

2. "Notes of a Tour on the Hartz Mountains, Part III.," by Dr. Lindsay.

3. "On the Physiological and Therapeutical actions of *Cannabis indica*," by Dr. James B. Balfour, Kilsyth.

4. "Notice of Plants found in the neighbourhood of Dollar in the autumn of 1853," by Dr. Balfour.

ROYAL SOCIETY OF EDINBURGH.

Tuesday, December 6, 1853.—Sir Thomas Brisbane, President, in the Chair.

Notice of the Blind Animals which inhabit the Mammoth Cave of Kentucky. By JAMES WILSON, Esq.

The cave in question was described as of great extent, and remarkable in several respects. Although described as a "cave," it consists of innumerable extensive underground galleries, the sides and tops of which consist of limestone. The temperature of the cave is uniformly 59° Fahrenheit throughout the whole year, and a remarkable phenomenon is shown by the variation of temperature outside. When the temperature outside is higher than that of the cave, then an outward current of air is observed, its violence being proportionate to the difference of temperature. On the other hand, when the outer air falls below 59°, then a reverse current sets in. In some cases these currents are so strong as to extinguish the lamps carried by explorers. No change of temperature has, however, been on any occasion observed in the cave, a proof of its vast extent. It is completely dark, but inhabited by some animals. These inhabitants are, in most cases that have been observed, completely blind, some indeed having the rudiments of eyes, and others the eyes to *appearance* pretty well developed, but useless for the purposes of vision. Specimens of the animals were handed round, and the author of the paper detailed their characteristics and habits, as well as of all other remarkable animals in other parts of the world that are known to be without the power of vision. As blind inhabitants of the Kentucky cave, he noticed two bats, two fishes, several beetles, two rats,—one found at a distance of seven miles from daylight, some spiders, moles, crustacea, and other animals, including the minute infusoria, which last not being furnished with eyes in those species that live in light, were not to be expected to possess them in those that live in darkness. He alluded to the blind mole of the Cape, and also to the blind mole of Greece, which is the common mole there, and the mole of Aristotle. Aristotle was therefore correct in describing *the mole* as blind, and his correctors and commentators wrong who found eyes in the British mole, which is a different animal, possessed of the faculty of vision. He also noticed a blind reptile. The inquiry as to the origin of those remarkable beings that inhabit the Kentucky cave is full of interest. Whether their origin is coæval with the cave itself we cannot tell; it may be that they were created for the remarkable conditions which

it affords. But it is also possible that they may represent unfortunate animals that had ages ago wandered into the dark recesses of the cave, and in the total absence of light, and consequent disuse of their visual organs, these organs may have become obliterated, or where their forms remain, they may have become incapable of performing their functions. In such an inquiry, the author remarked, that, like the animals themselves, we grope in the dark.

MISCELLANEOUS.

On the Anatomy of Terebratula australis. By M. P. GRATIOLET.

1. *The muscles which move the shell.*—The Brachiopoda are destitute of the sort of spring which opens the shells of the Lamelli-branchiate Mollusca. Cuvier in his work on *Lingula* supposed that they separated the valves by means of their arms. This explanation has been adopted by Owen, Blainville, and Siebold. D'Orbigny has put forward the opinion within the last few years, that the movement which separates the valves might be explained by the action of the corneous cilia with which the edges of the mantle are furnished.

The author's examination of some specimens of *Terebratula australis* leads him to support the views announced by Quenstedt as early as 1835, that the shell of these animals is opened by the action of certain special muscles, which he calls *diductors*. These muscles are attached to the cardinal process (*talon*) of the imperforate valve behind the point of articulation of the valves; they raise this cardinal process, and consequently depress the other extremity of the lever. Thus there are muscles to close the shell and others to open it. This is peculiar to the Brachiopoda, and occurs in all the genera of which the anatomy is known.

[The true action of these muscles, called by Professor Owen *Adductores breves*, and by Mr. Davidson *Cardinal muscles*, is well known in this country, having been pointed out by Mr. Woodward in 1851. The question of the real nature of those processes of the mantle which M. Gratiolet calls 'branchial papillæ,' but which are assuredly not branchial, will be found fully discussed by Dr. Carpenter, "On the intimate structure of the Shells of the Brachiopoda," Palæontographical Society, 1853.]

Besides these muscles there are four symmetrical and very fleshy muscles which pass from the valves to the peduncle. These muscles cause the various movements of the shell upon its stalk.

2. *The mantle.*—The structure of the mantle is remarkable. Its edges are furnished with a crown of corneous cilia, finely annulated, and originating in follicles, like true hairs. A circular muscle and small radiating fibres move these ciliated margins.

The internal lamina of the mantle is smooth and scarcely vascular, which is the reverse of what takes place in the *Lingulæ* and *Orbiculæ*; on the other hand, the outer lamina is rich in vessels and covered with branchial papillæ which are inserted in the innumerable perforations.



1854. "Royal Society of Edinburgh." *The Annals and magazine of natural history; zoology, botany, and geology* 13, 71–72.

<https://doi.org/10.1080/03745485709496309>.

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