

Family SCINCIDÆ.

Plestiodon leptogrammus, Baird.—Two post-nasals, the posterior one behind and above the much smaller anterior. Color black, with five narrow, white lines, the two lateral along the middle of single rows. Median light line not bifurcated.

Hab.—Platte River Valley. Lt. Warren, Dr. Hayden. Type No. 3119.

Plestiodon inornatus, Baird.—Two post-nasals of equal size, one above the other. Hind leg applied three times forwards, reaching the ear.

Hab.—Sand Hills of Platte. Lt. Warren, Dr. Hayden. Type No. 3110.

Plestiodon tetragrammus, Baird.—One post-nasal plate; post-frontal and inter-nasals separated by the post-nasal. Five supra-orbitals. Dorsal scales of equal width. Light olive green above; sides with two yellowish lines, separated by six rows of darker olive scales. Upper labials pure yellowish. Body encircled by about 28 rows of scales. No dorsal stripe.

Hab.—Lower Rio Grande. Dr. Berlandier, Lt. Couch. Type No. 3124.

Plestiodon egregius, Baird.—One post-nasal plate; post-frontal and inter-nasals separated by the post-nasal. Four upper labials. Ears very small. Two central dorsal rows largest. Body cylindrical. Color reddish ash, with two or three white lines on each side, margined with dusky, sometimes a third; all these along the centres of single rows of scales. Upper lateral lines separated by two plain rows. Body encircled by about 22 rows of scales.

Hab.—Indian Key, Fla. G. Wurdemann. Type No. 3128.

Plestiodon septentrionalis, Baird.—One post-nasal plate which does not separate the inter-nasals and post-frontals. Color above olive, with four equidistant and equal dark stripes on adjacent half rows of scales. Two narrow white lines on each side, traversing the centres of single rows, and margined above and below by black. Upper lateral light stripes separated by six rows of scales. Beneath light greenish.

Hab.—Minnesota and Nebraska. Rev. S. W. Manney. Type 1356.

Remarks on the lower Cretaceous beds of Kansas and Nebraska, together with descriptions of some new species of Carboniferous fossils from the valley of Kansas river.

BY F. B. MEEK AND F. V. HAYDEN.

The Cretaceous system as developed in Nebraska, is clearly divisible into five distinct formations, which have, for the sake of convenience, been numbered 1, 2, 3, &c., from the base upwards. Although at first entertaining some doubts as to whether No. 1, or the lowest formation, might not be older than Cretaceous, we always placed it provisionally, in our published sections, in the Cretaceous system. More recently, after a careful review of the subject, we became satisfied from the modern affinities of numerous dicotyledonous leaves found in this formation, that we hazarded little in regarding it as a settled question that it could not be older than Cretaceous, and so expressed ourselves in our paper read before the Academy of Natural Sciences, Philadelphia, March, 1858.

The reference of this formation to the Cretaceous, however, was not without some exceptions generally admitted, for Professor Jules Marcou, in his work on the "Geology of North America," page 143, refers it to the New Red Sandstone, and in a subsequent publication,* he places it in the Jurassic; while some investigators in this country also inclined to the opinion that it must be Triassic. In the midst of these conflicting opinions, although satisfied we were right, we wished, in order to remove all doubts from the minds of others, to have the opinion of some good authority in fossil botany, (a department of palæontolo-

*Notes pour servir a une description geologique des Montagnes Rochenses, page 20.

gy to which we have given little attention,) respecting the fossil leaves on which we mainly based our views in regard to the age of this formation. Consequently, we sent outline sketches of a few of them to Professor Oswald Heer,* the distinguished authority in fossil botany at Zurich, Switzerland, informing him they were from a formation we regarded as Cretaceous and requesting him to let us know to what genera and geological epoch he would refer them. This letter was sent to Professor Heer in August last, before we started to Kansas, and on our return, in the latter part of October, we were disappointed at finding no reply from him. After waiting some days longer, and receiving no answer from Professor Heer, we concluded our letter had either failed to reach him, or that he was unwilling to express an opinion based upon mere sketches of the leaves; consequently we submitted the whole to Dr. Newbury, who had then returned to Washington, and in whose opinion on this subject we have the fullest confidence.

After examining the specimens, Dr. Newbury gave us a written statement bearing date Nov. 12, containing a list of the genera to which he had referred the leaves, together with some interesting remarks and generalizations, in which he expressed the opinion that they are certainly Cretaceous, some of them belonging to genera peculiar to that epoch, and that the whole belong to more highly organized plants than anything known in the Triassic or Jurassic flora.

Knowing as we did that the rocks from which these plants were obtained, —beyond all doubt,—hold a position beneath, at least, eight hundred feet of Cretaceous strata, containing great numbers of *Ammonites*, *Scaphites*, *Baculites*, &c., it of course never once occurred to us that any person might suppose it Tertiary.

About the thirteenth of November we sent on to the American Journal of Science, a communication containing Dr. Newbury's list of the genera to which he had referred our plants, with some extracts from his remarks, all of which will appear in the January number of that Journal. Some two or three weeks after we had corrected the last proof of this paper, we received (13th of Dec.) a letter from Professor Heer, bearing date of Nov. 20, in which he informed us that our letter had reached him at a late date, in consequence of his absence from home, and that after his return, other engagements had prevented him from replying sooner. In this letter Professor Heer, in accordance with our request, sent us a list of the genera, as near as it was possible for him to make them out from hastily drawn sketches, and also kindly furnished brief diagnoses of the species,† stating at the same time that although one of the outlines resembles a Cretaceous genus (*Credneria*), the nervation being obscure, and the others being more like Tertiary forms than anything known in the Cretaceous of the old world, he was inclined to the opinion that they are Tertiary.

Along with Professor Heer's letter, we also received a printed pamphlet, entitled "*Letters on some points of the Geology of Texas, New Mexico, Kansas and Nebraska*;" addressed to Messrs. F. B. Meek and F. V. Hayden, by Jules Marcou." In this pamphlet Professor Marcou quotes Professor Heer's conclusions in regard to our fossil plants, and expresses the opinion that No. 1, of the Nebraska section, is both Miocene and Jurassic, or in other words, that we have included in it strata belonging to each of these two widely different geological epochs.

Having a very high regard for Professor Heer's opinions on any question in fossil botany, where he has had an opportunity to examine the specimens themselves, or to study good figures and descriptions, we are quite sure, had the whole collection been submitted to him, instead of mere sketches of a few of the species, his opinion would have been very different. At any rate, we can assert with the fullest confidence that it is absolutely *impossible* that this formation, or any part of it, can be Tertiary, for we know it passes, as already stated, beneath at least eight hundred feet of Cretaceous strata. This is not mere conjecture, nor an inference drawn from having seen this formation under cir-

* Our friend Dr. Newberry was then in New Mexico.

† For descriptions of these plants by Prof. Heer, see the last two pages of this paper.

cumstances leading us to *suppose* from the dip of the strata, that it must pass beneath the Cretaceous if continued in a given direction at the same angle of inclination, but from the fact that it has actually been seen, directly beneath the other Cretaceous rocks, not merely at one place, and by one observer, but by several persons at numerous localities.

In order to satisfy others we are not mistaken in this, we will give a few of the many facts in our possession, bearing on this question. In the first place, we would remark that the farthest point towards the south at which we have seen this formation, is near Smoky Hill river, in Kansas, latitude $38^{\circ} 30'$ north, and longitude $97^{\circ} 30'$ west. Here we found it forming the upper part of several isolated elevations known as the "Smoky Hills," at an altitude of about 1200 feet above the Missouri at Fort Leavenworth. At this locality, however, we saw no rocks overlying it, and consequently have no *stratigraphical* evidence that it is the same rock seen by us at other localities under Cretaceous beds; but our lithological and palæontological evidence is quite conclusive on this point, for this rock in color, composition, and all other respects, is undistinguishable from No. 1, of the Nebraska section, as seen near the mouth of Big Sioux river on the Missouri, and contains numerous fossil leaves, some of which are identical with those occurring in No. 1, at the last mentioned localities. Amongst these leaves Dr. Newberry has also identified at least one genus (*Eltingshausiana*) peculiar to the Cretaceous system.

Bearing in mind that all the rocks here have a gentle but uniform inclination or dip to the north west; and that the formation under consideration consists of red and yellowish sandstones, and various colored clays, with generally more or less impure lignite and ferruginous concretions, we will be prepared to recognize it at lower and lower elevations as we proceed northward.

Without undertaking to mention in detail the intermediate exposures, we will pass northward at once to localities where it has been seen beneath Cretaceous rocks by three different observers at various times; this is near the Kansas and Nebraska line—latitude 40° north, and in the vicinity of 97° of west longitude. Here at an elevation of about seven hundred feet above the Missouri at Fort Leavenworth, or some five hundred feet below the level of the exposures mentioned at the Smoky Hills, our deceased friend, Mr. Henry Pratten, saw near Wyeth's creek, in 1853, the following exposures in descending order;

1st. Slope, thickness not given.

2nd. Yellow and whitish limestone filled with casts
of *Inoceramus*, referred by him to *I. mytelooides* } No. 3, Nebraska Sec.
= *I. problematicus*.

3rd. Slope, thickness not given. } No. 2, Nebraska Sec.

4th. Red ferruginous sandstone with leaves of di- } No. 1, Nebraska Sec.
cotyledonous trees.

A short distance west of this exposure Dr. J. G. Cooper informs us he saw outcrops of a red sandstone in the valleys at about the same elevation; and above this, exposures of dark gray laminated clay answering exactly the description of No. 2, of the Nebraska section, while above the latter, near the tops of the hills, he met with outcrops of light colored limestone containing numerous casts of *Inoceramus*.

At other localities not far to the southwest of the foregoing, Mr. Hawn saw exposures of light colored limestone forty-five feet in thickness, containing great numbers of *Inoceramus* which we referred, from specimens sent by him, to *I. problematicus*. * Below this there was a slope of twenty-seven feet in which he saw no exposures, while still lower he observed outcrops of dark ferruginous and yellow sandstone, and various colored clays with impressions of leaves

* It is with some doubt we have referred this species to *I. problematicus*; it is the same species described by Dr. Schiel in the second volume of the Pacific Rail Road Report, page 108, plate 3, figure 8. It is rather longer on the hinge than is common in *I. problematicus*, from which it may be distinct. We always refer to this shell in speaking of *I. problematicus*.

resembling, as he supposed, those of oaks and willows. (See his section published by us in the Proceedings of the Academy of Natural Sciences of Philadelphia, May, 1857.)

Proceeding northward from the last mentioned localities, we find on reaching the Loup fork of Platte river, near the eastern limits of the Pawnee reservation, outcrops of the light colored *Inoceramus* beds already mentioned, (No. 3, Nebraska section,) near the water's edge; and at the mouth of Loup fork, on the Platte, the red sandstone No. 1, so often referred to, crops out near the river margin, while the *Inoceramus* beds are seen in the bluffs above it. Going down the Platte in a direction nearly contrary to the dip of the strata, we find this sandstone rising up so as to form near the mouth of Elk Horn river, bluffs some sixty feet in height. Here it seems to rest directly upon Carboniferous rocks. Continuing on down the Platte, we find this red and yellow sandstone rising higher and higher in the hills until we come within five or six miles of the Missouri, where it is seen with its base elevated near sixty feet above the Platte; and there are probably outlines of it between that point and the Missouri at greater elevations. So that we here find the same formation which at Smoky Hill river is elevated about twelve hundred feet above the level of the Missouri at Fort Leavenworth, and seven hundred feet above the same horizon near Little Blue river, has by the gradual north-western dip of the strata, sunk to within about one hundred feet of the Missouri at the mouth of the Platte.*

Ascending the Missouri from the localities just mentioned, we see occasional exposures of the upper Carboniferous rocks, which gradually sink lower and lower until they pass beneath the river near Florence, to be succeeded by the reddish and yellow sandstones, &c., of No. 1.—(Nebraska section.) Above this, occasional exposures of this formation are seen with its characteristic fossil leaves, along the river; and at several localities, some thirty miles below the mouth of Big Sioux river, it forms perpendicular escarpments of yellowish sandstone rising from the water's edge to an elevation of about eighty feet; while at a higher point, back on the summits of the Hills, the same calcareous beds are seen, containing *Inoceramus problematicus*. Here at a quarry in the sandstone (formation No. 1,) some twenty feet above the level of the river, one of us (Dr. H.) collected a large number of fossil leaves, some of which are identical with species found by us in this rock at the Smoky Hill locality already mentioned. The sketches of leaves sent by us to Professor Heer were mostly drawn from specimens collected at this locality.

At the mouth of Big Sioux river a low bluff of this formation, not more than fifteen or twenty feet in height, is seen, and on the hills back a little from the river at a higher elevation the same *Inoceramus* bed crops out at several places, and is used for making lime. At another locality, about eight or ten miles up the Big Sioux river, which comes in from the north west, one of us (Dr. H.) saw No. 1, containing its characteristic fossil leaves, *directly beneath* No. 2, of the Nebraska section. This exposure presented the following beds in the descending order:

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| 1st. 20 feet exposed of light gray limestone and marl, containing <i>Inoceramus Problematicus</i> . | } No. 3 of Nebraska Sec. |
| 2d. 45 feet dark laminated clay with ferruginous concretions containing fish scales | |
| 3d. 15 feet exposed above the edge of the water, consisting of yellowish friable sandstone, with a thin bed of impure lignite above, and some layers of various colored clay below, containing dicotyledonous leaves. | } No. 1 of Nebraska Section. |

* The gradual descent of the Missouri river makes its surface at Fort Leavenworth, about three hundred feet lower than at the mouth of the Platte, hence the exposures of No. 1, seen at the latter locality, one hundred feet above the Missouri, are some four hundred feet above the level of the Missouri at Fort Leavenworth, and of course about three hundred feet lower than the Little Blue river outcrops. The dip, however, is greater than this would indicate, for the strata incline towards the north west, while the mouth of Platte river, is north east of the Blue river localities.

One of the sketches of a long lanceolate leaf, like some of the existing species of *Salix*, sent by us to Prof. Heer, was drawn from a specimen collected from one of the lower sandstones here.

Again at another locality on the Missouri, about thirty miles above the mouth of Big Sioux river, No. 1, was seen by one of us (Dr. H.) only five feet above the water's edge, and *immediately overlaid* by No. 2, of the Nebraska section, containing its characteristic species of *Ammonites*; and directly over the latter, he saw No. 3, containing *Inoceramus Problematicus*.* At this locality he also found in No. 1 some of the same fossil leaves characterizing it at the other places already mentioned.

On ascending the Missouri, above the last named locality, formations No. 2, 3, 4 and 5 are seen to sink at the same gradual uniform rate of dip, in regular succession, beneath the level of the Missouri; so that on reaching Heart river, we find the top of No. 5 nearly down on a level with the water's edge, and a short distance above that locality it passes out of sight, to be succeeded by the Great Tertiary Lignite basin of the upper Missouri, which overlaps it on the hills along the river for some distance below.

From the foregoing statement, we think it will be clearly understood, that formation No. 1 of the Nebraska section holds a position *beneath* the other cretaceous deposits of that region; while the occurrence in it of highly organized angiosperm dicotyledonous plants proves that it cannot be older than Cretaceous. It may be argued, however, that it may in part be Cretaceous and part Tertiary, or at any rate that *some* of these leaves may have been obtained from overlying Tertiary beds which we have confounded with the Cretaceous below. This, however, is impossible, simply because specimens of nearly all the species found at the various localities, have been quarried from the same bed at Blackbird Hill, and the whole, not a part only of this formation, passes beneath all the other Cretaceous rocks of the north west. In addition to this, we have extensive collections of plants from the Tertiary of Nebraska, not a single species of which is identical with those from No. 1.

When we stated in some of our papers that it was possible we might have included in this formation beds not belonging to the Cretaceous, it was not because we thought any part of it might be Tertiary, but because we suspected some of the lower beds referred to it in Kansas might possibly be Jurassic; and we are even now prepared to believe it may yet be found to repose on Jurassic rocks in that Territory, as it does at the Black Hills.

DESCRIPTIONS OF NEW CARBONIFEROUS FOSSILS.

The carboniferous species described in the following pages of this paper, were collected by us in Kansas, from the upper coal measures, extending up to the base of the Permian, through a series of strata holding a higher stratigraphical position than most of the coal deposits of the west. We found this series of rocks abounding, at places, in organic remains, mostly of the same species occurring in the coal measures of Missouri, along with a few others approximating to Permian forms.

Amongst our collections from these rocks we have identified most of the carboniferous species figured by Prof. Marcou in his work on the geology of North America, which represents a group of fossils characteristic of our western coal measures. We had hoped to have ready for this paper some remarks on the upper carboniferous and Permian rocks of Kansas, illustrated by many local sections, showing the range of the various fossils, but we have, for want of time, been compelled to defer these for another occasion.

FUSULINA CYLINDRICA, Fischer.

In our collections from the upper members of the Coal Measures of Kansas, we have great numbers of *Fusulina*, many of which agree so very nearly with figures

* It is of course unnecessary for us to inform geological readers that a rock overlaid by strata containing *Ammonites* and *Inoceramus*, cannot be Tertiary, because these genera became extinct at the dawn of the Tertiary epoch.

and descriptions of the species above cited, that we have thus far failed to find any reliable differences by which they can be distinguished. If these are really identical with *F. cylindrica* it not only proves that species to have had an immense geographical range, but to have existed through vast periods of time, since, according to Murchison de Verneuil and Keyserling, it is widely distributed in Russia, where it only occurs in the upper part of the lower carboniferous or mountain limestone series; while in Kansas it ranges through a great thickness of upper carboniferous rocks, much of which appears to be even more modern than most of the western coal measures.

F. cylindrica var. *ventricosa*.

Along with the forms above mentioned, which we regard as probably identical with *Fusulina cylindrica*, we find in some of the upper members of the coal measures in Kansas, others differing so much in size and form, that we even suspect they may possibly belong to a distinct species. These we propose to designate for the present as a variety of *F. cylindrica*, under the name of *ventricosa*, which will be a good specific name, should they prove to be distinct. They differ from *F. cylindrica*, as figured in Murchison de Verneuil and Keyserling's work on the geology of Russia, in being much larger, some of them measuring nearly half an inch in length, and 0.20 inch in diameter at the middle; they are also proportionably much more ventricose, and differ in being usually less symmetrical, in consequence of one side being more gibbous than the other. The transverse grooves marking the position of the septa also pass across the central ventricose region with more of a lateral curve than in the Russian specimens; while the edges of the septa themselves, when the outer shell is removed, are seen to be apparently less distinctly waved. Again the aperture in all our specimens is so very narrow as to appear entirely closed.

In the description of the Russian specimens it is said that young individuals are proportionably so much shorter and more fusiform than the old, that they might readily be mistaken for a different species; exactly the reverse, however, is the case with our Kansas specimens, the smaller individuals being more nearly cylindrical, while they appear to have become more gibbous with age, until in some cases they might be described as subglobose.

Locality and position.—This variety is found at Juniata on Blue river, and at Manhattan on the Kansas, far above all the coal beds yet discovered in Kansas.

ORTHISINA CRASSA, n. sp.

Shell thick, of medium size, subquadrate, rather compressed; hinge, generally a little less than the greatest breadth of the shell, but sometimes equaling it. Front broadly rounded; lateral margins more or less arcuate,—in some examples nearly straight. Surface ornamented by numerous straight radiating striæ, numbering near the beaks about thirty to forty on each valve, but increasing by the implantation of others between them, from one hundred, to about one hundred and twenty four, around the margin; these striæ are crossed by numerous fine elevated concentric lines, which are not only quite distinct in the spaces between, but on well preserved specimens are prominent on the striæ, to which they impart a sub-crenulate aspect, as seen by the aid of a lens. Adult specimens also generally have several strong concentric imbricating marks of growth.

Larger or ventral valve nearly flat, cardinal edge sloping a little towards the lateral margins; beak not very prominent or distinct, not incurved, sometimes a little twisted to one side; area rather broad, flat, and inclined obliquely beyond the cardinal edge of the other valve; deltidium thick and prominent.

Smaller or ventral valve moderately convex in the middle, concave on each side of the umbo, which is generally depressed: mesial tooth strong, and prominent, bifid. Length of a specimen a little above the average size 1.25, inch, breadth, 1.30 inch; transverse diameter of the two valves

Locality and position.—Leavenworth City, K. T., in Coal Measures.

CHONETES MUCRONATA, n. sp.

Shell rather large, semicircular, having its greatest breadth on the cardinal border, which is usually extended into mucronate angles. Surface ornamented by a few sub-imbricating concentric marks of growth, crossed by fine regular closely set striæ, about one hundred and fifty of which may be counted around the border, where eight or nine of them occupy the space of one line.

Larger valve depressed, having generally a broad, shallow, undefined, mesial sinus extending from the front towards the beak. Ears sometimes separated from the central region by very shallow depressions, and often slightly curved upwards at the extremities. Cardinal margin sloping a little from the beaks, on each side of which it is ornamented by from eight to eleven tubular spines, directed obliquely outwards. Area rather wide and, having a broad deltoid aperture, with elevated margins.

Smaller valve following nearly the curve of the other; beak and central region concave; ears flat; area rather broad, but narrower than the other, and rectilinear. Interior provided with a small very slightly projecting bifid median tooth, which nearly closes the aperture of the other valve. From the base of this tooth there are five radiating ridges, two of which are rather obscure, and extend obliquely outwards near the cardinal edge, while a third extends at right angles to the hinge, a little more than half way across towards the front of the valve. The other two ridges are much shorter, and occupy an intermediate position between this median ridge and the lateral one, and are directed obliquely forwards and outwards. The whole interior is more or less granulose, the granules near the border being much smaller than the others, and ranged in rows parallel to the striæ on the outside. Breadth of largest specimen 1.13 in.; length 0.62 inch.

This species is very nearly allied to *C. Smithii*, of Norwood and Pratten, to which we were at first inclined to refer it; a careful examination, however, of a large number of individuals in all conditions of preservation, has satisfied us that the striæ of the shell now before us are always entirely destitute of the pits so characteristic of *C. Smithii*. Our shell is also much more extended on the hinge line, which terminates in more acute angles; while there are not unfrequently eleven, instead of ten tubes on each side of the beak.

Locality and position.—Near Fort Riley, K. T., Upper Coal Measures.

AXINUS (SCHIZODUS) OVATUS, n. sp.

Shell ovate, most gibbous slightly in advance of the middle; anterior extremity broader than the other, somewhat narrowly rounded; posterior end narrow and compressed, obliquely truncate above, sub-angular below. Base semioval in outline, the most prominent part being in advance of the middle; cardinal edge very short, straight and horizontal, meeting the obliquely truncate posterior margin at an angle of about one hundred and thirty degrees. Beaks located slightly in advance of the middle, elevated, and incurved at right angles to the hinge, rather distinctly angular down the posterior slopes and obliquely towards the lower part of the posterior extremity. Surface unknown. Length 0.65 inch; height 0.45 inch; transverse diameter of the two valves 0.20 inch.

This species appears to be about intermediate between *Schizodus truncatus*, King, and *S. rotundatus*, Brown, as represented by figures 27 and 30, plate xv., King's Permian fossils of England. From *S. rotundatus*, it differs in being more elongate, less broadly rounded in front, and much more obliquely truncate posteriorly; the hinge line is also shorter and more nearly horizontal. It differs from *S. truncatus* in the more nearly central position of the beaks, much shorter and less sloping cardinal edge; while its anterior extremity is more narrowly rounded.

Locality and position.—Cottonwood Creek, K. T., high up in Upper Coal Measures.

[Dec.

ALLORISMA ? ALTIROSTRATA, n. sp.

Shell oblong oval, very gibbous in the umbonal region; beaks much elevated above the cardinal edge, incurved, and located over the anterior end. Posterior extremity more compressed, but apparently more or less gaping, rounded in outline, anterior end vertically subtruncate, somewhat gaping; base nearly straight, or a little concave near the middle, rounding up towards the extremities. Cardinal border rather short, straight and inflected so as to form a moderately distinct, impressed area for the reception of the ligament. Surface of cast marked by concentric undulations, which are narrower, more regular, and distinct on the umbones and over their slopes, than towards the base and extremities. From the anterior side of the beaks, there is on each valve, an obscure sulcus descending obliquely and widening towards the middle of the base. Length 3.06 inch; height from the base to dorsal margin 1.63 inch; do. to highest part of beaks 1.74 inch; greatest transverse diameter.

Having only seen an internal cast of this shell, showing neither the muscular nor pallial impressions, and giving no clue to the character of the hinge, there must remain some uncertainty respecting its generic relations. Its most marked peculiarity is the unusual elevation of the beaks, which gives it much the form of some of the Jurassic *Pholadomyas*. We know of no other shell from the whole Carboniferous System with which it can be confounded.

Locality and position.—Grasshopper Creek, K. T., Upper Coal Measures.

ALLORISMA SUBCUNEATA, n. sp.

Shell large, clavate, cuneate, gibbous in the anterior and umbonal regions, contracted and compressed posteriorly. Beaks depressed, incurved and removed about one eighth the length of the shell from its anterior extremity. Posterior end narrowly rounded, and apparently gaping a little; buccal end obliquely truncate above, rather narrowly rounded, and somewhat gaping below. Base nearly straight along the middle, curving up very gradually behind, and abruptly in front; dorsal outline sloping slightly from the beaks towards the anal extremity. Surface of cast marked by more or less regular concentric undulations; hinge long and straight; lunule oval, not very well defined; ligament area long and narrow, bounded on either side by a narrow obscure ridge, on the outside of which there is a long, parallel, shallow undefined sulcus. Anterior muscular impression lunate, the upper extremity curved back over itself so as to give the whole somewhat the form of the letter G; posterior muscular impression, large, oval, ovate, or rhomboidal, located about one third the length of the shell from the posterior end; pallial impression faint, having a deep angular sinus. Length 5.10 inch; height 2.25 inch; greatest thickness near the anterior end 1.70 inch.

This species is very similar to *Sanguinolites clava* of McCoy, but its ventral margin is straighter, its beaks rather more depressed, and its anterior border more narrowly rounded below the beaks. The lunette on the anterior side of the beaks, in our shell, appears to be less distinctly defined than is represented in Prof. McCoy's figure, while the anterior muscular impression in *S. clava* appears to be orbicular instead of lunate as in our shell.

Locality and position.—Leavenworth City, in upper coal measures.

ALLORISMA ? LEAVENWORTHENSIS, n. sp.

Shell very thin, oblong, subcylindrical behind, more compressed anteriorly; posterior end broad, rather obliquely truncate, very widely gaping, or even dilated at the margins; buccal end narrowly rounded and nearly closed. Base almost straight, or but slightly convex, rounding up gradually in front and much more abruptly unto the truncate posterior border. Dorsal outline concave from the beaks to its elevated posterior extremity. Beaks moderately elevated, slightly flattened; more or less angular behind, incurved, and located about half way between the middle and the anterior end. Surface marked by obscure concen-
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tric undulations, which curve abruptly upwards parallel to the truncate anal margin; these undulations are crossed by radiating rows of very small granules, only visible by the aid of a lens.

The anterior muscular impression is oval, arcuate, and surmounted by a small accessory impression nearly detached from it. The posterior muscular impression is broad oval, not very deep, and placed close up under the posterior extremity of the dorsal edge; from this impression, the pallial line descends, with a broad gently concave curve, so as to form a broad very shallow sinus.

Length 2.85 inches; height from ventral margin to middle of dorsal edge 1.36 inch; do. from ventral margin to a line drawn from summit of beaks to the elevated posterior extremity 1.50 inch; greatest transverse diameter (near the centre) 1.11 inch; breadth of posterior hiatus 1.07 inch, height do 1.44 inch.

Locality and position.—Leavenworth City, Kansas Territory, Coal measures.

ALLORISMA? COOPERI.

Panopæa Cooperi, Meek and Hayden. Trans. Albany Inst. vol. iv. p. 11. March 2d, 1858.

This species bears such a striking similarity, in form and general appearance, to some of the Jurassic and Cretaceous *Panopæas*, that we were at first lead to refer it to that genus, supposing as we then did, that it was a Permian species. Since that time we have collected specimens of it in Kansas, showing that the hinge is edentulous, consequently it cannot be a *Panopæa*; we therefore now refer it provisionally to the genera *Allorisma*, King, to which it appears most nearly related, though we are not quite sure it is a true *Allorisma*.

We found it ranging through a considerable thickness of the upper coal measures, but we do not think it ranges quite up into the Permian.

Locality and position.—Near Helena, Kansas Territory, Upper Coal Measures.

PLEUROTOMARIA SUBTURBINATA, n. sp.

Shell rather thick, obliquely conical; spire moderately elevated, pointed at the apex; volutions six to six and a half, convex and angular in the middle, obliquely concave above, and having around the middle of the last one, just below the angle, a rather narrow revolving shallow sulcus. Umbilical region not much depressed, but perforated by a very small pit; aperture suborbicular. Surface ornamented by small revolving lines, only preserved on the under and outer sides of the body whorl in our specimen, which is somewhat worn, and shows no lines of growth. The angle on the middle of the whorls appears to be double, or composed of two closely set parallel lines; suture linear but distinct.

Length 0.36 inch; breadth 0.29 inch; spiral angle regular, divergence 69°.

Locality and position.—Same as last.

PLEUROTOMARIA HUMEROSA, n. sp.

Shell ovate turbinate; spire turreted, moderately elevated and pointed at the apex. Volutions five to five and a half, very convex, more or less obliquely flattened or a little concave above, rounded below, and distinctly angular at the outer margin of the upper flattened side. Suture distinct; umbilical region slightly depressed, and having a very small perforation. Surface ornamented by about ten rather strong revolving lines, only four of which are visible on the turns of the spire, below the angle; on the obliquely flattened space above, there are usually six or seven revolving striæ, which are not more than half as large as those below the angle. Aperture suborbicular. No lines of growth are visible on our specimens, which are somewhat worn.

Length 0.62 inch; breadth 0.50 inch, spiral angle about 62°.

Locality and position.—Grasshopper creek, K. T., Coal Measures.

[Dec.

The following are the descriptions by Prof. HEER of the fossil plants from No. 1 of the Nebraska section, referred to on page 257.

1. *Liriodendron Meekii*, Mihi.

L. foliis trilobatis, lobo medio apice rotundato, late emarginato, basi angustato, lobis lateralibus obtusis.

Differt a *L. Procaccinii*, Unger, et a *L. tulipifera*, L., lobis rotundatis et lobo medio basi angustato.

This leaf is furnished with a slender petiole, towards which it gradually diminishes; the midrib extends to the apex; towards the middle of the lobes on each side proceeds a secondary nerve, which also sends out on both sides tertiary nerves at rather acute angles. Further down on each side (near the base) is another secondary nerve, which inosculates with the former. This is a mode of structure which characterizes *Liriodendron*; further up there arises very delicate secondary nerves, which likewise branch off from the petiole.

2. *Sapotacites Haydenii*, Mihi.

S. foliis obcordato-ellipticis, basi sensim attenuatis integerrimis penninervis, nervis secundariis numerosis, ramosis angulo-acuto egradientibus.

Affinis *S. minusops*, Heer. Flora Tert. Helv. I. Taf. ciii. f. 4.

The leaf gradually diminishes toward the base, rounded toward the apex, rather deeply emarginate, margins entire. From the midrib which gradually becomes slender and dies out, proceed at acute angles very numerous secondary nerves which have the peculiarity of ramifying very much.

3. *Laurus primigenia*, Unger. Taf. 13, fig. 1? *of leaf work?*

Heer, Flora tertiar Helvet. Taf. lxxxvi. fig. 1.

The form and nervation agree as far as the leaf has been preserved, with the preceding species, only the leaf is diminished in a somewhat less degree toward the petiole, and prolonged toward the apex as in Unger.

It looks quite similar to the leaves of *Laurus primigenia*, which I have received from Corfe, in the Isle of Wight.

Dunker (Paleontographica, iv. Taf. 34, f. 2,) has figured a similar leaf as *Salicites Hartigi*, from the chalk of Blankenburg. But in this, along with stouter secondary nerves, there are always several more delicate ones.

4. *Leguminosites Marcouanus*, Mihi.

L. foliis magnis, obovalibus, apice obtusis, emarginatis nervis secundariis sparsis; basilaribus approximatis.

The leaflet is very large, but caesalpinia-like, at the base somewhat unequal, obtusely rounded. It is also rounded at the apex and deeply emarginate. The midrib dies out toward the apex; secondary nerves very sparse and delicate, one on each side near the base, the next following ones distant and much curved.

In its form it reminds one strongly of *Caesalpinia Falconeri*, but is much larger. It would, however, be important to know whether the leaf is leather-like or thin skinned. If the latter is the case, the leaf probably belongs to *Caesalpinia*, but if it is leather-like, the *Dalbergia* are to be compared, as among them similarly shaped leaves are found.

5. *Populus leuce*, Unger. Taf. 15, fig. 6?

Phyllites leuce, Rossmassler, Blatter Von Altsaltel, Taf. 3, fig. 12?

Unfortunately this leaf is not preserved entire, and the margin is no where complete. So far, however, as the form can be determined, it agrees with *Populus leuce*, as also in the nervation. Thus we have a stout midrib, and from this mid rib above the base of the leaf proceeds on either side stout secondary nerves, which then send off outwardly two or three rather stout tertiary nerves, which are curved toward the apex. Besides these, springs forth on each side below them, but almost at the same spot, a delicate secondary nerve which does not ramify any further, but dies out near the margin. At about the middle of the height of the leaf, there springs from the midrib on each 1858.]

side, another secondary nerve, which runs nearly parallel with the basal one, and further above are two other similar ones. The nervules are curved, some remaining single, others forked. In all these points the Nebraska leaf agrees with *Populus leuce*, but for a positive determination we must wait for leaves whose margins have been preserved.

A similar leaf from the Isle of Wight has been figured by Prestwich (on the structure of the strata between the London clays, &c., Quart. Jour. x. pl. iv. fig. 1, 2), but in this (of which I have specimens before me) the lower basal nerves are much stouter, and the two upper ones are curved much more toward the apex, while the midrib cannot send forth any more such stout secondary nerves farther up.

At first sight the leaf also appears similar to *Credneria integerrima* Zenker, Paleontographica, but in this leaf the midrib is much stouter, and the side nerves are more bent and curved towards the apex, otherwise the nervules are of similar structures.

6. *Populus cyclophylla*, Mihi.

P. foliis orbiculatis, basi attenuatis, triplinervis, integerrimis.

Similar to the preceding, and may perhaps belong to that species as a younger leaf, yet the base of the leaf is attenuated toward the petiole, and there are at the base of the leaf only three nerves. On the supposition that the former leaf is *Populus leuce* it is assumed that it is rounded at the base, but should more perfectly preserved specimens show that, like the small one, it is diminished at the base into the petiole, it would form a species different from *Populus leuce*, as in this latter species the leaves are rounded at the base, and moreover possess some obtuse teeth on the margin.

7. *Phyllites obtusi-lobatus*, Mihi.

Folium trilobatum, lobis integerrimis, obtusiusculis.

Perhaps belonging to *Liriodendron Meekii*, but Liquidambar and Acer are also to be taken into consideration. It is, however, too imperfectly preserved to be determined with certainty. It seems to have three lobes with entire margins.

8. *Phyllites obcordatus*, Mihi.

Folium obcordatum, basi angustatum, integerrimum, nervo-primario pecto, nervis secundariis angulo acuto, egredientibus, debilibus, subramosis.

Valde affinis Ph. clusiodes, Rossmassler, Beitrage 33, Taf. 6, fig. 24, et non nisi nervis secundariis fortioribus et ramulosis distinguendum.

The Corresponding Secretary read his report for the last two months.

The following reports from the Recording Secretary, the Librarian and the Curators were read:

REPORT OF THE RECORDING SECRETARY FOR 1858.

During the past year, Dec. 1, 1857, to November 30, 1858, there have been elected sixty-nine members and eight correspondents.

Of these thirteen members were not residents of the city at the time of their election.

Two members have resigned.

Three have forfeited their membership.

Seven have died, to wit: Mr. Charles McEuen, Mr. W. Frederick Rogers, Professor John K. Mitchell, M. D., Professor Robert Hare, M. D., the Hon. Job R. Tyson, Edward Minturn, M. D., and Gavin Watson, M. D.

The deaths of the following correspondents have been announced: Mr. George R. Gliddon, Mr. John A. Vancleve.

The following Papers have been read before the Academy, and ordered to be published in the Proceedings or Journal.

By Spencer F. Baird, "Description of a new Phyllistome Bat from California."

By W. G. Binney, two, to wit: "Notes on American Land Shells, No. 3 and No. 4."

[Dec.