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Meeting for Business, and Annual Meeting, December 26, 1843: Descriptions of Nineteen Species of Tertiary Fossils of Virginia and North Carolina; Observations on the Lead Bearing Limestone of Wisconsin, and Descriptions of a New Genus of Trilobites and Fifteen New Silurian Fossils

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## MEETING FOR BUSINESS, AND ANNUAL MEETING,

DECEMBER 26, 1843.

VICE PRESIDENT MORTON in the Chair.

The Committee, to whom was referred Mr. Conrad's paper, read November 21st, and the additions thereto read December 19th, reported in favour of publication.

*Descriptions of nineteen species of Tertiary fossils of Virginia and North Carolina.*

By T. A. CONRAD.

## ANOMIA.

*ANOMIA Ruffini.* Subovate or suborbicular, irregular; larger valve with concentric laminae, sometimes obsolete, often closely arranged towards the base, plicated on the margin; disk with numerous irregular interrupted radiating furrows and lines; hinge area wide; muscular impression very large, ovate-elongated. Height of the largest specimen, two and a half inches.

*Locality.* Pamunkey river, Kent county, Virginia.

This fine large species was found by Edmund Ruffin, Esq., and I take pleasure in dedicating it to a gentleman distinguished for his science, and his successful and enlightened efforts to improve the agriculture of his country.

## ARCA.

*ARCA propatula.* Rhomboidal, thick and ponderous; posterior side produced; sides flattened, slightly concave towards the base; umbonial slope rounded, rather elevated; ribs about thirty-two, square, not profoundly prominent, about equal in width to the interstices, which have transverse imbricated lines; ribs largest about the umbonial slope, very distinct on the posterior slope, which is concave towards the hinge line; posterior margin oblique, concave, extremity widely rounded; summit of umbo moderately elevated, slightly retuse; cardinal area wide, with diverging grooves; series of teeth slightly sinuous anteriorly; teeth numerous; at the posterior extremity, the series suddenly becomes dilated, and the teeth interrupted or tubercular; inner margin crenate, crenae profound, and remote posteriorly. Length, four inches; height, rather more than one and one-third inches.

*Locality.* James river, below City Point. Petersburg, Mr. Tuomey; Ware river, Gloucester county, Virginia, Mr. Ruffin.

Perhaps this may prove to be an old specimen of *A. arata*, Say.

*Arca scalaris*. Obliquely rhomboidal, elevated, ventricose, ribs about twenty-three, broad, square, prominent, profoundly and robustly crenate, wider than the interstices, seven on the posterior slope, prominent; posterior slope flattened; umbonial slope angulated; summit elevated, narrowed; anterior margin obliquely truncated; anterior basal margin obliquely subtruncated; posterior extremity subangulated; beaks remote; area with transverse slightly impressed lines; cardinal teeth irregular, oblique towards the extremities of the hinge line; within with furrows corresponding to the ribs; margin profoundly crenate. Length, two inches; height, one and a half inches.

*Locality*. Petersburg, Virginia. Mr. Tuomey.

Allied to *A. incongrua*, Say. The description applies to the left valve only, as the opposite one has not yet been found.

#### CYRENA.

*CYRENA densata*. Subtriangular, thick, convex, with robust lines of growth; anterior margin obtusely rounded; basal margin profoundly and regularly curved to the posterior extremity, which is subtruncated, direct, and greatly above the line of the base; beaks central, summits elevated; teeth large, robust, very prominent, three in one valve, and two in the opposite; middle tooth of the right valve bifid; lateral teeth elongated, robust, anterior tooth truncated, suddenly deflected at the extremity; posterior tooth distant. Length, one and a half inches; height, one inch and seven-eighths.

*Locality*. Vicinity of Petersburg, Virginia. Mr. Tuomey. Rare.

#### MACTRA.

*MACTRA triquetra*. Triangular, thick, ventricose; anterior margin obtusely rounded; posterior margin obliquely truncated; extremity angular; anterior and basal margins regularly curved; posterior basal margin obliquely truncated, and the disk slightly flattened above; umbonial slope forming a right angle with the posterior depression; beaks slightly remote, central, summits profoundly elevated; lateral teeth robust; fosset small, ovate. Length, one and a quarter inches; height one inch.

*Locality*. Vicinity of Petersburg, Virginia.

I found a single perfect valve of this species, which is much larger and proportionally shorter than *M. congesta*, and differs especially in the beaks being distant from the hinge margin.

#### VENUS.

1. *VENUS capax*. Cordate, suborbicular, ventricose, with concentric lamelliform prominent lines; posterior margin curved, extremity truncated, direct, and remote from the line of the base; basal margin profoundly curved; lunule dilated, cordate, defined by a groove, and not distinctly impressed; inner margin finely crenulated.

*Locality*. Pamunkey river, Kent county, Virginia. Mr. Tuomey.

This shell is of a more rotund, tumid form than any of the species allied to *V. mercenaria*, and much more capacious; the lunule is shorter and wider.

2. *VENUS permagna*. Subtriangular, cordate, profoundly ventricose, thick and ponderous, with coarse concentric recurved rib-like lines, elevated, closely

arranged, and lamelliform on the sides; lunule cordate, elongated, defined by a deeply impressed line; posterior side subcuneiform, extremity obtusely rounded or subtruncated; cardinal plate broad: muscular impressions large; margin strongly crenulated. Length, seven inches.

*V. permagna*, Foss. of Tert. Formations, p. 9.

*Locality.* Neuse river, below Newbern, North Carolina. Miocene?

This is perhaps the largest *Venus* known: it is remarkably rough and ponderous. In outline it approaches *V. Rileyi*, but it is greatly more ponderous and ventricose. The usual size is about four and a half inches in length.

#### ARTEMIS.

*ARTEMIS elegans.* Lentiform, regularly convex, with strongly marked rather distant impressed concentric lines; on the posterior side these are closely arranged and profound, forming prominent recurved lines, which become acute or lamelliform towards the posterior margin; posterior hinge margin elongated, slightly convex, oblique; lunule cordate, deeply impressed. Height, two and a half inches; length, two inches and seven-eighths.

*A. elegans.* Fossils of Tertiary Formations, p. 30.

*Locality.* Neuse river, below Newbern, North Carolina. Miocene.

This beautiful shell is allied to *A. concentrica*, but is readily distinguished by its stronger remoter stria, by its convexity of disk, and its more robust anterior cardinal teeth; the posterior teeth are less oblique, forming a wider space between them and the anterior teeth. The posterior hinge margin is not so elongated, in proportion, as in the *concentrica*.

I found this and the kindred species recent on Mullet Key, at the entrance of Tampa Bay, and, fortunately, specimens of the young of both, which show a marked difference in specific character.

#### LORIPES.

*LORIPES elevata.* Suborbicular, elevated, thin, ventricose, smooth, not oblique; beaks medial; hinge margins very oblique; posterior margin truncated, direct, very regularly rounded towards the base; anterior basal margin obliquely truncated; cardinal plate thin, arched, with an elongated channel anteriorly; cardinal teeth profoundly diverging. Length, nine-sixteenths of an inch; height, the same.

*Locality.* Neuse river, below Newbern, North Carolina. Miocene?

Proportionally more elevated than *LORIPES americana* (*Mysia*), thinner, not oblique like that species, and very distinct.

#### SOLEN.

1. *SOLEN directus.* Linear, straight, except towards the summit, where it is slightly recurved, gradually widening from the hinge downwards; basal margin rounded slightly towards the posterior extremity; anterior margin obliquely truncated, not reflected; cardinal teeth, one in the right valve, compressed, in the opposite valve, two, the superior one very small and near the extremity, the other somewhat distant, elevated, robust, slightly recurved. Length, four inches.

*Locality.* Neuse river, below Newbern, North Carolina. Miocene?

I am doubtful of the geological age of the three fossils above described, as we know not the group among which they occur.

2. *SOLEN ensiformis*. Linear, slightly curved, gradually narrowed from the middle to the posterior extremity, which is subcuneiform; anterior margin obliquely subtruncated. Length, three inches.

*Locality*. St. Mary's river, Maryland. Miocene.

#### TURRITELLA.

*TURRITELLA bipertita*. Turrited, thick; suture profoundly excavated; whorls flattened, divided nearly in the middle by a deeply impressed revolving line, margined on each side by a fine impressed line; inferior volutions carinated at base; lines of growth oblique, meeting at an angle at the groove in the middle of each volution. Length, ———; width, seven-eighths of an inch.

*Locality*. Vicinity of Petersburg, Virginia. Mr. Tuomey.

This large species is very distinct from all others, and remarkable for the profound channel between the whorls.

#### SCALARIA.

*SCALARIA procera*. Subulate, turrited, volutions scalariform, contracted inferiorly, with obsolete revolving impressed lines: ribs thick, elevated, reflected, distant, with sharp triangular reflected aculei on the shoulder of each volution; base with a revolving interrupted carina; aperture longitudinally obtusely oval. Length, ———; width of body whorl, nearly half an inch; three volutions from the base measure one inch.

*Locality*. Vicinity of Petersburg. Mr. Tuomey.

#### PLEUROTOMA.

*PLEUROTOMA multisecta*. Turrited, with closely arranged deeply impressed revolving lines, and longitudinal robust prominent ribs; superior portion of each whorl destitute of ribs, with minute revolving lines, and a sharp revolving slightly undulating carina margining the suture; aperture elliptical, rather more than one-third the length of the shell. Length, one and one-eighth of an inch; greatest width, three-eighths of an inch.

*Locality*. Vicinity of Petersburg. Mr. Tuomey.

#### BUCCINUM.

*BUCCINUM harpuloides*. Ovate, ventricose, with alternated revolving raised lines, and longitudinal slightly oblique rather distant narrow elevated ribs: spire scalariform, volutions five; base of the shell with an acute oblique carina; aperture half the length of the shell; columella profoundly concave, with a prominent fold or carina on the angle formed by the obliquely truncated base; a slight protuberance near the superior extremity of the aperture; margin of labrum nearly straight, suddenly rounded inferiorly. Length, one inch; width, five-eighths of an inch.

#### FUSUS?

*FUSUS? cannabinus*. Fusiform; whorls six or seven, with longitudinal rounded costæ, and revolving prominent alternated lines finely wrinkled transversely; spire somewhat scalariform, elevated; suture undulated; body whorl

abruptly rounded at base ; beak short, subperforate, tortuous ; aperture with the channel rather less than half the length of the shell ; labrum with eight short dentiform prominent striæ within. Length, one inch and a quarter.

*Locality.* Petersburg, Virginia. Mr. Tuomey.

Closely resembles *Fusus cinereus*, Say, but the whorls are more scalariform, and the body whorl much shorter and more abrupt at base ; the beak narrower and more tortuous.

#### TEREBRA.

*TEREBRA curvilirata.* Subulate, whorls with a revolving impressed line below and near the suture ; beneath this line the whorls are convex ; ribs longitudinal, curved, acute, dislocated by the impressed line ; revolving lines minute, crowded, obsolete ; columella sinuous. Length, one and a quarter inches.

*Locality.* St. Mary's river, Maryland.

Differs from *CERITHIUM dislocatum*, Say, in wanting the distinct revolving lines, and the small dislocated portion of the ribs are not of a tubercular form ; the aperture is longer and narrower.

#### POLYPARIA.

##### TURBINOLIA.

*TURBINOLIA pileolus.* Obtusely obconical, slightly compressed, periphery with an oval outline ; lamellæ smooth, of equal thickness, united to an elliptical centre ; between each plate is one, sometimes two, short irregular lamellæ, either free or united to the base of the larger rays. Length, nearly half inch, diameter, half inch.

*Locality.* Pamunkey River, Kent Co., Virg. Mr. Tuomey.

#### ECHINODERMATA.

##### SPATANGUS.

*SPATANGUS orthonotus.* Ovate, convex-depressed ; truncated at each end, more elevated anteriorly than posteriorly ; dorsal line of the suture a little elevated, and curved gradually to the mouth on the anterior half ; on the posterior, straight to the margin and parallel to the base ; canal very wide and slightly impressed on the back, margined by an obtuse carinated line and slight furrow ; on the periphery the canal is deep and angular ; ambulacra rapidly expanding from the extremities towards the dorsal suture ; pores disunited ; in the middle of the back a slight furrow crosses obliquely each of the anterior ambulacra at its termination ; base plano-convex ; anus large and remote from the margin ; granulations on the back minute and very closely arranged, in the canal much larger and unequal in size ; base with large tubercles, becoming gradually smaller and more closely arranged towards the margins. Length, two inches and three-eighths ; diameter, two inches and an eighth ; height, one inch and an eighth.

*Locality.* Near Coggins' Point, James River, Virginia. Mr. Tuomey.

## OBSERVATIONS.

In 328 species of organic remains already described, independent of minute and uncertain forms, 43 have been found in a recent state; and when to these are added numerous very small shells which are found in every careful examination of marl from the various localities, the percentage of recent species may be pretty accurately estimated at about 11 or 12 per cent. This result I have obtained by a careful exploration of the fossiliferous beds, and two visits to the shores of Florida and Alabama to procure recent forms for comparison with those of the Miocene strata. The last trip furnished three recent shells before known only in the fossil state.

Several species described in the preceding pages I obtained during a recent excursion to Petersburg, Virginia, at the kind invitation of Mr. Tuomey. In the course of a few hours examination of the marl in the vicinity in three or four days, I collected about 100 distinct species. This locality is peculiarly interesting, being the western limit of the Miocene, having a considerable elevation above tide, and based on granite, it is the spot in which to search for the estuary and fresh water shells of the Miocene period. Mr. Tuomey has already found an extinct *Cyrena*, and a univalve not very unlike\* *Palundina subpurpurea*, (Say,) whilst I discovered a species of *Cerithium*, identical with a shell which I found last spring inhabiting oyster beds in the Manatee river, near its junction with Tampa Bay. It is about the size and nearly resembles *C. trilineatum*, figured in Kiener's work.

The elevation of the Petersburg Miocene is considerably more than 100 feet above tide, and as the rise decreases towards the sea, it is probable that the primary rocks continued to be uplifted even after the era of the Miocene; indeed how can we otherwise account for the elevation of fossiliferous beds, even of those of the Post-Pliocene period?

It is an interesting fact that the Miocene estuaries were inhabited by two species of bivalves, now extinct, of the same two genera which still occur in similar situations in Florida and Alabama, that is at the confluence of rivers and bays, where the water is nearly fresh. These genera are *Gnathodon* and *Cyrena*, both of the family CYRENADÆ. The extinct *Gnathodon* has a considerable resemblance to the recent species, but the *Cyrena* is widely different from the living shell. These fossils are frequently water-worn, always with disunited valves, and appear to have been transported. Occasionally a specimen occurs not in the least abraded, a circumstance which indicates the vicinity of the Petersburg deposits to the mouth of a river. The strata occur in a meadow, and consist of blue marl of a sandy texture, often intermixed with small gravel, and of ferruginous sand, full of shells; there is here also a proportion of gravel, of rounded quartz, occasionally of large size. Water-worn fragments of bivalves are abundantly intermingled with entire shells, and many species occur with connected valves. This is particularly the case with the burrowing shells, as *Panopæa*, but also, though less frequently, with the large *Venus tridacnoides*, *Crassatella undulata*, *Astarte concentrica*, *Cytherea albaria*, two species of *Chama*, and even two species of *Ostrea* are not uncommon; but there is nothing like an oyster bed in these strata which might indicate shoal water. The

\* *P. glaber*, (*Terbo glaber*, Lea.)

proportion of oysters to the other bivalves is about the same which the dredge furnished at the mouth of Cape Fear river, N. C. at the depth of 8 fathoms.

With the many interesting bivalves of Petersburg I found a valve of the beautiful

*PHOLADOMYA abrupta.*

which Deshayes has referred to *Panopæa*. I carefully removed the marl from the hinge, in order to ascertain if there was an erect curved tooth as in *Panopæa*, but the hinge proved to be destitute of any kind of tooth or process, and closely resembles that of the recent *Pholadomya*. Two characters, therefore, remove this shell from the genus *Panopæa*; the pearliness of the substance and the absence of a cardinal tooth. A true *panopæa* is never pearly, any more than a *Unio* is ever otherwise.

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*Observations on the Lead Bearing Limestone of Wisconsin, and descriptions of a new genus of Trilobites and fifteen new Silurian fossils.*

By T. A. CONRAD.

As the galeniferous limestone of Wisconsin and Galena has attracted the attention of our most distinguished Geologists, who have endeavored to assign its relative position in the scale of formations, I hope it may not be deemed presumptuous if I endeavor to assist in settling a question of so much importance. The difficulty has hitherto arisen from the scarcity and obscurity of characteristic fossils, which is now in a great measure removed. Some years since I had the pleasure of examining a series of organic remains collected by Richard C. Taylor, Esq. at the lead mines in Wisconsin, and then distinctly recognized the species which belong to the Trenton limestone of New York, a rock which, in my first report on the Geology of New York, I showed to be an independent formation, and entirely distinct from any above or below it. Since then I have proved its occurrence at Cincinnati, in Ohio, and at Carlisle and Bedford Springs, Pennsylvania. In these remote localities the fossils are generally the same species, and the group a unity which admits not of doubt or ambiguity.

The specimens found by Mr. R. C. Taylor are chiefly from the limestone below the lead, and consist of *BELLEROPHON bilobatus*, (Sowerby.)

There are also specimens of fossiliferous limestone from Cassville, Wisconsin, of the same age, containing a Trenton limestone species of *Orthis*, like *C. callactis*, a *Naculite*, occurring also near Middleville, N. Y., *BELLEROPHON bilobatus*, a *Strophomena* like *ORTHIS alternata*, Sowerby, a common shell in the New York Trenton limestone, and an *Orthis* resembling *O. testudinaria*, still more abundant in the same rock.

In the same collection are carboniferous fossils, in limestone and in chert, from St. Genevieve, Missouri. The species consist of a large *BELLEROPHON*, three species of *PRODUCTUS* and one of *Atrypa*, all of which are found only in the carboniferous or mountain limestone.

I am indebted to the liberality of Mr. Stephen Taylor, who has recently returned to this city from Mineral Point, Wisconsin Territory, for an opportunity



to investigate some organic remains of more than ordinary interest, which that gentleman procured at the lead mines. Accompanying these are specimens of fossiliferous limestone, shells, and fragments of *Trilobites* in beautiful relief upon the surface, and so familiar and characteristic, that at the first glance I recognized the Trenton limestone of New York. The most prominent of these fossils consist of the *trilobites*, *CERATURUS pleurexanthemus*, *ISOTELUS gigas*, and *ILLENUS* ———; and of the shells, *STROPHOMENA sericea*, *PHRAGMOLITES compressus*, and *BELLEROPHON bilobatus*. With these are a large *Cytherina*, known also to occur in the Trenton limestone of New York: the *TEREBRATULA (Atrypa) Schlottheimii* of Von Buch, and some beautiful new species of bivalves. The limestone is very compact, replete with shells and favosites, of a light color, inclining to drab, and it immediately underlies the rock in which the galena occurs, as Mr. Taylor informs me. Many of the fossils are loose and exceedingly well preserved, having apparently come from a soft limestone shale.

In examining, a few years since, some specimens of limestone brought from Galena, by the late lamented Nicollet, and which he informed me, was the rock immediately below the lead-bearing strata, I recognized the group of fossils which characterize the Trenton limestone, but Mr. Nicollet was unable to procure any organic remains from the overlying rock, which might furnish a clue to its geological age. Mr. Taylor has fortunately obtained this desirable object, in Wisconsin, having discovered not only well preserved fossils, in the lead-bearing formation, but even shells and remains of crinoidea replaced by the sulphuret of lead. There is particularly the cast of a large *Turritella* composed entirely of this mineral, and a specimen of *PLEUROTOMARIA angulata*, which is a limestone cast, with the upper part of the spire of galena, and from fragments yet remaining between the cast and matrix, it is evident that the shell itself had been replaced by the sulphuret of lead. These two shells are not uncommon in the Trenton limestone of Lewis county, New York. The *Turritella* I have never known to occur in any other formation but the *Pleurotomaria* I found also in the Salmon river, or Pulaski shale, near Rome, Oneida county. Mr. Taylor has likewise a crinoidal column, almost wholly replaced by galena: it has distant very prominent rings or ridges, and is a species which has been observed in the Trenton limestone of New York.

From the evidence it is clear that the limestone of Galena, Illinois, and of Mineral Point, Wisconsin, in which the lead occurs, is certainly not of more recent date than the Pulaski and Lorraine shales of New York, and the caradoc sandstone of Great Britain: but I believe it will prove to be an upper member of the Trenton limestone formation.

Mr. Taylor has also a specimen of Trenton limestone, precisely similar to that of Galena and Mineral Point, which was found in Wisconsin, 40 miles N. E. of Galena.

There is a specimen of the sulphuret of lead, among the cubes of which is imbedded a single valve of *Strophomena*, very thin and silicified.

Mr. Taylor brought the *PENTAMERUS oblongus*, *CATENIPORA escharoides*, and *C. labyrinthica*, which were found together on one of the hillocks or "mounds," as they are termed in Wisconsin. These two fossils, when associ-

ated, characterize the upper part of the Caradoc sandstone, (Clinton group of New York.)

The lead-bearing rock is a buff colored granular limestone, and contains the following species of organic remains, all of which have been found in the Trenton limestone, except the two printed in italics :—

*Univalves.*

*Inachus pervetus*, Con.  
*Pleurotomaria angulata*, Sowerby.  
*Turritella* ———

*Bivalves.*

*Orthis testudinaria* ?  
*Delthyris* ———  
*Strophomena sericea*.

*Coral.*

*Cyathophyllum profundum*, Con.

There is also the post-abdomen of an undetermined trilobite and various forms of crinoideal vertebræ.

In the Trenton limestone of Mineral Point, the following species of organic remains were collected by Mr. Taylor :—

*Shells.*

*Cyrtoceras marginalis*, Con.  
*Orthoceras annellus*, Con.  
*Phragmolites compressus*, Con.  
*Turritella* ———  
*Pleurotomaria angulata*, Sowerby.  
*Bellerophon bilobatus*, Sow.  
*Euomphalus triliratus*, Con.  
*Inachus pervetus*, Con.  
*Subulites elongata*.  
*Delthyris* ———  
*Strophomena sericea*, Sow.  
 ——— *deflecta*, Con.  
 ——— *recta*, Con.  
*Orthis testudinaria* ?

*Shells.*

*Orthis disparilis*, Con.  
 ——— *perveta*, Con.  
 ——— *tricenaria*, Con.  
 ——— *bellarugosa*, Con.  
 ——— *subequata*, Con.  
*Atrypa* (Tereb.) *Schlottheimii*, (Von Buch.)  
*Nuculites*, 2 species.

*Crustacea.*

*Ceraurus pleurexanthemus*, Green.  
*Isotelus gigas*, Dekay.  
*Thaleops ovata*, Con.  
*Cytherina fabulites*, Con.

## THALEOPS.

Capite lunato, trilobato, oculis distantibus, eminentissimis, non reticulatis; trunco 10-articulato, valde trilobato; lateribus expansis, medio angulatis; costis integris; post-abdomine trilobato, minimo; costis nullis.

Ovate, profoundly trilobed, lateral lobes wider than the middle lobe; buckler lunate, with very remote oculine tubercles, not reticulated; abdomen with 10-articulations; ribs without grooves and not alternated in size; outer half of lateral lobes suddenly depressed; post-abdomen without ribs or grooves and profoundly trilobed.

This genus is remarkable for the great width of the buckler, and the very prominent laterally projecting smooth oculine tubercles. It differs from *Bumastus* in being profoundly lobed, and in having the side lobes as in *Asaphus* much

wider than the middle lobe. From *Illænus* it may be distinguished by its ovate form, want of reticulated eyes, the width of the lateral lobes, and the profound lobes of the tail.

The genus *Thaleops* characterises the Trenton limestone formation of the Lower Silurian group.

*Thaleops ovata*. Obtusely ovate, surface minutely punctate; head very wide, lunate, involuted; eyes very prominent, rounded, smooth, placed on a line with the angle in the middle of the side lobes; ribs flattened, smooth, without a border at the extremities where they are rounded and not expanded; post-abdomen with the middle lobe convex, rounded and well defined at the extremity; inferior margin obtusely rounded. Length two-thirds of an inch: width of buckler three-quarters of an inch.

*Locality*. Mineral Point, Wisconsin, (blue limestone quarry,) Mr. Taylor.

This rare trilobite may be studied as well in Mr. Brano's excellent model, as in the natural specimen. It is probably a rare fossil that few naturalists will be able to procure, and for this reason we would recommend the model to those who are desirous to have a knowledge of the genus.

Wherever many entire trilobites are found, a very quiescent state of the waters wherein the rock which contained them was deposited, may be inferred from the abundance of scattered bucklers and post-abdomens, which occur in other strata where there is no evidence of violence on any of the delicate shells accompanying them; the articulations of the abdomen were therefore held together by a frail ligament, whilst the post-abdomen although ribbed in many species, was in all composed of an inarticulated crust and thus is almost always preserved entire in the rock.

## CRUSTACEA.

### CYTHERINA.

*CYTHERINA fabulites*. Ovate, reniform, smooth, with a slightly concave or truncated cardinal margin, the extremities of which are angulated; end margins rounded. Length, half an inch.

*Locality*. Mineral Point, Wisconsin, (Trenton limestone.)

## SHELLS.

### STROPHOMENA.

1. *STROPHOMENA deflecta*. Semi-oval; superior valve slightly concave, deflected at the angles, the other valve reflected; radii very closely arranged, prominent, subequal, minutely crenulated; inferior valve slightly depressed in the middle; cardinal area wide; superior margin of the concave valve rather elevated. Breadth, half an inch.

*Locality*. Ibid, (Trenton limestone.)

2. *STROPHOMENA recta*. Semi-oval, with angulated slightly prominent hinge extremities; radii strongly defined, numerous, minutely crenulated; superior valve flat, with a prominent umbo; inferior valve depressed, with a wide

mesial furrow: cardinal area of the valves equal. Breadth, rather more than half an inch.

*Locality.* Ibid, (Trenton limestone.)

Resembles the preceding, but differs in the equal hinge areas, in being much more compressed, in having a proportionally longer hinge line, with more angulated extremities, &c.

#### ORTHIS.

1. *O. disparitis*. Semi-circular, with about twenty-eight prominent rounded regular ribs; larger valve rather prominent in the middle; the sloping sides flattened; middle rib bifid; lesser valve slightly concave, somewhat depressed or furrowed in the middle, the termination slightly contracting the base; lateral margins regularly rounded inwards from the angular extremities of the hinge; cardinal area wide. Length, one-fourth of an inch; breadth, one-third of an inch.

*Locality.* Ibid, (Trenton limestone.)

2. *O. perveta*. Transversely oval, wider than the length of the hinge line; valves slightly ventricose, subequal, with numerous prominent radiating rounded striæ, bifurcated on the umbo; larger valve ventricose in the middle, with a slight central depression; sides somewhat depressed; the opposite valve flattened towards the base, and depressed to correspond with the elevation of the other valve, forming a sinuous margin when viewed in profile; base truncated; superior lateral margin obliquely truncated, rounded inferiorly. Length, one-third of an inch; breadth, nearly half an inch.

*Locality.* Ibid, (Trenton limestone.)

3. *O. tricenaria*. Semi-oval, with about thirty prominent very regular rounded ribs; larger valve ventricose; summit elevated; the dorsal margins subrectilinear, very oblique; lesser valve flat or slightly concave in the middle; cardinal area very wide; apex of the larger valve profoundly elevated above that of the opposite valve. Length, three-fourths of an inch.

*Locality.* Ibid, (Trenton limestone,) Lower Silurian.

4. *O. bellarugosa*. Semi-oval; valves nearly equally convex; lesser valve with a mesial subangular furrow; ribs prominent, linear, with unequal bifurcations; disks with numerous concentric prominent subsquamose wrinkles; apex of larger valve not much elevated above that of the opposite valve; cardinal area rather wide. Length, less than half an inch.

*Locality.* Ibid, (Trenton limestone.)

5. *O. subequata*. Semi-oval; valves ventricose, subequal; lesser valve with a slight subangulated mesial furrow; larger valve prominent in the middle, with flattened sides; radiating striæ fine, closely arranged, unequal, rounded, cardinal area rather wide; apex of larger valve prominent, not profoundly elevated above the opposite beak; the dorsal margins concave. Length, half an inch.

*Locality.* Ibid, (Trenton limestone.)

#### EUOMPHALUS.

*E. triliratus*. Discoidal; volutions margined by a profound channel and a carinated line and with a wide concave furrow from this line to the carinated

periphery; margin truncated, direct, tricarinated; disk and base with sharp prominent transverse sinuous lines. Length, one-third of an inch.

*Locality.* Ibid, (Trenton limestone.)

#### CYRTOCERAS.

*C. marginalis.* Rapidly increasing in size from the apex; the portion without septa straight on the inner margin; septa closely arranged and slightly sinuous; siphuncle marginal. Length of fragment, four inches; greatest breadth, one and seven-eighths of an inch; at the smaller end, where it is broken off, half an inch.

*Locality.* Ibid, (Trenton limestone.)

This species does not appear to have been greatly involuted; about twenty-five septa remain. It is a cast in compact limestone.

#### ORTHOCERAS.

*O. annellus.* Elongated, tapering, with very prominent, not approximate, acute slightly sinuous transverse ribs, with very fine crowded profoundly wrinkled longitudinal lines; siphuncle submarginal. Length of fragment, one inch and a half; breadth, half an inch at the larger end; three-eighths of an inch at the opposite end.

*Locality.* Ibid, (Trenton limestone.)

#### INACHUS.

*I. pervetus.* Flattened above and sloping slightly inwards; periphery angulated; from the periphery to the base slightly convex and sloping inwards; base acutely rounded or subangulated. Breadth, one inch and one-third: greatest diameter, one-third of an inch.

*Locality.* Ibid, (Lead-bearing limestone.)

#### TURRITELLA.

*T. ———.* Turritted; whorls six or seven; profoundly convex; rapidly increasing in size from the apex. Length, three inches.

*Localities.* Mineral Point, Wisconsin, Lewis county, New York. (Trenton limestone.)

This species occurs in casts, and is the largest shell of a turritted form yet known in the Silurian system of this country.

#### CRINOIDEA.

##### PENTREMITES.

*P. truncata.* Subovate, or cylindrical; ambulacra narrow, convex, with distinct numerous rather fine transverse lines; scapula concave, with carinated margins; base truncated, sides slightly convex, the lower half nearly direct. Length, five-eighths of an inch; breadth, half an inch nearly.

*Locality.* Edwardsville, Madison county, Illinois.

This species differs from all others that are published in the truncated base, the points of the ambulacræ being on a line with the centre of the pelvis, independent of the elevation of the alimentary canal.

## POLYPARIA.

## CYATHOPHYLLUM.

*C. profundum.* Conoidal; base incurved, single, acutely pointed; longitudinal lines obsolete; interior profoundly excavated, with a thin erect margin; lamellæ rough, very prominent, alternated with a short intermediate finer one.

*Locality.* Mineral Point, Wisconsin, (Lead-bearing limestone.)

The Recording Secretary then read his Annual Report, which was ordered to be published in the Proceedings.

## REPORT

## OF THE

## RECORDING SECRETARY

*For the year 1843.*

In the Report, which a twelvemonth since, in accordance with the established rule of this Institution, it became my duty to present, it was the design throughout to place before you a candid statement, embracing every circumstance which it was believed would tend to give an encouraging view of its condition at that time, and of its future prospects.

A review of its proceedings for the present year will furnish conclusive evidence that we have continued reason to be gratified with its position and success.

At home and abroad, its members, correspondents, and friends have given ample proof of their zeal and interest in its welfare. The contributions to its Library and Collections have equalled those of former years; its usefulness has been thereby increased, and the field for investigation and the study of the Natural Sciences enlarged. In all the departments this has been the case, as the following summary will show:

In Geology and Mineralogy there have been received twenty-three donations from the following: Drs. Burrough; Morton; Elwyn; Blanding; Lafon; Goheen, of Liberia, Africa; D. D. Owen, of New Harmony, Indiana; Fussell, of Indiana; B. B. Brown, of St. Louis; Professors Forchey, of Natchez, and H. D. Rogers; and from Messrs. French and Demestre, of New Orleans; Codwise, of St. Croix; J. Cassin; S. B. Ashmead; W. S. Vaux; G. R. Gliddon; Marsh; Land; Lessig, and Stephen Taylor, Jr.

In Ornithology, eight donations, from Dr. G. Watson, and Messrs. J. Cassin; Baird, of Carlisle, Pennsylvania; J. G. Strain, U. S. N.; J. Dundas, and Miss Percival, of Philadelphia.

In Zoology, three donations, by Mr. Cassin, and Dr. Wm. Blanding.

In Entomology, ten donations, by Drs. Watson, Owen, and Blanding; and Messrs. Kilvington, Ashmead, Cassin, and Strain.

In Ichthyology, six donations, by Dr. J. Carson; and Messrs. Cassin, W. B. Maull, and Philip Lowry, Jr.

In Herpetology, seven donations, by Messrs. James Read; W. S. Vaux; J. G. Strain; B. M. Norman, of New Orleans; and Drs. Goheen; C. W. Pennock; and P. B. Goddard.

In Helminthology, one donation, by Mr. William G. Burke.

In Conchology, seven donations, by Messrs. J. G. Anthony, of Cincinnati; C. M. Wheatley, of New York; Dr. J. C. Jay, of do.; Professor Forchey; Mr. Thomas Beasley, of New Jersey; and Messrs. Ashmead and Cassin.

In Osteology, two donations, by the Messrs. Baird, of Carlisle, and Dr. Goheen.

In Botany, five donations, by Messrs. J. N. Nicollet; P. A. Browne; Mr. Codwise, of St. Croix; Mrs. Wm. S. Biddle, of Philadelphia, and Dr. Goheen.

The most interesting and valuable accession to the Museum during the year has been that of an articulated skeleton of an adult male Chimpanzee, *Troglodytes niger*, Geoff., received from Dr. S. M. E. Goheen, of Liberia, Africa, and one of the Correspondents of this Institution. The skeleton is deficient only in the sternum, the two patellæ, and some of the smaller phalanges of the feet and hands. For these, similar bones of a young human subject have been substituted, so that the specimen appears perfect.

I have the satisfaction to state that during the last season the interest in the Entomological department has been revived, and that to several sources, but especially to our fellow members, the Messrs. Ashmead, Mr. Kilvington and Dr. Watson, is the Academy indebted for a considerable accession of native insects. For a long period, little or no effort has been made in this department. The valuable collection presented to the Academy by the late Mr. Say has been entirely lost or destroyed, and the beautifully arranged and costly cabinet of Drs. McMurtrie and Pickering has very nearly shared the same fate. Of other minor donations the bare fragments can be found. Various plans have been resorted to, in the hope of preventing these losses, but hitherto without success. Under such discouragements, it is not surprising that this department should have been neglected of late. To the donations mentioned, have been added the best and most perfect specimens selected from the collection of Drs. McMurtrie and Pickering, and all have been carefully disinfected by exposing them to a high temperature for many hours. A new method for preserving them from future injury has been adopted, which it is believed will be effectual.

The collection of Reptilia, during the last summer has been removed from the Hall to the room on the ground floor, and now occupies the cases formerly containing the collection of crania belonging to Dr. Morton. The members must have observed great improvement in the new arrangement of the specimens, which have been greatly increased in number, and each one carefully examined, the bottles and jars containing them refilled with alcohol, and new labels added. In fact, the extent and value of this collection could not previously be properly appreciated. It will now bear comparison with any in this country.

The large and fine collection of Birds in skin, possessed by the Academy, has been thoroughly overhauled, and the imperfect specimens, or which had sustained injury from insects, have been removed, and the rest disinfected by exposing them to a high temperature in a large copper apparatus provided for the purpose. The collection is now in the best order for mounting or exchange.

The accessions to the Library have exceeded those of the year previous. They consist of one Folio; eleven works in quarto form, including the Memoirs and Transactions of learned Societies; sixty-five octavos and duodecimos, including Journals, Annals, Bulletins, &c.; and seventy-two productions in pamphlet form, or in numbers, consisting of Reports, Proceedings of Societies, addresses, discourses, memoirs, &c. To these are to be added several manuscripts, charts and engraved copper plates. Of the whole number contributed, twenty-nine have been derived from Societies, sixty-three from Members, and the remainder, amounting to sixty-seven, from correspondents, authors, editors, &c.

The papers read before the Society, and published in its Proceedings between the 1st of January and 1st of November of the present year, are four in number. The first is by Mr. William Gambel, of this city, and contains descriptions of some new and rare birds of the Rocky Mountains and California, the tour of which he has recently made. The second is from the Messrs. Baird, of Carlisle, Pennsylvania, and describes two new species of *Tyrannula*, from Cumberland county, Pennsylvania. The third by Mr. Haldeman, is entitled a "Catalogue of the Carabideous Coleoptera of South Eastern Pennsylvania, and descriptions of new North American species of Coleoptera:" and the fourth paper entitled "Descriptions of a new genus, and of twenty-nine new Miocene, and one Eocene fossil shells of the United States," is contributed by Mr. T. A. Conrad.

The publication of the Proceedings has been regularly continued during the year. It has now attained sufficient bulk to authorise the Committee to bring the first volume to a close with the coming number. On the first of November last, two years and seven months had elapsed since the first number was commenced, and in that period 311 pages of matter selected from the minutes of the meeting have been issued, or an average of about 120 pages annually. As every care is taken in the style and execution of this periodical, to render it worthy of the Institution whence it emanates, and a considerable expenditure is therefore incurred, it is proposed to give here a condensed summary of the contents of the present volume, as far as published, in order that some idea may be formed of its merits and utility.

Its first and most obvious advantage is in being a medium for communicating to the scientific public discoveries and observations at short intervals of time, and thus often enabling the claim to priority to be securely established. There have been, with this view, offered to the Society, and printed either entire or in part in its Proceedings, during the period above mentioned, upwards of thirty original papers on scientific subjects, the titles and authors of which are as follows:

By Dr. S. G. Morton, two papers, viz., "Descriptions of several new fossil shells from the cretaceous deposits of the United States," and "Descriptions of two new species of fossils from the lower cretaceous strata of New Jersey." By Mr. T. A. Conrad, three papers; "Descriptions of three new species of *Unio* from the rivers of the United States;" "Descriptions of twenty-six new species of fossil shells from the medial tertiary of Calvert Cliffs, Maryland," and "Descriptions of a new genus, and of twenty-nine new Miocene, and one Eocene, fossil shells of the United States." By Professor Johnson, two papers; "An examination and analysis of coal from Arauco, Chili;" and "On the relation between the coal of South Wales and some Pennsylvania Anthracites." By Mr. Phillips, three papers; "Descriptions of two new American species of



Helix;" "Memorandum of dates of publication of papers in the early numbers of the Journal of the Academy," and "On the nomenclature of Natural Science." By Mr. Haldeman, the following papers: "Descriptions of new species of *Cyclas*;" several on new species of *Cypris*; "Descriptions of two new fresh-water shells of the genera *Amnicola* and *Physa*;" "of another new species of *Cyclas*;" "of a genus of *Sterelmintha*;" "of two species of *Entomostraca*, and two *Hydrachnæ*;" "of a new *Daphnia*;" several on changes of nomenclature in Natural History; a "Catalogue of the Carabideous Coleoptera of South Eastern Pennsylvania, and descriptions of new species of North American Coleoptera;" and "Description of a new species of *Pasimachus*." By Dr. Hallowell, a paper describing a new species of *Chamæleon* from Africa. By Dr. Benj. H. Coates, a paper on "The natural alliances of the genus *Cecidomyia*." By Peter A. Browne, Esq., a portion of a paper containing strictures on terms used in vegetable physiology. By Mr. William Gambel, "Descriptions of some new and rare Birds of the Rocky mountains and California." By the Messrs. Baird, of Carlisle, Pennsylvania, "Descriptions of two new species of *Tyrannula* from Cumberland county, Pennsylvania." By Professor Locke, of Cincinnati, "Observations on *Cryptolithus tessellatus*." By J. Hamilton Couper, of Georgia, "A description of the strata in which were found the valuable fossil bones and shells from the Brunswick Canal," presented by him to the Academy. By Dr. Clapp, of New Albany, Indiana, a paper in reference to the geological equivalents of that vicinity, and of those of the falls of the Ohio. By Miss Morris, of Germantown, "Observations on the development of the Hessian fly." By Messrs. Audubon and Bachman, "Descriptions of new species of North American Quadrupeds;" and by Dr. Ravenel, of Charleston, "Descriptions of several new fossil *Scutellæ*."

The communications made before the Society in a verbal form, and recorded in the Proceedings, are even more numerous, and contain much information on important and interesting facts in natural science. The limits to which this Report is necessarily restricted, will only admit of the mention of the names of those gentlemen who have most largely contributed to this portion of the Proceedings. There are—from Dr. Morton, six communications; from Prof. Johnson, twenty; Prof. Rogers, five; Mr. S. S. Haldeman, four; Dr. B. H. Coates, three; Mr. Phillips, two; Dr. George C. Leib, three; Dr. Chaloner, four; Mr. Joseph A. Clay, one; Dr. Blanding, one; Dr. Bridges, two; Prof. Bailey of West Point, one; Mr. Quimby, two; Dr. Goddard, five; Mr. George R. Gliddon, two; Dr. Elwyn, one; and from Dr. Owen, of New Harmony, two.

This publication also records for the period mentioned, 219 donations to the Museum of the Society from 110 individuals; and 281 donations to its Library, 68 of which are from Societies, and 213 from individuals.

Another most important advantage derived from it is in its general distribution to foreign and domestic Societies and Correspondents. Nearly one hundred and fifty copies of each number as it appears are sent, not only in every direction throughout the Union, but to various sections of the globe, and a correct knowledge of the character and standing of this Institution is thus widely diffused. I have transcribed from the Memorandum Book of the Corresponding Secretary, the following list of Societies receiving copies of the Proceedings, either regularly or as opportunity offers:

Royal Society of London; Botanical Society of London; Zoological

Society of do.; Linnean Society of do.; L'Institute Royale de France; Ecole Royale des Mines, at Paris; Société Entomologique de Paris; The Royal Society of Edinburg; L'Academie Royale des Sciences, Stockholm; L'Academie Royale des Sciences et Belles Lettres, Brussels; Academia de Ciencias Naturales, Madrid; L'Accademia Reale delle Scienze, Turin; Société Imperiale des Naturalistes de Moscou; Royal Academy of Sciences of Berlin; Academy of Sciences of St. Petersburg; Royal Academy of Sciences of Munich; Royal Botanical Society, Ratisbon; Asiatic Society of Bengal; and the Egyptian Society at Cairo.

The domestic Societies are as follows:

American Philosophical Society; Franklin Institute; Philadelphia Athenæum; Albany Institute; New York Lyceum of Natural History; Natural History Society of Boston; National Institute at Washington; Franklin Society of Providence, Rhode Island; U. S. Naval Lyceum at Brooklyn; and Northern Academy of Arts and Sciences at Hanover, New Hampshire.

Letters of acknowledgement of the reception of the Proceedings by these Societies, and by numerous Correspondents, are constantly read before you.

In short, the reputation of this Institution has been greatly enhanced since the adoption of this mode of publishing periodically an account of its Transactions, and the propriety of its continuance cannot be questioned.

Three alterations in the By-Laws have been made during the present year. The first reduces the amount of the Initiation fee from \$10 to \$5, and the second reduces the amount of a life subscription from \$80 to \$50. Both of these alterations have been in contemplation for a length of time, but no action determined on until within the last few months, when the expediency and even necessity of adopting them were so obvious as not to admit of longer delay. The third alteration requires of Correspondents residing within the United States, elected after the 31st of January, 1843, a small diploma fee. This is a measure which the Society is justly entitled to adopt, and is only in accordance with the usage of most Institutions of a similar character. The demand has been cheerfully complied with in every instance where the receipt of his notice of election has been acknowledged by a Correspondent.

Between the 1st of January and the 1st of December of this year the Academy has added eleven new Members and twenty-one Correspondents to its list. Of the latter, twelve reside in the United States, and nine are foreign. The number of members elected is nearly double the average of the three preceding years.

The finances of the Academy are in a most favourable condition, as the Report of the Treasurer will show. The right of way to a small portion of the lot in the rear of the building, was disposed of in the early part of the year for the sum of \$660, to the holders of the adjoining property. The offer was an advantageous one to the Academy, and was promptly accepted by it. A heavy ground rent held by the original owners of the lot on which this building is erected, has been recently paid off by the next purchaser. This is a source of some gratification to the Academy, as re-

lieving it from a possible contingency which might involve its interests in some degree. By the prudent management of the Treasurer, the Institution has been enabled to meet all its ordinary annual expenses, and some new arrangements for the coming year proposed by him, will, if carried out, materially lessen its remaining obligations, which, although now comparatively light, still prevent that entire appropriation of its annual income to the general purposes of the Institution, which is so ardently desired by all its members.

All which is respectfully submitted by

W. S. ZANTZINGER,  
*Recording Secretary.*

Hall of the Academy, December 26th, 1843.

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The Report of the Treasurer was read, and referred, as usual, to the Auditors for examination.

#### NEW BUSINESS.

Professor Johnson offered the following resolutions, which were unanimously adopted:

Resolved, That the extended and valuable Report of the Recording Secretary, presented this evening, contains the most gratifying evidences of the prosperity of this Institution, and of the assiduous devotion of the Secretary to his various duties.

Resolved, That the thanks of the Society be presented to the Recording Secretary for his labour in preparing this Report, and that the same be referred to the Committee on the Proceedings for publication.

Mr. Phillips offered the following resolution, which was also unanimously adopted:

Resolved, That the thanks of this Society be presented to Mr. George W. Carpenter, for the ample and gratifying report of the financial concerns of the Institution presented this evening, and for his assiduous and successful attention to the trust confided in him.

The Society then proceeded to an election for Officers for the ensuing year. The tellers appointed by the chairman announced the following result:

PRESIDENT.

William Hembel.

VICE PRESIDENTS.

John Price Wetherill,  
Samuel George Morton, M. D.

CORRESPONDING SECRETARY.

Walter R. Johnson.

RECORDING SECRETARY.

Wm. S. Zantzinger, M. D.

TREASURER.

George W. Carpenter.

LIBRARIAN.

Alfred L. Elwyn, M. D.

CURATORS.

Wm. S. Vaux,  
Samuel Ashmead,  
John Cassin,  
Gavin Watson, M. D.

AUDITORS.

William S. Vaux,  
Robert Pearsall,  
Robert Bridges, M. D.

COMMITTEE OF PUBLICATION.

A. L. Elwyn, M. D.,  
T. A. Conrad,  
Edmund Draper,  
John Simmons,  
William S. Vaux.

The following gentlemen were elected Correspondents of  
the Academy:

Mr. John Van Cleve, of Dayton, Ohio.

Prof. James Hall, of Albany, New York.

And

Daniel Keyser, of Philadelphia, a Member of the same.