

west of the African coast opposite the Sahara, and in the bed of the Indian Ocean to the south of Australia, small grains of red quartz sand, and they had found scarcely a trace of such in the sea-bed in any other part of the world. He suspected this quartz sand had been blown out from the Sahara in the one case, and from the Australian desert in the other.

In the south of Algeria he got a light carriage which could traverse the desert, such as was now in use for the post just established by the French to Tougourt, in the Sahara. Taking bedding and food with him, he first skirted a large area covered with salt, and then passed on through the long belt of oases which the French have planted on the way to Tougourt. Along this route numerous artesian wells had been sunk, and an abundant supply of water thereby obtained for the palm-trees which had been planted. There were now three companies in existence, who had dug artesian wells, and were planting thousands of palm-trees, with the view of getting a valuable return in a few years.

At Tougourt the real sandy part of the desert began, and he made excursions into it, with that town as his head-quarters. He exhibited to the meeting a specimen of the sand, of a light yellowish-brown colour, and exceedingly fine in the grains. There were a good many clay particles in it, and the quartz particles, which were also numerous, were identical with those they had got in the bottom of the Atlantic. There was no doubt that the winds from the desert carried the sand a long way out to sea. He had also examined the region geologically, and the formation of the rocks was entirely that of fresh water, and of Quaternary date.

The great majority of geographers and geologists had expressed the belief that the Sahara was an old sea-bed, but he was of opinion that it had never as a whole been covered by the sea since Cretaceous or Devonian times, and no part of it had been covered by the ocean since Tertiary times. All the assertions as to the discovery of shells rested upon one common species being found very rarely in one region of the desert. He thought that, owing to recent researches, the opinion as to the Sahara being an old sea-bottom was likely soon to disappear from our text-books. He considered that the features of the region had been produced by atmospheric conditions. The sand was the product of the disintegration of the rocks *in situ*, which engirdle the Sahara. The existing rock was not far below the surface, and, by digging down to it, the hard sandy particles were found embedded in the stone. The sun shone on the rocks, and they expanded. The sudden cooling at night broke them up, the wind carried away the smaller particles, and so continually the rocks were being disintegrated by means of changes other than water, although water perhaps had in times past played a greater rôle there than it did now.

There was a range of hills in the desert to the south 7000 feet high, and for three months in the year their summits were covered with snow. Descending the hills were river-courses, some of great length. Much of the region, he considered, had once been a large freshwater lake. Speaking of the commercial aspect of the Sahara, he said it was difficult to go there without becoming enthusiastic about it. There seemed to be no limit to the amount of water that was to be got by sinking artesian wells. The head of the water must be a long distance away in the higher lands surrounding the desert.

The cultivation of palms was extending to an enormous extent, and the French expected to carry on their railway to Tougourt (at present nearly a week's journey from Algeria) in the next few years. The French were also hopeful that France would tap all the trade of the North Soudan across the Sahara, by making a railway across the desert. He did not think it was at all impossible to build and keep open such a railway. There was plenty of water to be had, and the sand never drifted to such an

extent as to bury a railway. The climate, though very warm, was at the same time very healthy. If the French built the railway, they would then have no cause to complain about Britain remaining in Egypt.

WILLIAM KITCHEN PARKER, F.R.S.

WILLIAM KITCHEN PARKER was born at Dogsthorpe, near Peterborough, June 23, 1823, and died suddenly, of syncope of the heart, July 3, 1890. He was visiting his second son, Prof. W. N. Parker, at Cardiff, and, whilst cheerfully talking of late discoveries and future work in his favourite biological pursuits, he ceased to breathe. Accustomed to outdoor life, he was a true lover of Nature from the first; the forms, habits, and songs of birds, especially, he knew at an early age. Village schooling at Dogsthorpe and Werrington, and a short period at Peterborough Grammar School, prepared him for an apprenticeship, at 15 years of age, to Mr. Woodroffe, chemist and druggist at Stamford; and three years afterwards he was apprenticed to Mr. Costal, medical practitioner, at Market-Overton. At Stamford he studied botany earnestly, and used to persuade a fellow-apprentice to leave his bed in early mornings to go afield in search of plants. Both when living at his father's farm, and in his holidays afterwards, he kept many pet animals, and dissected whatever he could get, including a donkey and many birds. Of the latter he prepared skeletons; and of these he made many large drawings, at Market-Overton, which of late years he had some thought of publishing as an atlas of the osteology of birds. In 1844-46 he studied at King's College, London; and became student-demonstrator to Dr. Todd and Mr. (now Sir William) Bowman there. He also attended at Charing Cross Hospital in 1846 and 1847, and, having qualified as L.S.A., he commenced practice, in 1849, at Tachbrook Street, Pimlico; and soon afterwards married Miss Elizabeth Jeffery. His wife's patient calmness under all difficulties and trials was a true blessing to a man of Mr. Parker's excitable temperament; and her unselfish life and widespread influence for good are well known in and beyond the family circle. Unfortunately he was left a widower about four months ago. His family consists of three daughters and four sons. Of the latter, one is Professor of Zoology and Comparative Anatomy in the University of Otago, New Zealand; the second is Professor of Biology in the University College at Cardiff, South Wales; the third is an able draughtsman and lithographer; and the fourth has lately taken his diplomas of L.R.C.P. and M.R.C.S.

Mr. Parker had a good father, courteous and gentle by nature, conscientious, and earnest in business, who had worked hard to be able to give even his youngest son, Mr. W. K. Parker, "a start in life." From his placid and thoughtful mother he probably inherited much of his love of reading and his talent for learning.

Always energetic, in spite of constant ill-health, Mr. Parker enthusiastically carried on his medical work and his natural-history studies, especially in the microscopic structure of animal and vegetable tissues. Polyzoa and Foraminifera, collected on a visit to Bognor, and from among sponge-sand and Indian sea-shells, especially attracted his attention. Having sorted, mounted, and drawn numbers of these microzoa, he was induced, about 1856, by his friends W. Crawford Williamson and T. Rupert Jones, to work at the Foraminifera systematically. His paper on the *Miliolitida* of the Indian Seas (Trans. Micros. Soc., 1858), and a joint paper (with T. R. Jones) on the Foraminifera of the Norwegian coast (*Annals N. H.*, 1857) resulted; and the latter formed the basis of a memoir on the Arctic and North-Atlantic Foraminifera (Phil. Trans., 1865). With T. Rupert Jones, and after-

wards with W. B. Carpenter and H. B. Brady, Mr. Parker, down to 1873, described and illustrated many groups and species of Foraminifera, recent and fossil (see C. D. Sherborn's "Bibliography of Foraminifera" for these papers and memoirs), thereby establishing more accurately a natural classification of these microzoa, determining their bathymetrical conditions, and therefore their value in geology. That he did not neglect anatomical research is shown by memoirs in the Proceedings and Transactions of the Zoological Society on the osteology (chiefly cranial) and systematic position of *Balaniceps* (1860), *Pterocles* (1862), *Palamedea* (1863), Gallinaceous Birds and Tinamous (1862 and 1866), Kagu (1864 and 1869), Ostriches (1886), *Microglossa* (1865), Common Fowl (1869), Eel (*NATURE*, 1871), skull of Frog (1871), of Crow (1872), Salmon, Tit, Sparrow-hawk, Thrushes, Sturgeon, and Pig (1873). In the meantime the Ray Society had brought out his valuable "Monograph on the structure and development of the Shoulder-girdle and Sternum in the Vertebrata" (1868); and his Presidential addresses to the Royal Microscopical Society (1872, 1873), and notes on the *Archæopteryx* (1864), and the fossil Bird bones from the Zebbug Cave, Malta (1865 and 1869), had been published. Subsequently the Royal Society's Transactions contained his abundantly illustrated memoirs on the skull of the *Batrachia* (1878 and 1880), of the Urodelous *Amphibia* (1877), the Common Snake (1878), Sturgeon (1882), *Lepidosteus* (1882), *Edentata* (1886), *Insectivora* (1886), and his elaborate memoir on the development of the wing of the Common Fowl (1888). In the "Reports of the *Challenger*" is his memoir on the Green Turtle (1880); and those on *Tarsipes* (Dundee, 1889), and the Duck and the Auk (Dublin, 1890), are his last works.

In former times a skull was taken as little more than a dry, symmetrical, bony structure; or, if it were the cartilaginous brain-case of a shark, it was to most a mere dried museum specimen. When, however, the gradations of the elements of the skull, from embryonic beginnings, were traced until their mutual relations and their homologues in other Vertebrates were established, light was thrown on the wonderful completeness of organic uniformity and singleness of design. How such studies can be carried on both by minute dissection and the modern art of parallel slicing, and not by one method alone, is to be gathered from his teaching.

Mr. Parker was elected a Fellow of the Royal Society in 1865, and in the year following he received a Royal Medal for his comprehensive, exact, and useful researches in the developmental osteology, or embryonal morphology, of Vertebrates. Some few years afterwards the Royal Society gave him an annual grant to aid in the prosecution of his studies; and, when that was discontinued, a pension from the Crown was graciously and appropriately awarded to him. A generous friend, belonging to a well-known Wesleyan family, more than once presented £100 towards the cost of some of the numerous plates illustrating his grand memoirs in the Philosophical Transactions.

In 1873 he received the diploma as Member of the Royal College of Surgeons, and was appointed Hunterian Professor, Prof. Flower being invalidated for a time; and afterwards both held the Professorship conjointly. His earnestness and wide views were well appreciated, opening up the modern aspect of comparative anatomy, and showing that both in Man and the lower Vertebrates the wonderful structural development of their bony framework should be studied in a strictly morphological rather than a teleological method, and that its stages and resultant forms could be regarded only in the Darwinian aspect.

These lectures, given in abstract in the medical journals, became the basis of his "Morphology of the Skull," in writing which, from his dictation and notes, Mr. G. T. Bettany kindly assisted him; and again, in a semi-popular book, "On Mammalian Descent," another friend (Miss

Arabella Buckley, now Mrs. Fisher) similarly helped him. In the latter work, his own usual style frequently predominates, full of metaphor and quaint allusions, originating in his imaginative and indeed poetic mind, fully impregnated with ideas and expressions frequent in his favourite and much-read books—Shakespeare, Bacon, Milton, some of the old divines, and, above all, the old English Bible.

Separating himself from the trammels of foregone conclusions, and from the formulated, but imperfect, misleading conceptions of some of his predecessors in Biology, whom he left for the teaching of Rathke, Gegenbaur, and Huxley, Prof. W. K. Parker earnestly inculcated the necessity of single-sighted research, and the following up of any unbiassed elucidations, to whatever natural conclusion they may lead. Simple and firm in Christian faith, resolute in scientific research, he felt free from dread of any real collision between science and religion. He insisted that "our proper work is not that of straining our too feeble faculties at system-building, but humble and patient attention to what Nature herself teaches, comparing actual things with actual" (*Proc. Zool. Soc.*, 1864); and in his "Shoulder-girdle, &c.," p. 2, he writes: "Then, in the times to come, when we have 'prepared our work without, and made it fit for ourselves in the field,' we shall be able to build a 'system of anatomy' which shall truly represent Nature, and not be a mere reflection of the mind of one of her talented observers."

Again, at p. 225, in illustration of some results of his work, he says:—"The first instance I have given of the Shoulder-girdle (in the Skate) may be compared to a clay model in its first stage, or to the heavy oaken furniture of our forefathers, that 'stood pond'rous and fixed by its own massy weight.' As we ascend the vertebrate scale, the mass becomes more elegant, more subdivided, and more metamorphosed, until, in the Bird Class and among the Mammals, these parts form the framework of limbs than which nothing can be imagined more agile or more apt. So also, as it regards the Sternum; at first a mere outcropping of the feebly developed costal arches in the *Amphibia*, it becomes the keystone of perfect arches in the true *Reptile*; then the fulcrum of the exquisitely constructed organs of flight in the *Bird*; and, lastly, forms the mobile front-wall of the heaving chest of the highest *Vertebrate*."

Prof. W. K. Parker was a Fellow of the Royal, Linnean, Zoological, and Royal Microscopical Societies; Honorary Member of King's College, London, the Philosophical Society of Cambridge, and the Medical Chirurgical Society. He was also a Member of the Imperial Society of Naturalists of Moscow, and Corresponding Member of the Imperial Geological Institute of Vienna, and the Academy of Natural Sciences of Philadelphia. In 1885 he received from the Royal College of Physicians the Bayly Medal, "Ob physiologiam feliciter excultam."

In conversations shortly before his death, he often spoke of looking forward throughout his life-time (alas! how quickly shortened!) to continued application of all the energy he could devote to his useful work—at once a consolation to him and a duty.

He has well expressed his own view of biological pursuits, at p. 363 of the "Morphology of the Skull":—"The study of animal morphology leads to continually grander and more reverend views of creation and of a Creator. Each fresh advance shows us further fields for conquest, and at the same time deepens the conviction that, while results and secondary operations may be discovered by human intelligence, 'no man can find out the work that God maketh from the beginning to the end.' We live as in a twilight of knowledge, charged with revelations of order and beauty; we steadfastly look for a perfect light, which shall reveal perfect order and beauty."

An unworldly seeker after truth, and loved by all who

knew him for his uprightness, modesty, unselfishness, and generosity to fellow-workers, always helping young inquirers with specimens and information, he was suddenly lost to sight as a friend and father, but remains in the minds of fellow-workers, of those whom he so freely taught, and of his stricken relatives, as a great and good man, whose beneficent influence will ever be felt in a wide-spreading and advancing science, and among thoughtful and appreciative men in all time.

ALPHONSE FAVRE.

BY the death of Prof. A. Favre, Switzerland has been deprived of one of her foremost men of science, and geology has lost a very assiduous and successful cultivator. His death appears to sever the last remaining link between the present generation of Swiss geologists and that older and famous one which included Bernhard Studer, Arnold Escher von der Linth, Peter Merian, and Oswald Heer. The late Prof. Favre, who had reached the age of seventy-seven at the time of his death, was the author of numerous papers, the earliest of which, "On the Anthracites of the Alps," was published as long ago as 1841. He will perhaps be best remembered by the part he took in the famous controversy concerning the supposed admixture of fossils, belonging to different geological horizons, which were said to occur in the same beds in the Alps. In opposition to M. Scipion Gras and others who asserted that such intermixture of fossils did actually occur, Favre was able to show, by a series of patient investigations, that the apparent reversals of succession, and intimate union of Carboniferous, Jurassic, and Tertiary strata, could all be accounted for by repeated interfoldings and complicated overthrust faults. It is interesting to note that at the time when Favre was thus successfully contending for such an interpretation of supposed anomalies in the Alpine rocks, James Nicol in this country was engaged in a precisely similar controversy with Murchison and his followers, concerning the rocks of our own Highlands. But whereas the triumph of Favre's views was immediate and complete, and their author lived to see the justice of his interpretation universally admitted, Nicol was fated to witness the influence of great authority exerted for a long time in preventing the truth of his conclusions from being accepted; and only after his death was the retraction made which showed how much Scotland owes to this able interpreter of the geological structure of his native land. History may be relied upon, however, to do equal justice to the successful Swiss geologist and the disappointed Scotch one. Prof. Favre, besides papers on a great variety of geological questions, wrote several works dealing with the geology of the parts of Savoy, Piedmont, and Switzerland of which Mont Blanc forms the centre. During the later years of his life he had retired from his Professorship of Geology at Geneva, but up to the time of his death Favre held the post of President of the Federal Commission having charge of the geological map of Switzerland. As long ago as 1874 he was elected a foreign member of the Geological Society, and he was also a correspondent of the Institute of France.

AID TO ASTRONOMICAL RESEARCH.

PROF. PICKERING, of the Harvard College Observatory, has issued the following notice:—
"Miss C. W. Bruce offers the sum of six thousand dollars (\$6000) during the present year in aiding astronomical research. No restriction will be made likely to limit the usefulness of this gift. In the hope of making it of the greatest benefit to science, the entire sum will

be divided, and in general the amount devoted to a single object will not exceed five hundred dollars (\$500). Precedence will be given to institutions and individuals whose work is already known through their publications, also to those cases which cannot otherwise be provided for, or where additional sums can be secured if a part of the cost is furnished. Applications are invited from astronomers of all countries, and should be made to the undersigned before October 1, 1890, giving complete information regarding the desired objects. Applications not acted on favourably will be regarded as confidential. The unrestricted character of this gift should insure many important results to science, if judiciously expended. In that case it is hoped that others will be encouraged to follow this example, and that eventually it may lead to securing the needed means for any astronomer who could so use it as to make a real advance in astronomical science. Any suggestions regarding the best way of fulfilling the objects of this circular will be gratefully received.

"EDWARD C. PICKERING.

"Harvard College Observatory, Cambridge, Mass.,
U.S.A., July 15, 1890."

NOTES.

THE American Association for the Advancement of Science will meet this year at Indianapolis, under the presidency of Prof. Goodale. The first meeting will be held on August 19. The subject selected in advance for special discussion is "The Geographical Distribution of North American Plants," and papers upon it will be presented by Messrs. Watson, Macoun (of Ottawa), Sargent, Britton, Underwood, Halsted, and Coulter.

A ROYAL COMMISSION has been appointed to inquire and report "what is the effect, if any, of food derived from tuberculous animals on human health, and, if prejudicial, what are the circumstances and conditions with regard to the tuberculosis in the animal which produce that effect upon man." Lord Basing is chairman. The other Commissioners are Prof. G. T. Brown, Dr. George Buchanan, Mr. Frank Payne, and Prof. Burdon Sanderson.

THE Turin Academy of Medicine has proposed the following theme for the Riberi Prize of about £750: "Researches on the nature and the prophylaxis of one or several infectious diseases of man." Works may be sent printed or in manuscript; they may be in Italian, French, or Latin; and printed works must have appeared since 1886. The date limit is December 31, 1891.

THE failure of the Government to carry its scheme for the extinction of some public-house licences is likely to result in an important advantage to education. In his statement on Monday with respect to the money which was to have been applied to this object, Mr. Goschen said:—"As regards England we propose to add the amount set free by the abandoned licensing clauses to the residue which, under the Bill as it stands, goes to the county councils, accompanying this inclusion by an intimation that possibly new charges may, by and by, be put upon them, with reference to intermediate, technical, or agricultural education. It seems very desirable, if more is to be done in this respect, that the localities, and especially county councils, should be interested in the work. In England there is at present little machinery available for carrying out such an object, and it would be impossible to create such a machinery at this period of the session. But in Wales and in Monmouthshire the machinery does exist. County councils may supply funds to the joint committee for intermediate education under the Act of last year out of the county rate, but to the extent of a halfpenny of such rates only. We shall propose that the county councils in Wales