

atoms, similarly endowed, the successive stages of creation were accomplished. There is so much resemblance between Gassendi's account of the appearance of the different animal forms, and the Miltonic narrative of the time when "the grassy sods now calved," that the question suggests itself whether the "Paradise Lost," which appeared in 1667, might not have been influenced by the *Syntagma Philosophicum*, its predecessor by some twenty years? From the side of Atomism Gassendi seeks to explain the Divine cessation from labour after the six stages of creation. Besides the atoms which, when endowed with kinetic energy, gave rise to the primordial plants and animals, there remained others in which their characteristic motions and affinities still continued potential, and which had been subject to distribution only. These account on the one hand for the seminal reproduction of plants and animals, and on the other for the phenomena of so-called spontaneous generation. On this view, as may be supposed, spontaneous generation presents few difficulties to Gassendi. He needs but the hypothesis of the endurance from the creation of the atoms special to any peculiar form of life. Then, when their potential motions and affinities become kinetic, they must of necessity issue in the forms of life which by their concurrence they were destined to produce. Two points are worthy of notice in this connection—Gassendi's definition of spontaneous generation, and his list of animals produced spontaneously. Spontaneous generation is not generation "sine seminibus" (germs), but "sine parentibus." Amongst his "animalia sponte nascentia" are enumerated "mures, vermes, ranæ, muscæ, aliaque insecta."

In a theory such as this is there no evolution, no selection. The atoms themselves are unchangeable, and so are the specific characters of the aggregates which they build up. Plants and animals, as they now are, are but copies of the primitive forms, be they produced by gamogenesis or spontaneously. The natural conditions also by which floral and faunal habitats and distribution are regulated, Gassendi seems to regard as having been fixed once for all at the creation. Reading "Deus" for "Natura," Virgil's lines express Gassendi's views on this point—

"Continuo has leges, æternaque fœdera certis
Imposuit Natura locis."—(Geo. i., vv. 63, 61.)

There is a sort of superficial resemblance between Gassendi's atoms and Mr. Spencer's "physiological units," but with capital points of difference. In both theories the molecules of each species of plant and animal have distinctive characteristics, and an inherent power of arranging themselves in the form of the organism to which they appertain. But while Gassendi's atoms are simple and indivisible, as one of their synonymes, *corpuscula insectilia*, connotes, Mr. Spencer's physiological units are complex. While Gassendi's atoms are specific creations and endowed with unalterable properties, Mr. Spencer's physiological units are themselves the products of evolution, and are perpetually undergoing adaptation to equilibrate the action of forces internal and external.

I am inclined to suspect that Maupertuis may have, in the main, borrowed the atomic theory contained in the "Système de la Nature" from Gassendi. The materialism which led Maupertuis to make perception a fundamental property of his atoms is, however, all his own; at any rate it is not Gassendi's.

In Physics as in Ethics, the nearest affinity of the philosophy of Gassendi is to that of Epicurus. It is Epicurianism modernised, and modified so as not to clash, openly at least, with Christianity and with the dogmas of the current theology. By his want of originality he was led to base his philosophy on an already established system, and by his adoption of Bacon's method he was attracted to Epicurus, for that philosopher and his school were the sole ancient representatives of the new *a posteriori* philosophy. De Gerando thinks that an additional link between Gassendi and Epicurus existed in the similarity of their views on the physical doctrines of a vacuum and of atoms. But it seems at least as probable that the French philosopher adopted these conceptions from the Greek, as that he reached them by his own independent thought. While, however, he was essentially an Epicurean, Gassendi was careful not to commit himself to any doctrines which might cause his orthodoxy to be questioned; in fact, he more than once clearly expresses this determination.

"How far back can traces of the great theory of Darwin and Spencer be discovered?" As I showed in my letter on Maupertuis, in NATURE, vol. vii. p. 402, the doctrine is discoverable in that writer; but De Maillet, with whom Mr. Spencer begins his historical sketch, is a quarter of a century

earlier than Maupertuis. My examination of Gassendi leads me to the conclusion that the doctrine of Natural Selection is not to be found in his works, and further that his views, as far as I understand them, effectually preclude his holding the theory under any form.

W. H. BREWER

P.S.—On looking back over what I have written, I find that I have omitted to point out the different attitudes of Gassendi towards the two distinct portions of his cosmological views. When he is borrowing from the Mosaic account of the creation, all his assertions are positive, for here we have "quod Fides et Sacræ Literæ docent." When, however, he is borrowing from Atomism his views take a hypothetical form, and are introduced by the phrase "nihil vetat supponere."

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Care of Monkeys for their Dead

As a supplement to the extract from James Forbes' "Oriental Memoirs," given by Dr. Gulliver in NATURE (vol. viii. page 103), the following incident, recorded by Capt. Johnson, deserves a mention:—

"I was one of a party at Jeekarry, in the Bahar district; our tents were pitched in a large mango garden, and our horses were picketed in the same garden at a little distance off. When we were at dinner, a Syce came to us complaining that some of the horses had broken loose in consequence of being frightened by monkeys (*i.e. Macacus Rhesus*) on the trees. . . . As soon as dinner was over, I went out with my gun to drive them off, and I fired with small shot at one of them, which instantly ran down to the lowest branch of the tree, as if he were going to fly at me, stopped suddenly, and coolly put his paw to the part wounded, covered with blood, and held it out for me to see. I was so much hurt at the time that it has left an impression never to be effaced, and I have never since fired a gun at any of the tribe.

"Almost immediately on my return to the party, before I had fully described what had passed, a Syce came to inform us that the monkey was dead. We ordered the Syce to bring it to us, but by the time he returned, the other monkeys had carried the dead one off, and none of them could anywhere be seen."

G. J. R.

The Intellect of Porpoises

IN Prof. Huxley's admirable criticism of "Mr. Darwin's Critics,"* the following passage occurs:—"The brain of a porpoise is quite wonderful for its mass, and for the development of the cerebral convolutions. And yet, since we have ceased to credit the story of Arion, it is hard to believe that porpoises are much troubled with intellect."

I have no doubt that Prof. Huxley will agree with me in further concluding that "it is hard to believe" that the remarkably developed cerebral hemispheres of the porpoise with their deep and numerous convolutions perform no more exalted functions than the smooth pair of mere pimples that stand behind the olfactory ganglia of a cod-fish, and constitute the whole of his claim to a cerebrum proper.

The psychology of the porpoise (and also that of the dolphin and other cetaceans with similar brains) is thus a subject of primary interest to the student of cerebral physiology. As a contribution to the subject I offer the following facts:—

Many years ago I made the voyage from Constantinople to London in a small schooner laden with box-wood, &c. The passage was very slow, occupying fully two months, including the whole of August, and parts of July and September. We were often becalmed, with porpoises playing about the ship. The sailors assured me that no sharks were in the neighbourhood while the porpoises were near, and accepting this generalisation I frequently plunged overboard and swam towards the porpoises. They usually surrounded me in a nearly circular shoal or company, and directed towards their unusual visitor an amount of attention which I may venture to dignify with the title of curiosity. Their respiratory necessities precluded any long-continued scrutiny, but after dashing upwards for their customary snort, they commonly resumed their investigations, sometimes approaching uncomfortably near and then darting off to the circumference of the attendant circle. I am not able to describe the expression on the features of a porpoise, but my recollection of that of the eyes of my swimming companions is very different

* *Contemporary Review*, 1871. Reprinted in "Critiques and Addresses."