

sucker, the male parent alone attends to the cleaning of the nest while it is in use by the fledglings. The methods used in securing the photographs, as well as the manipulation of the cameras, were explained by the speaker.

GLOVER M. ALLEN,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE STRATIGRAPHIC POSITION OF THE JUDITH RIVER BEDS. A CORRECTION OF MR. HATCHER'S CORRECTION.

IN SCIENCE of November 21 Mr. J. B. Hatcher publishes a note in which he disputes some statements made by Professor Osborn in an article on 'New Vertebrates of the Mid-Cretaceous.' One of these relates to the position of the Judith River Beds, and Mr. Hatcher expresses the opinion that these beds which have usually been considered part of the Laramie are really much older than that formation. He says that 'The fact that Cretaceous Nos. 2 and 3 [Benton and Niobrara] are entirely wanting in this region leads to the inference that they are represented by the lower members of the Judith River beds, and that the lower members of these beds are in reality older than the oldest of the Belly River series, a little farther north.' This inference is wholly incorrect, but as it claims to be based on the field observations of so able and careful a worker as Mr. Hatcher it is likely to be accepted by many and to confuse all future discussions of the subject if it is not promptly corrected.

It has long been known that the equivalents of the Fort Pierre and Fox Hills beds underlie the Judith River beds in their typical exposures near the mouth of Judith River. Mr. Hatcher quotes Meek and Hayden's erroneous statement of 1857, but if he had examined their later references to the geology of the region he would have found the error corrected and that the sandstone first called 'No. 1' was later referred to the Fox Hills or 'No. 5.'*

The section has been studied by E. D. Cope, C. A. White and doubtless many others. In

* See Meek's statement in U. S. Geol. Surv. Terr. quarto Vol. IX., 1876, pp. xxxvi, xlviii, xlix.

1894 it was the writer's privilege, in company with Mr. W. H. Weed, to examine the section along the Missouri River from Fort Benton to the mouth of the Judith. Between these two points the distance along the meandering course of the river is somewhat over 100 miles and the rocks are well exposed almost continuously from the Benton shales up to the Judith River beds. By the latter term I mean the brackish- and fresh-water beds to which it was first applied, well exposed on both sides of the Missouri River near the mouth of Judith River, Montana. At many places in this neighborhood these beds were seen to lie directly on shales and sandstones containing an abundant marine invertebrate fauna which elsewhere is known to be characteristic of the Fox Hills beds. The relation of these fossiliferous marine beds to the overlying Judith River beds may be seen near the mouth of Dog Creek about three miles east of Judith P. O.; on Dog Creek three to four miles above its mouth; on the north side of the Missouri opposite Judith; and on the north side of the Missouri three miles northwest of Judith. Among the species collected are *Cardium speciosum* M. & H., *Mastra alta* M. & H., *Avicula nebrascana* M. & H., *Cymella undata* M. & H., *Sphaeriola cordata* M. & H., *Callista nebrascensis* M. & H., and *Tancredia americana* M. & H. These are sufficient to establish the horizon as Fox Hills without question and the overlying Judith River beds cannot possibly be very much older than the Laramie. In my opinion they are Laramie.

The marine beds containing the faunas of the Fox Hills and Fort Pierre are exposed along the Missouri River for some miles above the mouth of the Judith. Between these and the typical Benton shales there is a series of coal-bearing sandstones and shales whose stratigraphic position is precisely the same as that to which the Belly River series has been assigned. In the Fort Benton folio Mr. Weed has called this the Eagle formation. It is separated from the Judith River beds by several hundred feet of marine beds and the lithologic resemblance is not very close, though it might be possible to confuse them in areas where the section is not well exposed.

It is just possible that in the Canadian areas that have been referred to the Belly River beds two or more distinct horizons have been confused under one name. In fact the late Dr. George M. Dawson admits this possibility in one of his early descriptions* of the Belly River beds, stating that in certain areas the beds assigned to the Belly River might be supposed to *overlie* the Pierre shales rather than underlie them. His descriptions and the invertebrate fossils that he reports arouse the suspicion that at some localities the formation includes the Fox Hills and the Judith River beds.

Whether the subsequent work of the Canadian geologists has removed all grounds for doubt as to the stratigraphy in all the Belly River areas and whether these doubts could reasonably involve any of the localities at which vertebrate remains were obtained I have not been able to learn from the published reports. These queries are worthy of the attention of those familiar with the field.

The point which I wish to emphasize is the truth of Professor Osborn's statement that 'the true Judith River beds certainly overlie the Fort Pierre and are of more recent age.'

T. W. STANTON.

WASHINGTON, D. C.,
November 25, 1902.

THE PRICKLES OF *XANTHOXYLUM*.

IN No. 413 of SCIENCE, p. 871, there appeared a note calling attention to an error which occurs in some books regarding the nature of the prickles of *Xanthoxylum*. As in that note also the 'Cyclopedia of American Horticulture' is cited as making the erroneous statement that the paired prickles at the base of the petioles are stipular spines, I should like to point out that this statement is made only in the illustration, while in the text these bodies are always called prickles, though no particular mention is made of the occasional occurrence of paired prickles at the base of the petioles, and none of the absence of stipules in the genus, since this is a character common to the whole family of

Rutaceae. The discrepancy of text and illustration is explained by the fact that the illustration was inserted without my knowledge after I had sent in my manuscript and that I had no opportunity to read proofs of my articles in the fourth volume of that work, since I was abroad in Europe during the time it was printed. If I had considered the prickles in *Xanthoxylum* metamorphosed stipules, I certainly should have spoken of them as spines and not as prickles. There occurs a similar arrangement of prickles in some species of roses, chiefly in species of the sections *Cinnamomeæ* and *Carolinæ*, but in this case no doubt can arise of their nature, since the true stipules are conspicuously present, usually adnate to the petioles. In both genera these prickly bodies are simply outgrowths of the epidermis and, therefore, morphologically to be considered prickles, though they might, in regard to their ecological significance, possibly be considered equivalent to stipular spines.

ALFRED REHDER.

ARNOLD ARBORETUM.

NATURAL HISTORY IN ENGLAND.

IN a letter to the editor of SCIENCE, December 5, 1902, Professor Packard writes as follows:

"Our American children are * * * woefully lacking in interest in natural history * * * far behind German, and even English children, I fancy."

The 'even' in this sentence staggered me so completely that I am moved to write in protest—or at least in inquiry. I received my school education—the regular English classical course—in Sussex and Worcestershire, and spent various holidays in Devonshire. I thus had groups of boy friends and acquaintances in three English counties. So far as I remember, it was a matter of course that we should be interested in some branch of natural history. At any rate, I can now recall but two exceptions to this rule from the whole list of my schooltime friends. And I well remember that our natural history interests proved a bond of friendship with farmers' boys and gamekeepers' sons, with whom we should otherwise, as public-school boys, have been at daggers drawn.

* Geol. Surv. Canada, 'Rept. of Progress for 1882-83-84,' pp. 118-126 C.