A CHECK LIST OF THE UNIONIDAE OF THE STREAMS
OF FRANKLIN COUNTY, OHIO

A Thesis Presented for the
Degree of Master of Science
by
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THE OHIO STATE UNIVERSITY
1940

Approved by:

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INTRODUCTION

Specific interest in the rejuvenation of conchology as a branch of science and a general interest in taxonomy led me to choose as a research problem the making of a check list of the Unionidae of the streams of Franklin County, Ohio. It was my aim to collect as completely as possible, and identify the Unionidae of the streams of this County. This information together with certain ecological data is contained in the check list.

The Pelecypods form a very abundant and diversified class of the Mollusca. They are bilaterally symmetrical, laterally compressed, and have a two piece calcareous shell secreted from a double lobed mantle. There is no apparent head; the anterior, ventral region is differentiated into a muscular foot. There are two sets of gills which function in respiration and aid in sifting objectionable particles out of the water. The muscles connecting the animal and its shell are very large and powerful, this in contrast to the small size and power of the animal itself. Some forms of the Pelecypods are monoecious, others dioecious. Development is by a metamorphosis which includes a trophophore stage.

Though the majority of Pelecypods are marine forms, there exists a large number of freshwater species, usually spoken of as freshwater "mussels". These inhabit the inland rivers, lakes, and ponds and are of economic import in that they act as a natural fish food and some of their shells are often used in the manufacturing of buttons and other mother-of-pearl ornaments.

The freshwater mussels are grouped into two orders; the Frisonodesmacea and the Teleodesmacea. The family Sphaeridae, the only
family of the Teleodesmacea, contains the very smallest mussels; and due to their size and minor diversities are very difficult to classify. For this reason, most taxonomists have omitted the Sphaeridae from the classification keys. The Prionodesmacea contains two families; the Margitanidae (of only one genus) and the Unionidae. The latter family is made up of some 30 genera. Because of the rarity of forms of Family Margitanidae in Ohio streams, the scope of this work is directed to the Unionidae.

The collection and identification of Molluscs, known as the science of conchology, is a very old study. Most all of the work has been done in the nineteenth century, and only a few conchology reports are recent. Those workers who were more or less expert have since died, leaving relatively few modern authorities. Also, over a long period of time the scientific nomenclature has changed perceptibly, making it difficult to rely on older check lists. Hildreth (1888) described and arranged some shells found in the vicinity of Marietta, Ohio, thus giving a short list of some of the Ohio forms. The nomenclature used is very old and now out of use, though it may still serve as a source of reference. Lewis (1877) listed some forms of the Unionidae of Ohio, still using the old classification. His work consisted mostly of naming the mussels of large rivers and hence is not very complete. Harper (1896) classified some of the shells found around Cincinnati and listed them in a brief catalogue which today is of limited use. Sterki (1907) of New Philadelphia, Ohio was the most recent contributor of a check list of Ohio mussels. In this,
Sterki lists the scientific names of species which he had collected in Ohio, but little mention was made of a Franklin County collection. All of the above workers merely listed the species with some small data on their location. Nothing was mentioned as to habitat or special morphological features.

Ortmann (1919) published his monograph of Pennsylvanian "Naiades", which, by many, is still regarded as the best authoritative source. This work not only includes a new key of modern nomenclature, but also descriptions of locations and specific habitats. Baker (1928) added further changes to the nomenclature in his description of the Wisconsin Mollusca. Baker's work includes complete anatomical descriptions, type locations, and ecology. Neither the contribution of Ortmann or Baker deals with Ohio Paleogypsa, yet both are invaluable in the classification of the group. Professor H. R. Eggleston of Marietta College, Marietta, Ohio, one of the few authorities on the Mollusca in this area, has ready for publication a study of Ohio Mollusca which will be a valuable contribution to the rejuvenated science of conchology.

I wish here to express gratitude to Mr. David F. Miller and Mr. Carl Vanard of the Ohio State University whose guidance as advisors has been very helpful, and to Professor H. R. Eggleston of Marietta College whose suggestions and help have been greatly appreciated.
THE STREAMS OF THE COUNTY

The streams of Franklin County are quite numerous and are varied in size. Even though there are diversities in size and in the topography of their basins the conditions of the water and substratum are in general similar. The flow of water in most places is rather slow, causing higher temperatures and decreased aeration. The water, typical of most Ohio streams, is unable to clear as rapidly as in faster running streams. Two generalizations are mentioned here.

In the northern half of the County the stream bottoms are dominantly of rock and gravel, while in the southern half there is less rock and gravel and more sand, small gravel, and mud. Also, the streams of the southern half of the County contain quite a bit of pollution due to their proximity to the city of Columbus and its industrial centers.

The names and locations of the streams used in the survey follow:

1. Scioto River. This is the largest stream and runs from north to south through the middle of the County.

2. Olentangy River. This large stream runs from north-central to the center of Columbus where it joins the Scioto.

3. Big Walnut Creek. This stream runs from north to south in the mid-eastern half of the County.
4. Alum Creek. This stream runs from north to south about 3 to 4 miles east of Big Walnut, and joins Big Walnut in the southeastern quarter of the County.

5. Black Lick Creek. This stream, smaller than the above, runs north and south along the eastern boundary of the County joining Big Walnut in the southeastern quarter.

6. Big Darby Creek. This stream runs from north to south along the western boundary of the County.

7. Little Darby Creek. Only a small portion of this stream enters the County, this, in the southwestern quarter joining Big Darby at Georgesville.

8. Little Walnut Creek. This small stream cuts across the extreme southeastern corner of the County.

9. Rocky Fork Creek. This stream, smaller than any of the above, is in the northeastern quarter of the County joining Big Walnut from the east, just south of Gahanna.

The following are very small runs which were included in the survey:

10. Hell Branch Run. This stream runs from north to south in the southeastern quarter and joins Big Darby, from the east, north of Harrisburg.

11. Big Run. This stream runs from west to east in the middle of the southwestern quarter to join the Scioto River.

12. Georges Creek. This stream runs from north to south in the southeastern quarter of the County to join Little Walnut between Groveport and Canal Winchester.
COLLECTING STATIONS

Thirty-four collecting stations were selected for the survey at various places in the twelve streams. The stations were selected in consideration of two major ideas;

1. Each area should have some diversity of habitat.
2. The areas should be so spaced as to give a representative collection.

The stations were numbered from one to thirty-four so that reference to each might be easy. Hereafter, in this paper, each station will be mentioned merely by number, e.g. Station 18. On the Columbus quadrangle map published by the U. S. Geological Survey, and the Franklin County Road Map are located and named the thirty-four collecting stations.
PROCEDURE

Collection. At each station the various habitats were noted, and containers for the specimens taken from each habitat were properly labeled. Each habitat was surveyed as a unit, thus giving order to and ease in recording the ecological data. Most specimens were taken by hand, but in the deeper water a heavy triangular dredge net was used. The net was a homemade affair consisting of three pieces of iron pipe wired in triangular form. To this was attached enough 3/8 inch mesh wire to form a bag about one cubic foot in volume. The bottom piece of pipe had an attached rake head, which helped in digging up the mussels. A handle, five feet in length, was attached to the top of the triangle, making it possible to dredge to a depth of some six feet. I found, however, that the dredge was needed only at a few stations in the County. The specimens were brought into the laboratory in their respective containers and cleaned.

Classification. The classification of the molluscs, in general, centers about the characteristics of the shell. Due to minor differences between species and even genera, and due to the many variations in each species classification of the Unionidae is very difficult. Also, the terminology of the various investigators is quite different, adding some confusion to the work of the taxonomist. The keys of Baker and Ortmann were used in the present taxonomic survey. These two authors differ on many points, so, at
Professor Eggleston's suggestion I chose the nomenclature of Baker's *Freshwater Mollusca of Wisconsin* for my classification. The species listed, with noted exceptions, are named according to Baker's descriptions.
THE UNIONIDAE OF FRANKLIN COUNTY, OHIO

Family UNIONIDAE

Sub-Family UNIONINAE

Fusconaia flava (Rafinesque)

This distinctive species is very abundant in the State, and apparently in the County. It was found at Stations 2, 3, 4, 6, 8, 11, 13, 14, 15, 17, 18, 21, 23, 24, 28, 32 and 33. The species was generally found in quiet waters, usually below riffles on a sand-small gravel substratum. In most cases the water was shallow; about 6 inches to 2 feet deep. However, at Stations 4, 14 and 24 the mussels were found in the riffles. Only one specimen was taken from deep water,¹ that at Station 13.

Megalonsia gigantea (Barnes)

This species (called by Baker a large river form), is not very abundant in this part of the State. Two specimens were taken in the County, from Station 18 and Station 21. Though Baker speaks of this form as frequenting mud bottoms, these specimens were taken from sand. In both cases the water was still and quite deep.

¹Water which is from 2 inches to 2 feet in depth will be spoken of as "shallow" water, and water which is from 2 feet to 6 feet in depth will be called "deep" water.
Amblema costata (Rafinesque)

This species is quite abundant in various locales over the State, according to Eggleston. Franklin County is apparently one of those locales, as the species has been taken from Stations 1, 2, 3, 4, 5, 9, 11, 13, 14, 18, 21, 24, 25, 26, 28, 29, and 33. In most cases, the species was found in shallow\(^1\) water on a sand-mud bottom. A fairly rapid current was present. At Stations 18 and 29, however, the water was very quiet, and at Stations 6, 14, and 21 the species was taken from deep water.

*Quadrum* pustulosa (Lea)

This species is not common in this area, though it is abundant in other parts of the State. I have found one specimen, however, at Station 8. This form seems to be a variant from the normal *pustulosa* by lacking the customary pustules. I have tried in vain to find other specimens of the species at Station 8 and elsewhere. At Station 8 the species was taken from deep water having a rapid flow. The bottom was primarily of rock and gravel.

*Tritogonia* verrucosa (Rafinesque)

(This species is placed in Genus *Quadrum* by Ortmann.)

This form also appears to be rare in this area. Two specimens

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\(^1\)Refer to footnote on page 9.
were taken, one from Station 4 and one from Station 8. Both were found in the riffles on a sand-small gravel substratum.

*Fleurobema coccineum* (Conrad)

(The classification of the species of Genus *Fleurobema* has been quite a problem to the conchologists. Even today, it is difficult to differentiate the species. The nomenclature used here is based on the classification of Eggleston.) Two specimens of this form were taken. At Station 28 one was found on the sand in water about one foot in depth. Here, the current was quite slow. At Station 25 the form was taken from a rapid current. Other conditions were the same as at Station 28.

*Fleurobema coccineum catillus* (Conrad)

This subspecies was found to be more abundant than the above type. It was taken from Stations 9, 13, 14, and 26. In general, it was found to frequent shallow water on a sand-mud substratum. The current was usually rapid. However, at Station 26 the water was very quiet.

*Fleurobema clava* (Lamarck)

This species is very rare in central and western Ohio, according to Professor Eggleston. Baker has not found it in Wisconsin, though he does mention its presence in Illinois. Ortmann, however, has recorded the species from various
locales in eastern Ohio and Pennsylvania. The one specimen found in this survey was taken as a dead form from Station 27.

**Pleurobema obliquum** (Lamarck)

(This species is not listed by Baker, and at Professor Eggleston's suggestion, I have used Ortmann's nomenclature.) This form is rather rare in Ohio, usually being found in larger rivers. However, one specimen was taken in this area, that from Station 2. Here the form was found in deep water on a gravel bottom. The current was rather fast.

**Elliptio dilatatus** ( Rafinesque)

This abundant species was taken from Stations 1, 2, 3, 4, 8, 13, 14, 15, 16, 17, 21, 26, and 32. According to both Baker and Ortmann, this form is found in almost every type of habitat. This was found to be true in the present survey. The majority, however, were taken in shallow water on a sand substratum and, in general, from a steady current. Yet, at Stations 4, 13, and 16 they were found in mud and quiet water. Also, at Stations 3, 17, and 32 the species was living in deep water.

Sub-Family **ANODONTINAE**

**Lasmigona costata** (Rafinesque)

This species has been recorded from a large part of the United States as a typical small river form. It is certainly
abundant in this area, being found at Stations 1, 2, 3, 4, 8, 10, 11, 16, 20, 21, 22, 25, and 29. Baker has recorded the form as frequenting many types of habitats. However, in this survey the majority were taken from the riffles on a sand substratum. At Station 21, the species was found buried in the mud in about 3 feet of slowly moving water. Also, at Stations 4 and 16 it was found living among the large gravel in the riffles.

*Anodonta grandis* (Say)

This distinct species is quite common in Franklin County, being taken from Stations 3, 4, 6, 6, 10, 15, 18, 20, 21, 25, and 32. Most specimens were found in water from 2 to 6 feet deep. Usually the current was very slow and the forms were buried in a sand-mud mixture. However, at Station 21 one specimen was found in a rapidly moving current. And at Station 8 a specimen was taken from sand in very shallow water. In all habitats the mussel was found buried in the substrata.

*Anodontcides ferussacianus* (Lea)

This species, often mistaken for *Anodonta grandis*, is one of the very common forms of the State. In this area it was taken from Stations 1, 2, 3, 4, 8, 9, 14, 15, 16, 18, 23, 25, 28, 29, and 32. This form was also found partially buried in sand and mud bottoms. The water in which it was found was
usually shallow and rather quiet. Many specimens were taken at Station 4, and were found here in varying habitats. Some were taken from riffles, others from deep water. Never were any specimens taken from a rock or gravel bottom.

*Amaeidonta marginata* (Say)

This oddly shaped species was found at Stations 4, 6, 10, 11, 15, 16, 18, 21, 25, and 29. In most cases, the specimens were found in the riffles on a sand-gravel substratum. The water was shallow. Only one specimen was found in mud, that at Station 16. At Station 25, one specimen was taken from deep water.

*Strophitus rugosus* (Swainson)

This is another of those species which is abundant in some areas of the State and rare in others. The species, apparently rare in this area, was taken from only two Stations, 11 and 14. In both locations it was found in deep quiet water on a sand-mud substratum. According to Baker, the species has a somewhat varied ecological distribution, this, of course, not being shown by my limited local collections.

Sub-Family LAMPSILINAE

*Obovaria subrotunda* ( Rafinesque)

(This nomenclature was taken from Ortmann’s monograph at Professor Eggleson’s suggestion.) This species, abundant throughout the State, is quite prevalent in Franklin County,
being found at Stations 2, 4, 7, 10, 13, 14, 16, 18, 22, 24, 29, and 33. Ortmann states that the form generally frequents sand and small gravel riffles. This is the apparent situation in Franklin County. Most specimens were taken from the shallow riffles on a sand-small gravel substratum. However, at Stations 14, 18, and 24, specimens were found in quiet water on a mud bottom. Also, at Station 23, one specimen was taken from rather deep water. Hence, in this area there seems to be some variations in the habitat of the species.

*Proptera alata* (Say)

According to Baker, this species is primarily a lake form but is known in some of the larger rivers. This species is one of the most abundant forms of the Muskingum River, yet, only one specimen was taken in Franklin County. Here it was found at Station 13, in shallow water on a mud bottom. The current was rather steady. At Professor Eggleston's suggestion, I made a thorough search for this form, but was unable to locate further specimens.

*Ligumia recta latisima* (Rafinesque)

According to Eggleston this species is abundant in certain areas of Ohio and rare in others. In this area the form is seemingly rare, being found only at Station 18. The one collected specimen was taken from the riffles on a sand-gravel substratum.
Ligumia iris novieboracii (Lea)

(This species is placed in Genus *Lurynia* by Ortmann.) This form is primarily a northern form, but according to both authorities does extend well into Ohio. Specimens were abundant in this area, mainly in the smaller streams. They were taken from Stations 1, 3, 4, 14, 18, 21, 22, 24, 26, and 28. Generally the species was found below riffles in shallow, quiet water on a sand bottom. However, at Stations 1 and 17 the species was taken from the gravel of shallow riffles. Also, at Stations 3 and 4 the mussel was found living in rather deep water.

Lampsilis alquoidae (Barnes)

(This is placed in Species *Luteola* by Ortmann.) This is by far the most abundant mussel of the County, and probably of the State. Together with its abundance, one must note the extreme variability of the members of the species. In this area the species has been taken from Stations 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15, 17, 21, 24, 25, 26, 28, 29, 32, and 34. The majority did show a preference for a common type of habitat. Most specimens were found in quiet, shallow water on a mud-sand bottom. In most cases they were partially buried in the substratum. However, at Stations 1, 9, 16, 24, and 29 the mussel was found in rather deep water. At Station 34, in a very small stream, I surveyed 400 to 500 yards of the substratum to find some 20 specimens
of *L. silquoides*. This was the only species found at the station and all were very young.

*Lampsilis ventricosa* (Barnes)

This large, heavy species is also quite abundant in this area, being taken from Stations 1, 2, 3, 4, 6, 10, 14, 15, 20, 21, 23, 24, 25, 26, 28, and 29. Baker speaks of its general distribution as being on sand and gravel bottoms, "rarely on mud". I have found the species always in quiet water and usually on a sand-gravel bottom. Also, the water was usually deep. However, at Stations 2, 24, and 28, the mussel was found in mud. And at Stations 15 and 29 the specimens were taken from very shallow water.

*Lampsilis ovata* (Say)

(This species is not listed by Baker, and is hence taken from Ortmann's nomenclature.) This form, fairly abundant in Ohio, was found at Stations 3, 24, and 29. It was generally found in a strong current of water on a gravel substratum. The depth was quite variable. However, at Station 3 the species was taken from rather slowly moving water.

*Dipnomia triquetra* (A. Rafinesque)

(This was placed in Genus *Truncilla* by Ortmann.) This small mussel is fairly abundant in the County, being found at Stations 2, 4, 10, 18, and 28. At all of the stations it was
found somewhat buried in the sand, in or just below the riffles. However, at Station 2 one specimen was taken from deep water.

_Ptychobranchus fasciolare_ (Nafinesque)

(This species is placed in Genus _Ellipsaria_ by Ortmann.)

Though this form was recorded, by Sterki, in various parts of the State, it is seemingly rare in this area. Eggleston also speaks of it as an uncommon form in Central Ohio. I have taken only one specimen, that from Station 18. Here it was found in the shallow riffles on a gravel substratum. Further search for the species did not prove successful.

_Truncilla rangiana_ (Lea)

(At Professor Eggleston's suggestion, the specimens were recorded as members of Genus _Truncilla_, complying with Ortmann's descriptions.) This area appears to be one of the locales of abundant distribution of this species in the State. The form was taken from Stations 2, 4, 8, 9, 13, 14, 20, 24, and 29. Ortmann has generally recorded the species from riffles on a sand-gravel bottom. Most of the specimens in this survey were taken from the riffles on a sand bottom. However, at Station 14 the specimen was taken from slow shallow water on a mud bottom. And at Station 2 the mussel was found in deep water.
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The Unionidae of Franklin County, Ohio and their preferred habitats.

(Note: 1. D in the chart headings signifies deep water (4' to 6').
S in the chart headings signifies shallow water (2' to 2').
2. These species were not found in abundance, and a preferred habitat cannot be determined.
3. Only a dead form of this species was found.)
In the table are summarized the results of the study, listing the species and their relative habitats in this area. The preferred habitat of those species which were found abundantly enough to judge preference is marked by XX. Other habitats where specimens were taken are marked by X. In some cases only a few specimens of a form were found and so it was impossible to designate a preferred habitat. These are noted on the chart.

It may be observed that no mussels have been recorded from Stations 5, 12, 19, 30, and 31. A short account of this follows:

Station 5 at Hell Branch Run was surveyed for a distance of some 400 yards, no specimens being found. Here there was even a lack of dead forms. The fact that the stream is very small and that it periodically dries up in several places may explain the lack of mussels.

Station 12 at Big Run, like Station 5, produced no specimens. Here, again, this may be explained by the smallness of the stream and its tendency to dry up in the summer months.

Station 19 at Alum Creek is an area of very deep (4 to 8 feet) water. Numerous dredgings from the bank produced no mussels, hence the absence of any records from this station.

Station 30 at Rocky Fork Creek was also surveyed for some 400 yards. No specimens were collected. This area probably exhibited the smallest stream conditions of the survey. Though I do not know, it is very probable that the stream periodically becomes dry. This and the fact that the water becomes quite stagnant
may explain the absence of mussels.

Station 31 at Black Lick Creek is entirely of rock bottom. For a great distance no sand, gravel, or mud is present. This may account for the lack of mussels in this area.
SUMMARY

1. In recent years there has been a rejuvenation of the collection and classification of the **Unionidae**. The study of the Ohio **Unionidae** has been very limited and has only been investigated by a few workers, these of the last century.

2. Thirty-four stations, in the twelve larger streams of Franklin County were selected for the collection of the **Unionidae**. The purpose of the survey was the noting of the species and their particular habitats.

3. Twenty-five different species and sub-species were collected. These were contained in nineteen different genera.

4. It was noted that many of the individual species had a preferred habitat, though there was often a varied distribution.
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