

**Cox, E. T.**, State Geologist. Geological Survey of Indiana. Annual Report for 1875.

This volume contains a paper by G. M. Levette, entitled, "Observations on the Depth and Temperature of some of the Lakes of Northern Indiana." There is given in the paper a list of fifteen *Unios*, one *Margaritana*, four *Anodons* and nineteen species and varieties of fresh water univalves. The list, except the portion pertaining to the *Unionidae*, was prepared by Mr. John W. Brykit, of Indianapolis. It is intended to cover only northern Indiana.

**Stein, Fred.** Geological Survey of Indiana. Annual report for the year 1880. Pp. 451-467. Contains the molluscous fauna of Indiana.

There are listed the *Unioncs*, *Margaritanas*, *Anodontas*, and other fresh water bivalves, of several genera and species. Besides these there are given the genera and species of fresh water univalves, and all the known species and varieties of land shells. This list bears the distinction of being the very first to endeavor to present a complete view of the shell-life Indiana.

#### Species described from Indiana.

In collating the lists of mollusks known from this state it has been matter of great interest to note those which had an original habitat ascribed to some part of Indiana. This was to be expected, perhaps, since the earliest of the best known and most scientific writers in conchology, Thomas Say, was for a long time a resident of that interesting colony—the basal principle of which was a kind of Utopian doctrine of communism—which founded New Harmony. While resident here, under the inspiration of association with such men as Troost, Maclure, and the older Owen, opportunity was afforded Say to collect and examine very many of the mollusks of the region. He improved the occasion, as we well know, and gave to the world of science its best early American contributions to conchology. Since his day other species have been found, supposed to be new and described as such by various authors until the list has grown to very respectable proportions. While some of the names following are properly recognized as synonyms yet they are given with the reference to the forms which have priority, for it is but fair to the workers of other days that we recognize the disadvantages of long distance from scientific centers and the other untoward conditions of life in a practical wilderness.

#### LAND SHELLS.

*HELICINA OCCULTA* Say. Near New Harmony.

*SUCCINEA VERMETA* Say. New Harmony.

*POLYGYRA FASTIGIATA* Say. New Harmony.

## FRESH WATER UNIVALVES.

- ANCYLUS TARDUS Say. Wabash river.  
 VIVIPARA SUBPURPUREA Say. Wabash river.  
 CAMPELOMA PONDEROSUM Say. Ohio river.  
 PLEUROCERA CANALICULATUM Say. Falls of the Ohio.  
 PLEUROCERA MONILIFERUM Lea. New Harmony.  
 PLEUROCERA ANTHONYI Lea. Fox river, "Indiana."  
 PLEUROCERA TROOSTII Lea. Near New Harmony.  
 LITHASIA OBOVATA Say. Wabash and Falls of the Ohio.  
 ANGITREMA VERRUCOSA Say. Wabash river.  
 ANGITREMA ARMIGERA Say. Wabash river.  
 MELANIA NUPERA Say. Wabash river.

=ANGITREMA VERRUCOSA. Wabash river.

- ANCULOSA PRÆROSA Say. Falls of the Ohio.  
 ANCULOSA TRILINEATA SAY. Falls of the Ohio.  
 GONIOBASIS DEPYGIS Say. Falls of the Ohio.  
 GONIOBASIS INTERSITA Haldeman. Swan creek.

This species was based on specimens furnished by Mrs. Say after the death of her husband.

- GONIOBASIS CONSANGUINEA Anthony. "Indiana."  
 GONIOBASIS BICOLORATA Anthony. Camp creek, near Madison.  
 GONIOBASIS CUBICOIDES Anthony. Wabash river.  
 GONIOBASIS INFANTULA Lea. Falls of the Ohio.  
 GONIOBASIS LOUISVILLENSIS Lea. Falls of the Ohio.  
 GONIOBASIS INTERLINEATA Anthony. Christy creek.  
 GONIOBASIS SPARTANBURGENSIS Lea. Wabash river.  
 GONIOBASIS INFORMIS Lea. Falls of the Ohio.  
 GONIOBASIS KIRTLANDIANA Lea. "Indiana."

=GONIOBASIS SEMICARINATA Say. Richmond.

=GONIOBASIS BICOLORATA Anthony. Camp creek.

- MESESCHIZA GROSVENORII Lea. Wabash river.

This genus is now recognized to have been based upon pathologic specimens of a *Goniobasis*, probably *Goniobasis cubicoides* Anthony. The specimens were not only pathologic but immature. The writer has several times, in streams in the South, noted many specimens of traumatic shells which might easily be referred to this genus.

## FRESH WATER BIVALVES.

- UNIO ABRUPTUS Say. Wabash river.  
 UNIO ORBICULATUS Hildreth.  
 UNIO ARQUATUS Conrad. Wabash river.  
 =UNIO RECTUS Lamarck. Pathologic.  
 UNIO CAPILLUS Conrad. Wabash river.  
 =UNIO FABALIS Lea. Ohio river  
 UNIO CICATRICOSUS Say. Wabash river.  
 =UNIO VARICOSUS (?) Lea.  
 UNIO CYLINDRICUS Say. Wabash river.  
 UNIO ELEGANS Lea. Wabash and Ohio rivers.  
 UNIO HEROS Say. Wabash river.  
 =UNIO MULTIPLICATUS Lea.  
 UNIO MYTILOIDES Rafinesque. Wabash river.  
 UNIO PERSONATUS Say. Wabash river.  
 UNIO PHILLIPSI Conrad. Wabash river.  
 UNIO SAMPSONII Lea. Wabash river.  
 =UNIO PERPLEXUS Lea.  
 UNIO SECURIS Lea. Ohio and Wabash rivers.  
 UNIO SULCATUS Lea. Wabash and Ohio rivers.  
 UNIO UNDULATUS Barnes. Wabash river.  
 MARGARITANA CONFRAGOSA Say. Wabash river.  
 MARGARITANA DEHISCENS Say. Wabash river.  
 =UNIO DEHISCENS Say.  
 MARGARITANA MONODONTA Say. Wabash and Ohio rivers.  
 =UNIO MONODONTA Say. From Falls of the Ohio.  
 ANODONTA EDENTULA Say. "Indiana." Locality not given.  
 ANODONTA FERRUGINEA Lea. Simon's creek.  
 ANODONTA IMBECILLIS Say. Wabash river.  
 ANODONTA SUBORBICULATA Say. Ponds near Wabash river.

A summary of this list of shells originally described from Indiana shows three species of land shells; twenty-nine species of fresh water univalves; and twenty-one species of *Unionidæ*. While several of these have been relegated to the standing of pure synonyms they yet serve a useful purpose in determining the exact nature of the molluscan fauna. It may be that more extended opportunities in the matter of literature will add to this list other forms, thus enriching the original contributions of Indiana to conchologic lore.

## GENERAL LIST OF MOLLUSCA.

In the following lists there has been no serious attempt to classify the shells of the state in any systematic manner. At the present time geographical distribution is the most important feature. In pursuance of this object, the arrangement is chiefly alphabetical. Only in a few instances have data which give exact localities been attainable. In seeking to enlarge the list hereafter only specimens accompanied with exact locality references should be admitted.

A number of shells listed from Indiana in various amateur papers, and known to belong to a fauna entirely different, have been excluded as not being authentic. No injustice is done any student by relegating these forms to a doubtful list and awaiting the result of careful examination within the state. Should such examination reveal the forms so excluded it will be a source of congratulation that so many extralimital shells should be found in Indiana.

## Register of Land Forms.

*Conulus fulvus* Drapernaud.

*Helicina occulta* Say. New Harmony.

*Helicodiscus lineatus* Anthony.

*Limax flavus* Linnaeus. New Albany.

This form is very abundant in and about Louisville, Ky., having been introduced through commerce.

*Limax campestris* Say. Franklin county.

*Limax (Tebennophorus) carolinensis* Bosc.

*Limax (Tebennophorus) dorsalis* Binney.

*Mesodon albolabris* Say. All over the state.

*Mesodon clausa* Say. Southern Indiana.

*Mesodon exoletus* Binney. Indianapolis.

*Mesodon mitchelliana* Lea. Franklin county.

*Mesodon multilineata* Say. All over south Indiana.

*Mesodon profunda* Say. Indianapolis; Madison; Charleston.

*Patula alternata* Say. Generally distributed.

*Patula perspectiva* Say. Indianapolis.

*Patula solitaria* Say. Indianapolis; Charleston.

*Patula striatella* Anthony. Indianapolis; New Albany.

*Polygyra fastigiata* Say. New Harmony.

*Polygyra leporina* Gould. No specimens seen.

*Pupa armifera* Say. Bloomington; Indianapolis.

- Pupa contracta* Say. Bloomington.
- Pupa corticaria* Say. Indianapolis.
- Pupa fallax* Say. Indianapolis; Bloomington.
- Pupa muscorum* Linnaeus. Bloomington.
- Pupa pentadon* Say. Bloomington.
- Pupa rupicola* Say. Franklin county.
- Selenites concava* Say. Generally distributed.
- Stenotrema hirsutum* Say. Generally distributed.
- Stenotrema monodon* Rackett. Generally distributed.
- Stenotrema monodon fraternum* Say. Indianapolis.
- Stenotrema monodon leaii* Ward. Indianapolis.
- Stenotrema stenotrema* Ferussac. Indianapolis; Madison.
- Succinea avara* Say. Generally distributed.
- Succinea obliqua* Say. Credited to state.
- Succinea ovalis* Gould. Indianapolis.
- Succinea totteniana* Lea. Vincennes.
- Succinea vermeta* Say. New Harmony.
- Strobila labyrinthica* Say. South Indiana.
- Triodopsis appressa* Say. Indianapolis; Madison.
- Triodopsis fallax* Say. Indianapolis.
- Triodopsis inflecta* Say. Indianapolis; south Indiana.
- Triodopsis obstricta* Say. Indianapolis.
- Triodopsis palliata* Say. Generally distributed over central and northern  
Indiana.
- Vallonia pulchella* Muller. Indianapolis; Bloomington.
- Vertigo gouldii* Binney.
- Very doubtful determination. Probably some other form was really in  
the hands of the authority.
- Vertigo ovata* Say. Generally distributed.
- Zonites arboreus* Say. Indianapolis; generally over the state.
- Zonites friabilis* W. G. Binney. New Harmony.
- Zonites fuliginosus* Griffith. Indianapolis; Charleston.
- Zonites militum* Morse. Southern Indiana.
- Zonites nitidus* Muller. Generally distributed.
- Zonites indentatus* Say. Franklin county.
- Zonites inornatus* Say. Referred to Indiana.
- Zonites intertextus* Binney. Authority of Binney.
- Zonites ligerus* Say. Indianapolis; southern Indiana.

*Zonites limatulus* Ward. Indianapolis; generally distributed.

Register of Fresh Water Univalves.

*Carychium exiguum* Say. In all damp places under leaves.

This is one of the most minute of American shells.

*Ancylus tardus* Say. Wabash, White and Ohio rivers.

*Bulinus hypnorum* Linnæus. Indianapolis; northern Indiana.

*Helisoma bicarinatus* Say. Indianapolis.

*Planorbis trivolvis* Say. Indianapolis; generally distributed over the state.

*Limnophysa columella* Say. Credited to Indiana.

*Limnophysa caperata* Say. Indianapolis; Wabash river.

*Limnophysa desidiosa* Say. Indianapolis; generally distributed over the state.

*Limnophysa humilis* Say. All over the state.

*Limnophysa palustris* Muller. Generally distributed.

*Limnophysa reflexa* Say. Indianapolis.

*Menetus excavatus* Say. Generally distributed in ponds.

*Physa gyrina* Say. All over the state.

*Physa heterostropha* Say. All over the state.

*Valvata tricarinata* Say. Credited to the state.

*Somatogyrus isogonus* Say. White river; Wabash river.

*Pomatopsis lapidaria* Say. Wabash river. Probably generally distributed.

*Campeloma apertum* Lewis. (Ms.) West Fork White river.

=*Campeloma integrum* DeKay.

*Campeloma decisum* Say. St. Joseph river.

*Campeloma integrum* DeKay. St. Joseph river.

*Campeloma ponderosum* Say. Wabash and Ohio rivers.

*Campeloma rufum* Haldeman. St. Joseph and White rivers.

*Campeloma regularis* Lea. Ohio river.

=Junior *C. ponderosum* Say.

*Campeloma subsolidum* Anthony. Wabash river.

*Liopla. subcarinata* Say. Laporte.

*Vivipara contectoides* Binney. Wabash river.

*Vivipara subpurpurea* Say. Wabash river.

*Anculosa prærosa* Say. Falls of the Ohio.

*Anculosa trilineata* Say. Falls of the Ohio.

*Angitrema armigera* Say. Wabash river.

*Angitrema nupera* Say. Wabash river.

=*Angitrema verrucosa* Say.

*Angitrema verrucosa* Say. Wabash and Ohio rivers.

*Goniobasis bicolorata* Anthony. Camp creek, Madison.

*Goniobasis consanguinea* Anthony. "Indiana."

It is probable that a no more satisfactory author than this one ever wrote on American shells. Exact localities are rarely ever mentioned by him, and most of those given are open to serious question. He was notorious for looseness in this very important matter. Rarely can his references be used for geographic distribution.

*Goniobasis cubicoidea* Anthony. Wabash river.

*Goniobasis depygis* Say. Falls of the Ohio.

This is one of the most abundant shells at the falls, and at low water may be secured by the gallon with very little effort.

*Goniobasis infantula* Lea. Falls of the Ohio.

=*Goniobasis depygis* Say.

*Goniobasis informis* Lea. Falls of the Ohio.

*Goniobasis interlineata* Anthony. Christy creek.

=*Goniobasis semicarinata* Say.

*Goniobasis intersita* Haldeman. Swan creek.

*Goniobasis louisvillensis* Lea. Falls of the Ohio.

=*Lithasia obovata* Say.

*Goniobasis kirtlandiana* Lea. "Indiana."

=*Goniobasis bicolorata* Anthony.

=*Goniobasis semicarinata* Say.

*Goniobasis semicarinata* Say. Richmond; Franklin Co.

*Goniobasis spartenbergensis* Lea. Wabash river.

=*Goniobasis depygis* Say.

*Lithasia obovata* Say. Wabash river; Falls of the Ohio. Very abundant at the last locality.

*Mesochiza grosvernorii* Lea. Wabash river. Pathologic form.

*Pleurocera anthonyi* Lea. "Fox river, Indiana."

There is considerable uncertainty about this locality reference. Fox river is in Illinois.

*Pleurocera canaliculatum* Lea. Falls of the Ohio.

A very abundant and exceedingly variable shell.

*Pleurocera elevatum* Say. Ohio river.

*Pleurocera moniliferum* Lea. Wabash and Ohio rivers.

*Pleurocera simplex* Lea. Ohio river.

*Pleurocera troostii* Lea. New Harmony, Wabash river.

This species was based upon specimens submitted to Dr. Lea from very widely separated localities. The greater number came from North Alabama and Georgia. There is very much doubt that this species was found in the northern locality to which it is credited.

*Pleurocera undulatum* Say. Ohio river.

FRESH WATER BIVALVES.

*Pisidium abditum* Haldeman. Ohio river. Probably generally distributed over the state.

*Pisidium virginicum* Bourguignat. Ohio river.

*Sphaerium solidulum* Prime. Franklin county.

*Sphaerium sphaericum* Anthony. Ponds along Wabash river.

*Sphaerium stamineum* Conrad. Ohio river.

*Sphaerium sulcatum* Lamarck. Ohio river.

*Sphaerium transversum* Say. Ohio and Wabash rivers.

*Anodonta decora* Lea. Ohio river.

*Anodonta edentula* Say. Wabash, White and Ohio rivers; lakes in northern Indiana.

*Anodonta ferruginea* Lea. Simon's creek.

*Anodonta ferussaciana* Lea. Ohio river; lakes in northern Indiana.

*Anodonta footiana* Lea. South Bend.

*Anodonta grandis* Say. Flat Rock creek; Wabash river. Probably distributed all over the state.

*Anodonta imbecillis* Say. Wabash and Ohio rivers; Canal at Indianapolis.

*Anodonta pavonia* Lea. Flat Rock creek.

*Anodonta plana* Lea. Ohio river; Flat Rock creek.

*Anodonta salmonia* Lea. Blue river.

*Anodonta shaffneriana* Lea. Flat Rock creek.

*Anodonta suweylindracea* Lea. White river.

*Anodonta suborbiculata* Say. Ponds near Wabash river.

*Anodonta wardiana* Lea. White river.

*Margaritana calceola* Lea. Ohio river; Flat Rock creek.

= *Margaritana deltoidea* Lea.

*Margaritana complanata* Barnes. Ohio and White rivers.

*Margaritana confragosa* Say. Ohio and Wabash rivers.

*Margaritana dehiscens* Say. Wabash and Ohio rivers.

Described as *Unio dehiscens* Say.

*Margaritana deltoidea* Lea. Wabash, White and Ohio rivers.

*Margaritana hildrethiana* Lea. Ohio river.

*Margaritana marginata* Say. White river.

*Margaritana monodonta* Say. Falls of the Ohio river; Wabash river.

Described as *Unio monodontus* Say.

*Margaritana rugosa* Barnes. Wabash and Ohio rivers; Lakes in northern Indiana.

*Unio abruptus* Say. Wabash river.

= *Unio orbiculatus* Hildreth.

*Unio asopus* Green. Ohio river.

*Unio alatus* Say. Ohio, White and Wabash rivers.

*Unio anodontoides* Lea. Ohio and Wabash rivers.

Described as *Unio teres* Rafinesque, from the Wabash.

*Unio arctior* Lea. White, Wabash and Ohio rivers.

= *Unio gibbosus* Barnes, white nacre'd variety.

- *Unio arquatus* Conrad. Wabash river.

= *Unio rectus* Lamarck, pathologic.

*Unio asperrimus* Lea. Wabash and Ohio rivers.

*Unio camelus* Lea. Ohio river.

= *Unio phaseolus* Barnes.

*Unio phaseolus* Barnes.

*Unio camptodon* Say. Ohio river.

*Unio capax* Green. Ohio river.

*Unio cicatricosus* Say. Wabash river.

= *Unio varicosus* Lea.

*Unio cincinnatiensis* Lea. Ohio river.

= *Unio perplexus* Lea.

*Unio circulus* Lea. Wabash, White and Ohio rivers.

*Unio clarus* Lamarck. Wabash, White and Ohio rivers.

*Unio coccineus* Lea. Wabash and Ohio rivers.

*Unio cooperianus* Lea. Ohio river.

*Unio cornutus* Barnes. Wabash and Ohio rivers.

*Unio crassidens* Lamarck. Wabash and Ohio rivers.

*Unio cylindricus* Say. Wabash and Ohio rivers.

*Unio distans* Anthony. St. Joseph river.

= *Unio luteolus* Lamarck.

*Unio donaciformis* Lea. Wabash river; Ohio river.

*Unio dorfeullianus* Lea. Ohio river.

*Unio ebenus* Lea. Ohio and Wabash rivers.

*Unio elegans* Lea. Wabash and Ohio rivers.

*Unio ellipsis* Lea. Ohio and Wabash rivers.

*Unio fabalis* Lea. Ohio river.

*Unio foliatus* Hildreth. Ohio river.

*Unio fragosus* Conrad. Wabash and Ohio rivers.

*Unio gibbosus* Barnes. Lakes in northern Indiana; Ohio, White and Wabash rivers.

*Unio glans* Lea. Ohio and White rivers; lakes in northern Indiana.

*Unio gracilis* Barnes. Ohio river.

*Unio graniferus* Lea. Ohio river.

*Unio heros* Say. Wabash river.

= *Unio multiplicatus*. Lea.

*Unio iris* Lea. St. Joseph's, White and Ohio rivers; lakes in northern Indiana.

*Unio irroratus* Lea. White and Ohio rivers.

*Unio lachrymosus* Lea. Ohio river. *Unio asperrimus* Lea is a synonym of this form.

*Unio levissimus* Lea. White and Ohio rivers.

*Unio lens* Lea. Canal, Indianapolis; Ohio river.

= *Unio circulus* Lea.

*Unio ligamentinus* Lamarck. Wabash and Ohio rivers.

*Unio luteolus* Lamarck. Lakes in northern Indiana; Ohio river. Probably generally distributed.

*Unio metanervus* Rafinesque. Wabash, White and Ohio rivers.

*Unio multiradiatus* Lea. Canal, Indianapolis; White river.

*Unio multiplicatus* Lea. Ohio and Wabash rivers.

*Unio mytiloides* Rafinesque. Ohio and Wabash rivers.

*Unio nasutus* Say. Lakes in northern Indiana. Only in those which drain into the Great lakes.

*Unio obliquus* Lamarck. Ohio and Wabash rivers.

*Unio occidens* Lea. Ohio river.

= *Unio ventricosus* Barnes.

*Unio orbiculatus* Hildreth. Ohio and Wabash rivers. See *Unio abruptus* Say.

- Unio ovatus* Say. Ohio river.
- Unio parvus* Barnes. Ohio river; Wabash river. Probably over a great portion of the state.
- Unio perplexus* Lea. Wabash and Ohio rivers.
- Unio personatus* Say. Wabash river.
- Unio phascolus* Barnes. Wabash, White and Ohio rivers.
- Unio phillipsii* Conrad. Ohio and Wabash rivers.  
= *Unio perplexus* Lea.
- Unio plenus* Lea. Wabash and Ohio rivers.
- Unio plicatus* Lesueur. Ohio river.
- Unio pileus* Lea. Ohio river.  
= *Unio personatus* Say
- Unio pressus* Lea. Lakes in northern Indiana; Canal at Indianapolis; Ohio river.
- Unio pustulatus* Lea. Ohio river.
- Unio pustulosus* Lea. Wabash and Ohio rivers.
- Unio pyramidatus* Lea. Ohio and Wabash rivers.
- Unio rangianus* Lea. Ohio and White rivers; Wild Cat creek, Carroll county.  
= *Unio perplexus* Lea.
- Unio rectus* Lamarck. Ohio and Wabash rivers.
- Unio retusus* Lamarck. Ohio and Wabash rivers.
- Unio rubiginosus* Lea. Lakes in northern Indiana; Ohio and White rivers.
- Unio sampsonii* Lea. Wabash river.  
= *Unio perplexus* Lea.
- Unio securis* Lea. Ohio and Wabash rivers.
- Unio solidus* Lea. Wabash and Ohio rivers.
- Unio spatulatus* Lea. Lakes in northern Indiana.
- Unio suboratus* Lea. Ohio and White rivers.
- Unio subrostratus* Say. South Bend; Wabash river.
- Unio subrotundus* Lea. Ohio river.
- Unio sulcatus* Lea. Wabash and Ohio rivers.
- Unio tenuissimus* Lea. Ohio river.
- Unio triangularis* Barnes. White and Ohio rivers.
- Unio trigonus* Lea. Ohio river, Wabash river.
- Unio tuberculatus* Barnes. White, Wabash and Ohio rivers.
- Unio undulatus* Barnes. Wabash and Ohio rivers.

*Unio varicosus* Lea. Ohio river.

*Unio ventricosus* Barnes. Ohio river; lakes in northern Indiana.

*Unio verrucosus* Barnes. Wabash and Ohio rivers.

*Unio zigzag* Lea. Ohio river, Wabash river.

= *Unio donaciformis* Lea.

Summarizing the data herein presented, exclusive of synonyms and doubtful forms referred to the state by writers, we find the following totals: Of land shells, 17 genera and 58 species; of fresh water univalves, 18 genera and 47 species; of fresh water bivalves, 5 genera and 102 species. That the number of species will be largely increased on careful examination there can be no question.

Louisville, Ky., Nov. 30, 1893.

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## GEOLOGY.

### GEOLOGICAL LITERATURE OF INDIANA—(STRATIGRAPHIC AND ECONOMIC).

By VERNON F. MARSTERS AND E. M. KINDLE.—Geological Department, Indiana University.

The following alphabetical list of the contributions to Indiana Geological literature includes such as deal especially with the physical and economic phases of the subject, and only brief references to the larger and more important contributions to the paleontology of the state. This list is so arranged that the student can ascertain: First, what *counties* of the state have been subject to investigation, second, *by whom* the work was done, third, *where the results are published*, fourth nature and results of the investigations. A brief statement of the contents of the more important papers, Reports, etc., is placed under the *author's name*. The references of an *economic* phase are placed under the heading *Economic Geology* which comes in its proper place in the alphabetic series. Under this heading are placed the following subdivision: *Clays, coals, gas, hydraulic cements, oil, ore (minerals), stone (building)*. The reference to the paleontology of the state are not included *in detail* in this list for the reason that they demand a somewhat different treatment in order to make the treatise the most useful to the student.