

SIR RICHARD OWEN AND HIS WORK.

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T has been said, "half in jest," that the study of science is favourable to longevity, and the names of Lyell, Murchison, Brewster, Faraday, and many others have been given as those of men who have passed the allotted span of three-score years and ten. To these names may be added that of Sir Richard Owen. Born in 1804, he has now attained the advanced age of four-score years, without experiencing that "labour and sorrow" which the Psalmist says is the usual lot of those who reach this outer limit of human life. If genius may be defined as an "infinite capacity of doing work," Sir Richard may fairly lay claim to this gift, as few men have done more or better work than he has during his long and honourable career. Being destined for the medical profession, he, after completing the necessary studies, practised for some time in Serle Street, Lincoln's Inn Fields. The bent of his mind, however, was strongly scientific, and shortly after he had succeeded his father-in-law as Conservator of the Museum of the College of Surgeons he abandoned his profession altogether, and devoted his whole time and energy to scientific pursuits. About twenty years of his life were spent mainly in the study of comparative anatomy. His friend Baron Cuvier, in studying fossil bones and comparing them with those of living animals, had shown that each group of animals was formed on a distinct plan, and that the whole structure of each species was adapted to its living requirements. With this knowledge he was enabled, from a few fragments of bones, to re-construct the whole animal and give a complete picture of animals that had long been extinct. Owen extended and improved upon this method, showing that there was evidence of a greater conformity to type, especially in the bones of the head of vertebrate animals, than Cuvier supposed. In 1834 Owen was elected a Fellow of the Royal Society, and was appointed the first Hunterian Professor at the Royal College of Surgeons, and filled this chair for over twenty years. During this period he gave to the world several remarkable works on comparative anatomy and paleontology, among which may be mentioned his "Archetype and Homologies of the Vertebrate Skeleton," his work on the study of teeth, besides many memoirs on extinct reptiles and mammals. In addition to these he prepared catalogues, extending to seven quarto volumes, of the various departments of the Hunterian collection.

Richard Owen was not, however, a scientific recluse, poring over his catalogues and fossil bones, for amid all these labours he found time to devote part of his rare energy and ability to various social problems. In 1843 he was appointed one of the commissioners to inquire into the health of towns, and in 1848 he issued

a special report on the sanitary state of his native town, Lancaster, which resulted in improved drainage and water supply for that town. He was also one of the commissioners on the health of the Metropolis, and took part in various commissions of a kindred nature, including that of the Great Exhibition of 1851.

In 1856 Owen was appointed Superintendent of the Department of Natural History in the British Museum, and was chiefly instrumental in bringing about the building of the South Kensington Museum, which has proved such a valuable addition to our means of utilising our vast scientific collections. Notwithstanding the many arduous duties connected with his office in the British Museum, Sir Richard did not relax his scientific labours, but continued giving to the public many valuable memoirs. Almost every class of the animal kingdom was noticed by him. Besides his larger works on Fossils, he wrote papers on the Andaman Islanders, the Anthropoid Apes, the Giraffe, and many other subjects too numerous to mention. These untiring labours in the cause of science have not passed without due recognition from the various learned bodies and from those in high station. The Royal Society has bestowed upon him the Royal and Copley medals. The Universities of Oxford, Cambridge, and Dublin have conferred on him honorary degrees, and most of the learned societies of Europe and America have placed his name on their lists of honorary members. In 1857 he was elected President of the British Association. The King of Prussia, the late Emperor of the French, the Emperor of Brazil, and Her Most Gracious Majesty have delighted to do him honour.

In the year 1840 the British Association requested Sir Richard Owen to investigate the evidences of the reptilian fossils, as revealed in the formations of the secondary period, in Great Britain; and since that time he has accumulated a vast amount of information on the subject, which he has given to the public in a work recently published, entitled "A History of British Fossil Reptiles" (4 vols. 4to).^{*} This magnificent work forms a fitting crown to a long life spent in advancing human knowledge and happiness, and bears witness to the extraordinary vigour of his mind. With a short summary of its contents we will close this necessarily imperfect sketch of a career spent in incessant work, and of a life now full of years and full of honours.

We are sometimes much impressed when old cities are dug out of the dust of centuries, and the works of a people, whose very name has been lost for ages, are brought once more to the light of day. We regard with something akin to awe the remains of ancient halls where the soldiers and statesmen of a bygone age acted their various parts on the stage of common life. We speculate on the many centuries that have

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passed, and the great changes that have occurred, on this earthly scene; but the researches of our author carry us back to a period so remote that the earliest works of man are but as yesterday when compared with them, and to changes so great that we can scarcely realise them. At that time man had not yet appeared on the world; this island of ours had not yet been formed, at least in its present shape, and the place that it now occupies was inhabited by strange and weird forms of animal life. In fact, the kingdoms he describes to us are not those of men but of reptiles, who, at that time, seemed to be the rulers of the earth. The earth, the air, the sea appear to have swarmed with unearthly-looking gigantic lizards, flying dragons, crocodiles, alligators, serpents, and other noxious and formidable animals. We can scarcely believe that these inhabitants of tropical and warm climates once dwelt where the island of Great Britain now stands.

The only representatives of this wealth of reptile life existing at the present day consist of about half a dozen species, comprising the lizard, the slowworm, the viper, and two kinds of harmless snakes, degenerate descendants of gigantic ancestors.

In the course of his researches Sir Richard has found fossil remains representing all the known genera of crocodiles, and most of the tortoises. Besides these he has discovered remains of many species of turtles. Curiously enough the remains of the crocodile species, now only found in the rivers of Asia, are associated with the remains of the alligator, now confined to the rivers of America, as if even in those remote ages Great Britain was a sort of central station, where the products of the East and West were gathered together. In addition to these monsters, remains of various species of serpent were discovered, some of them as formidable in their dimensions as the boas or pythons of tropical lands. Cuvier, in his researches, had investigated some petrified remains

of a very uncertain nature, which some supposed belonged to a fish, others to a bat, and others again to a bird. He proved, however, that the remains were those of a strange reptile having powers of flight, which he named *Pterodactylus*, or finger-winged. Sir Richard Owen has found in Britain remains of as many as eighteen other kinds of these strange flying creatures, which he has divided into various groups of *Pterosaur*, or flying lizard. Strange, uncouth-looking creatures these must have been, unlike anything we now have in heaven above or in the earth beneath, with great bat-like leather wings, stretching sometimes six feet from tip to tip, and jaws armed with formidable piercing and cutting teeth.

If any reader of this sketch has the opportunity of visiting the Museum of Natural History in Cromwell Road, he should do so, and will be amply rewarded for his trouble. We are accustomed to think of lizards as very small animals, scarcely to be seen among the grass, but he will there see the restored remains of this species, 'gigantic in their dimensions, and of strange shapes, that once lived and roamed where the British Isles now stand. Of these predatory saurians or lizards Sir Richard found the remains of ten genera, besides what were already known, and he associated them under the order which he called *Dinosauria*. Besides these land animals there are well-restored skeletons of the sea-dragons, constituting various orders, such as *Plesiosaurus*, *Ichthyosaurus*, &c.—a strange collection of unearthly-looking monsters. The remains of these reptiles have been deposited on the sandy or muddy bottoms of the ocean in which they lived; these beds have since been raised by upheaval of the earth's crust, and now form cliffs on the south and east coasts of Britain.

We have seen that there were in Britain some lizards or saurians which inhabited the land, while others frequented the sea, but in an earlier geological period remains of a huge animal allied to the class of



FOOTPRINTS OF LABYRINTHODON.

(From "A History of British Fossil Reptiles," by permission.)

Amphibia, or that which dwells both on land and in water, like the frog, were found. This great beast had strong limbs for moving by steps on land, and teeth of destructive shape and size, unique in complexity of structure, whence they are called by the name of "Labyrinthodontia." We give a cut representing the print of their hand-like feet in the sands over which they moved.

What a strange picture this work brings before us of the condition of our native land in those primeval ages! How different everything must have been!—the waters of ocean covering what are now high mountain cliffs; the sites of our great cities perhaps the centres

of marshes or of forests; the climate modified, so that tropical animals could live and thrive there. Above all, not a man, savage or civilised, to be seen. Only huge saurians, wandering and splashing over the marshy plains; serpents hiding their dangerous folds amid the rank vegetation, and strange monstrous shapes, undreamt of even in the wildest vagaries of human fancy, flitting through the sultry air; the crocodile and the alligator swarming in the ancient rivers, and the very ocean filled with unimagined monsters. Truly the results of science are more wonderful than fairy tales, as from the broken and scattered rocks we laboriously spell out the earlier history of the world.

OUR MODEL READING CLUB.

SECOND PAPER.



REMISSING—we hope, not without cause—that Model Reading Clubs have been established in many parts of the country on the basis laid down in our first paper, we now proceed to say a few additional words about our

HOME READING DIVISION.

It has been very well remarked that the value of regular and consistent reading lies not so much in the *number* of books perused as in the *way* in which they are read. One good book carefully studied will do the reader more good than a hundred books scanned in a desultory way. For this reason instructive books—whether histories, biographies, travels, science treatises, or what not—should always be perused thoughtfully, difficulties should be reasoned out, important passages should be marked for further study, notes should be taken, and a careful summary of the entire work should be made. The ability to write a good condensed summary or abstract of a book affords, perhaps, the best proof that the reader has really mastered its contents.

Professor Morley, in his "First Sketch of English Literature," has given many good examples of the way in which the whole purpose and method of a book may be summed up in a very few lines. Take, for instance, his abstract of Chaucer's "Canterbury Tales," or of Locke's "Essay concerning Human Understanding." Or, to quote one case, read something of what he has to say of Wordsworth's poem—

"THE PRELUDE, OR GROWTH OF A POET'S MIND."

"Wordsworth's purpose was to review thoughtfully the course of his own mind through surrounding influences. . . . After tracing his life from childhood to the days of his enthusiastic sympathy with the French Revolution, he showed how, after settling down with his sister Dorothy

in a small cottage at Grasmere—to which a little later he brought his wife—the influence of Dorothy, and communion with nature, brought him calmer sense of the great harmony of creation, and of the place of man in the great whole. His interest in man grew deeper as he cared less for the abstract questions about life, and more for the real man:

"Studious more to see
Great truths, than touch and handle little ones."

"We have fought our battle, and won freedom enough to work on and show the use of freedom—to what end the powers of civil polity were given. All we have now to do is to remove hindrances and furnish aids to the development of each individual. Let each unit become better and wiser, and the whole nation will grow in strength and wisdom by the growth of its constituent atoms. There are millions helpless or mischievous, because not born to conditions which have made the lives of others happy. We are not idly to lament 'what man has made of man,' but actively to mend the mischief. Whoever makes his own life and its influence wholesome, or in any way helps to make lives about him wholesome, adds thereby to the strength of his country, and is doing the true work of the nineteenth century. Having gained, said Wordsworth,

"A more judicious knowledge of the worth
And dignity of individual man;
No composition of the brain, but man—
Of whom we read, the man whom we behold
With our own eyes—I could not but inquire,
Not with less interest than heretofore,
But greater, though in spirit more subdued,
Why is this glorious creature to be found
One only in ten thousand? What one is,
Why may not millions be?"

"Upon this thought Wordsworth rested. Here, also, his narrative draws to its close, touching the key-note of the days in which we live. Wordsworth made it the one work of his life as a poet to uphold the 'dignity of individual man,' strengthen the sense of all the harmonies of nature, and show how, among them all, when taking its true place,

"The mind of man becomes
A thousand times more beautiful than the earth
On which he dwells, above this frame of things
(Which, 'mid all revolution in the hopes
And fears of men, doth still remain unchanged)
In beauty exalted, as it is itself
Of quality and fabric more divine."

In another paper we may possibly give some further hints as to the best method of producing an abstract of a book. For the present, however, we must pass on to give another short list of books which will well repay reading:—

Buckland's "Curiosities of Natural History," First Series.
Picton's "Life of Oliver Cromwell."