual and Ideal," advocating the claims of natural science in the teaching scheme of a university. In 1873 the new *Encyclopædia Britannica* was begun, and Huxley did much work for it, writing, among other articles, that on evolution.

The year 1875 was remarkable for the fact that it brought forward very prominently the discussion which has ever since raged round the question of vivisection. Huxley was subject to some cruel misrepresentations in this matter, his own attitude being that of great personal distaste for this method of work, while still advocating its absolute necessity for physiological and other scientific progress. He

served on the Royal Commission on this subject. In 1875, also, he delivered the course of lectures on Natural History at Edinburgh University, owing to the absence of Professor Thomson. In the following year he was again in Edinburgh, and subsequently sailed for America, where he met with a most cordial reception. This visit also enabled him to see his sister, who lived in that country. He delivered the opening address of the Johns Hopkins University at Baltimore, and then went to New York, where he gave three lectures on evolution, reaching England in time for his autumn work.

The year 1877 found Huxley delivering lectures and addresses on many different subjects, but especially connected with technical education, in connection with which he gave a course of lectures at South Kensington for teachers. He was also busy with the Scottish Universities Commission, of which he was a member.

In 1878 he was employed on a *Life of Harvey*, and, in a lecture on this subject, showed that the discoverer of the circulation of the blood employed methods of vivisection, and incidentally drew attention to Bacon's ignorance of science. He was present at the British Association meeting in Dublin, receiving the degree of LL.D. from the University. The following year was occupied with very similar work, but was, in addition, marked by his researches upon dogs and the problems connected with them, which, however, were never finally completed in book form.

From preceding paragraphs it will have been seen that more and more, as the years went on, Huxley's time and energies were being largely absorbed by his

official and administrative duties, and to that extent, of course, was he deprived of giving so much attention to those investigations which were peculiarly in his line. In 1881 he was appointed Inspector of Fisheries, in addition to his other work—an appointment which was partly administrative and partly scientific. In addition to these duties, he delivered an address at the International and Medical Congress in London, showing the close connection between medicine and the physical sciences. As usual, he attended the British Association meeting, which was held that year at York.

The year following (1882) was marked by the death of two of England's greatest scientists, Charles Darwin and Francis Balfour. In 1883 Huxley's official work had reached such an enormous volume that he published but one scientific paper. He was, however, busy with his Fishery Commissions, in addition to lecturing and his duties as examiner, and, to make matters worse, his health was far from good. But this year, however, found him attaining the blue ribbon of the scientific world, in his election as President of the Royal Society. In spite of the great honour involved in this, Huxley's own wish was to stand on one side and devote his remaining time to his own scientific work. But after some pressure he consented to be nominated to fill the temporary vacancy pending the final formal election. His tenure of the Presidency was marked, as far as he himself was concerned, by the obvious care that he took, in connection with every subject which came before the Society, to put his own personal opinions on one side. He had lived so much in the light of the public eye that his opinions on more

important topics were well known, and he was scrupulously careful lest the Royal Society itself should be thought to be identified with his private convictions. The business of the Royal Society occupied most of his time just at this period, and subsequent to this, and noticeably from the year 1884, his health grew steadily worse. His untiring energy began to be obviously failing. Microscopical work was painful from the effort of stooping, and hence, naturally enough, he turned his attention more to philosophical and theological reading. He continued, however, in all his important positions up to the beginning of October, but was already contemplating resigning his Presidency, as well as retiring from other active spheres. In a letter to Sir M. Foster, written in October, he says, "I do not think there is anything the matter with me except a profound disinclination to work," which, to any one who knew anything about Huxley, must have appeared a very serious symptom, and, as a matter of fact, a day or two after writing those words he was ordered abroad immediately. He went to Italy, whence he wrote that he thought he was getting better, but very slowly, and, indeed, he was not much improved, though his return to England seemed for a time to benefit him. Acting, however, on the advice of Sir Andrew Clark to give up work, he resigned his Inspectorship of Salmon Fisheries in May 1885. He was then sixty years of age. In spite of this, however, there was no improvement, and so at the anniversary meeting of the Royal Society on November 30 he announced his resignation of the position of President.

Huxley had now given thirty-one years of devoted and strenuous service to Government work, and the

Treasury voted him a pension of £1200 on his retirement, in spite of the fact that his own education department wished him to retire upon full pay (£1500).

In November 1885 came the article by Mr. Gladstone in the *Nineteenth Century*, which purported to show that the description of Creation given in the first chapter of Genesis was supported by scientific evidence. This was the commencement of what afterwards was known as the "Genesis Controversy," into which Huxley, at a time of somewhat better health, threw himself with something of his old vigour. For some months the controversy raged. Possibly his freedom from official appointments allowed him to speak out even more freely than was his habit, and certainly, in the controversy with Mr. Gladstone, Huxley made himself particularly plain. He concluded this particular duel with his article in the *Nineteenth Century* of February 1886, when he would have been glad to retire from what he called the "atmosphere of contention."

The year 1887 was occupied, in the intervals from bad health and work, at the Council of the Royal Society, examining committee work in connection with London University, and the Marine Biological Association, as well as by a strenuous advocacy on behalf of technical education in England. It was in this year that the proposal to establish the Imperial Institute, in connection with the jubilee, came forward, and to this Huxley gave his warm support. His mind, however, was getting more and more directed towards philosophy, and from now onwards we find him entering the lists on behalf of science with various more or less famous corre-

spondents who were opposed to the new scientific thought. His article on "Science and Pseudo-Scientific Realism" in the *Nineteenth Century* is an example of this, and was the commencement of the well-known correspondence between Huxley and the Duke of Argyll—a correspondence which only ceased by Huxley declining to continue it, since the Duke did not withdraw certain statements which Huxley thought should have been withdrawn.

In spite of himself, he was drawn into conflicts which involved political matters, and he was strongly opposed to the President of the Royal Society being a Member of Parliament, on the grounds that the supreme representative of science should not have the remotest connection with party politics. Huxley himself was a staunch Unionist in politics, principally on the grounds of the betrayal of trust which would be involved in a measure of Home Rule, so many people having invested money in Ireland on the strength of the existing circumstances.

In November of this year (1887) he was profoundly distressed by the death of his second daughter, but, nevertheless, fulfilled some important engagements in connection with technical education in Manchester. At the end of this year, too, Huxley was devoting some time to reading the proofs of Mr. Herbert Spencer's autobiography.

His health was still very unsatisfactory in 1888—a year which is marked by a good deal of correspondence between Huxley and Spencer on the subject of the struggle for existence. During this year, also, he wrote the obituary notice of Charles Darwin for the Royal Society. His own health was so bad after April that all work had to be put on one side

for the time being; indeed, it was not until June that he was strong enough to go abroad. A few months later, however, he was sufficiently well to walk ten miles and climb two thousand feet.

In 1889 he was engaged in considerable correspondence in defence of agnosticism. His two youngest daughters were married during this year also, and this enabled Huxley to leave London more easily and take up his residence at Eastbourne—a climate which suited him admirably. Here he built a house near Beachy Head, and with improving health came the desire to be once more working. Hence sprang his article in the *Nineteenth Century* on "Agnosticism and the Value of Testimony to the Miraculous." To these replies were made by Dr. Wace and Bishop Magee amongst others, which in turn drew from Huxley his third article, "Agnosticism and Christianity." Four essays on political philosophy appeared in the early numbers of the *Nineteenth Century* in 1889, and drew forth criticisms from all kinds of people.

Early in 1890 he left England for Teneriffe and Madeira, returning home to find that the medal of the Linnean Society had been awarded to him.

In 1890 once more we find Huxley in controversy with Mr. Gladstone. This followed upon the publication of Mr. Gladstone's article in *Good Words*, which attacked Huxley's positions. The press about this time was very rarely free from correspondence on one or other aspects of this controversy of Huxley's, and the columns of *The Times* contained many such letters of this date. Indeed, the early part of 1892 is principally marked by further controversies in connection with the story of Creation in the book

of Genesis. Huxley's views on these matters have been touched upon in various places in these pages, and our readers who wish to study them in detail will find them in the fifth volume of the *Collected Essays*.

In 1892 Huxley was the recipient of an entirely unexpected honour in being made a Privy Councillor. This he accepted on the grounds that it was not a title but an office, and although an office in which there was possibly but little chance of service, still, theoretically, it was one in which a representative of science might conceivably be of use to the Government. The following year (1893) was remarkable for little that was new in Huxley's life, but was noted by the loss of three old friends in Sir Andrew Clark, Tyndall, and Jowett. Perhaps his more important work this year was his "Romanes Lecture," which elicited a good deal of criticism and discussion.

In 1894 he completed his ninth volume of the *Collected Essays*, and various other literary work, and in August made his last great public appearance at the meeting of the British Association at Oxford—a meeting which was dramatic in many of its phases, especially for Huxley and those who followed him. The Presidential address was given by Lord Salisbury, and was remarkable in accepting the doctrine of evolution as being disputed by no reasonable man, though, at the same time, Lord Salisbury's address clearly showed a great lack of appreciation and understanding of Darwin's views. It was thirty-four years since the Association had met at Oxford on that famous occasion to which we have already referred, when Huxley and Bishop Wilberforce met in conflict. Much had happened in the interval;

discussion had been practically continuous, and frequently bitter; but at last Darwin's day had come, and it must have been a remarkable experience for Huxley once more to be in the great theatre where he and others had been so roundly abused, listening to the doctrines, for which they had so long contended, being admitted as a matter of course.

Huxley's own part on this last occasion was to second the vote of thanks to Lord Salisbury for his Presidential address. In spite of the obvious irritation with which Huxley had listened to the address, he, nevertheless, was thus in the position of having to thank the speaker for sentiments which were, to a large extent, in exact opposition to those for which he himself had contended for the past quarter of a century. The President's vote of thanks was proposed by Lord Kelvin; and then Huxley, in the words of Professor Osborn, "veiled an unmistakable and vigorous protest in the most gracious and dignified speech of thanks." Professor Osborn adds that at this meeting Huxley gave one the impression of being aged, but not infirm, and that no one realised that he had spoken his last word as the champion of evolution.

Huxley's own opinion of Lord Salisbury's address appeared in a criticism, which he named "In Nature," the main point of which is that, in spite of his unwillingness to do so, Lord Salisbury and his school were compelled to admit the truth of the main contentions put forward by Darwin. Huxley's own impression of this memorable meeting may be gathered from letters such as that written to Hooker, collected by Huxley's son. He says, "It was very queer to sit there and hear the doctrines you and I

were damned for advocating thirty-four years ago at Oxford, enunciated as matters of course—disputed by no reasonable man—in the Sheldonian theatre by the Chancellor." . . . "Doctrines for which the Bishop of Oxford coarsely anathematised us thirty-four years earlier." Towards the end of this year (1894) Huxley received the Darwin Medal from the Royal Society, thus following the award to Wallace and Hooker—a remarkably happy instance of the fitness of things, considering that these three men were perhaps those who had done more than any others to explain and familiarise the world with Darwin's ideas. One could hardly imagine a more suitable conclusion to Huxley's public life than this of being awarded the Darwin Medal.

The winter of 1895 was an extremely severe one, and it seemed to try Huxley considerably. Nevertheless, it was only a subsequent attack of influenza which really broke him down. In the meantime, Mr. Balfour had published his *Foundations of Belief*, and this drew forth from Huxley a reply to the attack upon agnosticism in that work.

After his attack of influenza he had an attack of bronchitis and serious lung trouble, and for the next few months his life was a painful struggle against disease, borne, his son tells us, with a patience and gentleness which was rare, even in the long experience of the nurses who attended him. He recovered by May, well enough to walk a little in his garden, but the lung trouble had left his heart seriously affected, and kidney trouble followed this. We find him as late as the 26th of June writing to his old friend Hooker to relieve him of anxiety about his own condition, but, nevertheless, three days afterwards

he had an attack of heart failure, and died at half-past three on June 29, 1896.

Huxley was buried at Finchley (the funeral being private) beside his brother George and his own little son. Upon his tombstone are three lines written by his wife—"lines inspired by his own robust conviction that, all questions of the future apart, this life as it can be lived, pain, sorrow, and evil notwithstanding, is worth—and well worth—living:

> "Be not afraid, ye waiting hearts that weep;
> For still He giveth His belovèd sleep;
> And if an endless sleep He wills, so best."

CHAPTER IV

SCIENTIFIC WORKS

HAVING sketched as briefly as possible in the foregoing pages the main outlines of the most important events in Huxley's crowded life, we now turn our attention to an equally brief survey of the principal contents of his most important public works. It is, of course, impossible in a few pages to do more than indicate the wealth of thought and material which is to be obtained by the thoughtful reader who will go to these volumes himself. The most that it is possible to do here is to show the nature of those volumes, to point out their intense interest and their great value, in the hope that the perusal of these sign-posts, so to speak, will be taken to point the way to the earnest reader.

In 1862 *Man's Place in Nature* was published, in spite of some friendly advice to the author warning him that its contents would bring down upon him considerable abuse. The prophecy was abundantly fulfilled, but it did not deter Huxley from publishing the book; indeed, nothing ever did deter him from saying or writing what he believed to be true, if he thought science or life would be benefited thereby. It was his duty of teaching biology with reference to palæontology which drew his attention specially to the problem of the position of the human species

in zoological classifications. The question was, of course, a burning one in those days, and those who touched it were apt to suffer. Various scientific papers and works dealing with the features of the brain and mind, which were said to be peculiar to man, aroused still further Huxley's interest, and started him on personal investigations, which afterwards caused his opinion to differ from these writers. He soon found that the structures in question were shared in common by man and many of the apes, and these connections he taught in his lectures. When the *Origin of Species* was published, it appeared to Huxley that since vertebrate anatomy was not a specially strong side of Darwin's work, he himself might very well take up this side of the argument, and thereby strengthen Darwin's contentions. This he did, and in 1860 actually had the temerity to choose the relations of man to the lower animals for the subject of his series of popular lectures to working-men. Huxley finished writing the lectures in 1862, so that they represented the careful thought and investigation of a number of years. Before it was issued in book form, it was submitted to an anatomical friend who, although finding no errors in it, earnestly warned Huxley of the consequences to himself if he published it. The result, as we have said, was that he encountered a perfect hurricane of ridicule and misrepresentation for some time; indeed, he says that he is surprised to think how any one who had sunk so low as he was in the estimate of his critics could have since emerged into relative respectability. The book was issued in the Eversley edition in 1894, together with "Other Essays."

The six points dealt with in the essays in the work

referred to are: first, the natural history of the highest apes; second, the relation of man to the lower animals; third, the fossil relations of man; fourth, the results of the study of ethnology; fifth, the facts of British ethnology; and, lastly, the discussion of the Aryan question. These various essays appeared in different reviews, the first three being published in 1863. The argument of the first essay especially is to set forth in the simplest possible language, the principal facts upon which all conclusions "respecting the nature of the extent of the bonds which connect man with the brute world must be based." Having studied these, Huxley says that he might cease at that point, since Science has fulfilled her function, when she has ascertained the truth and stated it; but since he wished to appeal to a wider audience than scientific readers, he adds a paragraph or two, in the hope of dispelling the natural repugnance with which some of his readers would view his conclusions. It is interesting to note, too, here that, having endeavoured to show that there is no greater *morphological* difference between man and the apes than between various other animals, it is, he also adds, his own opinion that it is equally futile to draw a *psychical* distinction, since even the highest faculties show some germ in lower forms of life. He combats the belief that the unity of the origin of man and the brutes involves man's degradation. Is it true, he asks, "that the poet or the artist is degraded because he is the direct descendant of some bestial savage? Is he bound to howl and grovel on all fours because he was once an egg which no one could distinguish from that of a dog? Is maternal affection vile because shown in a bird? or fidelity

base because dogs possess it? The common-sense of the mass of mankind will answer those questions without a moment's hesitation. Nay more, thoughtful men, once escaped from the blinding influences of traditional prejudice, will find in the lowly stock whence man has sprung, the best evidence of the splendour of his capacities; and will discern in his long progress through the past, a reasonable ground of faith in his attainment of a nobler future."

In the volume entitled "Darwiniana," which is Volume II. of the series of *Collected Essays*, and which was first printed in 1893, and repeatedly reissued, Huxley brought together most of the arguments he had used to support Darwin's hypothesis, which were scattered throughout his speeches and writings since 1859. The volume contains also his answers to most of the serious criticisms to which Darwin's work was exposed, but, in addition, leaves on record Huxley's own impression of the great evolutionist, and sums up his deliberate conviction of what the result of Darwin's work would be in the immediate and remote future.

Some of the other contents are Huxley's lectures to working-men as originally given, and contain, as he says, the A B C of the great biological problem as it was set before a body of shrewd artisans. These six lectures constitute the last section of the book, under the general description of a knowledge of the causes of the phenomena of organic nature. Possibly the most interesting portion of the work to us is that which deals with the personality of Darwin—addresses contained in three chapters. One of these appeared in *Nature;* the second was his address as President of the Royal Society on handing over the

statue of Darwin to the Prince of Wales as representative of the trustees of the British Museum; and the third is Huxley's famous obituary notice of Darwin for the Proceedings of the Royal Society. In these three chapters we get what is possibly the most vivid, striking, and true estimate of Charles Darwin's work and character.

Huxley himself has said in one of his books that titles or dignities should not be held by men of science unless they involve an actual position, because only scientific men can adequately estimate the value of scientific work. If that be so, who was so competent to pronounce a verdict upon the life and work of Charles Darwin? And it is not the least striking thing in Huxley's estimate of Darwin that he puts first the intense and almost passionate honesty by which all Darwin's thoughts and actions were irradiated. He pays his attribute to the great reasoning powers, the vast knowledge, the marvellously tenacious industry persevered in under physical conditions which would have crushed most men; and after duly weighing all these great gifts it is still Darwin's transcendent honesty which appeals most to Huxley's own mind. It was this rarest and greatest of endowments, he estimates, which restrained Darwin's extraordinary imagination and power of scientific speculation within reasonable bounds, and which caused him to undertake such immense tasks of personal observations before he published his own opinions.

In his address as the President of the Royal Society on the handing over of Darwin's statue, Huxley draws attention to the fact, which has so often been repeated since, that since, and because of, the publication of

The Origin of Species the fundamental conceptions of students of Nature have been completely changed. And, again, in this address he returns with the same emphasis to Darwin's character, and begs the acceptance of the memorial "as a symbol by which, as generation after generation of students of Nature enter yonder door, they shall be reminded of the ideal according to which they must shape their lives, if they would turn to the best account the opportunities offered by the great institution under your charge."

Apart from Huxley's strictly scientific work, there was no subject which interested him more, and for whose advancement he laboured harder, than that of education in all its phases. School, technical institute, and university all claimed his attention in turn, and few men have done more than Huxley did by his strenuous advocacy to secure the position of certain sciences, especially the biological ones, in the teaching curricula of to-day. He was one of the first to realise that while we had plenty of teaching of science we had practically no scientific teaching. It is not surprising, therefore, that we find a whole volume of essays devoted to science and education (Volume III., *Collected Essays*, first printed 1893). Some of these are referred to in our chapter on "Lay Sermons," but we may add a word or two here in connection with the others. The chapter on "Science and Culture" is devoted to combating the opinion of some that culture is only to be obtained as the result of a prolonged classical education. Huxley incidentally expresses the opinion that for those who intend to make science their serious life's work, or who enter upon the study of medicine, or those destined

for a business career, a classical education is a mistake. He lays great stress upon the necessity of both employer and employed having the opportunity of clearly studying the conditions of social life, in order that they may come to some common agreement for action, and such knowledge can be obtained by no other method than by that of physical researches. In that way alone will men ever come to deal with sociological matters on scientific principles. One wonders whether if Huxley were alive to-day he would think that any great steps had been made towards the attainment of that most desirable object. We fear not.

In his address to the members of the Liverpool Institution on "Science and Art and Education," Huxley takes the opportunity of urging upon his hearers the necessity of the study of English writers, from the point of view of obtaining literary culture, because, he says, that while the French and Germans study their languages the average Englishman does not. And this subject, English literature, together with instruction in either music or painting, he considers necessary for the development of the æsthetic side of the mind. He also emphasises in this same address the great intellectual value of knowing some other language besides one's own—a truth we have possibly come to realise somewhat more fully to-day.

In his Rectorial address to the students of Aberdeen University, also published in this volume, Huxley takes the opportunity of describing the actual condition of the universities in contrast with his ideal of what they should be. More particularly, as was natural to the audience he was addressing, he spoke of medical education, and while he maintained that

the medical practitioner should be a person of education and culture, he also was of opinion that he should have obtained his culture before he devoted himself to medicine. In very strong language also he advocated the support of original, scientific research, which was then in even worse plight than it is to-day, though still there remains very much to be done in that direction. So hopeless, indeed, was the outlook then that Huxley in this address said: "In England it is better for a man's worldly prospects to be a drunkard than to be smitten with the divine dipsomania of the original investigator." Such was his conviction on this point that he dared not advise any student of his own, showing great originality, to adopt science as a career, fearing that he would be unable to convert his abilities into bread and cheese. We have progressed a little since it was possible for Huxley to say this with truth, but no one who is conversant with the trend of science to-day will think Huxley's opinions one whit too strong.

The only autobiographical manuscript of any dimensions which Huxley left is included in his volume on "Method and Results," and is the authority for many of the statements connected with his life which appear in these pages. Other chapters in this same volume appeared also in *Lay Sermons*, in connection with which we have noted them. Of the others, mention should be made of "The Progress of Science"—an account of the principal advances which, in Huxley's opinion, especially characterised the period of fifty years from 1837 to 1887. This account first appeared in *The Reign of Queen Victoria*, by T. H. Ward. To Huxley's mind, the most obvious feature of that period was the wonderful increase

of industrial production from the extended use of machinery, together with the improvements in the means of locomotion and in intercommunication. It would almost appear that the same features may be the outstanding ones when a similar review of the subsequent fifty years comes to be written. In the scientific world, of course, the era dealt with was specially marked by appearance and results of Darwin's works.

A very remarkable address, also published in this volume, is that entitled "Administrative Nihilism," delivered to the Midland Institute. In it Huxley discusses the true function of the State connection with individual and national interests, and more particularly with regard to the degree of interference with the personal liberty of the subject which one may consider justifiable. Huxley took a wide view of State functions, and, in answer to the objection that if you allow the State to enforce vaccination, for example, you must also allow it to prescribe your religious belief, or the number of courses you have for dinner, he says that as a matter of practice such extreme interference would not occur, for the simple reason that the State, being nothing else than the corporate reason of the community, will soon find out when it has gone far enough. He adds that his own opinion, based upon acquaintance with government officials, is that the State is far less eager to interfere with people than people are to be interfered with, simply because the latter are aware of evils requiring remedy which the State is inclined to leave to Nature. Especially does Huxley put in a plea in this address for liberal State assistance for purposes of national education, on the plea that

education promotes peace by teaching the realities of life and social obligations, that it promotes intellectual development, morality, and refinement, by its discipline. Other chapters in this volume deal with the "Natural Inequality of Men," "Natural and Political Rights," and, finally, "Government." The main theme of these latter is the necessity of disabusing our minds of philosophical delusions which have been associated with political thought in past centuries. These chapters were essentially critical and destructive, and at once met with the obvious reply: "If this be wrong, what is right?" Huxley, however, disclaimed any liability for suggesting the answer, though he did not refuse to put forward some of his thoughts. And he builds up an argument of government, based upon those scientific principles, which would enable a man to be successful in self-government and in family-government.

Two volumes (IV. and V.) which come in this of *Collected Essays* deal with the great controversy of the time which centred round the infallibility of the Hebrew scriptures, and such topics as absolute inspiration, and so forth. These volumes were doubtless much more striking to the general public at the time of their publication than they would be if issued to-day, for the simple reason that almost everything for which Huxley contended in them has now become part and parcel of the ordinary mental equipment of most educated men. The essays are especially intended to destroy any pretensions to infallibility, no matter by whom they are put forward. "Wherever bibliolatry has prevailed, bigotry and cruelty have accompanied it. It lies at the root of the deep-seated, sometimes

disguised, but never absent, antagonism of all the varieties of ecclesiasticism to the freedom of thought and to the spirit of scientific investigation." It is not necessary, however, to state the arguments put forward in detail; we have already pointed out that the dogmatical theology against which they were so strongly directed has practically passed out of existence.

In 1878 Mr. John Morley asked Huxley to write an account of Hume for the series of *English Men of Letters*, and Huxley, who had benefited much from the study of Hume's works, undertook the task. This statement of Hume's philosophy, as well as an account of his life, occupies the first part of Volume VI. of the *Collected Essays*, which book concludes with two chapters intended as helps to the study of Berkeley. In addition to the popular lectures and addresses which make up the volume of *Lay Sermons and Addresses*, some further items of similar character are included in Volume VIII. of the *Collected Essays*.

The "Romanes Lecture" of 1893 and "Evolution and Ethics" will be found in Volume IX. (*Collected Essays*), which volume also contains Huxley's article on "Science and Morals," which appeared in 1886. In this famous article Huxley affirmed his belief in the universal validity of the laws of causation; also his denial of the opinion attributed to him that everything beyond the scope of physical science was unverifiable. In answer to this latter charge, he says at once that a great many important phenomena lie quite beyond its scope, as an example of which he mentions consciousness. He also takes the opportunity to dispel the idea that he found any satisfaction in materialism, and he says that, if

he were forced to choose between that and idealism, he would elect for the latter, but is not aware that he is under any compulsion to choose either the one or the other. The conclusion of a very trenchant article is that the safety of morality does not lie in the adoption of any particular philosophical speculation or theological creed, but in vital belief that natural law will inevitably send social disorganisation upon the track of immorality. This is a cardinal article of Huxley's faith.

CHAPTER V

SCIENCE FOR THE PEOPLE

No account of Huxley's life would be at all complete which did not give some account of his more popular writings and speeches. Forty or fifty years ago it was by no means so common an event for a great man of science to deliver addresses to the man in the street, in the simplest of language which every one could understand, as it is to-day. And, doubtless, part of the great influence which Huxley wielded over the thought of his time, and subsequently, was to a great extent due to this very fact, that he thought it no unworthy task, even for his mighty brain, to attempt to place before a working-man audience some of the profoundest truths of science in the simplest of terms. Some of the more important of these efforts were afterwards published in book form, under the title of *Lay Sermons, Addresses, and Reviews.* (Macmillan & Co., 1870.)

They are prefaced with a letter to Tyndall, in which Huxley explains that he would have liked to have dedicated the volume to Tyndall himself, except for the fact that he thought such a formal dedication at the beginning of the book would look like a grand lodge in front of a set of cottages. Instead of the preface and a dedication, therefore, this letter to Tyndall is printed as a substitute for both. The object of

the letter, apart from that already stated, is to explain that Huxley had not time to write a defence of some of the contents of the book, which had been criticised, and, secondly, to point out that in certain particulars he had modified his views as therein stated.

The book opens with a lay sermon on the "Advisableness of Improving Natural Knowledge," delivered in St. Martin's Hall on the 7th of January 1866; and subsequently published in the *Fortnightly Review*. Huxley's thesis in this address is that the marvellous intellectual growth which has taken place since the time of our forefathers is mainly due to our increasing knowledge of natural science. Our forefathers, he says, accounted for calamity in their own way, submitting to the plague in humility and penitence, believing it to be the judgment of God, but interpreting the fire of London, with furious indignation, as the efforts of malicious republicans or papists, according to their political ideas. Huxley pictures the first noble President of the Royal Society revisiting modern London, anxious to know how often the city had been burnt down since his time, and the surprise with which this worthy man would discover that although London contains tenfold the inflammable material that it did in 1666, and that although our rooms are filled with woodwork and draperies, and in spite of the further fact that we bring inflammable gases into every corner of our streets and houses, yet we never allow a street to be burnt down. If he had asked how this had come about, he would have been told that the improvement of natural knowledge had furnished us with machines for dealing with such catastrophes as large fires;

and with regard to the plague we should have to explain that we have no reason to think that it is the improvement of our faith or our morals which keeps it away, but, once more, improvement of natural knowledge. This knowledge has taught us that plague and pestilence can only live in the narrow unwatered streets of cities with ill-drained, ill-lighted, and worse-ventilated houses. Such a city was London in 1665, and such are cities of the East where plague still rages.

Huxley, however, points out that although we have no plague, we still have typhus in our midst, and in an interesting, prophetic moment writes that it is not presumptuous to express the belief that when our knowledge is more complete, London will count her centuries of freedom from this disaster. We, who are living nearly fifty years after him who spoke these words, can see the commencement of the fulfilment of the prophecy.

Huxley then turns his attention to those who at that time criticised the pursuit of natural science as leading to nothing more than the improvement of the material resources and the increase of the comforts in life. He says that these folks can see nothing in the bountiful mother of humanity but a sort of comfort-grinding machine. And in a fine passage he adds, "If this talk were true, I, for one, should not greatly care to toil in the service of natural knowledge. I think I would just as soon be quietly chipping my own flint axe, after the manner of my forefathers a few thousand years back, as be troubled with the endless malady of thought which now infests us all, for such reward." But, on the contrary, he proceeds to argue that the improvement of natural

knowledge, whatever may have been the aims of those who began it, has not only conferred great material benefits on men, but has, at the same time, effected a revolution in their conceptions of the universe, and has profoundly altered their modes of thinking, and their views of right and wrong. "I say that natural knowledge seeking to satisfy natural wants has found the ideas which alone can still spiritual cravings. I say that natural knowledge, in desiring to ascertain the laws of comfort, has been driven to discover those of conduct, and to lay the foundations of a new morality. . . . If the religion of the present differs from that of the past, it is because the theology of the present has become more scientific than that of the past; because it has not only renounced idols of wood and idols of stone, but begins to see the necessity of breaking in pieces the idols built up of books and traditions and fine-spun ecclesiastical cobwebs; and of cherishing the noblest and most human of man's emotions, by worship 'for the most part of the silent sort' at the altar of the Unknown and Unknowable."

The next chapter in this volume of Huxley's works is entitled "Emancipation—Black and White." It is really concerned not with the doctrine of natural rights of the black man or the slave, but with that very modern question—the rights of women. At this time of day it is really very interesting to look back to what Huxley said in the *Reader* in 1865, and to note how far public opinion and thought have travelled since that time. There are various questions of emancipation, he says, stirring the world, one of the most important of which "is that which daily threatens to become the irrepressible woman

question. What social and political rights have women; what ought they to be allowed to do, be, and suffer? And how ought they to be educated?" He maintains that the present system of female education is inherently absurd, inasmuch as it seems to have been specially contrived to exaggerate those aspects of womanhood in which she is presumably inferior for contending in the battle of life. Instead of educating women to be our drudges, or toys, or angels, Huxley argues that the female type of character being neither better nor worse than the male, women should be educated to be men's comrades and fellows and equals so far as Nature permits. How is this to be done? He replies, "Emancipate girls." And in the result? Huxley prophesies that when this has been carried out women will find their place, and that it will be neither that in which they have been held, nor that to which some of them aspire; because whatever happens, the massive brains and vigorous muscles of the best men will carry the day in the contest for the prizes of life. He wisely points out that the very improvement of the women will lessen their own chances, because they will bring forth better sons; and his conclusion of the emancipation of women movement is that "so long as this potential motherhood is her lot, women will be found to be fearfully weighted in the race of life. The duty of man is to see that not a grain is piled upon that load beyond what Nature imposes; that injustice is not added to inequality."

Then follow three chapters on education, namely, A Liberal Education and Where to Find it (1868); Scientific Education (1869): on the Educational Value of the Natural History Science (the oldest

contents in the volume, 1854); and A Lecture on the Study of Zoology.

In these four chapters, which comprise lectures given to very different audiences, we get Huxley's ideas of what education was in his day, and what he thought it ought to be; and he certainly spares no pains to make himself plain. His well-known vigorous methods of speech are here seen at their best, and some of his sarcastic and scornful remarks make splendid reading. "I believe we should have compulsory education in the course of next session if there were the least probability that half-a-dozen statesmen of different parties would agree what that education should be." What is our idea of a liberal education? he asks; and his answer is, that education is learning the rules of the mighty game of life, and these rules are what we call the laws of Nature. His summary of what is taught in the primary schools of his time is a scathing indictment of the system, and especially does he deplore the absence of any teaching which would impart to the child that there is a reason for every moral law, as well as for every physical law. "If I am a knave or a fool, teaching me to read and write won't make me less of either one or the other—unless somebody shows me how to put my reading and writing to wise and good purpose."

The higher schools and the universities are dealt with in no less severe style. "I believe there can be no doubt that the foreigner who should wish to become acquainted with the scientific or the literary activity of modern England, would simply lose his time and his pains if he visited our universities with that object." Several times in these chapters he

pleads very strongly for the teaching of what he calls physical geography (the German "Erdkunde") —a description of the earth, its place and relation to other bodies, its structure and features, its winds, and tides, and mountains, its plants and animals, and its varieties of men.

In the other portions of this same volume Huxley returns to this question again and again. In fact the key-note of the whole book is to emphasise, as strongly as possible, the value of scientific training and scientific methods in education. Huxley asks why it is that men of different professions and businesses are not taught science as part of their everyday education. Why don't the clergy as a body, he asks, acquire some tincture of physical science such as will enable them to understand the difficulties there are in the minds of thoughtful and intelligent men who have learned these things? He divides the clergy into three sections: "an immense body who are ignorant and speak out; a small proportion who know and are silent; and a minute minority who know and speak according to their knowledge." He insists, too, that scientific training must be largely practical, in the way of object-lessons. Let the child not only be told that the magnet attracts iron, but let him *see* that it does, and let him *feel* the pull for himself, and especially tell him that it is his first duty to doubt until he is compelled by the absolute authority of Nature to believe. He points out very truly that although people talk of the difficulty of teaching young children natural science, they, at the same time, insist upon their learning the catechism, which contains propositions far more difficult to comprehend than

anything in an elementary course of science. He sums up his ideal of the object of education thus: "Education has two great ends to which everything less must be subordinate. The one of these is to increase knowledge; the other is to develop the love of right and the hatred of wrong."

In a further paper, published in pamphlet form in 1854, Huxley discusses the educational value of physiological science from the points of view of its position as a branch of knowledge, its value as mental discipline, its worth as practical information, and at what period it should be made a branch of education.

Then follows a lecture, delivered in 1861, on "The Study of Zoology," which is interesting as containing Huxley's ideas of how students should be taught; and, further, it is interesting to note that the methods advocated by him are practically those which are carried out in all our great scientific schools to-day. He says that the best model for teaching physical science is that which is based upon the three elements of lectures, demonstrations, and examinations; the particular value of each of which he elaborates.

The latter half of the volume at the present under notice deals with quite a number of entirely different topics. One of these, which is entitled "On the Physical Basis of Life," was a lay sermon delivered in Edinburgh, and afterwards published in the *Fortnightly Review*. It was the first of a series of Sunday evening addresses upon non-religious topics, instituted by the Rev. J. Cranbrook. Huxley himself said that this address was intended to contain a plain and non-technical statement of one of the great tendencies of modern biological thought,

accompanied by a protest from the philosophical side against what was then commonly called materialism. The result, however, was to draw upon his head some violent attacks by "microscopists, ignorant alike of biology and philosophy; by philosophers, not very learned in either biology or microscopy; by clergymen of several denominations; and by some few writers who have taken the trouble to understand the subject." Amongst these criticisms was one by Mr. Congreve, which drew forth from Huxley a further paper, under the name of "The Scientific Aspects of Positivism," which was really a reply to Mr. Congreve's attack on the lay sermon just mentioned.

Then we pass to some lectures and addresses of quite a different character. One of them is that "On a Piece of Chalk," which was delivered to the working-men of Norwich at the time of the British Association meeting in that city in 1868. This lecture has become famous, and has doubtless been taken as a model for many popular lectures on science since. Indeed, there is no doubt that it is very largely to Huxley that the credit is due for having stirred up in the popular mind that desire for simple explanations of the profound truths of natural science of which we are seeing so largely the fruits to-day.

This is followed by Huxley's anniversary address to the Geological Society, 1863, which is an inquiry into the nature and value of the present results of palæontological investigation. The anniversary address of the same society in 1869 follows, and deals with the subject of geological reform, being a review of geological thought during the past year. This address deals largely with the views of Hutton and

Lyell, and concludes with an inquiry into the geological speculations of the then Sir William Thomson. A good deal in this address is in somewhat technical geological terms, and it must be read in detail to be appreciated.

Then follows Huxley's great review of the *Origin of Species*, written, as he himself explains, in the heat of the first battle which was fought around Darwin's opinions. Huxley's summary of Darwin's great work is that it does not so far satisfy all the requirements of scientific logic, but he had no hesitation in asserting that it is as superior as any preceding or contemporary hypothesis in its power of explaining biological phenomenon, as was the hypothesis of Copernicus to the speculations of Ptolemy.

He returns to the same subject of the origin of species in an article in the *Natural History Review*, 1864, in which he deals with criticisms which had appeared on the Continent in connection with Darwin's work, particularly one by Professor Kölliker, the other by M. Flourens. Huxley champions Darwin against the criticisms of these two formidable opponents. He deals with the Professor with marked courtesy and moderation of language, but when he comes to M. Flourens his indignation at the weakness of logic and the shallowness of information displayed by the critic impels him to describe the writer as assuming a "tone of authority which always touches upon the ludicrous, and sometimes passes the limits of good breeding." M. Flourens, says Huxley, utterly failed to comprehend the first principles of the doctrine which he assails so rudely; and he certainly receives very severe treatment at the hands of Huxley.

Finally, this most interesting collection of Huxley's writings and sayings contains an address to the Cambridge Young Men's Christian Association, "On Descartes' Discourse touching the Method of Using One's Reason Rightly and of Seeking Scientific Truth."

Such, in brief review, are the contents of this volume of lay sermons and addresses. Enough has been said here to indicate to the reader that in them will be found some of Huxley's most trenchant writing and speaking, and no one who wishes to obtain anything like a complete insight into Huxley's mind can afford to disregard the contents of this volume.

CHAPTER VI

DICTA HUXLEYANIA

FEW men could put more into a single short sentence or two than could Huxley. His lectures, addresses, and letters abound in epigrammatical sayings, which frequently throw a brilliant light upon the question under discussion. On account of this it is comparatively easy to find out exactly what Huxley thought concerning a great many various topics, and one has not to wade through long pages of arguments to discover precisely what he meant. And since it is one of the points of interest in a biography of any great man to state his opinions on various current topics, we may allow Huxley to speak for himself on some of those which were much to the front in his day, selecting them from the various contents of the volumes of the *Collected Essays*. They may show the many-sided mind of the man, his clearness of thought, his lucidity of expression, his directness of statement. Such a selection might be added to indefinitely, but the few that are given here will afford some idea of Huxley's style, and, at the same time, will give the reader Huxley's opinions on various topics in the briefest possible manner. The headings given are the present writer's.

Differences in Men.—"The most considerable difference I note among men (he concludes) is not

in their readiness to fall into error, but in their readiness to acknowledge these inevitable lapses."

Atheism.—"To my mind, atheism is, on purely philosophical grounds, untenable. That there is no evidence of the existence of such a being as the God of the theologians is true enough; but strictly scientific reasoning can take us no further. Where we know nothing we can neither affirm nor deny with propriety."

Home Rule.—"If anybody will show me a way by which the Irish may attain all they want without playing the devil with us, I am ready to give them their own talking-shop or anything else."

Stimulants and Brain Work.—"If a man cannot do brain work without stimulants of any kind, he had better turn to hand work—it is an indication on Nature's part that she did not mean him to be a head worker."

Orthodoxy.—"I desire that the next generation may be less fettered by the gross and stupid superstitions of orthodoxy than mine has been. And I shall be well satisfied if I can succeed to however small an extent in bringing about that result."

Rational Beliefs.—"It is not to be forgotten that what we call rational grounds for our beliefs are often extremely irrational attempts to justify our instincts."

Absolute Certainty.—"Only one absolute certainty is possible to man—namely, that at any given moment the feeling which he has exists."

The Permanent Satisfaction.—"There is nothing of permanent value (putting aside a few human affections), nothing that satisfies quiet reflection—except the sense of having worked according to one's

capacity and light, to make things clear and get rid of cant and shams of all sorts."

Moral Purpose.—"Of moral purpose I see no trace in Nature. That is an article of exclusively human manufacture—and very much to our credit."

Actions, Sinful and Virtuous.—"The actions we call sinful are as much the consequence of the order of nature as those we call virtuous. They are part and parcel of the struggle for existence through which all living things have passed, and they have become sins because man alone seeks a higher life in voluntary association."

Promotion by Seniority.—"*Cæteris paribus*, or with even approximate equality of qualifications, no doubt seniority ought to count; but it is mere ruin to any service to let it interfere with the promotion of men of marked superiority, especially in the case of offices which involve much responsibility."

Moral Duty.—"Moral duty consists in the observance of those rules of conduct which contribute to the welfare of society, and by implication of the individuals who compose it.

"The end of society is peace and mutual protection, so that the individual may reach the fullest and highest life attainable by man. The rules of conduct by which this end is to be attained are discoverable—like the other so-called laws of Nature—by observation and experiment, and only in that way."

A University.—"It is an institution in which a man who claims to devote himself to Science or Art, should be able to find some one who can teach him what is already known, and train him in the methods of knowing more."

On Tennyson.—"He was the only modern poet, in

fact I think the only poet since the time of Lucretius, who has taken the trouble to understand the work and tendency of the men of science."

The Nineteenth Century.—"I conceive that the leading characteristic of the nineteenth century has been the rapid growth of the scientific spirit, the consequent application of scientific methods of investigation to all the problems with which the human mind is occupied, and the correlative rejection of traditional beliefs which have proved their incompetence to bear such investigation."

Overwork.—"I have come to the conviction, however, that steady work hurts nobody, the real destroyer of hard-working men being not their work, but dinners, late hours, and the universal humbug and excitement of society."

Education of Women.—"I am far from wishing to place any obstacle in the way of the intellectual advancement and development of women. On the contrary, I don't see how we are to make any permanent advancement while one-half of the race is sunk, as nine-tenths of women are, in mere ignorant parsonese superstitions."

Truth at All Costs.—"I have searched over the grounds of my belief, and if wife and child and name and fame were all to be lost to me one after the other as the penalty, still I will not lie."

The Source of Happiness.—"The one thing for men, who stand pretty much alone, and have a good deal of fighting to do in the external world, is to have light and warmth and confidence within the four walls of home."

The Term "Agnostic."—"Tolerably early in life I discovered that one of the unpardonable sins, in

the eyes of most people, is for a man to presume to go about unlabelled. The world regards such a person as the police do an unmuzzled dog, not under proper control. I could find no label that would suit me, so, in my desire to range myself and be respectable, I invented one; and, as the chief thing I was sure of was that I did not know a great many things that the —ists and the —ites about me professed to be familiar with, I called myself an Agnostic. Surely no denomination could be more modest or more appropriate; and I cannot imagine why I should be every now and then haled out of my refuge and declared sometimes to be a Materialist, sometimes an Atheist, sometimes a Positivist; and sometimes, alas and alack, a cowardly or reactionary Obscurantist."

Blind Obedience.—"No personal habit more surely degrades the conscience and the intellect than blind and unhesitating obedience to unlimited authority."

Ideal Womanhood.—"The possibility that the ideal of womanhood lies neither in the fair saint, nor in the fair sinner; that the female type of character is neither better nor worse than the male, but only weaker; that women are meant neither to be men's guides nor their playthings, but their comrades, their fellows, and their equals, so far as Nature puts no bar to that equality, does not seem to have entered into the minds of those who have had the conduct of the education of girls."

The Path of Truth.—"There is one guiding rule by which a man may always find this path, and keep himself from straying when he has found it. This golden rule is—give unqualified assent to no propositions but those the truth of which is so clear and distinct that they cannot be doubted."

The Liberty of the Subject.—"If my next-door neighbour chooses to have his drains in such a state as to create a poisonous atmosphere, which I breathe at the risk of typhoid and diphtheria, he restricts my just freedom to live just as much as if he went about with a pistol, threatening my life; if he is to be allowed to let his children go unvaccinated, he might as well be allowed to leave strychnine lozenges about in the way of mine; and if he brings them up untaught and untrained to earn their living, he is doing his best to restrict my freedom, by increasing the burden of taxation for the support of gaols and workhouses, for which I have to pay."

The Good of Mankind.—"I take it that the good of mankind means the attainment, by every man, of all the happiness which he can enjoy without diminishing the happiness of his fellow-men."

The Future of Women.—"Women will find their place, and it will neither be that in which they have been held, nor that to which some of them aspire. Nature's old salique law will not be repealed, and no change of dynasty will be effected."

The Christian Scriptures.—"Their strength lies in their appeals, not to the reason, but to the ethical sense. I do not say that even the highest biblical ideal is exclusive of others or needs no supplement. But I do believe that the human race is not yet, possibly may never be, in a position to dispense with it."

On Darwin.—"None have fought better, and none have been more fortunate, than Charles Darwin. He found a great truth trodden underfoot, 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 ? "

The Agnostic Attitude.—" Those who appreciate the nature of our position will see, at once, that when Ecclesiasticism declares that we ought to believe this, that, and the other, and are very wicked if we don't, it is impossible for us to give any answer but this : We have not the slightest objection to believe anything you like, if you will give us good grounds for belief ; but, if you cannot, we must respectfully refuse, even if that refusal should wreck morality and insure our own damnation several times over. We are quite content to leave that to the decision of the future. The course of the past has impressed us with the firm conviction that no good ever comes of falsehood, and we feel warranted in refusing even to experiment in that direction."

CHAPTER VII

HOW OTHERS SAW HIM

It is no easy thing to form an estimate of the value of a life such as Huxley's, lived as it was at a period when England was very rich in men of great attainment, and touching closely, as it did, so many varied aspects and subjects. For a man to be remembered at all in the scientific world, who was contemporary with Darwin, Tyndall, Wallace, Owen, and so many others, was no mean achievement. To have reached a foremost place amongst the men of his time proves Huxley one of the giants of the nineteenth century. Well may Henri Bergson say, "What scientific question, what philosophical problem is there which did not interest that luminous intellect—one of the broadest and most comprehensive that nineteenth-century England produced, fertile in great intellects as it was?"

The very fact that Huxley's crowded life was closely connected with so many different activities makes it the harder to form an opinion as to his outstanding qualities and value. And, doubtless, such a critical estimate would vary considerably, according to the personal interests of the critic. To the general public, at any rate for years after his death, his name was best remembered as that of the man who,

of all others, had been the most stalwart protagonist of the doctrines advocated by Charles Darwin, and who, in consequence, had suffered more than any one else in England in the estimation of those who arrogated to themselves the essence of righteousness. It was quite natural that this phase of Huxley's life should stand out so prominently at that time, and, indeed, any one could see that it was one of his foremost lines of work. But the years have passed since then, and everything for which Huxley contended—or nearly everything—has passed into the ordinary mental equipment of the average citizen of to-day, who would find it difficult to realise the intense opprobrium under which Huxley suffered for his beliefs and his advocacy of them. After all, in this respect he only suffered what every reformer and prophet has to undergo, and the remarkable thing is that the world never learns, in spite of repeated object-lessons, that the kind of persecution and abuse, to which it invariably subjects the greatest minds of any age, never has the slightest effect upon the ultimate establishment of their beliefs if true, or their extinction if false.

We may, therefore, briefly note the estimate formed of Huxley's life and work by some of his contemporaries, as an aid to forming our own conception of his place in history. Let us note first his son's opinion, as stated in the last of these three delightful volumes, *Life and Letters of Thomas Henry Huxley*. Mr. Leonard Huxley says that his strongest characteristic was his passion for veracity—"an uncompromising passion for truth in thought, which would admit no particle of self-deception, no assertion

beyond what could be verified; for truth in act, perfect straightforwardness and sincerity, with complete disregard of personal consequences for uttering unpalatable fact." Any form of lie was to Huxley most hateful, and no form of it more so than that due to self-delusion or foggy thinking. And with this he classed what he termed the sin of faith—that is, to say, the form of belief which does not make the proper use of reason, but which abuses reason by giving assent to propositions which are neither obvious nor sufficiently proved. It was here, of course, that he came into conflict with the church and orthodoxy. There was no such thing as compromise between truth and falsehood in his mind. He was independent in spirit, quite indifferent to rewards and honours, and even to financial successes. The only recognition he considered of any value was that of his contemporaries in science. The only thing for which he did claim recognition was the honesty of his motives. The opinion of those who judged him only from his public work was that he seemed hard, and at times unsympathetic, but to those who knew him well, and above all to his own family, it was quite obvious that the very reverse was the truth; so much so that one of his friends wrote after Huxley's death: "His many private friends are almost tempted to forget the public loss in thinking of the qualities which so endeared him to them all."

His mind was wonderfully balanced in its development on both the speculative and the practical sides, so that, in addition to his intense love of knowledge as such, he was always found urging the appli-

cation of it in life. Hence his strenuous advocacy of education in science for the people. Engrossed as he was in scientific work, it never became to him, as it did to Darwin, the only thing in life, for Huxley never lost his delight in literature and art and music. Keats, Tennyson, and Browning were his modern favourites, with Milton and Shakespeare forming an ever-increasing satisfaction. Indeed, what recreations he had were, as a rule, of a literary nature, and he rarely took much exercise. In his home life he exhibited to his children just the same tenderness, which was somewhat hidden under his unbending determination for the right, which distinguishes his public intercourse. So his son says that as children they felt their little hypocrisies shrivel up before him, and a confidence in the unfailing rightness of his moral judgment. His home happiness was one of the greatest assets in his life. It was, indeed, that which made the bitterness of controversy a matter to be borne with comparative ease. It was in his married life that he found his happiness and his strength, and his tenderness for his children was remarkable. Those who would realise the great beauty of the private side of Huxley's life must read for themselves these volumes by his son, from which these sentiments are taken.

Such was the impression of the father by the son. We may, therefore, turn next to notice very briefly the estimates formed of Huxley by his contemporaries in science. Dr. Alfred Russell Wallace, who knew him intimately for many years, says: "I find that he was my junior by two years, yet he has always seemed to me to be the older, mainly, no

doubt, because, from the very first time I saw him (now more than forty years ago), I recognised his vast superiority in ability, in knowledge, and in all those qualities that enable a man to take a foremost place in the world. I owe him thanks for much kindness and for assistance always cordially given, and although we had many differences of opinion, I never received from him a harsh or unkind word." For a man of Wallace's mental calibre and attainments to be able to write that of Huxley speaks volumes.

The late Professor Jeffrey Parker thus speaks of Huxley as a teacher: "His lectures were like his writings, luminously clear, without the faintest disposition to descend to the level of his audience; eloquent, but with no trace of the empty rhetoric which so often does duty for that quality; full of a high seriousness, but with no suspicion of pedantry; lightened by occasional epigram or flashes of caustic humour, but with none of the small jocularities in which it is such a temptation to indulge. To me his lectures before his small class at Jermyn Street or South Kensington were almost more impressive than the discourses at the Royal Institute, where for an hour and a half he poured forth a stream of dignified, earnest, sincere words in perfect literary form, and without the assistance of a note."

A graphic picture of Huxley as a lecturer is that given by Professor Fairfield Osborn: "He entered the lecture-room promptly as the clock was striking nine, rather quickly, and with his head bent forward, 'as if oppressive with its mind,' but usually glanced attention to his class of about ninety, and began

speaking before he reached his chair. He spoke between his lips, but with perfectly clear analysis, with thorough interest, and with philosophic insight which was far above the average of his students. . . . His lips were firm and closely set, with an expression of positiveness, and the other feature which most marked him was the very heavy mass of hair falling over his forehead, which he would frequently stroke or toss back."

Equally enthusiastic is Professor Mivart's account of Huxley as a lecturer. "I have heard many men lecture, but I never heard any one lecture as did Professor Huxley. He was my very ideal of a lecturer. Distinct in utterance, with an agreeable voice, lucid as it was possible to be in exposition, with admirably chosen language, sufficiently rapid yet never hurried, often impressive in manner, yet never otherwise than completely natural, and sometimes allowing his audience a glimpse of that rich fund of humour ever ready to well forth when occasion prompted, sometimes accompanied with an extra gleam in his bright, dark eyes, sometimes expressed with a dryness of gravity of look which gave it a double zest. . . . I learnt more from him in two years than I had acquired in any previous decade of biological study."

Similar testimony is that contributed by Professor Howes. "As a class lecturer Huxley was *facile princeps*, and only those who were privileged to sit under him could form a conception of his delivery. Clear, deliberate, never hesitant nor unduly emphatic, never repetitional, always logical, his every word told. Great, however, as were his class

lectures, his working-men's were greater. . . . He gave the workmen of his best."

Mr. G. W. Smalley gives his impression of Huxley in these words: "The square forehead, the square jaw, the tense lines of the mouth, the deep, flashing dark eyes, the impression of something more than strength he gave you, an impression of sincerity and solid force, of immovability, yet with the gentleness arising from the serene consciousness of his strength—all this belonged to Huxley, and to him alone. The first glance magnetised his audience, the eyes were those of one accustomed to command, of one having authority, and not fearing on occasion to use it. . . . He was masculine in everything—look, gesture, speech. . . . He had the secret of the highest art of all, whether in oratory or whatever else—he had simplicity. The force was in the thought, in the diction, and he needed no other."

From these word-pictures from the pens of men who knew him intimately one can gather very clearly what manner of man he was. And it is no wonder that all who heard him came under the influence of his marvellous and dominating personality. Indeed, from the records that are left and which are given by his son in his biography, one is struck with the fact that the personality of Huxley made the deepest impression upon those who studied under him and worked with him, before they themselves became prominent in science.

Mr. Edward Clodd, in his biography of Huxley, treats of him from five aspects, namely, the man, the discoverer, the interpreter, the controversialist, the constructor. Of these five sides to Huxley's

life and work the following is Mr. Clodd's estimate: As a man he was "of spotless integrity in every relation, and single-minded in every purpose, he went on from strength to strength, because each step made the rightness of the path which he had chosen more manifest. . . . Guided by reason within limits which none have defined so well,—he remains alike an example and an inspiration to all men for all time." As a discoverer in science, an aspect of Huxley which has been rather lost sight of by the general public—doubtless on account of his prominence as a controversialist—it is well to remember that the mere titles of his original scientific papers fill ten pages of the appendix to his biography. It, nevertheless, remains true that Huxley's work has been incorporated in the very body of science. His original work in biology alone would take pages to recount, and this aspect of Huxley's claim upon the world is best stated in the words of Professor Ray Lankester and Sir Michael Foster in their preface to his *Scientific Memoirs*. Their words are these: "Apart from the influence exerted by his popular writings, the progress of biology during the present century (that is the nineteenth) was largely due to labours of his of which the general public knew nothing, and that he was in some respects the most original and most fertile in discovery of all his fellow-workers in the same branch of science." Of his rôle as interpreter we have spoken on many occasions in these pages, and as a controversialist. It only needs to be added that nearly "all for which Huxley contended has been conceded, and the rest will follow in due time." (Clodd.)

As a constructive writer, he is perhaps at his best in "Ethics and Evolution." And his own remark that if he were to be remembered at all it would rather be as a man who did his best to help the people than under any other title shows how eager he was that scientific method should penetrate into the events of everyday life. In nearly all his papers which deal with social subjects, while there is much destructive criticism there is also much of definite suggested construction. In no part of his work is this better seen than in his writings and speeches on Education and in his system of laboratory teaching, which is now adopted in every university. These five aspects of Huxley, with which Mr. Clodd deals separately, will indicate the many-sided nature and talents of the man.

No finer tribute has ever been paid to any man than that of Professor Ray Lankester. "There has been no man or woman whom I have met on my journey through life whom I have loved and regarded as I have him, and I feel that the world has shrunk and become a poor thing now that his splendid spirit and delightful presence are gone from it. Ever since I was a little boy he has been my ideal and hero."

CHAPTER VIII

THE PLACE OF HUXLEY

Such are the opinions and estimates of the value of Huxley's work and character in the words of some of those who knew him best. But since those words were written, a good many years have gone by, and we are not quite sure whether they represent to-day the real value of Huxley's life to the world. Such an estimate is always difficult to form when one is very close to the event, and while we would be the last to detract one single word from those opinions, we may still be permitted to think that they do not necessarily represent the value of Huxley to us to-day. The times he lived in were so strenuous, and the controversies in which he was engaged were so bitter, that the really solid work which he did for science on the one hand was apt to be overlooked; and the quite temporary importance of the controversies was exaggerated on the other. Far be it from us to belittle the great part that Huxley took in securing the acceptance of Darwin's work. But it may be pointed out that, after all, what Huxley did in this case was simply to hasten the inevitable end. True, that was a very important matter, and in doing that he did good service. But Darwin's work depended for its immortality on no

man's advocacy, not even Huxley's. In the ultimate resort it must stand by one test only, namely, its truth or falsehood. So that in time to come, when Darwin's work has taken for many years its recognised place in the realm of science, it will be a matter of very little importance what attitude to it was adopted by Mr. Gladstone, Bishop Wilberforce, or even Huxley. His controversial work, however great it was, and important as it seems, was of temporary value only.

There remain, however, two other aspects of Huxley's life upon which, in our judgment, his ultimate claim to fame will rest. One of these will be remembered long after his controversial papers are forgotten, though possibly by a more restricted number than listened to and read his arguments. We refer to Huxley's purely scientific contributions, to biology, and comparative anatomy. From the nature of the case these do not appeal to the general public. Also from the nature of the case his original work in these directions will be prominent and lasting. None but those who are actually engaged in this kind of work can realise the immense value of Huxley's original researches, which were contributed in numerous papers to the Transactions of the Royal Society, and the facts of which have since found their way into the various text-books of the subjects. That is one aspect of Huxley's work which will always live—but which will live to be associated with him only in the minds of the initiated.

Will the mass of Huxley's countrymen, then, in time forget his name? Never so long as there is left a single man who values honesty of purpose

and freedom of thought at their proper estimate. It is here that we may probably find Huxley's ultimate claim upon the grateful recollection of the mass of mankind. If honest men to-day can speak their minds and write their thoughts in comparative security from popular abuse and sacerdotal persecution, it is Huxley that they have to thank. He it was who fought for Englishmen at large the battle of independence of mind and purpose and thought, once for all. It is almost impossible to realise to-day that any man, much less a man of Huxley's character, could have been so persecuted and so maligned by those who called themselves educated people for simply daring to say in public what he thought and believed about the most important things in the world. The records of his life must be read in detail to appreciate what he was made to suffer. And if Huxley has one claim stronger than any other upon the gratitude of posterity, it is that he fought, in season and out of season, with all the strength of his wonderful vigour for the rights of intellectual freedom. He demanded that human reason should be allowed free play, and that no restriction should be put upon it, save that of veracity and honesty. Should intellect and reason land a man in conclusions absolutely or apparently contradictory to those of the mass of orthodox minds around him, he should, nevertheless, have the right to hold and express them as he thinks fit.

The fact that we to-day have so largely obtained that intellectual freedom is our heritage from Huxley, and it is priceless. No greater boon was ever given to honest men, and no measure of gratitude to the

man who gave it can be too great. When the Darwinian controversy is forgotten, and its truths embodied in everyday science, and when all the other controversies into which Huxley was drawn by virtue of his strong convictions, have faded into obscurity, this one thing will remain an everlasting monument to the greatness of his mind—that he fought for intellectual freedom. This will be his permanent contribution to the world—and there could be no greater. If it shall be impossible ever again in this country for a man to be persecuted merely for expressing his thoughts and convictions, supporting them with arguments which cannot be met—that is due to Huxley, and almost to Huxley alone. This, we take it, is his great claim upon his country.

It would be quite impossible within the space of these pages at our disposal to have followed out in any detail any of the numerous lines of activity which made up Huxley's life. Nor was it in the least necessary for our purpose to do so. It is sufficient to have indicated in a general way the main directions of his activity. The view that a biography has as its primary business to be complete is not the truest view. A very incomplete picture of a man may tell us far more than a detailed description of all he did. A recent writer has said, and said truly, that the "one and indivisible purpose of biography is to achieve in words the portrait of the individual concerned, and as its merits may not be measured by the nobility of the man or the woman who is its theme, it need not lay too much stress upon the official actions of hero or heroine. It

should be its definite purpose to separate the individual from his class—to show in what respects he differs from others." [1] That being the case, it is quite obvious that mere length has nothing to do with the essence of biography, which may be compressed in the case of many into a few short sentences. That is to say that the outstanding features which make the portrait—the essence of the biography—may be so compressed.

That has been our object in these pages. The complete details of Huxley's life are intensely interesting, and will be found fully dealt with in the excellent biography of him written by his son, to which volumes we are much indebted for many facts in these pages. Here, however, we have merely attempted to throw into relief a picture of the man himself as he will be remembered. To that end we have sketched what was necessary in his environment to form a background, without which a portrait could not be made clear. But for our present purpose these details are merely background. We have, however, allowed others to tell us how the portrait appeared to them as an aid to our own conception. Moreover, we have allowed Huxley to speak for himself in his own inimitably clear manner, so that we may get something of that personal contact which is so essentially necessary to realise the individual. And, finally, we have ventured to add our own touch of the picture by stating what seemed to us the outstanding feature of the character depicted.

Some thirty years ago, in a far-off British colony, a schoolmaster, who realised the value of Huxley's

[1] *Letters of an Englishman.*

methods of teaching, placed in the hands of his older boys a little red book on human physiology, and worked through it with them. The result determined the career of one of those boys, to whom Huxley's life has been an inspiration ever since. The boy was the present writer, and the book, *Lessons in Elementary Physiology*, by Thomas Henry Huxley. To how many thousands that little work has been the means of attraction to scientific work none can say. It was first published in 1866, and has since gone through numerous editions and more numerous reprints, and remains to-day the best of its kind. One of those to whom it taught so much is glad to have been able to pay his grateful tribute to the great biological teacher, and to one of the greatest lives.

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