THE PICCADILLY PAPERS.

By a Peripatetic.

ON SOME MEN OF SCIENCE, AND THEIR GUESSES.

MR. DARWIN'S new work* will unquestionably be the great scientific novelty of the present season. It is the sequel to that famous 'Origin of Species' which seven years ago elicited some hundred controversial publications, and excited as keen an interest as any political or theological question of the day. We may pause for a moment to express our regret that ill health has been the reason of the tardy appearance of the work, and also to offer our congratulation on the success of Mr. Darwin's son, who is this year the second wrangler at Cambridge. The Darwins are men who have a vested and hereditary interest in science. One ancestor of our philosopher was the Erasmus Darwin who wrote the 'Botanic Garden,' and another, Josiah Wedgwood, was the great promoter of ceramic art. Have our readers ever read the 'Voyage of the *Beagle* round the world'? Let those few with whom it is not familiar instantly obtain it. It is the most philosophical book of travels ever written, and must, we think, go far to foster in its readers a love of experiment and observation. It is the best introduction to Mr. Darwin's subsequent writings, and to that series of future works which he promises in support of his hypothesis, and which, we sincerely trust, he will have the health and energy to complete. It would be well if those who were so very ill at ease on the theory of the 'Origin of Species by means of Natural Selection' would remember that it is simply an hypothesis, carefully considered, and perhaps established, in the author's mind; but still an hypothesis. No scientific induction can be made unless we have the help of an hypothesis to string the facts together. Mr. Darwin holds his theory because he considers that it collects under one point of view, and gives a rational explanation of many apparently independent classes of facts. He is entitled to hold this hypothesis, the most brilliant of all Guesses at Truth, although it is altogether open to controversy whether he has really guessed rightly. It will be convenient to some of our readers if we re-state that hypothesis. The idea is otherwise stated by the term 'Survival of the Fittest.' In the battle of existence extending over many centuries, the weak continually disappear and the strong prevail; the varieties which possess an advantage in structure, constitution, or instinct, are preserved by a process which he calls Natural Selection. The question arises, what may not this natural selection eventually effect? and we find the admirers of Mr. Darwin prophesying that at last 'the body of Osiris will rise in all its incomparable perfection.'

But the question is, whether organic beings really possess the inherent tendency to vary, on which Mr. Darwin builds his theory? He puts forth the present volumes as containing a large portion of his evidences. Whatever may be thought of the theory itself, the enormous accumulation of facts here brought together is fraught, in the highest degree, with interest and instruction. Those who are most inimical to the hypothesis will admit that on the subject of inheritance, and of transmitted peculiarities, on many subjects which will interest the highest philosophical thinker, on many subjects which will have the greatest interest for any reader who has the slightest touch of the naturalist about him, the present volumes form such a collection of facts as heretofore has hardly ever been brought together. Yet there is certainly a sense of comparative failure and incongruity, when we find that

* 'The Variations of Plants and Animals under Observation.' By Charles Darwin, M.A. With Illustrations. 2 vols.: Murray.

Mr. Darwin, in support of his hypothesis that we all come from one stock, has selected the domestic pigeon alone for exhaustive description. He takes a hundred and fifty distinguishable kinds, proved to be descended from one stock, and says that if they had been found in a state of nature they would have been grouped in at least five genera. This is interesting enough, but in the mean time his impugners say that 'his animated world rests upon the back of a pigeon,' and they further urge, on scientific grounds, with which we will not venture to trouble our readers, that his pigeon upsets him. It must be said that Mr. Darwin writes with admirable tone and temper, and it would certainly not be conjectured from his own pages that his speculations have been the object of so much angry controversy. More words cannot, however, here be given to a man of scientific character, but less could not be afforded to a work of such conspicuous merit and general interest.

But this mention of scientific hypothesis, the noblest kind of all guessing, recals to my mind a noble passage which I read the other day in a semi-scientific work of a most remarkable kind*—a passage which shows how the imaginative mind of a poet, to which the cold light of science is supposed to be most averse, has lighted upon truths of the highest scientific nature. This eloquent writer says:—

'One of the most beautiful scientific generalizations was the result not of the patient, persevering researches of the naturalist, but of the dreamy reverie of a poet. On the meditative mind of Goethe on one occasion dawned the bright idea, that the flower of a plant is not, as is commonly supposed, an added or separate organ, but only the highest development, or rather transformation of its leaves; that all the parts of a plant, from the seed to the blossom, are mere modifications of a leaf. This idea, at first, was founded on no observations of Nature or accumulations of facts; it was laughed at by scientific men as the dream of one ignorant of science; and even by the kindred mind of Schiller it was regarded simply as a poetical fancy, though he acknowledged its beauty and ingenuity. But as time wore on it began to attract more reverent attention; it was found to be a clear exposition of a somewhat hazy presentiment of the great Linnæus, and of a theory long buried in neglect, first propounded by Wolff. Thus recommended by scientific authority, men began to study it anew in the light of Nature's own revelations, and soon became convinced of its scientific value. Jussieu and De Candolle, the eminent French botanists, gave their unqualified assent to it; and now the poetry of the idea is lost sight of in its prosaic reality, and it is taught as a fundamental and all-essential truth in every text-book of vegetable physiology. The beneficial effects which it produced upon the study of natural history it is impossible to over-estimate. It created a complete revolution in the science of botany, changing it from a mass of confused and discordant facts into a highly compact and symmetrical system. It furnished a proper basis upon which a solid and accurate theory of the vegetable kingdom could be constructed. It supplied the key of explanation for the occurrence of all those singular metamorphoses which plants undergo, and which were formerly utterly inexplicable. It lies at the root of the arts of agriculture and horticulture; for without the law involved in it the simple wild plants of Nature could not possibly be connected with the magnificent double flowers of our gardens and the useful product of our fields.'

But the most remarkable of our scientific guessers is, of course, glorious old Murchison. He has engraved his name on rock, waterfall, and land, in the localities which grateful discoverers have named after him, unless, sharing the fate of the Dutch discoverers, of whom Mr. Motley tells us, the places are christened over again by the un-

* 'Bible Teachings in Nature.' By Rev. Hugh Macmillan: Macmillan. A work unrivalled for its unique and harmonious combination of science, poetry, and religion.

grateful forgetfulness of after ages. Sir Roderick has distinguished himself by two of the most successful and magnificent guesses which science has ever attempted. In one of his addresses to the Royal Geographical Society, of which it would be hardly too much to say that he is the animating principle, Sir Roderick propounded the original view that all the interior of South Africa would be found to consist of a vast watery plateau, from which the waters escaped to the ocean through fissures in loftier mountains. Guess, number one, verified by Livingstone and Sir Samuel Baker, and by other African travellers! His wonderful judgment, which almost rises into an intuition of truth, detected through all depressing accounts the clear hope and expectation that Livingstone was surviving. I dined with Livingstone the evening before he went away, and it was quite a weight off my mind to hear Sir Roderick's now verified hope, that my most pleasant, kindhearted acquaintance was still cheerfully pioneering the path of discovery through the African continent. His other great guess was made in the year 1844, when he conjectured that Australia was a gold-bearing country. He noticed the similarity of its rocks to those of the Ural mountains, and so formed his guess. He strongly advised the poor Cornish tin-miners out of employ to dig for gold in Australia; and what a thousand pities it is that his advice was not more extensively followed. I have the case of those poor Cornish tin-miners very much at heart. The waste lands ought to be given to them to cultivate, and they ought to be assisted to emigrate to wherever there is a real need of their pickaxe and gad. As soon as Sir Roderick received specimens of the gold he had predicted, he strongly urged on the Government to arrange matters for this contingency, and explained all about it in the 'Quarterly Review.' Now what bold and glorious guesses these are! Sir Roderick has probably done greater things, as in the elaboration of the Silurian and Devonian systems, and the classification of rock masses; but there can hardly be anything more sublime than guesses like these, which may ultimately change the history of the world. It would be almost fatiguing just to say what Sir Roderick has done in his feats of intellectual labour. And all this in a Belgravian of fortune, an old soldier, too, who fought in the battle of Corunna, and who used to ride regularly to hounds.

Then look, again, at Professor Owen. He is a vast literary and scientific subject in himself which would require no end of getting up. What a capital account Mr. Walford has given of him in his 'Representative Men,'* an account which is quite a model of scientific biography! Owen might have adopted the useful but obscure life of a naval surgeon had not Abernethy detected his great genius as an anatomist and procured him an office at the Hunterian Museum, for which Professor Owen has hardly done less than the great Hunter himself. Most readers will recollect the part which he took in the gorilla controversy, in which he proved a pillar of strength to M. du Chaillu. Here is a scientific induction which, to the popular mind, took the character of the boldest guess. Professor Owen's announcement of the past, or possibly the present existence of a race of struthious birds, of gigantic size, in New Zealand, derived from the examination of a femur, was one of the 'fairy tales of science.' 'So far as my skill in interpreting an osseous fragment,' said Professor Owen, 'may be credited, I am willing to risk the reputation for it on this statement.' It may now be said, that the theory has been satisfactorily demonstrated; any one may see, at the British Museum, where Mr. Owen would like to have an additional five acres for specimens, the skeleton of the *dinornis elephantopus*. When the fragmentary fossil relics brought by the 'Beagle' were handed over by Mr. Darwin to Professor Owen, he succeeded, by a microscopical examination of apparently valueless

* 'Representative Men in Literature, Science, and Art.' By Edward Walford, M.A. With Photographic Portraits from life: A. W. Bennett. 1868.

ragments, such as the teeth, in reconstructing extinct animals, in a way such as not even Cuvier himself had attempted. He would build up a whole animal from such unobserved circumstances as the grooves channelled in the bones by blood-vessels, or perforations by nerves. It has been truly said of Professor Owen that, from the sponge to man, he has thrown new light on every subject he has touched. Professor Owen has been ordinarily ranked as a supporter of the theory of development. But it would be well if, instead of accusing him of a scientific pantheism, we gave due attention to his own remarks, which go far to reconcile scientific facts with the teleological argument. 'When the analogy of a machine fails to explain the structure of an organ, such structure does not exist in vain if its true comprehension lead rational and responsible beings to a better conception of their own origin and creation.' 'There are phenomena which God, in his unsearchable ways, permits to be known by his observant instruments; and these phenomena, faithfully interpreted, plainly indicate that He has been pleased to operate differently from what some prefer to believe; thereupon the interpreter is charged with "blotting God out of creation." But on such charge truly lies the impiety. Could the pride of the heart be reached, when such imputations came, then would be found, unuttered,—"Unless every living thing has come to be in the way required by my system of theology, Deity shall have no share in its creation."'

We have just lost a scientific baronet by the death of Brewster, and have obtained one by the deserved promotion of Wheatstone. The death of Sir David reminds me of an earnest sentence well worth the quoting: 'At the close of all labours, a man must ask to what good end he has given himself. There are few who will find the answer so easy as those who have contributed even the smallest help in widening our knowledge of the order of Nature, and in revealing for our adoration the divine ideas which are at the basis of all things. In the generous efforts they are called to make, they have a hope, better founded than most human expectations, that they will find that education of their faculties for the future which we may reasonably suppose to be the most important object of our present existence.' This is from the review, in the last 'Edinburgh,' of Dr. Tyndall's lectures on Sound, which were probably heard by many of our readers, at the Royal Institution. It was a famous saying of Sir David Brewster: 'I have no doubt that before another century is completed, a talking and a singing machine will be numbered among the conquests of science.' A considerable progress in this direction has been made by Wheatstone. He invented the concertina, the stereoscope, and the solar clock. He was the originator of the submarine telegraph, and we all know how much he has done towards the electric telegraph. By the way, I cannot but express my extreme regret at the obituary notice of Sir David in the 'Athenæum.' They could not forget their sharp discussion with him on the subject of Desmaizeaux. 'What we said of Desmaizeaux we say of him, that he lived and died in honour.' The circumstances were hardly such that the 'Athenæum' should insist on having the last word. Whether justly or unjustly, Desmaizeaux has left a tarnished and contested reputation, and Brewster's name ought not to be compared with that of the less eminent Frenchman. Sir James Y. Simpson, of Edinburgh, himself a man of the highest scientific attainments, and the discoverer of chloroform, who gained his title of honour by reason of those attainments, has recently given a most affecting account of his attendance as medical man at the death-bed of Sir David Brewster. There never was a bedside so perfectly calm and happy. It was his idea that much of the happiness of heaven would consist of the advance of the soul in the mysteries of science and creation. But above all other thoughts, the thought of his Saviour and of heavenly happiness was

always growing stronger and more absorbing.

Professor Tyndall is just about to issue an account of Michael Faraday as a discoverer. Certainly we have had no greater man in modern times as a discoverer. It has been truly said, also, that Sir Humphry Davy made no greater discovery than when he discovered Michael Faraday. There never was a character of greater moral beauty than Faraday's, nor more animated by a pure, disinterested, absorbing love of truth. As a scientific man, Faraday could hardly have an abler exponent than Professor Tyndall. But there exists a radical difference between Faraday and Tyndall. Faraday's was one of the most devout and religious minds that ever adorned humanity. But it seems hardly possible for Professor Tyndall to write a book without revealing characteristics the very opposite to those of Brewster and Faraday—without using remarks that attack the most devout and cherished convictions of the majority of religious men. We refuse to bring religion into any antagonism with science—under no circumstances can truth be really antagonistic to truth—and have refused to discuss the alleged heterodoxy of such men as Mr. Darwin and Professor Owen. Therefore it is that we feel more at liberty to protest against Dr. Tyndall dragging into his writing attacks on the doctrine of Providence and prayer. The feud between science and revelation is virtually set at rest except for those who seek to foment every possible discord; and scientific men are more and more realizing the aspirations of the great father of experimental philosophy, that 'there may be given unto faith the things that are faith's.'

SEMI-THEOLOGICAL WORKS.

There is no more remarkable sign at the present day than the immense abundance of semi-theological, quasi-religious works. Even the 'Times' will admit long letters on ecclesiastical subjects, long reviews of ecclesiastical works, and sometimes comes out with leaders of a mixed funny and ecclesiastical character. The most formidable rival of the sensational novel is the volume of sensational theology. Books of popular divinity are also sold in editions of tens of thousands. Religion has become fashionable, though perhaps it is open to doubt whether it is quite as religious as it used to be. People who, in former days, would have set the whole subject aside as being entirely beyond the province of polite life, now take it up as a matter of conversation; and at one time there is a rage for theological science, as at another time there is a rage for some kinds of natural science. Many secular subjects are now treated religiously; and from time to time there are now issued from the press books of a semi-theological character in which things secular and things theological are mixed in varying proportions.

Some time back the Congress of the Archæological Institution was held in London, and a volume of papers read at the Congress has been lately published.* London is peculiarly rich in archæological subjects, and last year was a memorable one in the annals of the Institute. Mr. Beresford Hope, who, with great appropriateness, took the chair, said there was a crying need that the architectural topography of London (of which so many precious examples are daily perishing) should receive a really intelligent and learned examination. He said that London's 'veritable High Street, from Notting Hill to Stratford-le-Bow, is a continuous though curved line of houses, or of town-made park, some ten miles long.' A semi-theological character is given to the work by a sermon which Dean Stanley preached before the Institute in Westminster. The Dean lately denied the use of the Abbey to a large assemblage of English and colonial bishops; but he found no difficulty in handing it over to an assemblage of archæologists. His sermon constitutes the first of these 'papers read at the London Congress;' eloquent, in-

* 'Old London.' Papers read at the London Congress, July, 1866: Murray.