We are told that the belief that it has, at some time, arisen from the properties of inorganic matter is a logical necessity, but the only logical necessity is that when our knowledge ends we should confess ignorance.

Young men who have been trained in the routine of the laboratory tell us all their interest in biology would be gone if they did not believe all its problems are, in the long run, to be resolved into physics and chemistry.

The only answer we can give them is that noble work has been done in natural science by men like Wallace, who believe that life is fundamentally different from matter, and also by men like Haeckel, who believe the opposite.

They also serve science who only stand and wait, and among them I would wish to be numbered.

While nothing is gained by giving a name to the unknown agency which is the essence of life, it is better to call it a 'vital principle' than to deny or ignore its existence. It is better to be called a 'vitalist,' or any other hard name by zealous monists, than to be convicted of teaching, as proved, what we know is not proven.

The word *vitality* is as innocent as *electricity* or *gravity;* in fact, Newton's use of this word led Leibnitz to charge him with infidelity to the spirit of science, although no one need fear to follow where Newton leads.

The older vitalists may have looked on a mere word as an explanation, but the reason the word has fallen into disrepute is the antagonism of the monists to the view that the problem of life presents any peculiar difficulties.

Many thoughtful men of science have held that the 'faith' of men like Haeckel ignores many of the data which are furnished by our scientific knowledge of the world around us.

Huxley, in his essay on the Physical Basis of Life (1868), says it is necessary for a wise life to be fully possessed of two beliefs: "The first, that the order of nature is ascertainable by our faculties to an extent which is practically unlimited; the second, that our volition *counts for something as a condition of the course of events.* Each of these beliefs can be verified experimentally as often as we like to try."

Again, twenty-five years later (1893), he says (Evolution and Ethics) that, fragile reed as man may be, "there lies within him a fund of energy, operating intelligently, and *so far akin to that which pervades the universe that it is competent to influence and modify the cosmic process.*"

Clearly this man of science has no overwhelming dread of the charge of anthropomorphism or animism, or of any charge except lack of caution.

I think that he would also admit that every living thing contains some small part of this influence which 'counts for something as a condition of the course of events,' and that it must be reckoned with in our attempts at a philosophy of the universe.

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The Life and Writings of Constantine Samuel Rafinesque. (Filson Club Publications No. 10.) Prepared for the Filson Club and read at its meeting, Monday, April 2, 1894. By Richard Ellsworth Call, M. A., M. Sc., M. D. Louisville, Ky., John P. Morton & Co. 1895. 4to. pp. xiii + 227. Portraits, etc. Paper. Price $2.50, net.

This sumptuous volume is published by a Historical Club in Louisville, Kentucky, as a memorial to one of the pioneer naturalists and explorers of the Ohio valley, a man whose brilliant intellect, eccentric character and unhappy fate will always cause his career to be looked upon with interest, and whose nervous and appalling industry has

been the cause of a myriad of perplexities to students of the nomenclature of plants and animals in Europe as well as in America.

Born in Constantinople in 1783, his father a French merchant from Marseilles, his mother a Greek woman of Saxon parentage, Constantine Rafinesque early entered upon the career of a wanderer. The roving habit of mind which soon became a part of his nature led him into a mental vagabondage that influenced his career even more than the lack of a permanent place of abode. His youth was passed in Turkey, Leghorn, Marseilles, Pisa and Genoa. He had good opportunities for study and reading, and before he was twelve had, as he himself records, read the great Universal History and one thousand volumes of books on many pleasing and interesting subjects. He was ravenous for facts, which he gathered, classified and wrote down in his notebooks. He began to collect fishes and birds, shells and crabs, plants and minerals, found or made names for them, copied maps from rare works, and made new ones from his own surveys. His precocious mind, unguided and undisciplined, wandered at will over the entire field of books and nature, and by the time he reached the age of nineteen he had formed his own character and equipped himself for the career which lay before him. He became a man of catalogues, of categories, of classifications. He possessed much native critical acumen, and it is possible, though scarcely probable, that as his present biographer suggests, had he during the formative period been firmly guided by some master hand, he might have become one of the world's greatest naturalists. Lacking such guidance, however, he was by no means fitted to enter upon a scientific career in a country like the United States, so when, at the age of twenty, he crossed the Atlantic he brought with him the germs of failure and bitter disappointment.

From 1802 to 1805 he lived in Philadelphia. From 1806 to 1815 he was in Sicily, where he did some of his best work in his 'Index to Sicilian Ichthyology,' and in his often quoted 'Caratteri.' Here he established his monthly journal, the 'Mirror of the Sciences' (Specchio delle Scienze, etc.), which endured throughout the twelve months of 1814, but ended with its second volume. Rafinesque was not only the editor, but almost the sole contributor to this journal, in which he printed no less than sixty-eight articles upon a great variety of subjects—upon animals, plants, minerals, meteorology, physics, chemistry, political economy, archæology, history and literature, besides many critical reviews. His fatal tendency to 'scatter' was already apparent, and in the work which he did for the 'Specchio' all the weaknesses of his subsequent career were foreshadowed. While in Sicily, for political reasons, he assumed the surname, Schmaltz, that of his mother's family.

In 1815 he returned to America, and was shipwrecked on the coast of Connecticut, losing all his books, manuscripts and collections. For the next three years he lived in New York, and during this period he contributed to the 'American Monthly Magazine' a number of really brilliant and learned articles. So masterly, indeed, were these that it seemed as if he were likely to become one of the leaders in American scientific thought. It seems probable that he was at this time steadied and guided by his friend and patron, Dr. Samuel Latham Mitchill, whom he greatly respected and admired; at all events, when he left New York, signs of deterioration appeared in his methods. In 1818 he crossed the Alleghanies, and in the following year became a professor in the Transylvania University, at Lexington, Ky.

There he remained for seven years, sadly ill at ease among the old-school college professors who composed the faculty, yet, from

the showing even of his own complaints, treated with singular indulgence by them, and allowed to devote the most of his time to his excursions and to his writing. While here he printed nearly one hundred papers, chiefly descriptions of new plants and animals. From 1825 to 1840 his life was so irregular and his wanderings so extensive that his biographer has made no attempt to follow its course. Philadelphia was his home, when he had one, but he was a soured and disappointed man. His health was bad, and he could not get any one to print his voluminous writings. He established his 'Atlantic Journal,' which soon failed. He published various works by subscription, and also added to his income by the sale of 'Pulmel,' a medicine for the cure of consumption, concerning which he wrote a book. In his later years he established in Philadelphia his 'Divitial Institution and Six Per Cent. Savings Bank,' which seems to have had some degree of success. He died in 1840, in poverty and almost friendless, and is buried in an unmarked grave.

His career is described well and in sympathetic mood by Professor Call, who sums up the story of his last years in these words: "The experiences through which he had passed, which involved some of the saddest that come to men, had so broken him that there is little question that he was not of sound mind during these latest years. He was not, however, the irresponsible madman some would have us believe; rather, his was monomania and took the direction of descriptions of new forms of plant and animal life. But more than this, his defect was that peculiar form of monomania which believed only in himself; which gave his own work a value which does not always attach to it; which made him neglect the work of others, or, if it were noticed, impelled him to caustic and unwise criticism."

This judicious estimate, which is intended by Professor Call to apply only to his later years, I should be disposed with some slight reserves, to accept as a fair summary of his entire life-work, for all of the faults of his latest works were, as I have already suggested, foreshadowed in his Sicilian writings of 1814. The sympathy which I once felt for Rafinesque has almost vanished with the reading of the whole story of his life, for the man, as shown by his own private papers, appears to have been singularly unsympathetic and unlovable, enveloped in a mantle of self-esteem and interested in natural objects solely because he found in them something to name and to classify. In all his writings there appears scarcely a gleam of love or enthusiasm for nature, and he speaks of his fellow-men only in words of criticism or malediction. It would doubtless have been much better if he had never touched pen to paper. The fact that he had a keen eye and a remarkable power of diagnosis, and that he had learned the methods of systematic description, made his activity all the more pernicious, since regard for painstaking accuracy was as foreign to him as love of nature.

The canons of nomenclature which now prevail among American naturalists force them to take cognizance of all his descriptions and to use his names, whenever by any possibility his meaning can be determined. In many instances I have known him to be given the benefit of a doubt. So the unwelcome name of Rafinesque is constantly obtruding itself in almost every branch of zoölogy and botany, and it is likely to remain for a long time an obstacle in the way of securing the recognition of American nomenclature in Europe. He stands nevertheless as an important figure in early American biological literature, and whether we like him or not he cannot be ignored. It is fortunate, then, that all relating to his work has at last been brought together in so convenient a form.

The minute and scholarly bibliography,

which includes in all 420 titles, is most valuable. Professor Call's estimate of the value of these writings is a very kindly one. Bad as it was, Rafinesque's work unquestionably entitles him to recognition as the pioneer student of the ichthyology and conchology of the Mississippi valley, and he was also among the earliest to study its botany and its prehistoric archæology.

All the existing portraits of Rafinesque are reproduced, as well as a specimen of his handwriting, and in the appendix is reprinted his will, which affords a better insight into his character than all else he ever wrote.

The book is exhaustively complete, well written and beautifully printed, and in its publication the author and the Filson Club have accomplished admirably the task which they had undertaken. They have reared a noble monument to him who was 'the first Professor of Natural Science west of the Alleghanies.'

G. BROWN GOODE.

The Royal Natural History. Edited by RICHARD LYDEKKER. Illustrated by 72 colored plates and 1600 engravings. Frederick Warne & Co., London and New York. Royal 8°. 1894–95. Issued in monthly parts.

The second full volume of this important work is now out and, like the first, is devoted entirely to the Mammalia. The first comprised the Apes, Monkeys, Bats, Insectivores and part of the Carnivores; the second completes the Carnivores and includes also the Ungulates, Manatees and Dugongs. The well-known reputation of the editor and principal author, Mr. Lydekker, gives special value to these parts.

In general scope and plan of treatment the work resembles Brehm's *Thierleben*, of which several editions have appeared in Germany, and the *Standard Natural History*, published in this country. The illustrations are in the main borrowed from Brehm; they were pirated by the *Standard Natural History* ten years ago, and here appear for the third time. Of course this is not the fault of the author; but it is a pity original works cannot have original illustrations. Good plates are as much a part of a book as the text itself, and should be allowed to stand unmolested as monuments to the author. It is not intended to deprecate the exchange of technical figures or the judicious bringing together of scattered cuts illustrating special subjects—a very different thing from the wholesale reproduction of a previous author's pictures.

The original cuts are not of high merit. Those of the hooded seal and skull of the cave bear are gross caricatures, and nearly all the skulls and teeth are far inferior to modern standards for such work; and it is not too much to say that Mr. Lydekker himself, in previous publications, has done much toward fixing these higher standards. The colored plates are cheap chromos, in striking contrast to the excellent and artistic plates borrowed from Brehm.

In quoting American writers on 'big game' the most authentic and best informed writers are not always chosen. The one book that is beyond all comparison the best yet written on our larger mammals—I refer of course to Roosevelt's *Wilderness Hunter*—is apparently unknown to the editor. As a natural result some surprising statements are made, as, for instance, when Oregon antelope hunters are told that the pronghorn has 'almost or quite disappeared' from their State.

Some confusion arises from different usages of the common names of animals. The statement that in North America "the range of the *elk* appears to have extended originally from about the 43d to the 70th parallel of latitude, its northern limit being marked by the southern limit of the so-called barren grounds," will take the breath