NOTE ON THE "POSTERIOR BRAIN" OF STEGOSAURUS.

In a paper before the National Academy of Sciences in November last, and more recently in an illustrated article in the *American Journal of Science*, February, 1881, Professor O. C. Marsh has described certain remarkable peculiarities of *Stegosaurus ungulatus*, one of the Dinosaurian Reptiles of the American Jurassic formation.

Judging from the figures, which are said to be reduced to one-sixteenth of the natural size, the arm of this species must have been about one meter in length, while the leg was about twice as long. "The great disproportion in size between the fore and hind limbs, as well as the structure of the principal joints in each, show plainly that *Stegosaurus* walked mainly as a biped. The massive posterior limbs, and the huge tail doubtless formed a tripod on which the animal rested at times, while the fore limbs were used for prehension or defense. The heavy dermal plates and powerful spines probably rendered the latter an easy task."

After recalling the statement which had been made by him in a previous article, that, proportionately, "this reptile had the smallest brain of any known land vertebrate," Professor Marsh describes with some detail "a very large chamber in the sacrum, formed by an enlargement of the spinal canal. This chamber was ovate in form, and strongly resembled the brain case in the skull, although very much larger, being at least ten times its size. . . . A perceptible swelling in the spinal cord of various recent animals has been observed in the pectoral and pelvic regions, where the nerves are given off for the anterior and posterior limbs; and in extinct forms some very noticeable cases are recorded, especially in Dinosaurs. . . . In some allied forms, *Camptonotus* for example, where the disproportion between the fore and hind limbs is nearly as marked, the sacral enlargement of the spinal cord is not one-fourth as great as in *Stegosaurus*. It is an interesting fact that in young individuals of *Stegosaurus* the sacral cavity is proportionately larger than in adults, which corresponds to a well-known law of brain growth. The physiological effects of a posterior nervous centre, so many times larger than the brain itself is a suggestive subject, which need not be here discussed. It is evident, however, that in an animal so endowed, the posterior part was dominant."

In the hope that Professor Marsh may continue his important observations and reflections upon this subject, attention is called to the following points:

1. It seems to be taken for granted that "the posterior nervous centre" was as large as the sacral cavity. This is hardly warranted, although it is certainly favored by the size of the sacral foramina. The cranial part of the elephant's skull is far larger than is required for the lodgment of its brain, on account of the surface needed for the attachment of the immense cervical muscles. With many fishes, especially some skates and the *Lophius*, the brain occupies but a small part of the capacious cranial cavity. May it not be, then, that the sacral cavity of *Stegosaurus* was enlarged, in part at least, in correlation with a general enlargement of the whole pelvis, in reference to the functions of the legs?

2. Unless such examinations have been made already, it would be well to ascertain the condition of the myelon in the kangaroos, and that of the sacral cavity in *Diprotodon* and *Megatherium*, all of which may be compared with *Stegosaurus* in respect to the size of the legs, or their employment in connection with a large tail.

It would be interesting to know the form and size of the entire myelonal canal of *Stegosaurus*. The paper leaves us in doubt as to whether the writer considers the "posterior nervous centre" as the homologue of the ordinary "lumbar enlargement" of the myelon in man and other vertebrates. If not, may it be the not yet wholly abbreviated representative of what the late Prof. Jeffries Wyman referred to in his paper "On Symmetry and Homology in Limbs"? In some adult fishes the spinal marrow ends in a ganglionic enlargement forming a kind of caudal brain. We have found such a ganglion quite conspicuous in the American *Lophius*." In either case, it is probable that the remarkable condition of things in *Stegosaurus*, as described by Prof. Marsh, would have appeared to Prof. Wyman as an example of the law of organic polarity in the form of "fore-and hind symmetry," which has been advocated by him, by Dr. Coues, and by the writer of the present notice.

B. G. W.

THE ROMANCE OF ASTRONOMY. — Those interested in astronomy will be pleased to know that Professor R. Kalley Miller's delightful work "The Romance of Astronomy," has been published by the "Humbolt Library." Professor Miller is a professor at Cambridge, England, and has received aid from his distinguished colleagues, Sir William Thomson and Professor Tait. An appendix by Mr. R. A. Proctor is added. We remind our readers that the above work can be purchased for 15 cents, and that under the advantages now offered by club rates (to subscribers only), the 24 numbers issued annually can be secured for $2.25—an average of about 9 cents each.

ATMOSPHERIC DUST.

AT the period of the great debate on spontaneous generation between M. Pasteur and Pouchet, the latter was the first to draw attention to the fact, that some of the minute spherical granulations, discovered by the microscope in dust deposited from the air in various regions of the globe, were essentially composed of silica. That they had often been mistaken for eggs of infusoria or for micrococci was very evident; but when the dust was submitted to complete calcination in a platinum crucible the same grains were still visible, with the same forms and dimensions as before.

I have more than once repeated this experiment of Pouchet's, but I have also made the opposite one and examined the action of heat upon micrococci, diatoms and oscillariæ, which are supposed to contain large quantities of silica.

There is no doubt that the dust of the atmosphere reveals to the microscope, besides the larger mineral fragments mostly of an angular shape, exceedingly minute circular or spherical bodies, being often not more than 0.001 of a millimetre in diameter, and very similar in size and shape, which resist the action of a white heat in contact with the air, and that of strong hydrochloric acid. In some of my observations they were remarkably numerous. Both before and after the action of heat they are more or less transparent. What can be the origin of these singular objects?

The same experiments repeated with siliceous algæ, such as those belonging to the large family of the *diatomaceæ*, and with the *micrococci* of impure waters or vegetable infusions, showed me that they do not retain their forms after being subjected to the above treatment, and that in many instances they can be totally destroyed by heat on the object glass itself. On the other hand, the fossil diatoms resisted the action of heat and acids and retained their forms. I can draw only one conclusion from these observations: namely, that the minute siliceous bodies found in the atmosphere are also fossil—they are micrococci of another age.—Dr. T. L. PHIPSON, F.C.S.

SILVER BROMIDE.—The action of light upon this substance varies according as the bromide is in the state of emulsion in an indifferent medium, like collodian, or in an organic substance readily oxidisable, like gelatine. Temperature, moisture, and mechanical pressure do not appear to have any influence.