LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

Structure of the Plesiosaurian Skull.

IT is somewhat remarkable, that, in a group of fossil reptiles like the plesiosaurs, the nature and structure of the skull should have remained for so long a time practically unknown. Fragmentary remains of this very important part of the skeleton are not rare in collections, but none sufficiently complete to make out any thing at all satisfactory of its anatomy have hitherto been described. Very fortunately the museum of the Kansas University has recently been enriched by the skull and a large part of the neck of one of these animals, in most remarkably perfect preservation, collected from the Kansas Niobrara cretaceous by Judge E. P. West, assistant in paleontology at the State University. Recognizing the value and rarity of the specimen, Mr. West used the most scrupulous care in removing and shipping the specimen, and, as now cleaned from its matrix in the museum, it permits most of its structure to be made out with certainty and ease. I have in preparation a full description of the specimen, with illustrations, which will shortly be published in the "Transactions of the Kansas Academy of Sciences." Meanwhile, however, the very great importance of the find renders a brief description of its chief characters at the present time very desirable.

The species I refer provisionally to the genus *Cimoliosaurus*, though certain characters, as will be seen, do not accord with those given by Lydekker in his recent "Catalogue of Fossil Reptilia." The specimen lies upon its side, with twenty-six vertebræ in position; and all, save some of the posterior vertebræ, which were exposed, are in perfect preservation. The cervical vertebræ have the arches and riblets fully co-ossified with no or but very slight traces of their sutural attachments. There is but a single rib attachment, and the zygosphene is rudimentary. The spines are short; the anterior centra, gently cupped; the posterior ones, which increase gradually in slenderness, more deeply so. The parietal bone forms a roof-shaped covering, ascending into a high, thin sagittal crest two or three inches above the brain-case: there is no parietal foramen. There is but one temporal arcade, a broad bar passing directly backward, on a line with the maxilla, to unite with the lower part of the quadrate. The limits of the quadrato-jugal have not yet been satisfactorily made out. The post-orbital is a slender bone uniting broadly with the jugal below, and has no connection with the slender squamosal. There is apparently no post-frontal. Lying within the comparatively small orbit are eleven or twelve sclerotic plates, touching each other at their edges, and forming the larger part of a ring, a few having been misplaced. The mandibular symphysis is short, and the two sides are so firmly co-ossified that I have found no trace of the suture. There are about twenty teeth in each jaw, extending far back, the anterior ones very much larger than the posterior ones; in the locked jaws the upper ones reaching nearly to the lower margin of the stout mandible. A part of a single bone was found between the jaws, which I believe to pertain to a hyoid.

I need not point out the importance of the foregoing characters. Others scarcely less interesting will be given later. The ones here given, however, are nearly all in conflict with generic, family, ordinal, or even super-ordinal characters hitherto accepted. The sclerotic plates are the first ones described for any of the *Synaptosauria*, a branch comprising the *Chelonia* and *Sauropterygia*.

The species can be located with neither *Polycotylus* or *Elasmosaurus*, the two genera of the American cretaceous hitherto described as having co-ossified neural arches. I place it, however, under *Cimoliosaurus*, in Lydekker's acceptation, and shall describe and figure it under the name *C. Snowii*, in honor of Chancellor F. H. Snow, who has done so much for the development of the natural-history department of our university. I append a few measurements: length of skull from occipital condyle to top of premaxilla, 18 inches; greatest height of skull to top of parietal crest, 9 inches; length of centrum of second cervical vertebra, 1⅝ inches; height of centrum of second cervical vertebra, 1⅝ inches; height of spine above centrum, same vertebra, 2½ inches; length of centrum of eighteenth cervical vertebra, 2¾ inches; height of centrum, same vertebra, 2 inches; length of centrum of twenty-fifth cervical vertebra, 3⅝ inches.

S. W. WILLISTON.

University of Kansas, Oct. 25.

On the Characters and Systematic Position of the Large Sea-Lizards, Mosasauridæ.

A NEARLY complete skeleton of one of the mosasauroid reptiles, collected during the summer in the cretaceous of Kansas, enables me to give full characters of this family, and to determine absolutely its relations.

The skull is nearly, in every respect, of the pattern of the *Varanidæ;* the premaxillaries co-ossified with nasals, forming a single bone; frontals single, but indications of former division in front; parietals single; post-orbital arch complete,—a bony postorbito-quadrate arch. This arch is formed by the postfronto-orbitals, which are free from each other in young specimens, and by the quadratojugal (squamosal); pterygoids and palatines separated, pterygoids with teeth; vomers separated behind, connected in front; a small ecto-pterygoid (transverse bone); infra-orbital fossa as in *Varanidæ;* nasal opening formed by naso premaxillary, frontal, prefrontal, maxillary; orbits formed by prefrontal, jugal, postfronto-orbital, and a very small portion of the frontal; epipterygoid as in *Varanidæ;* no ossified alisphenoid; par-occipital (opisthotic) co-ossified with ex-occipital; petrosal (pro-otic) suturally united or co-ossified with ex-occipital and par-occipital; quadratojugal, squamosal, par-occipital, and quadrate, exactly in the same relations as in *Varanidæ;* lower jaw as in *Varanidæ*.

I have to mention here the important fact that the *Varanidæ* and *Helodermatidæ* have, like the *Mosasauridæ*, the peculiar articulation in the middle of each ramus, which enables these animals to extend the lower jaws considerably. The shoulder-girdle is between that of *Varanidæ* and *Helodermatidæ*. There is a very well developed interclavicle, a little divided at the proximal end. The clavicles are small and slender.

From all this it is evident that the *Mosasauridæ* are very closely related to the *Varanidæ*. They simply represent highly specialized aquatic forms. The enormous size of some of the *Mosasauridæ* has to be explained by that fact. I may remark here, however, that some fossil *Varanidæ* (*Varanus*) [*Megalonia*] *priscus*, Owen, for instance) from the pleistocene of Queensland reached a length of thirty feet. The *Helodermatidæ* belong to the same group, but the *Mosasauridæ* are very much nearer to the *Varanidæ*. For this group I retain the old name *Platynota*, and divide it into two superfamilies, — (*a*) *Varanoidea*, 1. *Varanidæ*, 2. *Mosasauridæ;* (*b*) *Helodermatoidea*, 1. *Helodermatidæ*.

A full account of the *Mosasauridæ*, with figures, will soon be published.

G. BAUR.

Clark University, Worcester, Mass., Oct. 29.

Two New Species of Tortoises from the South.

THROUGH the kindness of Mr. Gustave Kohn of New Orleans, La., I have received for examination a splendid collection of *Testudinata* from the Southern States: Louisiana, Florida, Alabama. This collection contains two new species of *Malacoclemmys*.

1. *Malacoclemmys oculifera* (*sp. nov.*).—This is one of the most beautiful of the American tortoises, and it is certainly very remarkable that it has not been described before. It was labelled *M. Lesueuri*, but it is totally different from that. The shell is broader and higher. The bony tubercles on the vertebral plates are more developed. Each of the dermal scutes of the carapace contains a yellow ring, bordered on the inside and outside with dark olive-brown. These rings are especially well developed on the costal scutes. This condition induced me to propose the name *oculifera*. The plastron is yellow, but with markings very much like *Chrysemys bellii*, Gray. The color of these markings is like the carapace, olive-brown. The head is entirely different from that of any of the described forms of *Malaco-*

clemmys. There is a large yellow spot behind the eyes, two yellow stripes from the orbit backwards, and a very characteristic yellow stripe covering the whole lower jaw. The upper and lower jaws are rounded in front. There are males and females in the collection. The localities where these tortoises were found are Mandeville, La., and Pensacola, Fla. Specimens from Mandeville, La., I consider as the types. Such specimens are also in the collection of the Smithsonian Institution, Washington, D.C., sent by Mr. G. Kohn, No. 15,511, etc.

2. *Malacoclemmys Kohnii (sp. nov.)*.—Three specimens labelled *M. geographica* are in Mr. Kohn's collection. They represent another interesting new species. The form of the shell is much like that of *M. oculifera*. The coloration is totally different, and resembles very much that of *M. Lesueuri*. The skull is quite different from that of *M. geographica*. The alveolar surfaces of the upper jaw do not meet in the middle line as in *M. geographica:* they are not so broad, therefore. They resemble more *M. Lesueuri* in that respect, but are broader. The symphysis of the lower jaw is longer than in that species. The coloration of the head is also quite different from *M. Lesueuri:* there is no big yellow spot behind the eye, but a thin yellow line, which is connected with another one running behind from the upper part of the orbit. The localities where found are Bayou Lafourche, La.; Bayou Teche, St. Martinsville, La.; Pensacola, Fla. I take the Louisiana forms as types. I have named this species in honor of Mr. G. Kohn, who collected the specimens.

From this it is seen that we have now five species of *Malacoclemmys* in the United States,—*M. terrapin*, Schoepff; *M. geographica*, Les.; *M. Lesueuri*, Gray; *M. oculifera, sp. nov.*; *M. Kohnii, sp. nov.*

It is probable that *M. terrapin*, the common diamond-back, shows variations according to different localities, and I should be very glad to get specimens from different points on the coast. The new species will be fully described and figured soon.

G. BAUR.

Clark University, Worcester, Mass., Oct. 27.

Remains of the Primitive Elephant found in Grinnell, Io.

HOWEVER common the remains of the mammoth may have become, there is always more or less interest attached to the discovery of each new individual, however fragmentary, or wherever found. According to vague rumors, the first evidence of the mammoth's remains in Grinnell came to light so early in the history of the town, that it has passed into obscurity; and the bones, treasured for a time as private relics, have simply disappeared, no one knows just when or how. It is not certain whether this doubtful specimen was a distinct individual, or part of the one subsequently found near the same place. The last one alluded to was found in 1884, while breaking ground for the Eagle Block, on the north-east corner of Main Street and Fourth Avenue. This animal, a large adult male, is represented by a tusk (eight feet long and nine inches in diameter), several grinders, lower jaw, and part of zygomatic arch, preserved in the museum of Iowa College. These bones occurred about five feet below the surface, and were in an exceedingly soft and perishable condition, as similarly situated remains usually are; but, owing to the skill of Professor H. W. Parker, the tusk and teeth especially were so well fixed with hardening-mixtures, that they were removed in an exceptionally fine condition. The other bones were naturally more fragmentary. The mandible is represented by a large fragment, including the entire symphysial region, the left ramus being complete as far as the angle. No limb bones in whole or part were taken out with these fragments, although many bones were seen in the clay passing under the walls of an adjoining block, endangering its foundations if dug out, and consequently left there. Doubtless when other excavations are made on the lots immediately adjoining, other bones will be found. Judging by the condition of the parts now at hand, it is not unreasonable to hope that a skeleton nearly complete may yet be unearthed.

Remains of another *Elephas primigenius* have just come to light, found Oct. 6, 1890, within half a mile of the site of the one of 1884. There is additional interest attached to this one, because of the depth at which it occurred. Workmen, while engaged in excavating an enormous well to supply the water-tanks of the Iowa Central Railroad, came upon certain badly broken mammoth bones, in the drift clay and pebbles, at a depth of twenty feet. All the bones, save a well-worn molar, were badly comminuted, and all the surroundings lead inevitably to the conclusion that they were transported with the drift in which they occurred. In addition to the small though complete molar, there were limb bones, a scapula, ribs, and a small tusk some five or six inches in diameter. The tusk, however, extended into the sides of the well in such a way that it could not be taken out without danger of a cave-in, and was left. The scapula, when found, was fairly complete, but was almost destroyed in the taking-out, little beside the thickened parts in the region of the glenoid fossa remaining. The few limb bones, owing to their fragmentary condition, coupled with the inexperience of the workmen in digging out such remains, were almost totally destroyed; the proximal end of a tibia, a fragment of the shaft of a femur, and the casts in clay of the medullary cavities of the same, being about all that remains to show for them at all. Although it is by no means uncommon to find skeletons of mammoths close to one another, yet it is less so to find them so far below the surface. ERWIN H. BARBOUR.

Iowa College, Grinnell, Io., Oct. 15.

Photo-Mechanical Work.

I WISH to remove, as far as may be, a wrong impression which your readers get from a short news item in your issue of Oct. 24, p. 231. Speaking of the coming exhibition by the Camera Club, of work by the several photo-mechanical processes, you say that "it is a remarkable fact that in no exhibition have they [photo-mechanical results] been brought together for comparison and study."

This statement is very misleading. In the United States National Museum in Washington, in the Section of Graphic Arts, under Mr. S. R. Koehler's management as curator, a large space (I think about nine hundred square feet of wall and cases) is devoted solely to photo-mechanical work and processes. This collection is both historical and technical; and I am perfectly safe in saying that there is no exhibition or collection of the kind anywhere that comes near it in instructiveness, general excellence, and beauty. In completeness the specimens here brought together form a remarkable whole, extending from the earliest times without a break to the present day.

The Camera Club will, I do not doubt, make a beautiful exhibition of recent photo-mechanical work; but the older necessary steps in the evolution of these arts, most difficult to get and most difficult to present effectively for educational and comparative purposes, are not likely to be represented in New York as they are in the National Museum here. J. W. OSBORNE.

Washington, D.C., Oct. 30.

MY attention has been called to a note in your issue of Oct. 24, announcing an exhibition of photo-mechanical process-work to be held by the New York Camera Club. In this note it is stated to be "a remarkable fact that in no exhibition have they [i.e., the photo-mechanical processes] been brought together for comparison and study." By referring to the "Classification of Exhibits in the Section of Graphic Arts," of the Smithsonian Institution, United States National Museum, you will see that considerable space is devoted to the illustration of the processes in question at the institution named. We endeavor not only to illustrate the various processes in their technical aspects and in their results as they are seen to-day, but it is our aim also to bring together an historical series; and I am happy to say that our efforts in this direction have not been quite unsuccessful. Among the specimens illustrating the development of the photo-mechanical processes historically is one by Nicephore Niepce (1824), while Fox, Talbot, Poitevin, Paul Pretsch, Tessié du Motay, Asser, Toovey, Osborne, Sir Henry James, Davanne, Lemercier, Pouncy, Bradford (of Boston), and others, are represented by several specimens each. That the workers of to-day, especially those of America, are well represented, goes without saying.

For these results the United States National Museum is largely