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Survey of Mollusks of the Platte River: Final Report

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SURVEY OF MOLLUSKS OF THE PLATTE RIVER

FINAL REPORT

March 1992

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University of Nebraska State Museum

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Sioux Falls College

Project funded 1990/1991 by the U.S. Fish and Wildlife Service,
Grand Island, Nebraska
Attention: Mr. David Bowman
Mr. John Sidle

Survey of Mollusks of the Platte River

Summary

A survey of the mollusks of the Platte River was carried out during the summers of 1990 and 1991. With the exception of the Big Bend Reach of the River in Dawson, Buffalo and Hall counties, no unionids (mussels) were found in the main channel of the river. We found 11 species of mussels along the river and 16 species of snails at 49 different sites from east to west across the state. We found the Asiatic clam, a known, non-native, pest species, for the first time in the state placing it several hundred miles west of the present eastern population of eastern Iowa and Missouri. Two species of snails surveyed are the first records for the state. Because very little past work has been done on the mollusks, we have little with which to compare present distributions. We think the lack of mussels east of the Big Bend Reach may be related to the lack of diversity of habitat along the river and to the increase in urban and cultural activities. All specimens are being curated and housed at the University of Nebraska State Museum and will serve as the benchmark study against which future surveys and monitoring of the mollusks of the Platte can be compared.

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Introduction

The survey on the Platte for mollusks was done over two summers, 1990 and 1991. Mr. Keith Perkins, Associate Professor, Sioux Falls College, SD, did the collecting, identification, sorting and early curation. Dr. Patricia Freeman, Curator of Zoology, University of Nebraska State Museum, supervised the project and organized the results for the final report.

Forty-nine sites along the Platte River in Nebraska were surveyed for mollusks. Of that total, 27 or 55% had no unionid mollusks (mussels). This 55% is concentrated on either side of the Big Bend Reach in the river. The remaining 22 sites had eleven species of mussels in varying degrees of abundance. These species do occur in other places near the Platte River but were rarely found in the main channel of the River. One of these mussels, the Asiatic clam (*Corbicula fluminea*), and an introduced species was found not only in Stagecoach and Wagontrain Lakes near Lincoln and away from the Platte but also in Cozad Canal in Dawson County, which is part of the Platte system. The density of this species should be monitored because it is a known pest in high densities and can clog pipes and irrigation canals. Two other significant notes have to do with diversity. Several small sites are lumped for collection site #19 (Fig. 1, Table 1). This site represents samples from the north and south channels of the Platte near Grand Island. Site 19 is noteworthy because it contains not only a high diversity of unionid mollusks but also a high number of individuals. These are significant populations and are healthy refugia. However, in dry years such as summer 1991, even the clear, spring fed south channel at this site was severely dewatered with some areas completely dry. In contrast, Perkins surveyed a stretch of the Missouri from Child's Point in Bellevue to Plattsmouth. The Child's Point site is an historically important Native American site where mollusks regularly occurred in the diet and were abundant. No unionids whatever were found in this stretch of the Missouri.

Geographic diversity

Normally there is greater diversity of species of mussels toward the mouth of a river (Cvancara, 1970), but this is not the case here. We suspect there are at least two reasons for this in the Platte. First, there are fewer backwaters and generally less diversity of habitat in the Platte from the mouth to the Big Bend Reach in Hall County and second, there is greater human activity east of Hall County especially from Columbus and Fremont on to the mouth. With more urban and cultural activity there would be an increase of mud, toxins, and organic compounds accumulating in the river and less distance for the water to cleanse itself before it reaches the mouth. Other reasons could include sampling bias where it was difficult to get permission to sample private lakes or sand pits near the river on the eastern end of the river. Finally and although there is scant information on early surveying of mussels on the Platte, it does appear that Aughey collected snails on the Platte for his 1877 report. He reports no mussels coming from the Platte but he does list certain species in "all streams in Nebraska," or "all tributaries of the Missouri in Nebraska," "all streams in eastern Nebraska," "all the Nebraska Rivers." We have no idea of the abundance or rarity of mussels in the Platte but we assume the presence of at least some of the eleven species we see today.

The Big Bend Reach has greater diversity of habitat with its channels, backwaters, and sandpits. West of this area we may be seeing the natural decrease of diversity as we move away from the mouth of the River as well as the western extent of known ranges for many of these animals which have an eastern continental distribution.

Diversity and abundance of species

Widespread and abundant category

We have divided the eleven mussel species into two groups based on abundance. Five are considered widespread and abundant and the remaining six are rarer. In the widespread category are Anodonta grandis grandis and Lasmigona complanata (Figs. 2, 6), both of which are not only widespread but are also species very tolerant to adverse environmental conditions and substrates. Anodonta grandis grandis can grow to be quite large. When it inhabits rivers it prefers quiet water with a mud or mud/gravel substrate. It will also adapt to lake environments and is common in Lake McConaughy. Lasmigona complanata is typically found in rivers that have large-river characteristics, namely ones that are sluggish and turbid with mud or mud/gravel bottoms (Oesch, 1984). A third species, Potamilus ohioensis (Fig. 9), is expanding its range and increasing in number. It is a known colonizer of sections of rivers that have been dredged. This species prefers shallow water with a good current but thrives in a variety of substrates (Oesch, 1984). These first three species have broad continental distributions and are abundant.

In contrast, Quadrula quadrula, "maple leaf" and the single most abundant mussel in the Platte proper, is a species on the western edge of a more eastern continental distribution. This mussel is a thick-shelled mussel and one of potential commercial value (pearls and buttons, Fig. 10). Quadrula quadrula favors large rivers and rivers with large-river characteristics but can also adapt to lakes where conditions are appropriate. Rivers it inhabits can be clear or turbid and the substrate can range from small to medium gravel or rocks with or without mud in between (Oesch, 1984).

Anodontoides ferrusacianus (Fig. 4) is somewhat of a surprise because it was not expected to be as widespread as it is. This species usually is an inhabitant of small water, particularly of clean, headwater streams, small streams or clear, unpolluted lakes (Oesch, 1984). This species was abundant in the Big Bend Reach particularly the South Channel in Hall County, Bassway Strip in Buffalo County and the Willow Island area.

More restricted and less abundant category

In the rarer category are six species that for one reason or another - substrate, distributional extreme, exotic species - are not as common. Unio merus tetralasmus is a true prairie species as opposed to being found broadly over the United States (Fig. 12). As a prairie species it is frequent in the lakes and streams in the eastern part of the state and was found in the south channel of the Platte. Although not abundant it is probably holding its own as a species typical of this area. It has been listed by at least one author in Missouri as endangered. The preferred habitat of this species is

mud bottom lakes or quiet-water such as sloughs, oxbows, and pools of rivers and streams (Oesch, 1984). Anodonta imbecilis (Fig. 3) is a thin-shelled mussel that thrives in soft substrate where it readily adapts to a pond or lake environment. When inhabiting rivers it favors quiet backwaters with a substrate ranging from sandy to muddy (Oesch, 1984). Along the Platte it tends to reach greater numbers in lakes but is found in backwaters along the Big Bend Reach. If there is a mussel that cranes could eat it would be this species, because of its thin shell. In lakes it can be dug up by the handfuls from the mud.

In contrast is a tougher-shelled, smaller mussel, Corbicula fluminea (Fig. 5), the Asiatic Clam, which was found for the first time in the state both in lakes in Lancaster County and also in Cozad Canal in Dawson County. This is an introduced pest species known to clog pipes and irrigation canals and be abundant in thermal plumes associated with power plants. Corbicula is easily transported in the veliger stage in minnow buckets. Its flesh is also used as fish bait. As a very adaptable species it thrives in a broad variety of habitats. It does seem to prefer a substrate of small to medium-sized, stable gravel in swift water but also does well in lake environments (Oesch, 1984). The record in Nebraska denotes the westernmost specimens of the eastern population of this species, whose closest members are in eastern Iowa and central Missouri. Although Nebraska winters are probably too cold for this species, its presence in the state should be monitored.

The native species, Leptodea fragilis (Fig. 7) is another that is on the western edge of a more eastern continental distribution. This species can be found in small streams and large rivers with pure mud substrate or mud/gravel or gravel or sometimes pure sand and the water can be clear or murky (Oesch, 1984). We would have expected Leptodea in greater numbers. An earlier study reported this to be a regular inhabitant in the South Channel in Hall and Buffalo counties but this study found only a single, freshly dead specimen. It was common in the Schramm Aquarium ponds in Sarpy County. This species may well be rarer because of distributional limitations.

Two final species were expected in greater numbers but were not abundant. These were Potamilus alatus and Strophitus undulatus undulatus (Figs. 8, 11). Potamilus alatus is normally found in medium to large rivers and though seldom abundant is very widespread. It prefers almost any substrate in slow to swiftly moving water and will adapt to lake or river-lake conditions (Oesch, 1984). Continentally, its distribution is north, south and east of the state. Our only record is from Schramm Aquarium ponds in Sarpy County which is actually an artificial situation. Why this species was not found in the Platte is something that should be investigated in the future. Finally, Strophitus should also have been more abundant. In Missouri it is found in all the major rivers and small to large streams. It prefers gravel or gravel/mud bottoms in flowing water (Oesch, 1984). Though reported as being present in the South Channel of the Platte in Hall and Buffalo counties by Roedel (1990), we only found a worn half-valve in that area and are still tentative of its identification. We would have expected more of these and of the few vouchers saved from the previous study no Strophitus could be identified by either us or David Stansbery at Ohio State. There has either been a misidentification of the earlier specimens or the population in the South Channel has disappeared. This species was found nowhere else along the Platte or in other bodies of water that were sampled for this study.

We do not know past distributions of mollusks and little material exists from the past. We have received a tentative unpublished list of molluscan species in the state done by J. B. Burch at the University of Michigan and Shi-Kuei Wu at the University of Colorado. This list was put together primarily from the literature (a list containing only eight citations) although Dr. Wu has collected some gastropods from the state. There has never been a comprehensive survey of the mollusks of Nebraska.

Thus far Perkins has identified 16 species of snails from the Platte Valley (Table 2). Of the sixteen species, four are freshwater and the remaining twelve are land snails. Of the aquatic snails Physella gyrina was very common and will probably be found throughout the length of the river. Physella grazes on algae in shallow sandbar pools or anywhere the current is slow enough to allow detritus to settle or algal masses to accumulate.

The two species in the Family Vitrinidae are new records. Retinella indentata (Say, 1923) is a species found in eastern deciduous forest. It was not unexpected but it is a first record for the state and not on the Burch list. The continental distribution is north, south, east and west of Nebraska. A second species in this family is Paravitrea simpsoni and also typical of deciduous forest. However, a record of it in Nebraska puts it several hundred miles west of its current distribution, which is east and south of Nebraska, in Missouri, Arkansas and Oklahoma.

We consider the list of snails to be a preliminary list. Many species can only be identified by examining the soft tissue and radula because the shells can be polymorphic. Because the parts in question must be mounted for microscopic examination, identification is proceeding at a slower rate. Any additions to this list will be compiled for an addendum to this report.

Other Activities

Directly related to this project was the popularization of material for the public. In 1990 we arranged to have the first account of a mollusk in the Nebraska Fauna section of Nebraskaland magazine. This magazine has the second greatest circulation after the Omaha World Herald in the state. Perkins wrote the account on the Fragile Heel-splitter, Potamilus ohioensis, and Mark Marcuson, museum artist, painted the picture which was published in the Aug./Sept. issue (see Appendix).

In the summer (1991), Perkins was the featured speaker for the July "Sunday Afternoon with a Scientist Program" at the Museum where his topic was "Clamming around the Platte." Several hundred visitors came (331 adults, 202 children and 44 students) and were presented with a handout on clams, a map, a copy of what kind of field notes to take when finding a specimen, and a look at specimens of clams both alive and dead (Appendix).

References

- Cvancara, A.M. 1970. Mussels (Unionidae) of the Red River Valley in North Dakota and Minnesota, USA. *Malacologia*, 10: 57-92.
- Oesch, R.D. 1984. Missouri Naiades, A guide to the mussels of Missouri. Missouri Dept. Conservation, Jefferson City, 270 pp.
- Roedel, M.D. 1990. Unionid molluscs in the Big Bend Reach of the Platte River, Nebraska. *Prairie Nat.*, 22: 27-32.

Table 1

Collection Sites		Unionids coll. Y/N	Gastropods coll. Y/N	Species From Site
Site # on map	Site Locality			
1.	Missouri R. bet. Child's Pt. and Plattsmouth, NE, Sarpy County	Y	N	No unionids were found, gastropods not collected.
2.	Platte R. from its mouth 3 miles upstream Sarpy County	Y	Y	No unionids were found. <u>Physella gyrina gyrina</u> <u>Gyraulus deflectus</u> <u>Planorbella trivolis trivolis</u> <u>Vallonia costata</u> Pupillidae <u>Succinea (ovalis)</u> <u>Helicodiscus parallelus</u> <u>Anguispira alternata</u> <u>Retinella indentata</u> <u>Paravitrea simpsoni</u> <u>Derocerus laevis</u> <u>Mesodon thyroideus</u> <u>Stenotrema leai</u> <u>Triadopsis multilineata</u>
3.	Platte R. State Park and Schramm Aq. area in Sarpy Co. - from aquarium ponds	Y	N	<u>Anodonta grandis grandis</u> <u>Potamilus alatus</u> <u>Leptodea fragilis</u> <u>Lasmigona complanata</u> <u>Uniomereus tetralasmus</u>
4.	Platte R. where Salt Crk. enters Cass Co., NE, east of Ashland	Y	Y	<u>Quadrula quadrula</u> snails not yet done
5.	Platte R. where NE 92 crosses at Venice, NE, Douglas County	Y	N	No unionids were found, gastropods not collected.
6.	Platte R. west of Valley, NE, where NE 64 crosses, Douglas County	Y	N	No unionids were found, gastropods not yet done.
7.	Platte R. south of Fremont, Dodge County	Y	Y	No unionids were found, gastropods not yet done.
8.	Platte R. south of North Bend, NE, Dodge County	Y	N	No unionids were found.
9.	Platte R. south of Schuyler, NE, where NE 15 crosses, Colfax County	Y	N	No unionids were found.

Site # on map	Site Locality	Unionids coll. Y/N	Gastropods coll. Y/N	Species From Site
10.	Loup R. south of Columbus, NE, where NE 81 crosses, Platte County	Y	Y	No unionids were found. <u>Physella gyrina gyrina</u> <u>Succinea</u> sp. More yet to be done.
11.	Oxbow Lake at Isaak Walton League S. of Columbus, NE, Platte County	Y	Y	<u>Anodonta grandis grandis</u> <u>Lasmigona complanata</u> gastropods not yet done
12.	Platte R. south of Columbus, NE, where 81 crosses, Platte County	Y	N	No unionids were found.
13.	Shell Crk. was checked at six different locations, Platte County	Y	N	No unionids were found.
14.	Loup R. south of Genoa, Nance County	Y	Y	No unionids were found. Gastropods not done yet
15.	Silver Crk and Platte R. between Duncan and town of Silver Crk., Platte and Merrick counties	Y	Y	No unionids were found. <u>Physella gyrina gyrina</u> <u>Succinea</u> sp. More to be ID'd.
16.	Platte R. south of Central City, NE, Merrick County	Y	N	No unionids were found.
17.	Platte R. south of Grand Island, NE, where 281 crosses, Hall County	Y	N	No unionids were found.
18.	Crane Meadows on the Trust land, Hall County	N	Y	<u>Oxyloma retusa</u> <u>Derocerus laeve</u> <u>Physella gyrina gyrina</u> <u>Mesodon thyroideus</u> More yet to be done
*19.	This site represents 14 different collections from the N. & S. channels of the Platte between Gibbon, NE (Hwy 10) and Wood River, NE (Hwy 11) the east end is where the S. chan. dumps into Mid. Chan. east of Lilly Sand Gravel; Hall and Buffalo counties	Y	Y	<u>Oxyloma retusa</u> <u>Physella gyrina gyrina</u> <u>Anodontoides ferrusacianus</u> <u>Anodonta grandis grandis</u> <u>Uniomereous tetralasmus</u> <u>Potamilus ohioensis</u> <u>Anodonta imbecilis</u> <u>Lasmigona complanata</u> <u>Quadrula quadrula</u> <u>Leptodea fragilis</u> ?? <u>Strophitus undulatus</u>

Site # on map	Site Locality	Unionids coll. Y/N	Gastropods coll. Y/N	Species From Site
*20.	Bassway strip south of Kearney, NE, Buffalo County. Collections made both in Platte R. proper and in lakes	Y	N	<u>Potamilus ohiensis</u> <u>Quadrula quadrula</u> <u>Anodonta grandis grandis</u> <u>Anodontoides ferrusacianus</u>
21.	Platte R. (S. chan.) south and east of Elm Creek, NE, Buffalo County	Y	N	<u>Quadrula quadrula</u> <u>Anodonta grandis grandis</u> <u>Anodontoides ferrusacianus</u>
*22.	Phelps County Canal, two sites collected	Y	N	<u>Anodonta grandis grandis</u> <u>Potamilus ohiensis</u> <u>Lasmigona complanata</u> <u>Anodonta imbecillus</u> <u>Anodontoides ferrusacianus</u>
23.	Unnamed drainage ditch into S. channel of Platte R. - both lower ditch and river were collected on border between Gosper and Phelps counties	Y	Y	<u>Succinea</u> sp. <u>Physella gyrina gyrina</u> <u>Anodontoides ferrusacianus</u> <u>Lasmigona complanata</u>
24.	Where Plum Crk. enters the Platte R. - both lower creek and river were collected, Gosper County	Y	Y	<u>Succinea</u> sp. <u>Physella gyrina gyrina</u> <u>Anodontoides ferrusacianus</u> <u>Anodonta grandis grandis</u> <u>Lasmigona complanata</u>
25.	J-2 return, Gosper County	Y	N	<u>Quadrula quadrula</u> <u>Lasmigona complanata</u> <u>Anodonta grandis grandis</u> <u>Potamilus ohiensis</u>
26.	Johnson Lake, Gosper County	Y	N	<u>Potamilus ohiensis</u> <u>Anodonta grandis</u> <u>Anodontoides ferrusacianus</u> <u>Anodonta imbecillus</u>
27.	Platte R. south of Willow Island, NE, Dawson County	Y	N	<u>Anodonta grandis grandis</u> <u>Anodontoides ferrusacianus</u> <u>Anodonta imbecillus</u>
*28.	Cozad Canal - two different collections, Dawson County	Y	N	<u>Corbicula fluminea</u> <u>Anodonta grandis grandis</u> <u>Anodontoides ferrusacianus</u> <u>Lasmigona complanata</u> <u>Potamilus ohiensis</u> <u>Quadrula quadrula</u>

Site # on map	Site Locality	Unionids coll. Y/N	Gastropods coll. Y/N	Species From Site
29.	S. Platte R. south of North Platte, NE, Lincoln County	Y	N	No unionids found
30.	State fish hatchery and creek to Freemont Slough south of North Platte, NE, Lincoln County	Y	Y	No unionids found <u>Oxyloma haydeni</u> . <u>Physella gyrina gyrina</u>
31.	S. Platte R. near Paxton, NE, Keith County	Y	N	No unionids found
32.	S. Platte R. near Roscoe, NE, Keith County	Y	N	No unionids found
33.	S. Platte R. near Ogallala, Keith County	Y	Y	No unionids found Snails not yet done
34.	S. Platte R. near Brule, NE, Keith County	Y	N	No unionids found
35.	S. Platte R. near Big Springs, NE, Deuel County	Y	N	No unionids found
36.	S. Platte R. at Colorado border, Deuel County	Y	N	No unionids found
37.	N. Platte R. north of North Platte, NE, Lincoln County	Y	N	No unionids found
38.	N. Platte R. north of Hershey, Lincoln County	Y	Y	No unionids found <u>Oxyloma</u> sp. <u>Physella gyrina gyrina</u> <u>Stagnicola</u> sp.
39.	N. Platte R. in Sutherland canal, Keith County	Y	N	<u>Anodonta grandis grandis</u>
*40.	A total of seven collections at which specimens were found and 4 where none were found including Million Dollar Bay, Spillway Bay, No Name Bay and Van's Lakeside camp; Keith County	Y	N	<u>Anodonta grandis grandis</u> <u>Anodonta imbecilus</u>

Site # on map	Site Locality	Unionids coll. Y/N	Gastropods coll. Y/N	Species From Site
41.	N. Platte R. near Oshkosh, NE, Garden County	Y	N	No unionids found
42.	N. Platte R. near Lisco, NE, Garden County	Y	N	No unionids found
43.	N. Platte R. near Broadwater, NE, Morrill County	Y	N	No unionids found
44.	N. Platte R. near Bridgeport, NE - actually Bridgeport Pits and creek to N. Platte, Morrill County	Y	Y	<u>Anodonta grandis grandis</u> gastropods not done yet
45.	N. Platte R. near Bayard, NE, Morrill County	Y	N	No unionids found
46.	N. Platte R. near Minatare, NE, Scotts Bluff County	Y	N	No unionids found
47.	N. Platte R. near Morrill, NE, Scotts Bluff County	Y	N	No unionids found
48.	N. Platte R. near Henry, NE, Morrill County	Y	N	1/2 old <u>Lampsilis radiata</u> - I broke the shell to bits in bucket hiking back
49.	N. Platte R. across border in Goshen Co., WY	Y	Y	No unionids found Snails need work

*multiple collections from a single numbered site

Table 2

Gastropoda (Snails)

Family:

Genus (species)	Habitat	NE sites 1990/91
-----------------	---------	------------------

Freshwater Snails

Lymnaeidae

- | | | |
|--|---------------------------------------|---|
| 1. <u>Stagnicola elodes</u> (Say 1821)
(<u>Lymnaea palustris</u> Mull) | shallow backwaters
temporary pools | Sarpy Co., Hall Co.,
Platte River Valley |
|--|---------------------------------------|---|

Physidae

- | | | |
|---|---|---|
| 2. <u>Physella gyrina gyrina</u>
(Say, 1821) | shallow backwaters,
slow moving areas
temporary pools | entire length of
Platte River Valley |
|---|---|---|

Planorbidae

- | | | |
|---|--|---|
| 3. <u>Gyraulus deflectus</u>
(Say, 1824) | aquatic | Sarpy Co., Platte
River Valley |
| 4. <u>Planorbella trivolis</u>
<u>trivolis</u> (Say, 1817) | needs hard substrate
rocks are best
logs will do | scattered populations
but present throughout
river valley |

Land-Snails

Valloniidae

- | | | |
|--|--|--------------------------------------|
| 5. <u>Vallonia costata</u>
(Muller, 1774) | in drift line along
Platte near mouth | Sarpy County, Platte
River Valley |
|--|--|--------------------------------------|

Pupillidae

one broken specimen taken in Sarpy County, Platte River Valley

Succineidae

- | | | |
|---|--|--|
| 6. <u>Oxyloma haydeni</u>
(Binney, 1858) | by a shaded creek | along drain stream at
State Fish Hatchery
south of North Platte,
NE |
| 7. <u>Oxyloma retusa</u>
(Lea, 1834) | wet meadows & sand
bars in Platte River
Valley | common in crane meadows
in Hall Co., also good
colonies N. of Hershey,
NE |
| 8. <u>Succinea</u> sp.
(prob. <u>ovalis</u> Say, 1817) | alluvial woods | Sarpy Co., Douglas Co.,
Platte River Valley |

Helicodiscidae

- | | | |
|--|----------------------------------|-----------------------------------|
| 9. <u>Helicodiscus parallelus</u>
(Say, 1821) | drift line along
Platte River | Sarpy Co., Platte
River Valley |
|--|----------------------------------|-----------------------------------|

Family: Genus (species)	Habitat	NE sites 1990/91
<hr/>		
Discidae		
10. <u>Anguispira alternata</u> (Say, 1817)	eastern dec. forest- drift lines along Platte	Sarpy and Douglas counties, Platte River Valley
Vitrinidae (Zonitidae)		
*11. <u>Retinella indentata</u> (Say, 1823)	eastern dec. forest	eastern Platte R. - Sarpy & Douglas Co. at least
*12. <u>Paravitrea simpsoni</u>	dec. forest	eastern Platte R. - Sarpy & Douglas Co. at least
Limicidae		
13. <u>Deroceras laeve</u> (Muller, 1774)	moist areas anywhere	entire length of river valley
Mesodontidae		
14. <u>Mesodon thyroidus</u> (Say, 1817)	eastern dec. forest	Douglas & Sarpy Co. at least
15. <u>Stenotrema leai</u> (Binney, 1840)	floodplain	from Hall Co. east, at least, along Platte R., Platte River Valley
16. <u>Triadopsis multilineata</u> (Say, 1821)	eastern dec. forest	Sarpy Co. at least, prob. eastern counties, Platte River Valley

*not shown by Burch from NE

COLLECTING SITES

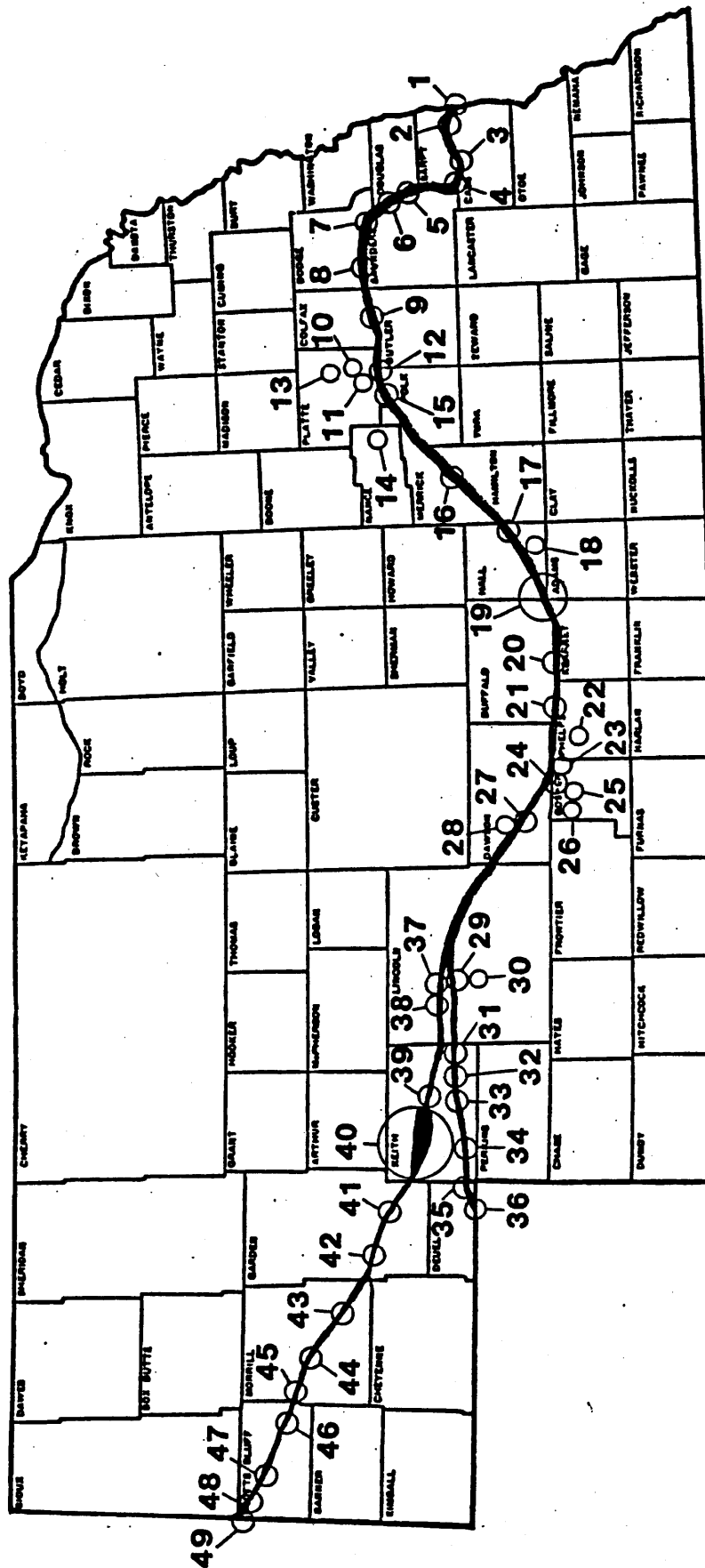


Fig. 1

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

UNIVERSITY OF NEBRASKA STATE MUSEUM

"Giant floater"

Anodonta grandis grandis Say, 1829

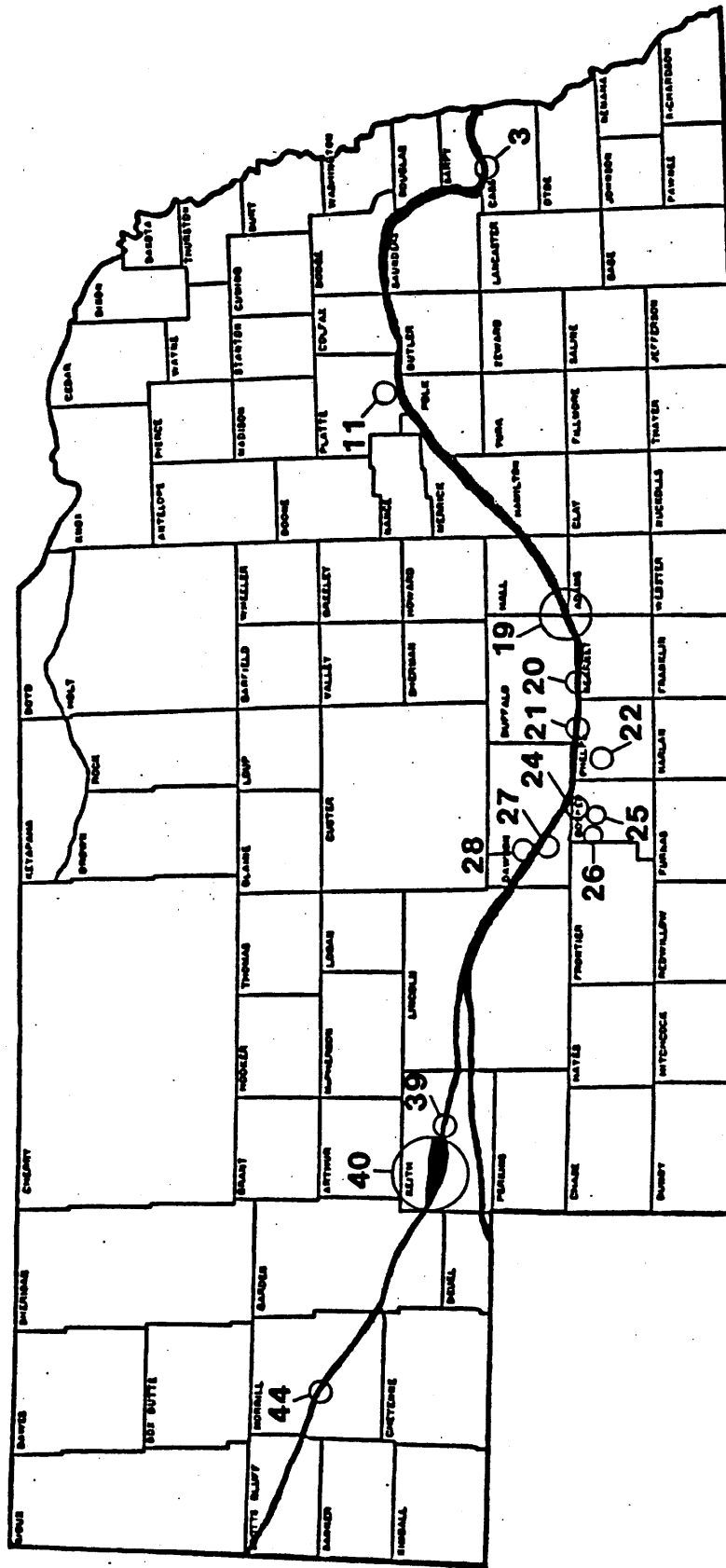


Fig. 2

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

UNIVERSITY OF NEBRASKA STATE MUSEUM

"Paper pond shell"

Anodonta imbecilis Say, 1829

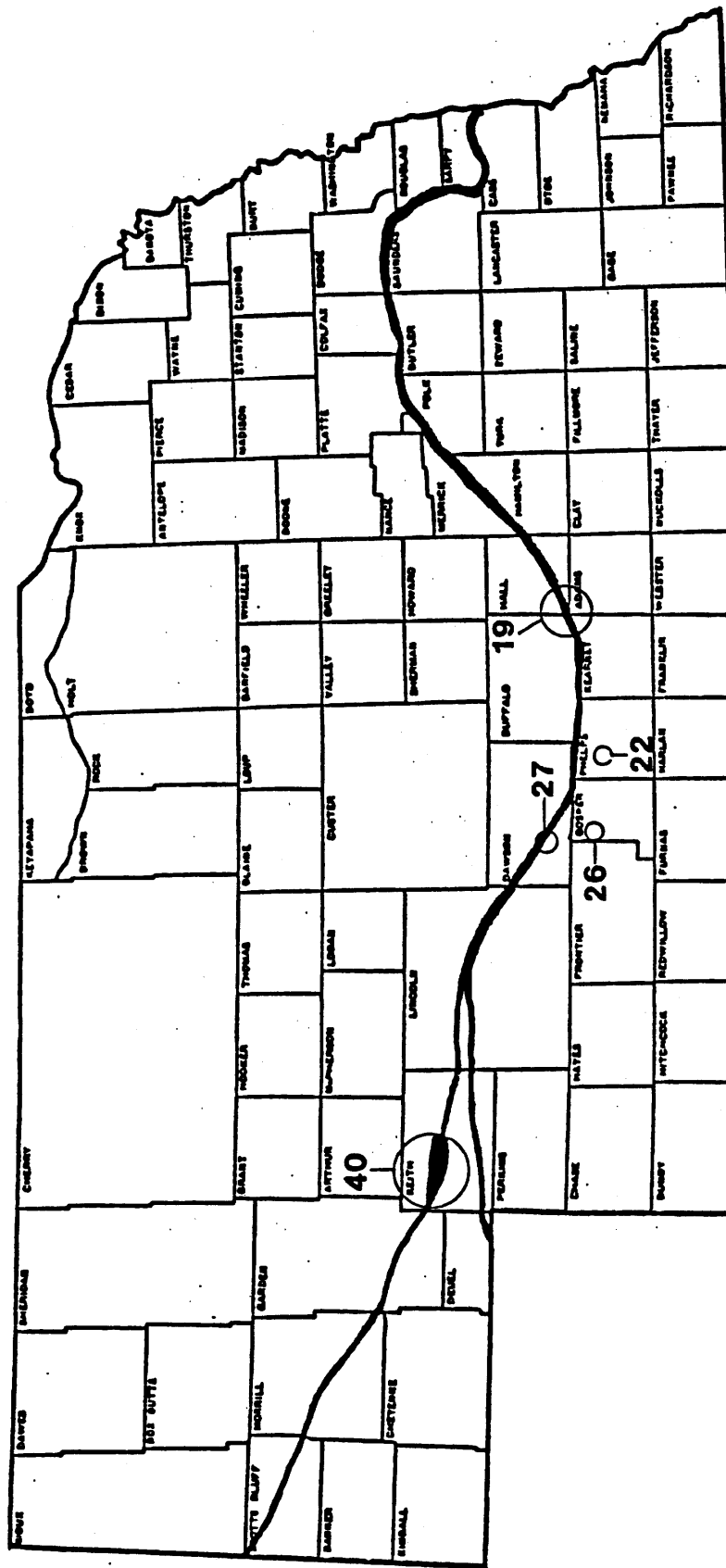


Fig. 3

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins
UNIVERSITY OF NEBRASKA STATE MUSEUM

"Cylindrical paper shell"

Anodontooides ferrussacianus (Lea, 1834)

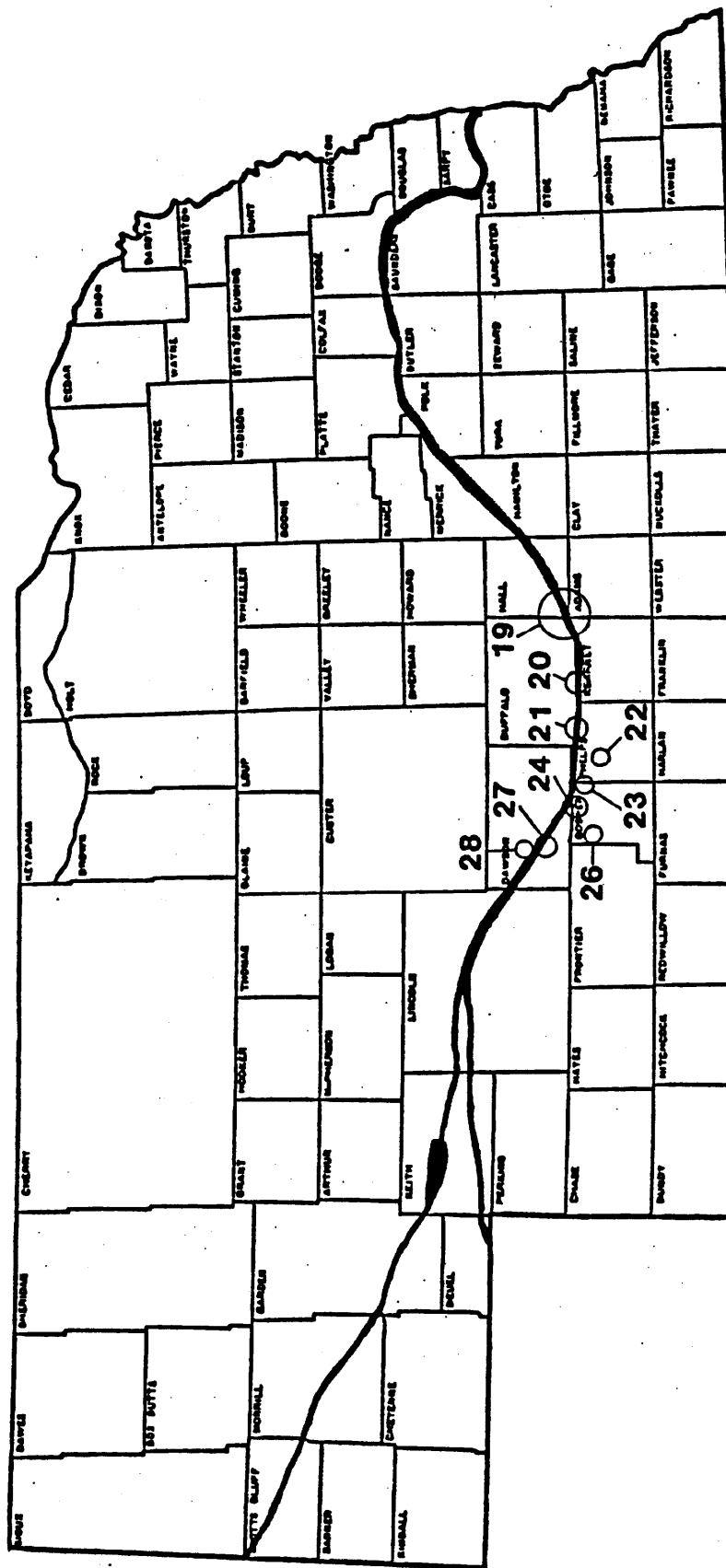


Fig. 4

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins
UNIVERSITY OF NEBRASKA STATE MUSEUM

"Asiatic clam"

Corbicula fluminea (Müller, 1774)

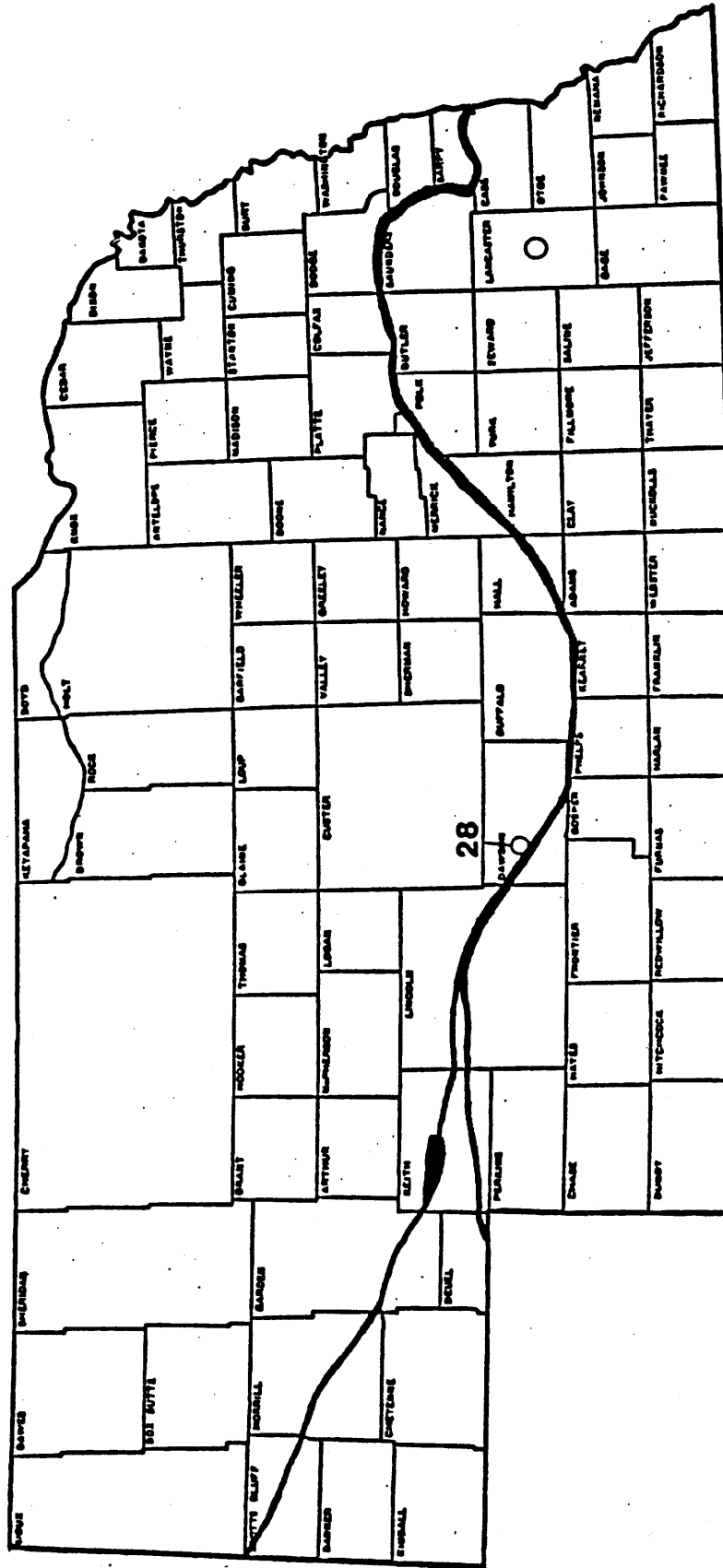


Fig. 5

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

UNIVERSITY OF NEBRASKA STATE MUSEUM

"White heel-splitter"

Lasmigona complanata (Barnes, 1823)

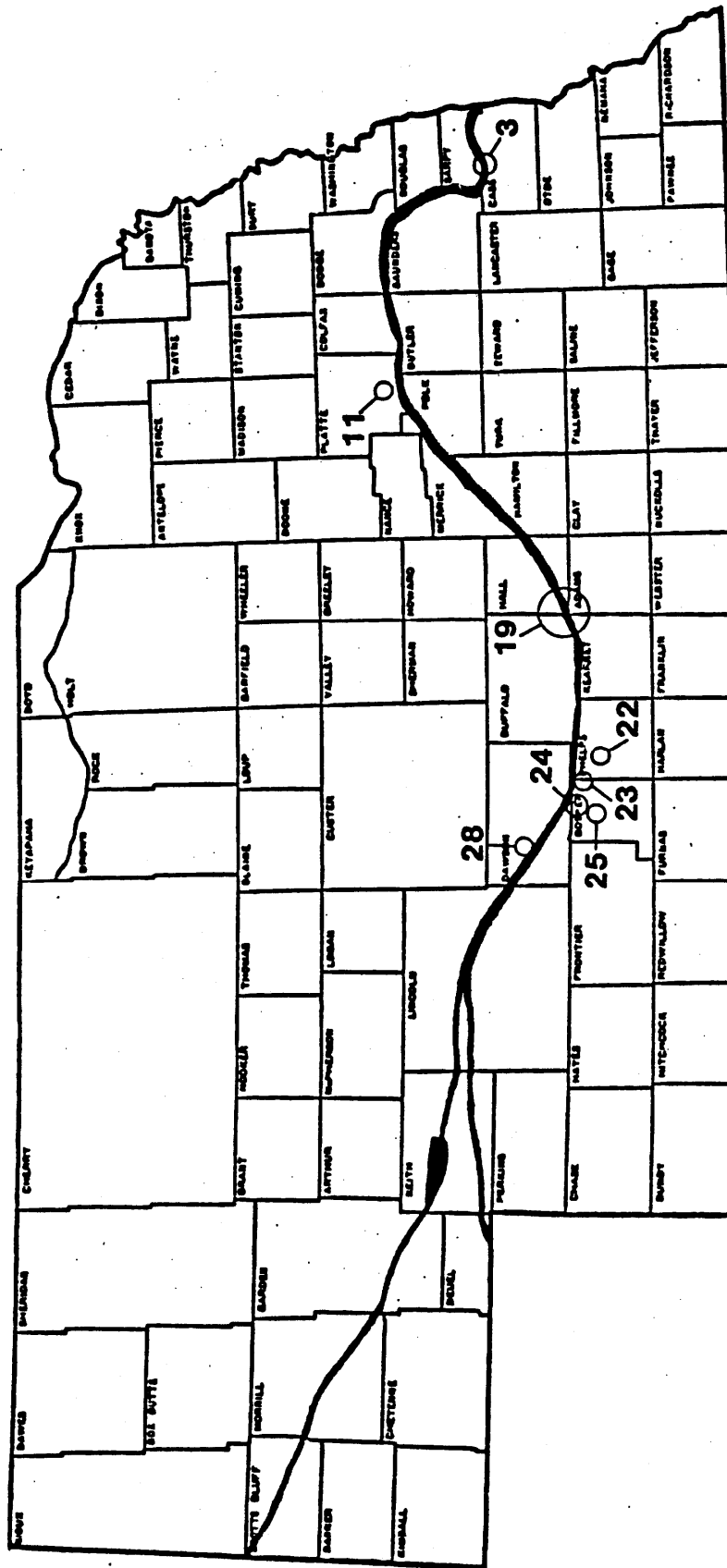


Fig. 6

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

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"Fragile heel-splitter"

Leptodea fragilis (Rafinesque, 1820)

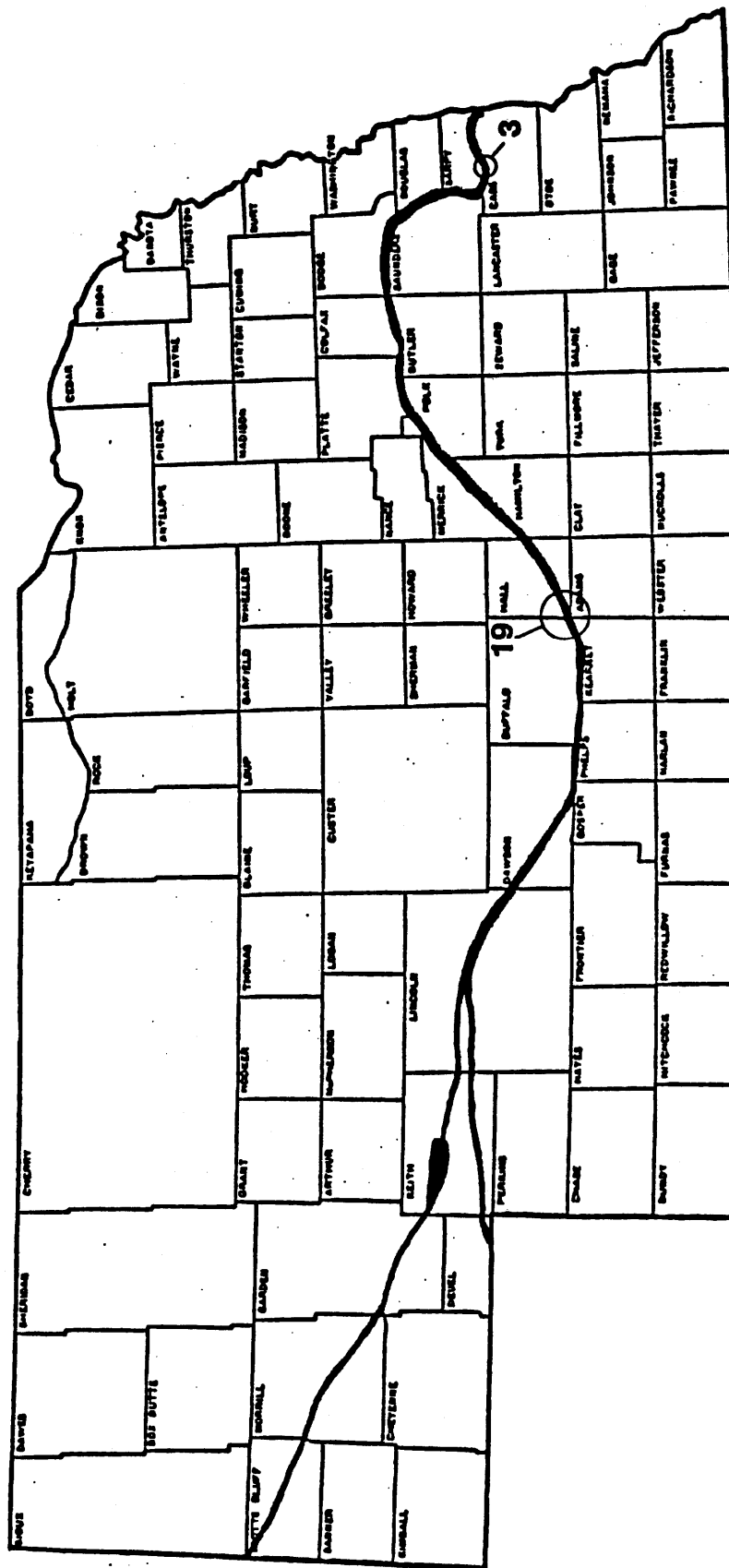


Fig. 7

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

UNIVERSITY OF NEBRASKA STATE MUSEUM

"Purple heel-splitter"

Potamilus alatus (Say, 1817)

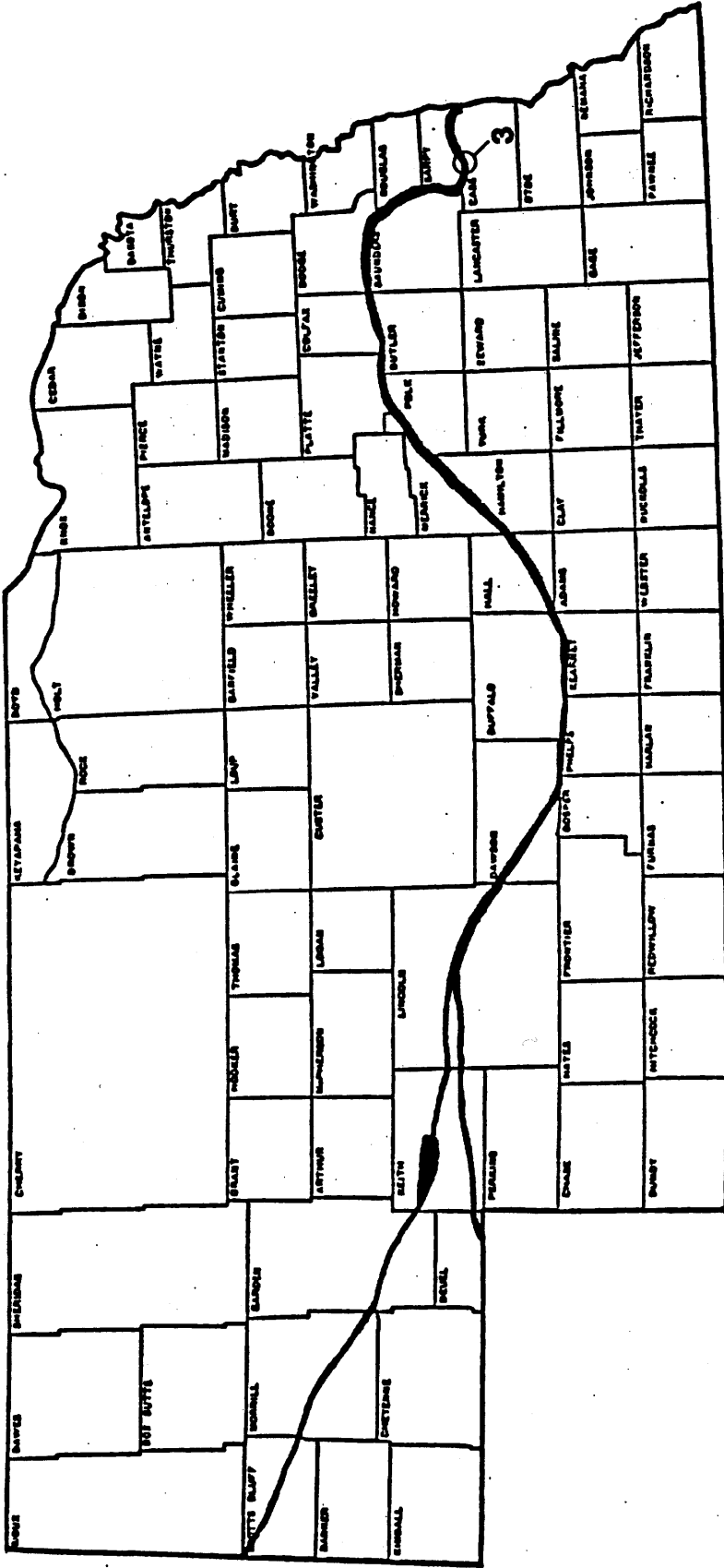


Fig. 8

MOLLSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

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Potamilus ohienis (Rafinesque, 1820)



MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

UNIVERSITY OF NEBRASKA STATE MUSEUM

"Maple-leaf"

Quadrula quadrula (Rafinesque, 1820)

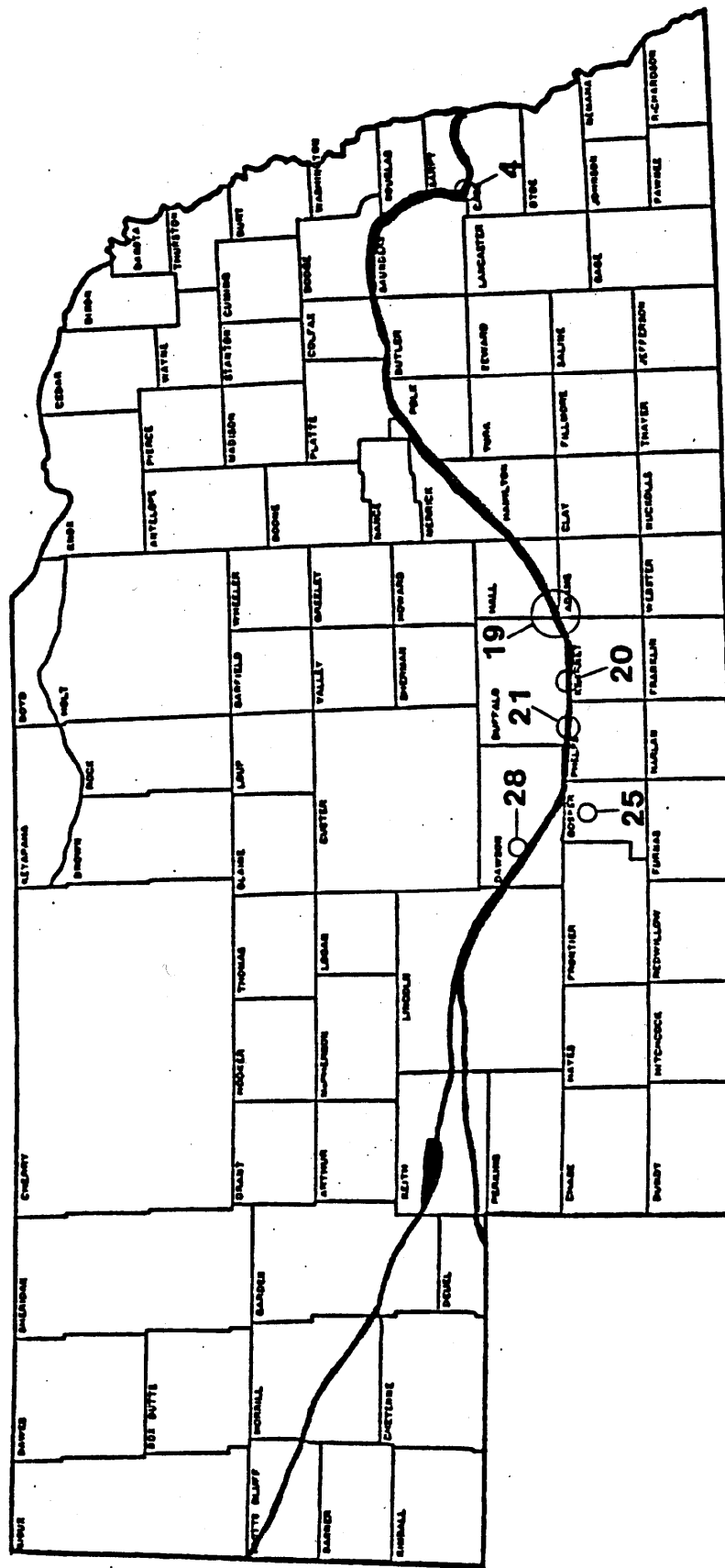


Fig. 10

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins
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"Squaw-foot"

Strophitus undulatus undulatus (Say, 1817)

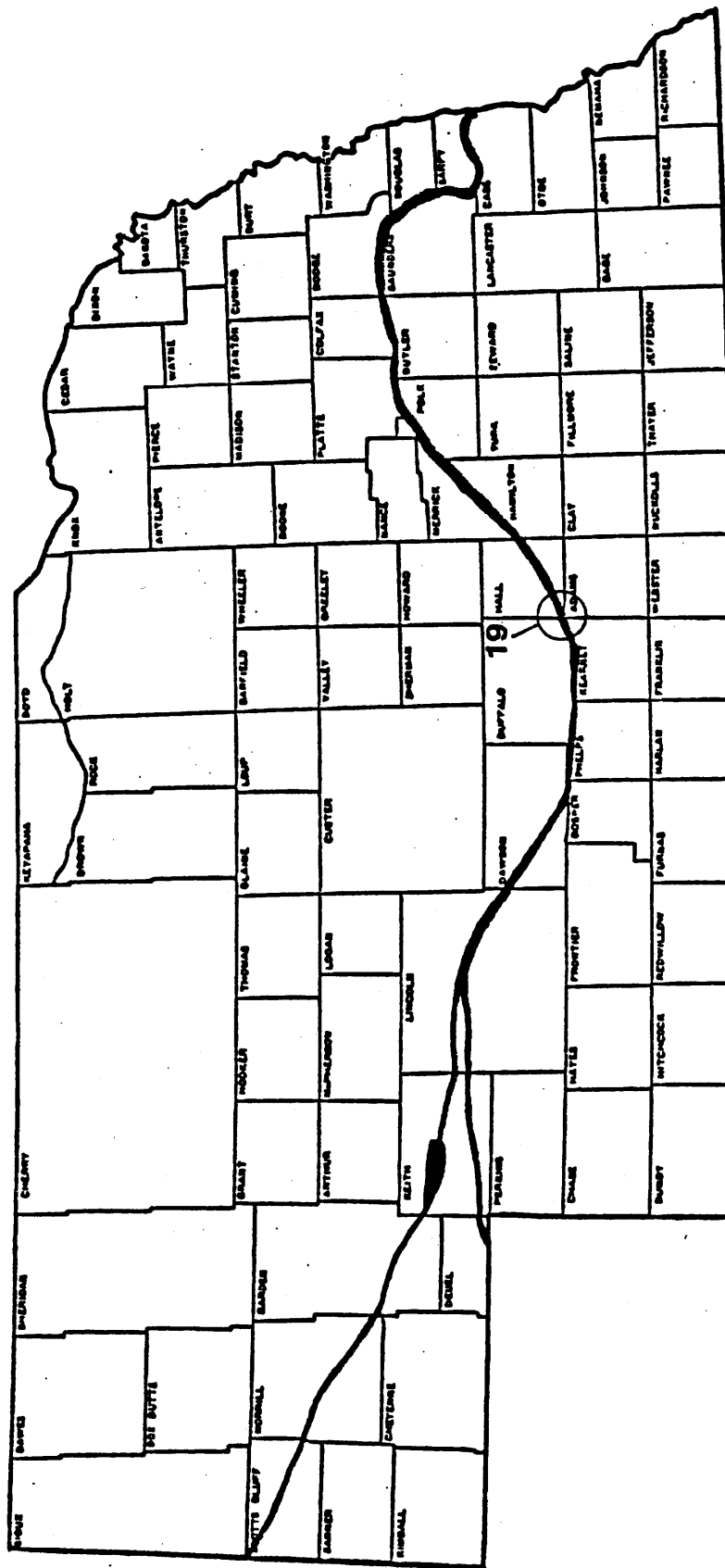
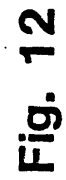


Fig. 11

MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins

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Uniomerus tetralasmus (Say, 1831)



MOLLUSKS OF THE PLATTE RIVER 1992 Freeman and Perkins
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Appendix

Quadrula quadrula (Rafinesque, 1820)

"The Maple Leaf"

The "maple leaf" is the most commonly found mussel in sections of the Platte River containing mussels. Its quadrate shape and nodules distinguish it from other Platte River unionids. The maple leaf is most frequent in larger rivers but is found in small streams and even lakes under certain conditions. The host fish of this mussel is the flat-head catfish (Howard and Anson, 1922).

Anodonta grandis grandis Say, 1829

"The Giant Floater"

The "floater" is a mussel that has much expanded its population even in my time. In the Vermillion River in South Dakota, I found this mussel to comprise 95% of the live unionid fauna but something less than 25% of the previous fauna based on subfossil shells. This mussel fares better than most in the increasingly polluted and silted waterways of today. It can be recognized by its double-looped beak structure, large size, lack of hinge teeth and generally elliptical shape. The host fish for this mussel are numerous and common including carp, yellow perch, bluegill, rock bass, crappie, etc.

Anodontoides ferussacianus (Lea, 1834)

"The Cylindrical Paper Shell"

The shell of this Nebraska naiad very closely resembles a young "giant floater" except that it has a beak sculpture of 3-5 fine bars/lines instead of the double loops of *A. grandis*. This mussel is found in some sections of the Platte River and is always associated with the headwaters of rivers or at least headwater-like conditions. Its presence is usually indicative of relatively good water quality. In Missouri this mussel is considered endangered. There are several host fish species present in Nebraska including the "common shiner," "fathead minnow," "white sucker," and "Iowa darter."

Potamilus ohiensis (Rafinesque, 1820)

"The Fragile Heel-splitter"

or

"The Pink Paper Shell"

(I prefer "Pink Heel-splitter")

The "fragile heel-splitter" is another naiad which is expanding its range and relative abundance. I attribute this expansion not only to an ability to generally resist chemical pollution and siltation but also specifically to its mobility. I say this clam can move. One of relatively few U.S. naiads to have a wing (upward projecting keel) both posterior and anterior to the umboes. The pink nacre tinged with bronze makes this a striking shell although it usually cracks with drying. Freshwater drum and white crappie are commonly cited host fish.

Anodonta imbecilis Say, 1829

"The Paper Floater"

This is an extremely thin-shelled *Anodonta* whose beaks (umboes) do not rise above the hinge line. The "paper floater" adapts well to lake, reservoir, pond and even swamp-like conditions. Some have reported the larvae of this mussel to be parasitic on green sunfish (Tucker, 1927) and creek chubs (Fuller, 1978) while others have claimed that this naiad may retain larvae within the gill tubules until they are ready for direct development without the need for a host fish (Baker, 1928). This mussel is not only found in the Platte but is common in the various impoundments on Salt Creek tributaries south of Lincoln.

Unio merous tetralasmus (Say, 1830)

"The Pond-Horn Shell"

This mussel is a true prairie species being historically associated with prairie rivers, streams and lakes. The single most distinctive feature of the shell of this species is the presence of two grooves with a raised ridge between them on the posterior slope. The Pond-Horn shell prefers mud or sand/mud bottoms of small rivers, streams, oxbow lakes, impoundments and sloughs. The host fish of this species is not known.

"Clamming around on the Platte"

"The ASIATIC CLAM"

Corbicula fluminea (Müller, 1774)

The Asiatic clam is currently the most costly liability of all exotic molluscs in North America (Sinclair, 1971). *Corbicula* is believed to have been introduced into the United States in the late 1930s and was first reported by Burch in the Columbia River in Washington state in 1938. From Washington state *Corbicula* spread south to Baja California and east to Florida. Oesch (1984) states that *Corbicula* reached Missouri in the 1950s, since 1968 has been spreading northwest in Missouri and as of 1984 occupied the southeast half of the state. Oesch (1984) expected the clam to spread over all of Missouri within ten years.

This spring (1991) I found evidence (many dead shells) of a breeding population of *Corbicula* in Stagecoach Lake in Lancaster County south of Lincoln. After a preliminary literature search and a few phone calls, I find no prior reports of this clam in Nebraska. Although transport of larvae or young clams by waterfowl cannot be absolutely ruled out, it is far more likely that *Corbicula* reached Nebraska in the bait bucket of a fisherman; either as bait proper or as larvae in water which came from a stream containing *Corbicula*. The spawning time for *Corbicula* is May to September which roughly corresponds to the fishing season (Oesch, 1984).

The economic significance of *Corbicula* is tied to its biology in that as adults, densities exceeding 25,000 per square foot have been recorded and that as a veliger larvae they are free floating and can gain access to any pipe system carrying untreated water where they attach and develop into adults (Sinclair, 1971). At various times and localities *Corbicula* has created problems in sand and gravel dredging operations, municipal and private water supply lines, navigation channels, condenser lines and irrigation canals. They are difficult to combat because they are able to "clam up" and withstand shock doses of a variety of chemicals.

Although the knowledge of *Corbicula's* presence in southeast Nebraska should not be neglected neither should it evoke any unconsidered response. Most experts seem to consider Nebraska's temperatures too low for unrestrained growth of *Corbicula* populations. Further, drainage of an affected water system will kill *Corbicula* as they are unable to withstand significant periods without water. Further, I have not confirmed living *Corbicula* in Stagecoach - they may have been extirpated by low water during the dry years of the mid to late 1980s.

NEBRASKAland

A black and white photograph of a person standing in a wooded area. The person is wearing a hat and a vest, and is looking towards the camera. They are standing in front of a large, fallen log. The background is filled with trees and foliage. The overall tone is dark and moody.

AUGUST/SEPTEMBER 1990 • \$1.50

Nebraska Fauna

FRAGILE HEELSPLITTER

By Keith Perkins

When wading barefoot in the Platte River or many other Nebraska creeks, rivers, ponds and lakes, be careful not to step on the naiad known as the fragile heelsplitter. "Naiad" is the name properly applied to a freshwater pelecypod (bivalve) mollusc of the order Unionoida, although we all commonly call these animals clams or mussels. The fragile heelsplitter is so named because its shell is relatively thin, and because of the presence in most specimens of a prominent dorsal alae or wing just posterior to the umbo (the raised, swollen portion of the shell—the valve—where growth of the animal began). When the animal is in normal position in the bottom of a river or lake, this wing projects above the surface of the substrate as a potential hazard to barefooted waders. The fragile heelsplitter is one of few U.S. naiads with which I am familiar which also has a wing anterior to the umbo.

Potamilus ohiensis (Rafinesque, 1820) is one of approximately 270 species of naiads that live in the United States. The vast majority of these species are found in the Mississippi River drainage system and several other large southeastern river systems that empty into the Gulf of Mexico independently of the Mississippi. West of Nebraska, very few species of these animals are found. Once my current survey of molluscs in Nebraska is completed, I anticipate I will have found 20 or 30 different species of naiads in the state.

Sometimes exceeding six inches in length, the valves of the fragile heelsplitter are generally elliptical in shape, not including the wings. The periostracum (outer covering of the valves) is smooth, rayless, shiny gray-green to olive to brown, and becomes lighter toward the umbos. The hinge and teeth are relatively weakly developed. The nacre (inner surface of the shell) is pink or purple with a significant bronze tinge.

Reproduction in the fragile heelsplitter is similar to many freshwater naiads in that the males shed sperm into the water

to be drawn into the water tubules of the females' gills. It is into these tubules that the eggs are also shed. Once fertilization is accomplished, early development to a larval stage known as a glochidium occurs. These stages occur from June to July, with the glochidia larva retained in the so-called "marsupium" of the gills through the next winter. The marsupium of *Potamilus ohiensis* occupies a kidney-shaped area of the posterior portion of the outermost of each of two gills on either side of the animal's body. The glochidia are discharged the following May or June. The glochidia attach as parasites to the gills of an appropriate host fish for a period of three to six weeks. The freshwater drum (*Aplodinotus grunniens*) is the most frequently mentioned host fish for the fragile heelsplitter. Since the parasitic stage is believed to be obligatory, the distribution of this naiad (as well as others) may be limited to the distribution of the host fish. Following the parasitic stage, the larva drops from its rather superficial attachment on the host fish to begin its independent life in the substrate.

The fragile heelsplitter is usually found in large streams and rivers, but it is occasionally found in small streams. I have collected this naiad frequently in oxbow lakes. Dr. T. G. Watters, of Ohio State University, informs me that this species sometimes quickly and extensively recolonizes river bottoms that have been dredged (usually to maintain navigation channels). As with all naiads, *P. ohiensis* is a filter feeder that uses its gills to filter algae, protozoans and detritus from the water. This method of feeding renders most naiads rather susceptible to the adverse effects of pol-

lutants and siltation. Indeed, the diversity and relative abundance of naiads in a body of water can often be taken as a rough indicator of water quality. When used in such a way, these animals would be termed "biological indicators." Their presence in a stream indicates relatively unpolluted waters, and their absence should make us suspicious that the stream or river is not healthy.

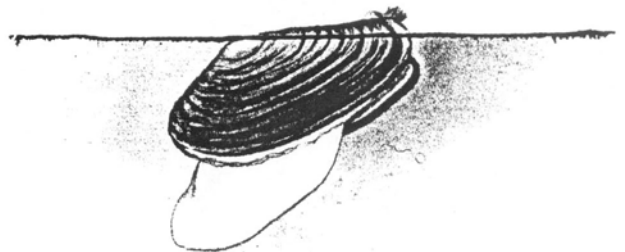
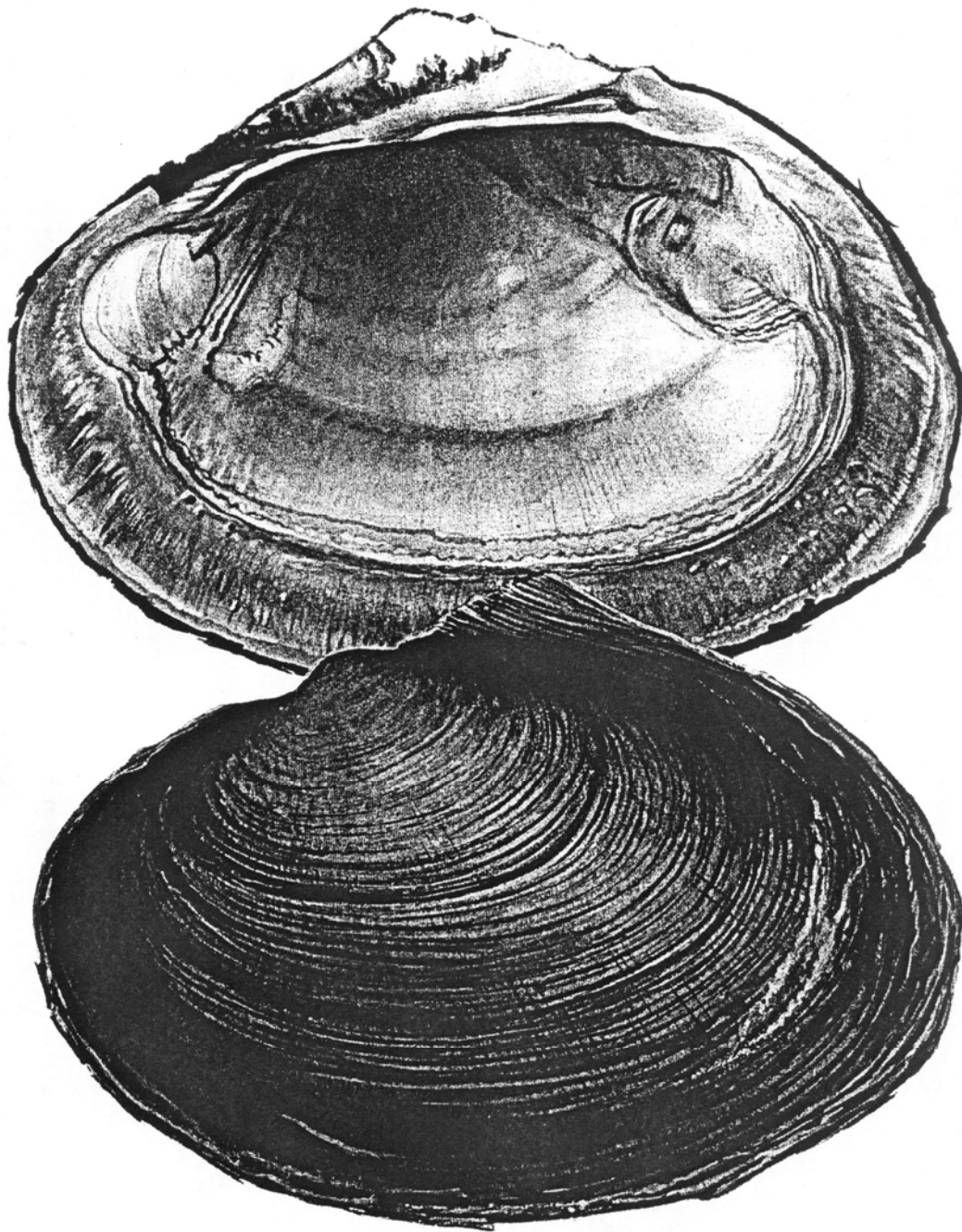
P. ohiensis and other naiads are frequently preyed upon by raccoons and muskrats, the latter often producing large middens of empty shells at favored eating and lounging sites. Dead shells and some live specimens often bear claw, scratch or tooth marks from this predation. We know that freshwater naiads were extensively utilized by Native Americans and early settlers as a food source, because the shells are consistently present in archeological digs associated with these people.

Shell collectors have long collected freshwater naiads, although probably not as frequently or extensively as land snails or sea shells. These collectors are interested in the aesthetic beauty and diversity of these animals, and may, on rare occasions, find a freshwater pearl.

In the past, shells of naiads were used for buttons, but since World War II and the advent of plastics, this use is much less common. Today, shells are harvested for shipment to Japan where they are cut into small spheres to act as nuclei for cultured pearl production in oyster beds. Currently, the possibility of raising cultured pearls in freshwater naiads is being investigated.

As with most Naiads, populations of *Potamilus ohiensis* are suffering from man's cultural influence and alteration of habitat. Although naturally widely distributed, this species is seldom common in Nebraska, and is considered endangered in Ohio. For this reason and in light of our new-found interest in maintaining the state's biodiversity, shell collections should be limited to dead shells, which can be every bit as beautiful as those collected alive. ■

Keith Perkins, Associate Professor of Biology, Sioux Falls College, Sioux Falls, SD is surveying molluscs of the Platte River, sponsored by the University of Nebraska State Museum, and funded by the U.S. Fish and Wildlife Service. Illustration by Mark Marcuson, Scientific Illustrator for the University of Nebraska State Museum.



MARK E. MARCUSON

Freshwater Mussel Collecting Information Sheet

(please collect dead shells only)

Name of Collector(s): _____

Collector's Address: _____

Collector's Phone Number: _____

Name of Body of Water: _____

Location (where is this body of water as precisely as you can tell us):

County: _____ State: Nebraska

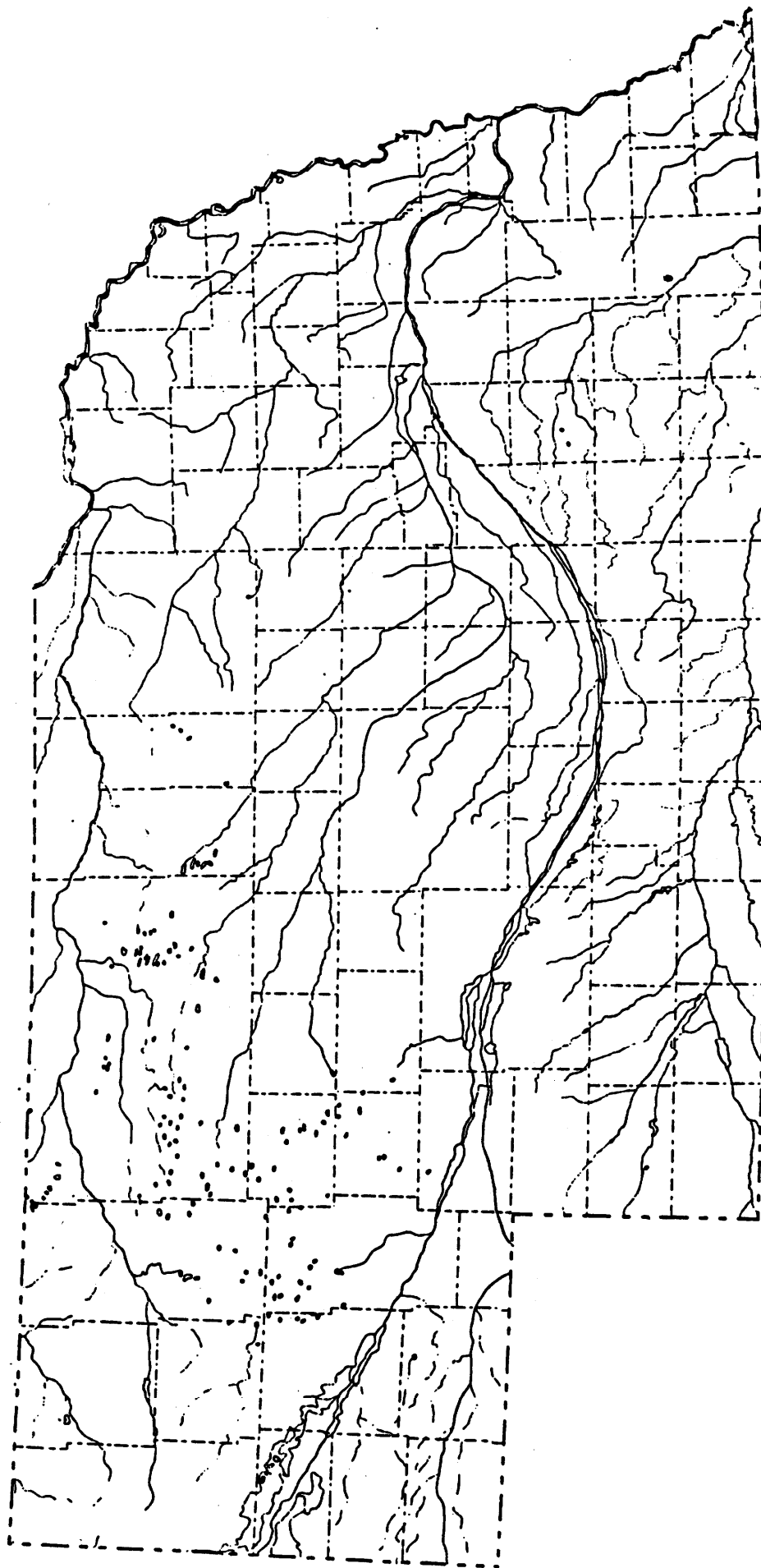
Date of Collection: _____

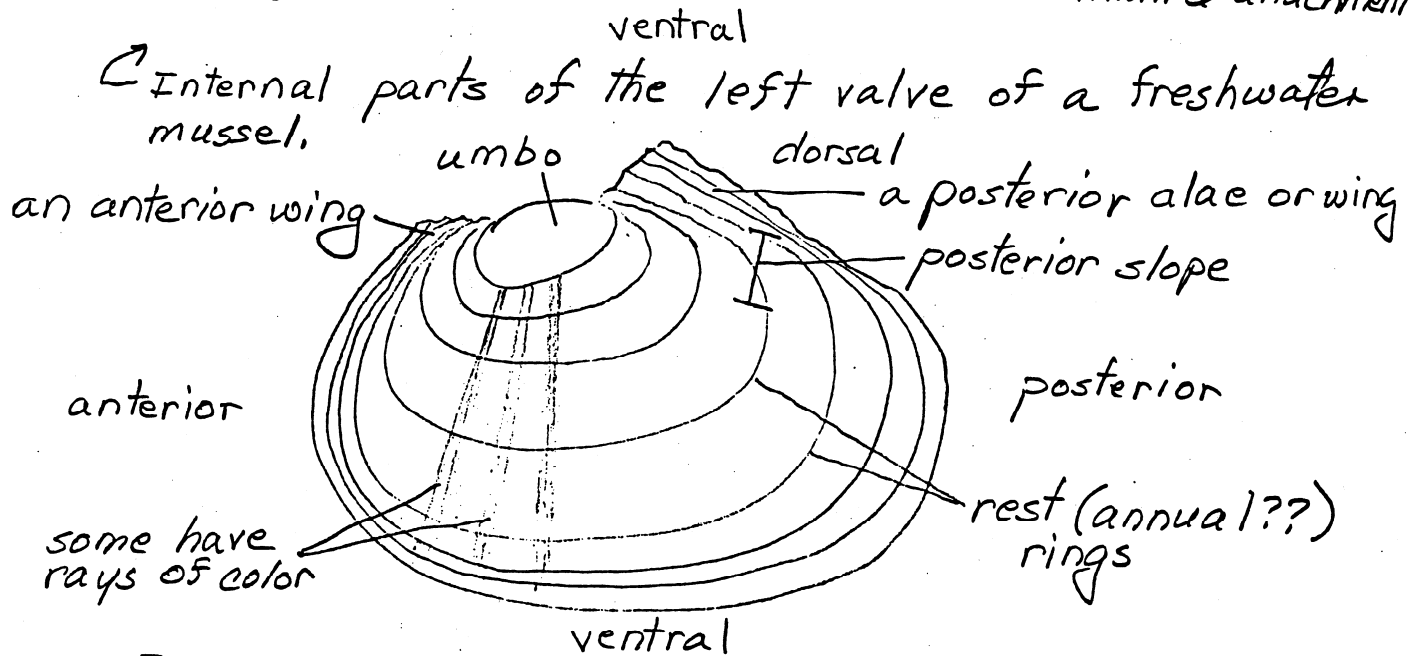
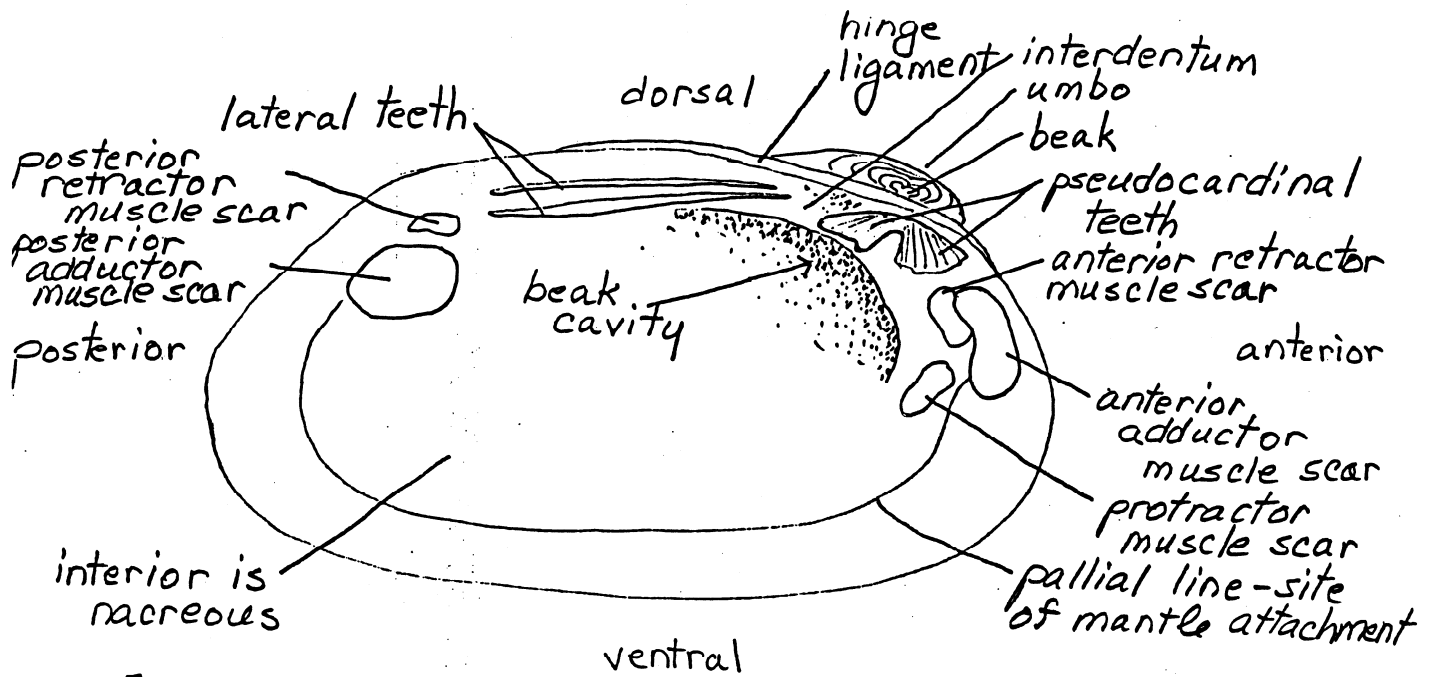
Shipping Specimens

Please pack dead, dry shells well in newspaper (or other suitable packing material), as these shells are very fragile, in a sturdy box. Mark "fragile" on the exterior. Send specimens postpaid (I'm afraid I must ask you to pay postage; the University cannot accept C.O.D. materials) to:

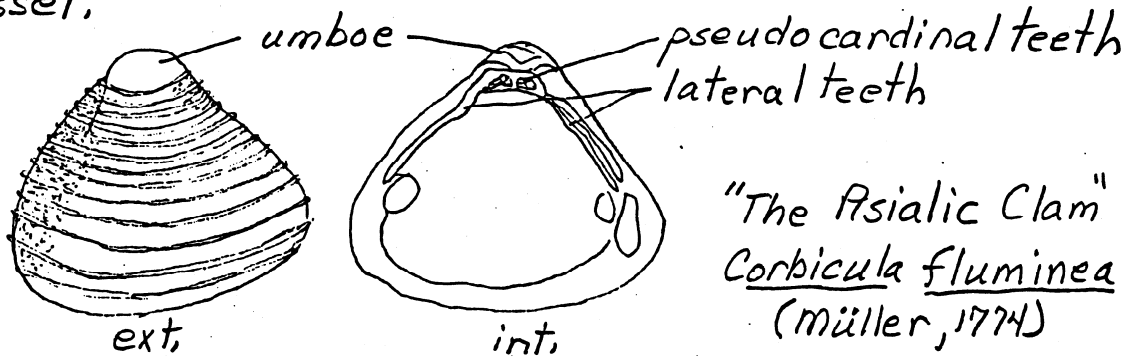
Division of Zoology - CLAMS
University of Nebraska State Museum
Systematics Research Collections
W436 Nebraska Hall
Lincoln, NE 68588-0514

Please make an "X" as close to the collecting site as possible on the drainage map on the back of this sheet.





External parts of the left valve of a freshwater mussel.



"The Asiatic Clam"
Corbicula fluminea
 (Müller, 1774)