curator of osteology in the Peabody Museum of Yale University.

HIRAM BINGHAM,
Director of the Expedition

SAMUEL BUTLER AND BIOLOGICAL MEMORY

THE present vogue of the books of Samuel Butler—not a great vogue but one fairly commensurate, perhaps, with the scientific worth and general interest of his writings—has led me to a rather critical reading of the four books and several scattered essays of this partly scientific, partly artistic, mostly iconoclastic, and wholly clever and epigrammatic modern namesake of the greater Samuel Butler of two centuries gone.

He finds himself dubbed in the British Museum Library catalogue as "philosophical writer," being alphabetically bestowed between "Samuel Butler, bishop" and "Samuel Butler, poet"; and in one of his essays tells a pretty story to account for his title.

The library catalogue is, as many will recall, printed and pasted in huge tomes, hundreds of them, and changes in its arrangement are not easily made. When our Butler found himself beginning to get into the catalogue he found also that he was getting mixed up with his namesake bishop and his namesake poet, and as yet he had no distinguishing title of his own. When he complained to the Library directors of his trouble it was pointed out to him that it was largely his own fault in not having sufficient distinction or distinctiveness to be classified properly. He must have a title. What was he, really? His writings were partly about Italian art, partly about the authorship of the Odyssey, partly about evolution and partly of the nature of stories. How was he to be distinguished? Had he any title? He replied, after meditation, that he was a Bachelor of Arts. The director pointed out that as far as his book titles were not actually confused with those of the bishop and poet, they were pasted in between theirs, and that if he were catalogued as "Samuel Butler, B.A.," the strictly alphabetical sequence of the catalogue would be wronged. Could he not, perhaps, arrange to be a Master of Arts? Butler replied that he understood that Cambridge stood one a Master for five guineas, but he was not willing to go above three guineas ten! Well, anyway, was the answer, he must be "Samuel Butler, something, between *bi* and *po!*" So it was finally agreed that he should be "Samuel Butler, philosophical writer"—*phi* agreeing properly with the order in which he had already been irrevocably pasted!

Now this long digression, by way of introduction, from the subject of my letter, has after all a definite significance in relation to it. It has indeed, for me, at least, a double significance. It suggests something about British ways and something about the doubt as to how Samuel Butler's writings, even the four books about Darwinism, Lamarckism and biological memory, should be classified. Are they contributions to science, or to pure literature? Certainly, they are contributions to the gaiety of nations when they are not, as occasionally they as certainly are, contributions to that which makes the judicious to grieve. Whatever of sharpness in polemic one may tolerate in a critic of Darwinism, innuendo and really almost scurrilous personal attack on Charles Darwin one will not tolerate. And Butler comes to no less than this in his attempt to show Darwin's bad faith in a matter of the use of a certain freely modified translation of an account of Erasmus Darwin by Krause, in *Kosmos*.

Butler, though strongly anti-Darwinian (that is, anti-natural selection and anti-Charles Darwin) is not anti-evolutionist. He professes, indeed, to be very much of an evolutionist, and in particular one who has taken it upon his shoulders to reinstate Buffon and Erasmus Darwin, and, as a follower of these two, Lamarck, in their rightful place as the most believable explainers of the factors and method of evolution. His evolution belief is a sort of Butlerized Lamarckism, tracing back originally to Buffon and Erasmus Darwin. He is equally insistent on degrading the explanations of Charles Darwin, Wallace and Weismann, viz., the selection

champions, to their rightfully ignoble place of puerility and imbecility. And finally he is intent on reestablishing the factor of design in evolution. He holds strongly to a certain sort of teleology in organic change. Organisms make themselves what they are somewhat understandingly, as it were. They know what is good for them, and try to do it and be it.

Granted, now, that this man is a master of epigram, paradox, sophistication, argument and audacity, and of a literary style as animated and sparkling as it is bold, and you can fancy that his books make interesting reading to professed students of evolution and to scientific men—at whom he sneers and laughs—as well as to those readers "whose time is worth money," whom he exalts and to whom he explicitly directs his writing.

The four books of this sort that were written originally some thirty years ago and that have been recently re-issued by Fifield in London and—I believe—Putnams in New York are: "Life and Habit" (1878), "Evolution, Old and New" (1879), "Unconscious Memory" (1880) and "Luck or Cunning" (1881). In 1890, in *The Universal Review* (London), he published three essays (really one in three parts) under the title "The Deadlock of Darwinism," in which he reiterates the general conclusions and theories set out in detail in his earlier writing.

In addition to these four books, offered as direct contributions to evolution discussion, a much earlier book, called "Erewhon" (= Nowhere) (1872), contains in its pages of fantastic picturing and imagination the budding thoughts that later form the basis of his anti-Darwinism. Particularly in the chapter called "The Book of the Machines" are his ideas of design and his denial of chance in world evolution set out. This book has had a wide diffusion, and is the one which really gave him literary repute. It is a picturesque account of the life and philosophy of the non-existent Erewhonians, and its pages reveal the imagination of a Wells and the satire of a Bernard Shaw. Shaw, indeed, has strongly commended it, and Augustine Birrell has called it the best satire since "Gulliver's Travels."

And I have not yet got to a word about "biological memory." Well, it will take but few sentences to point out Butler's relation to this subject. The fact that he used "Unconscious Memory" as title for one of his books shows the store he set by his notions about biological memory—notions that he undoubtedly developed independently, and that he believed, at the time he formulated them, to be wholly original with him. Butler's theory that heredity and instincts are the results of, or are themselves, biological memory, was set out in detail in his first biological book, "Life and Habit" (1878). The book "Unconscious Memory" (1880) is chiefly devoted to recording his discovery that he had been antedated by Ewald Hering, whose address on "Das Gedächtniss als allgemeine Funktion der organisirter Substanz," given before a meeting of the Vienna Imperial Academy of Sciences on May 30, 1870, he translates and prints in full. The book also contains a long translation from von Hartmann, and some discussion of it, to show that Hering's and Butler's theory of biological memory is not at all von Hartmann's unconscious control. And it is in this book, too, that Butler (Chap. IV.) says his worst about Darwin.

As a matter of fact, Hering was not the first to have the conception of an explanation of repetitive phenomena in organisms on the basis of cell or molecule memory. Lamarck and Haeckel had both suggested such an idea. In our own country, Cope and Hyatt, not earlier, but undoubtedly each originally, expressed the essence of such a conception. Hyatt indeed coined the word "mnemogenesis" for use in connection with his ideas about heredity and instinct. But Hering was certainly the first to give the conception full form, to compose it of details, and to suggest a physical basis for it, viz., the reception and storing by the body protoplasm of vibrations coming from without, so that this protoplasm became actually changed in capacity by its

various, and especially by its repeated, experiences.

Then came Butler, and, without knowledge of Hering's ideas, and out of a conviction that Darwin's natural selection of fortuitous variations was an absurd explanation of such fit things as instincts and hereditary repetitions, and that Lamarck's explanation of modification of individuals by effort and intent, carried over into racial acquirements by heredity, was a much better one but needed something else to make it complete, he re-invented the conception of biological memory and worked it out to its logical extreme. Just what this extreme is, and what the details of Butler's theory are, I leave to any of my readers interested to find out from Butler's books. For besides the interesting speculations of an intelligent and imaginative man about a subject that has, I am convinced, some real things in it to be found out some day, they will get from their perusal a gentle titillation of shock and amusement, such as the day's duty of "scientific reading" rarely brings.

Since Hering and Butler, have come, of course, Richard Semon with "Die Mneme" and its new, and perhaps useful, terminology for the older ideas, and lastly the blessing of Sir Francis Darwin on the whole idea, as well as on Butler himself, bestowed in his British Association President's address of 1908. But as it is Butler more than biological memory that this letter is meant to call attention to I may stop here. Butler died in 1902, and is only now coming to his hearing.

VERNON L. KELLOGG

LONDON,
February 24

THE DEATH OF NETTIE MARIA STEVENS

AT a meeting of the faculty of Bryn Mawr College, held May 6, 1912, it was voted to make the following record in the minutes:

WHEREAS, the faculty of Bryn Mawr College has heard with sincere sorrow of the death of Nettie Maria Stevens, A.B. and A.M. of Leland Stanford Junior University, graduate scholar in biology in Bryn Mawr College 1900–01, president's European fellow 1901–02, resident fellow in biology 1902–03, doctor of philosophy of this college in 1903, sometime research fellow in biology, Carnegie research assistant and Alice Freeman Palmer research fellow, and since 1904 as reader and then as associate in experimental morphology, a member of the teaching staff and of the faculty,

Resolved, that we, the faculty of Bryn Mawr College, desire to record our appreciation of her talent for research, of the skill and assiduity with which she carried on difficult investigations, achieving a success that placed her in the very front rank of students of science and gave her a world-wide reputation among workers in biology. No less would we recognize the faithfulness with which as a member of the faculty she responded to every call for her services in teaching or in any general work of the college. We deplore her loss. We honor her memory.

Resolved, that copies of these resolutions be sent to the relatives of Dr. Stevens, to the board of directors and to SCIENCE.

SCIENTIFIC NOTES AND NEWS

AT the suggestion of the German emperor, the Berlin Institute for Infectious Diseases will be named in honor of Robert Koch.

THE faculty, students and alumni of the university of California will erect in the museum corridor of the new agricultural hall of the University of California a bronze bust in honor of Dr. Eugene W. Hilgard, emeritus professor of agriculture.

PROFESSOR GRASSET, on the occasion of the thirtieth anniversary of his professorship of medicine at Montpelier, was presented with his bust and a medal.

PHYSICIANS of Philadelphia have been invited to join in honoring the memory of Dr. John Herr Musser by subscribing to the memorial fund to be used to endow the social service department of the University Hospital, Philadelphia, of which he was the founder and president. The will of Dr. Musser provides that if the personal estate reaches $240,000, the sum of $15,000 shall be given to the University of Pennsylvania for the endowment of a fellowship in honor of the late Dr. Robert M. Girvin.

THE new medical laboratories for the two years' course in medicine given at the Univer-