

# Wisconsin's Freshwater Mussel Resource

## *Biology, History, Challenges and Opportunities*

Kurt Welke

Fisheries Manager



## SUNNY SIDE WINS

### You, Inc.

**Susan Abrams**  
**Northwestern University**  
**Valuable Real-Life**  
**Proven Success Rules**  
**For Women...and Men**

**H**ere are top strategies from presidents, CEOs and other leaders for achieving career goals...

**Dare to be passionate.** Passion helps you do your job well despite its ups and downs. Your enthusiasm inspires others, too.

**Let people know where you want to go.** Discussing your goals with others helps you determine how to achieve them...and enables those others to assist you.

**Seek feedback.** Most workers

Susan C. Vaughan, MD, *Columbia University*

# Optimists Live Better Lives than Pessimists

## The Secrets of Happiness...



**T**o pessimists, the “movie of life” is a documentary that has an unchangeable script.

Optimists grab the story line and become directors. They edit, refocus and add color to concoct a brighter, happier picture. This hopeful, in-control attitude shields them from outside influences

who have more may trigger a sense of deprivation. But a contrast with those who are less well off makes us feel fortunate.

**Example:** In the film *My Life as a Dog*, the main character, a young boy, endures painful times by assuring himself he’s doing better than Laika, the Russian space dog lost in the cosmos.

• **Avoid negative influences.** Will-

# Cultural



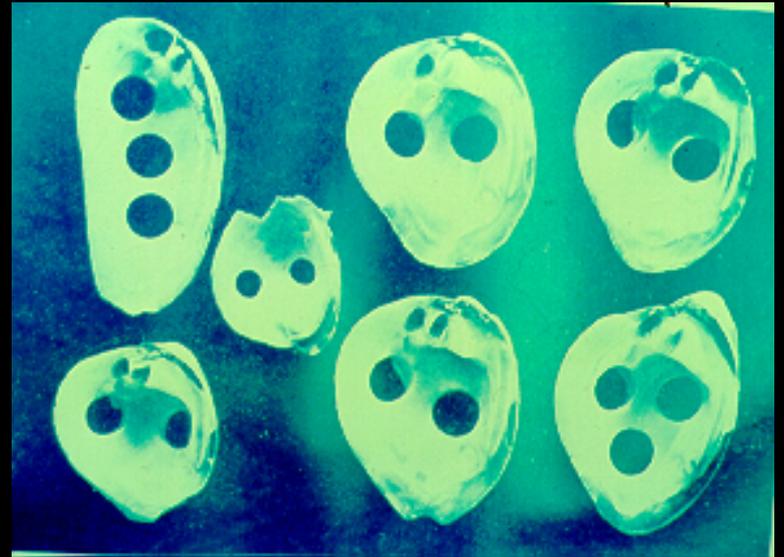
# Archeological



# Ancient History



# Contemporary History



# Economic

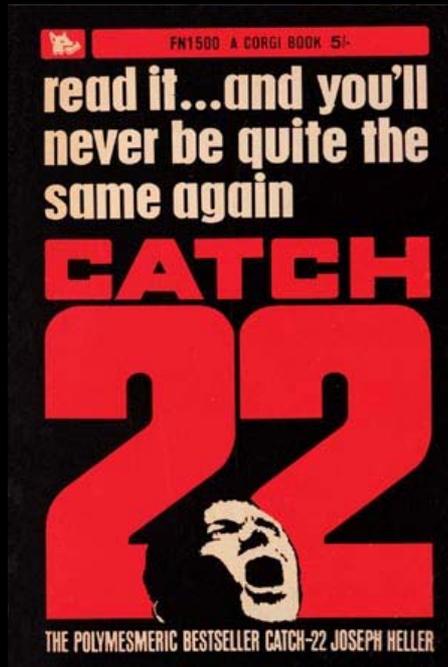




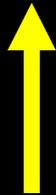
© M. C. Barnhart 2002







Prices \$



Supply



Kingdom...Animalia

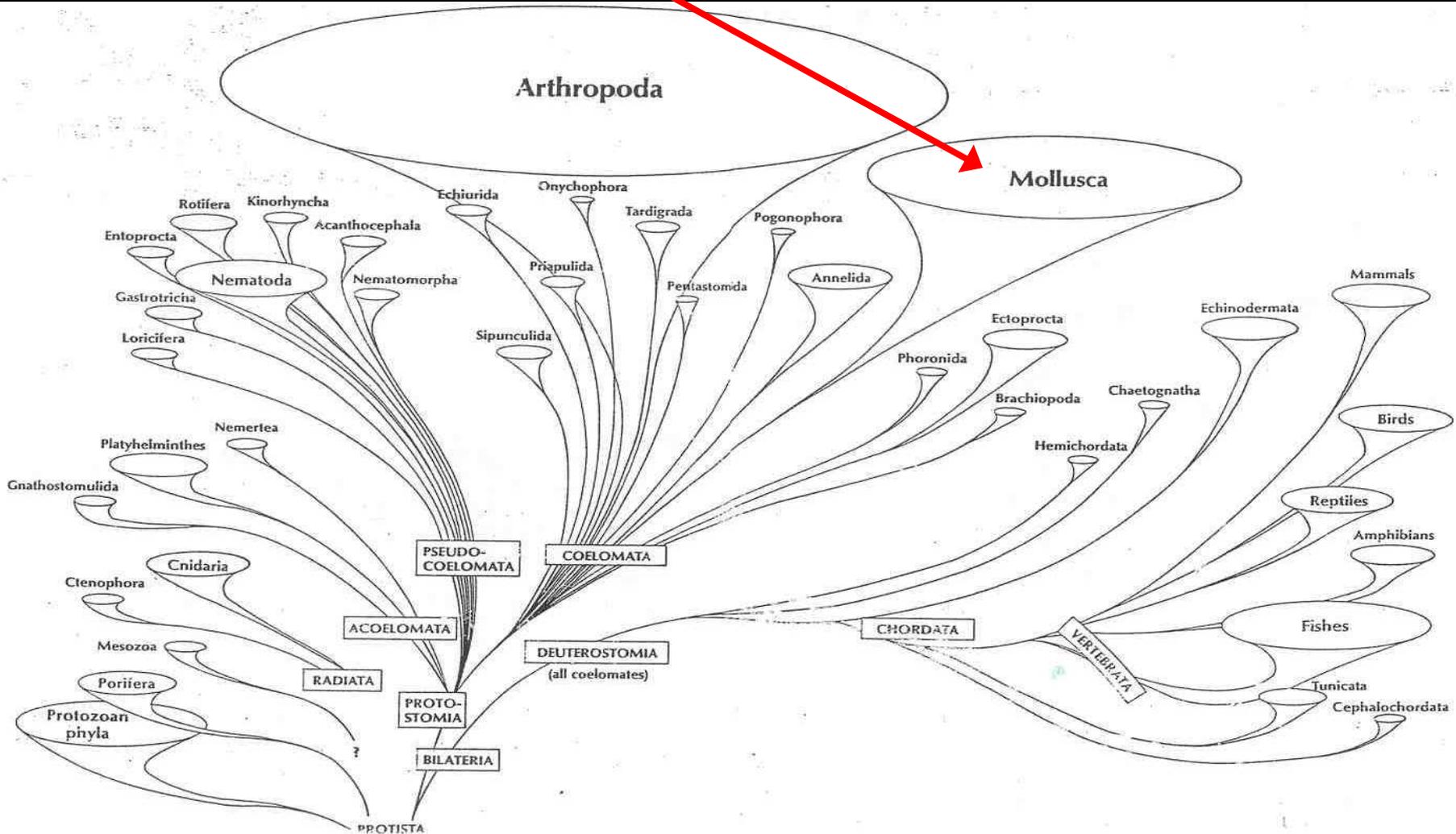
Phylum...Mollusca

Class... Bivalvia

Order... Unionoida

Family... Unionidae

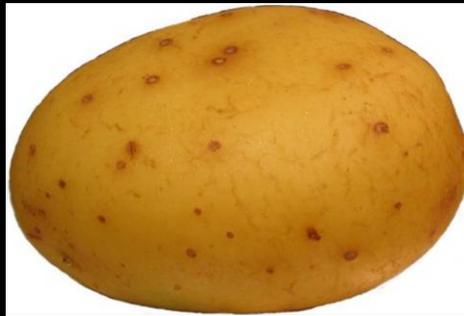
You are here



**Mussels (Unionids)**

versus

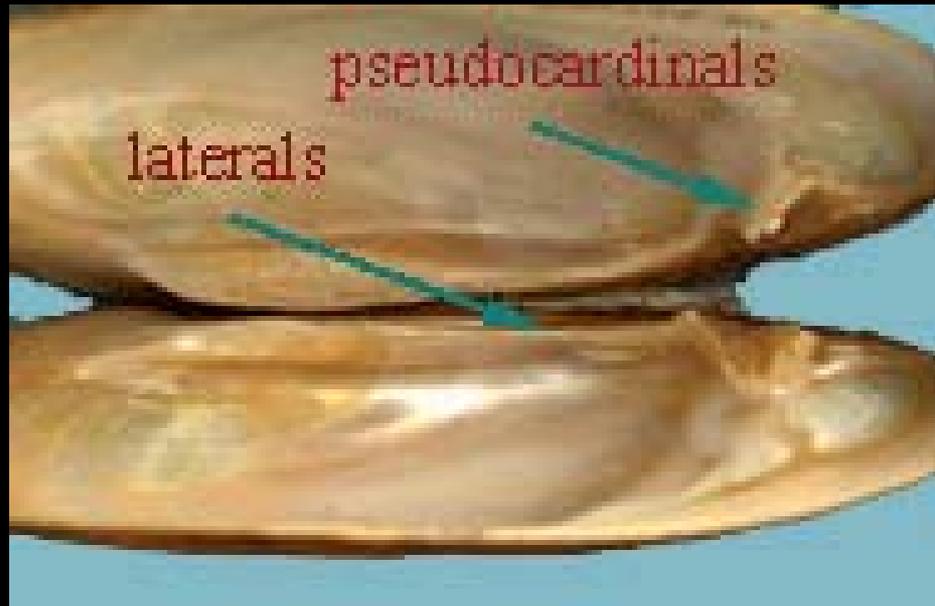
**Clams**



# Unionid mussels ...

- ➔ **Generally separate sexes..some exceptions and some dimorphism**
- ➔ **Have a parasitic stage requiring a fish host**
- ➔ **Have unique dentition - 4 “cases”**





*Elliptio complanata*  
eastern elliptio



*Strophitus undulatus*  
creeper

## Clams are ...

- ➔ Sexually all over the board ...hermaphroditic, self fertilizing
- ➔ Require no host....more direct life cycle
- ➔ Always have both cardinal and lateral teeth

In Wisconsin...*Fingernail* clams and *Corbicula*

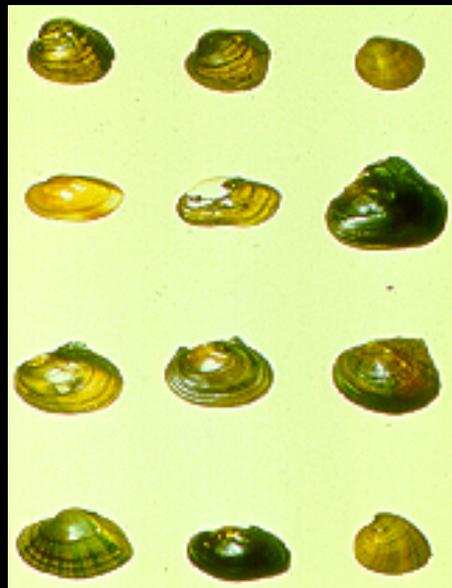
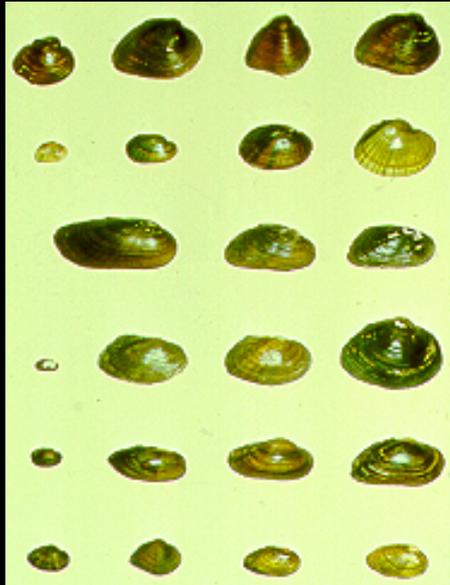




*In Wisconsin...*



**52 species: all sizes, shapes, textures**

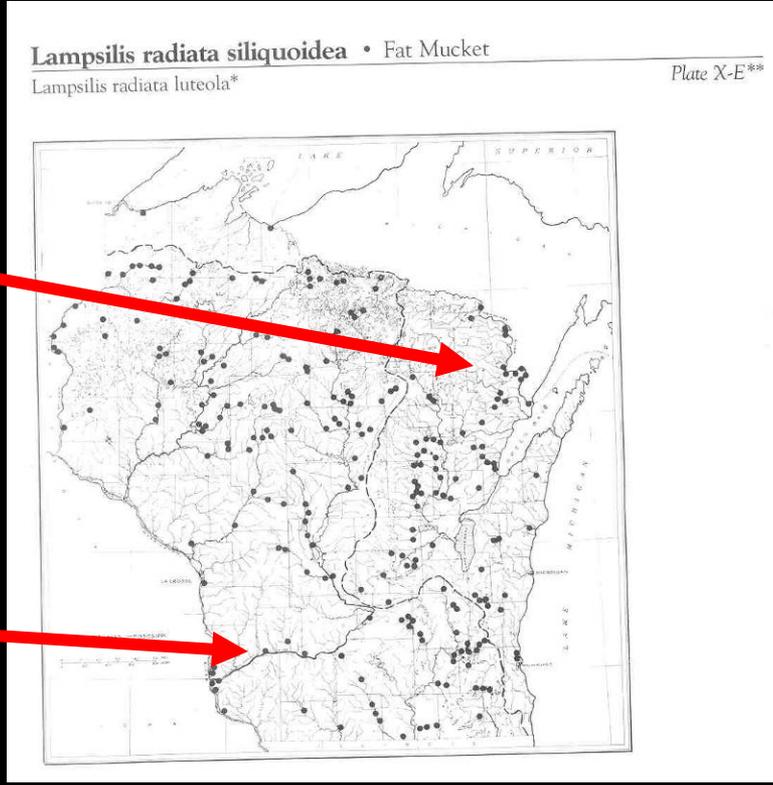
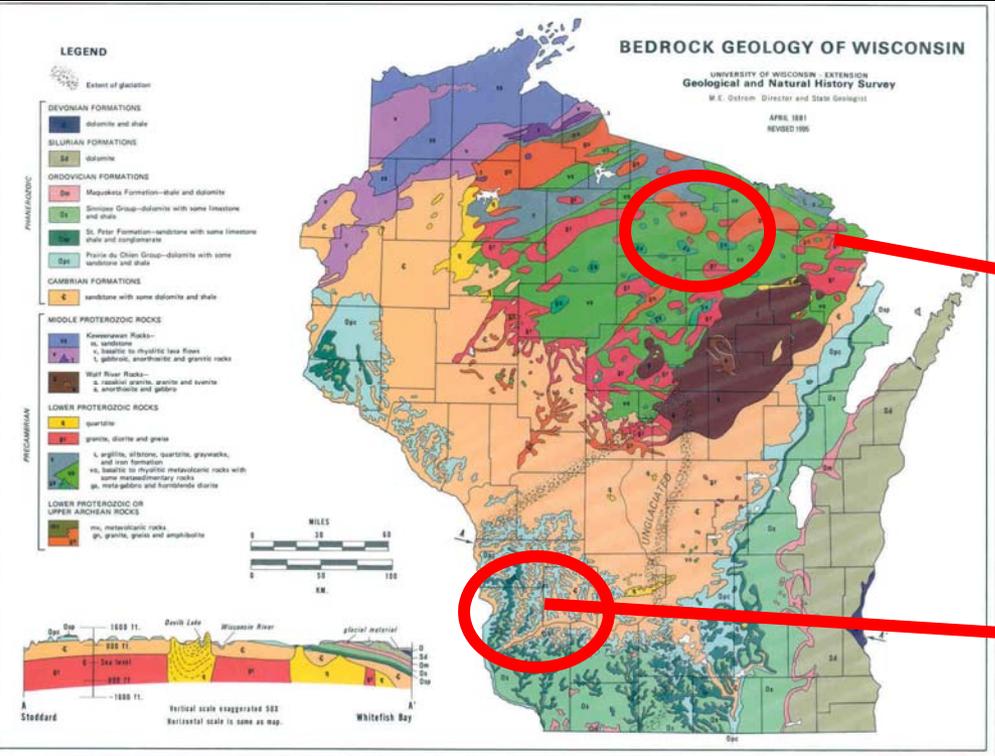




**Diverse habitats...largest to smallest**



# The Influence of Geology and Earth Processes on Mussel Distribution



# *Life History*

 **Long lived**

 **Slow growing = late maturing**

 **Require a vertebrate host (usually a fish)**

 **Long and chequered association with humans....uncertain future**



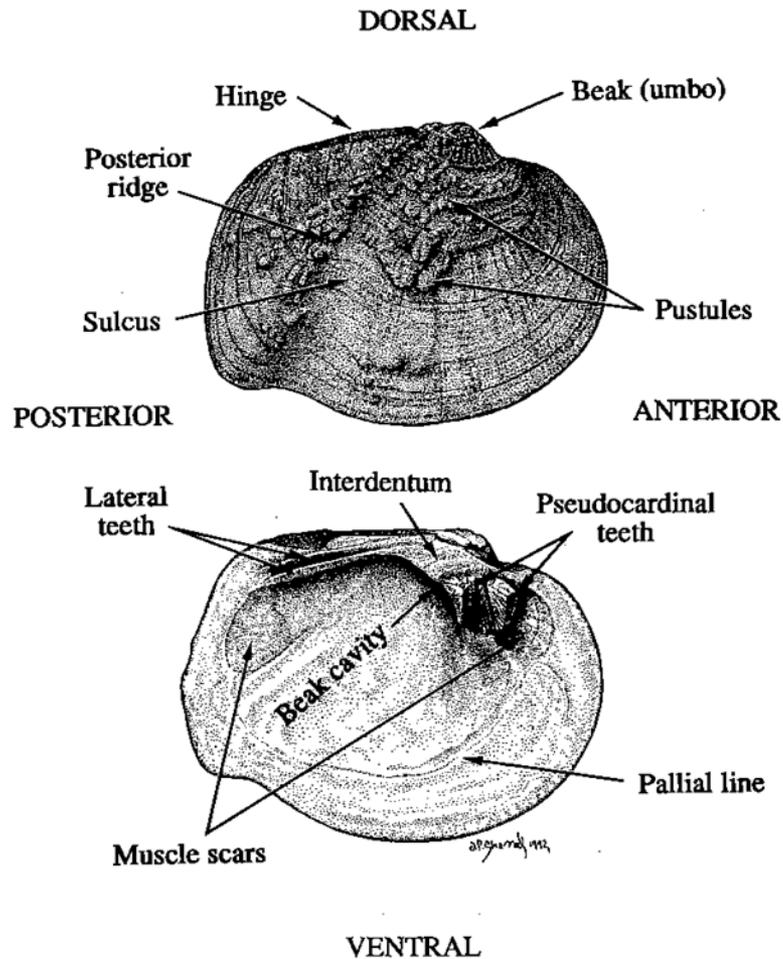


**Exterior characteristics : shell morphology**

**Internal anatomy “ plumbing and ventilation”**

**Sex lives & “intimate details” of Unionid reproduction**

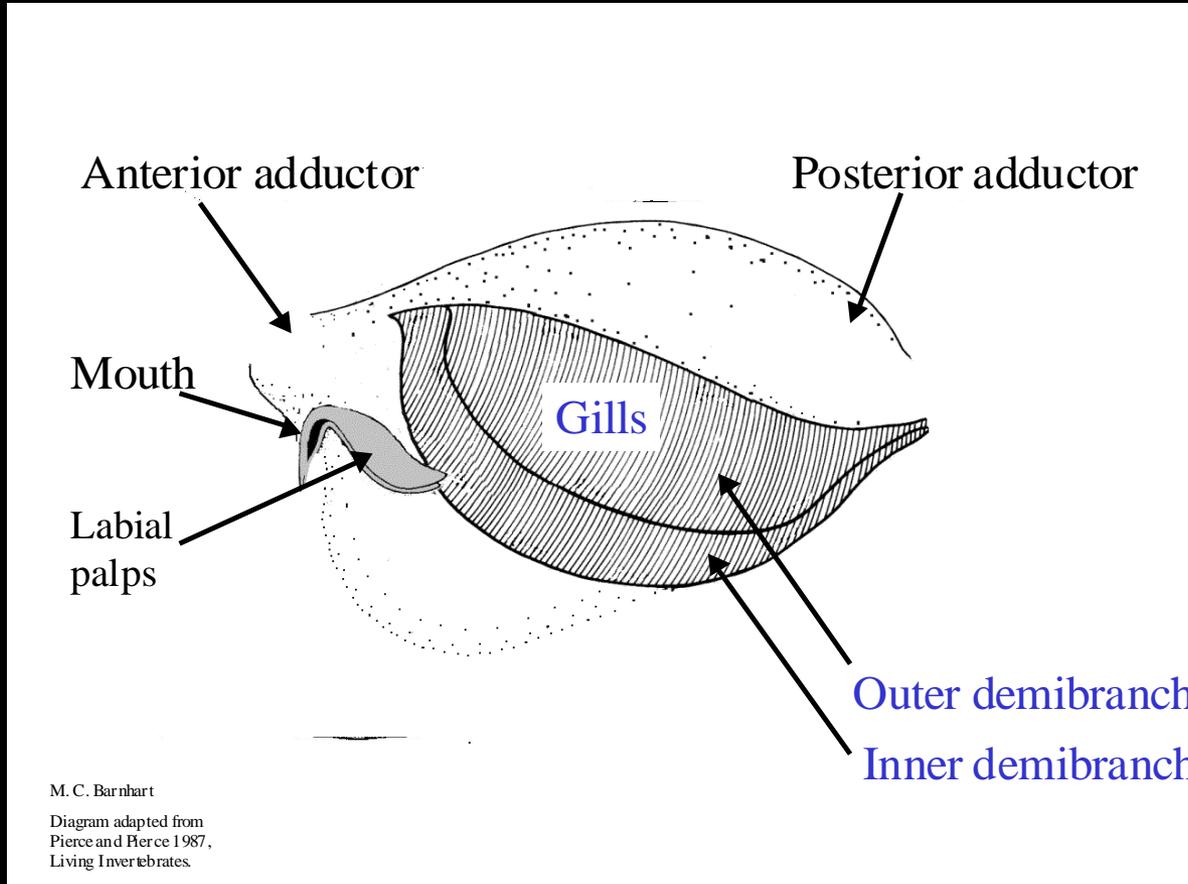
# EXTERNAL characteristics



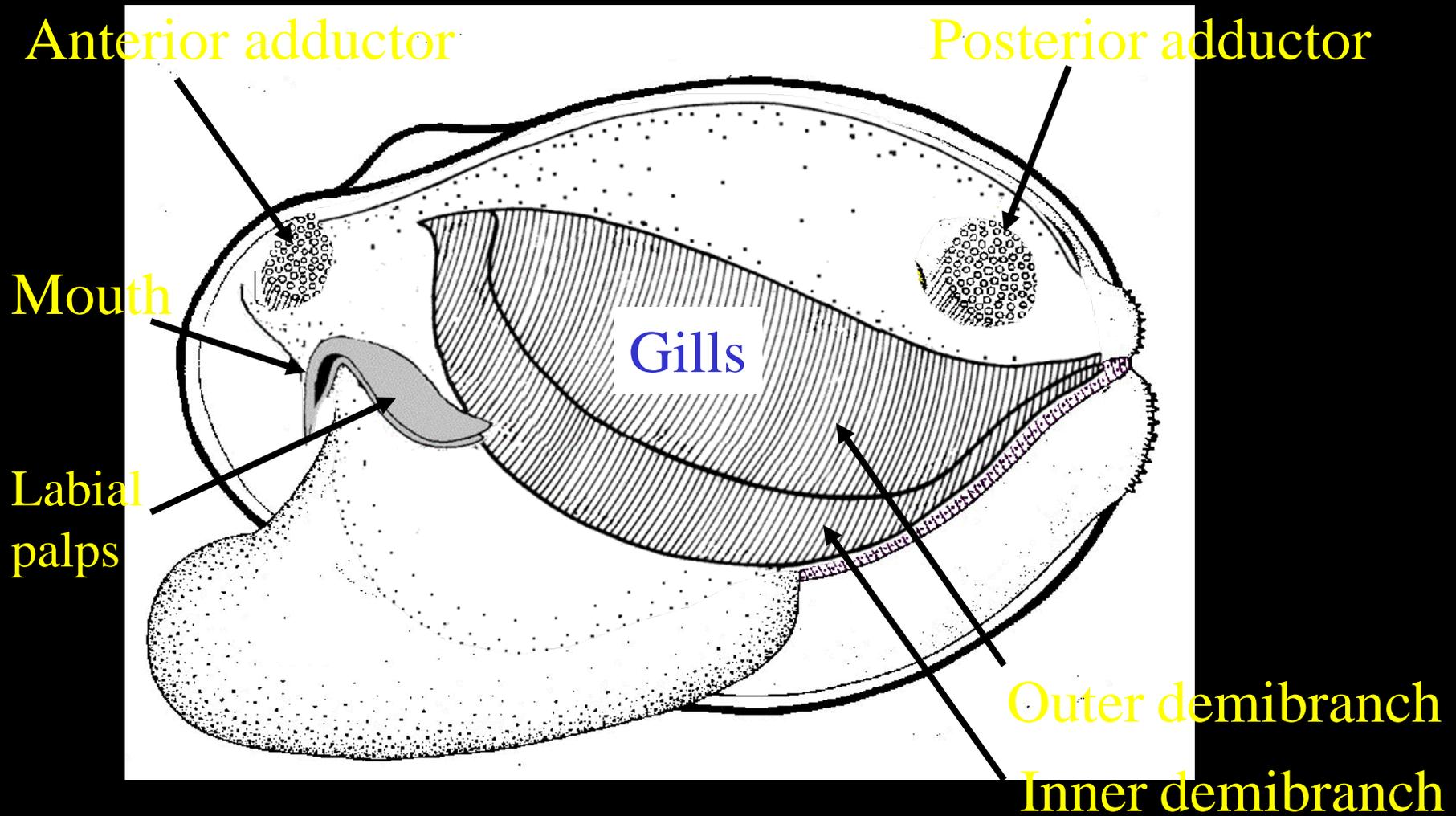
Tips for external identification:

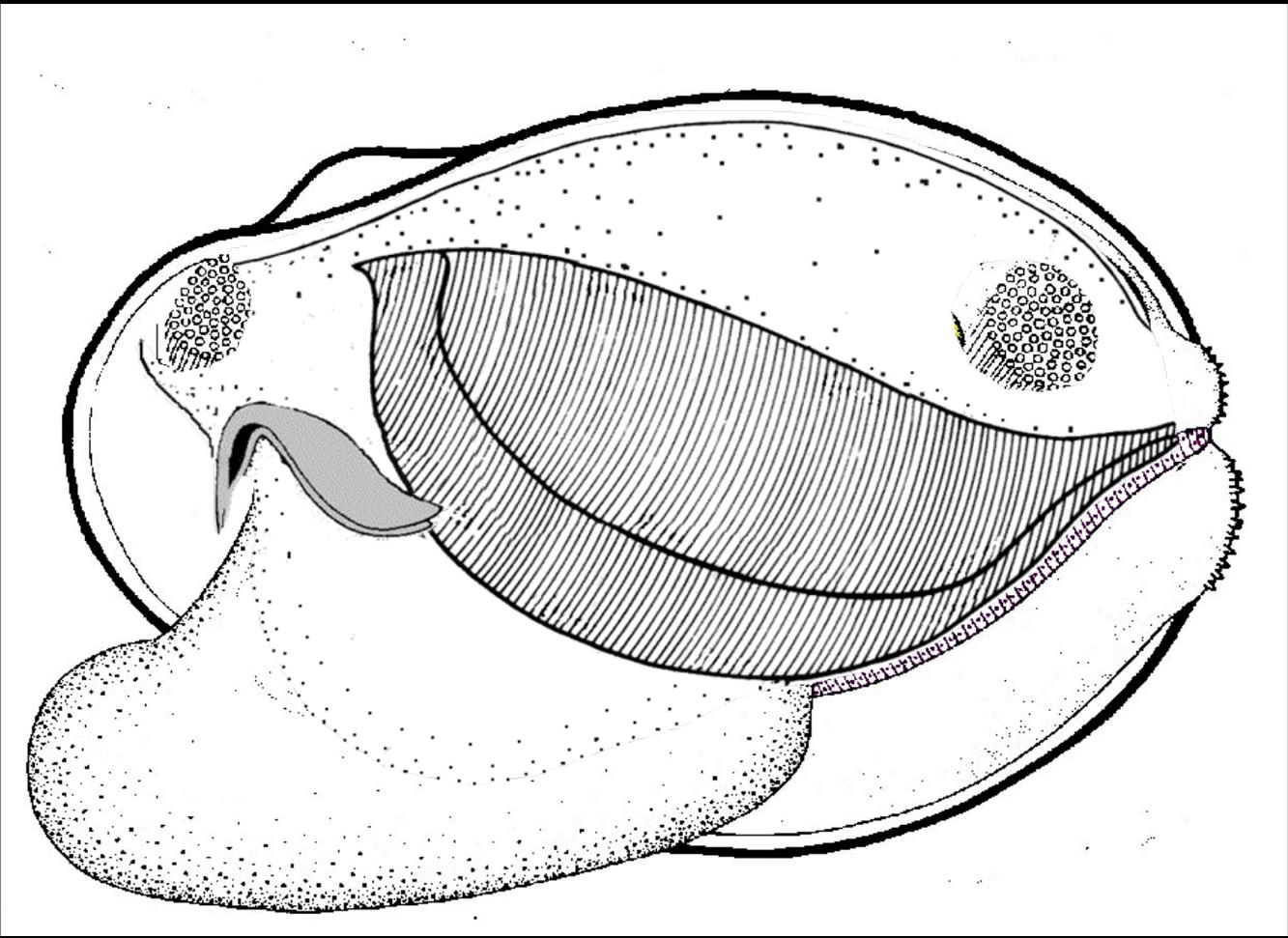
- Rely on combination of features
- Look at shell when small
- Consider the Latin name

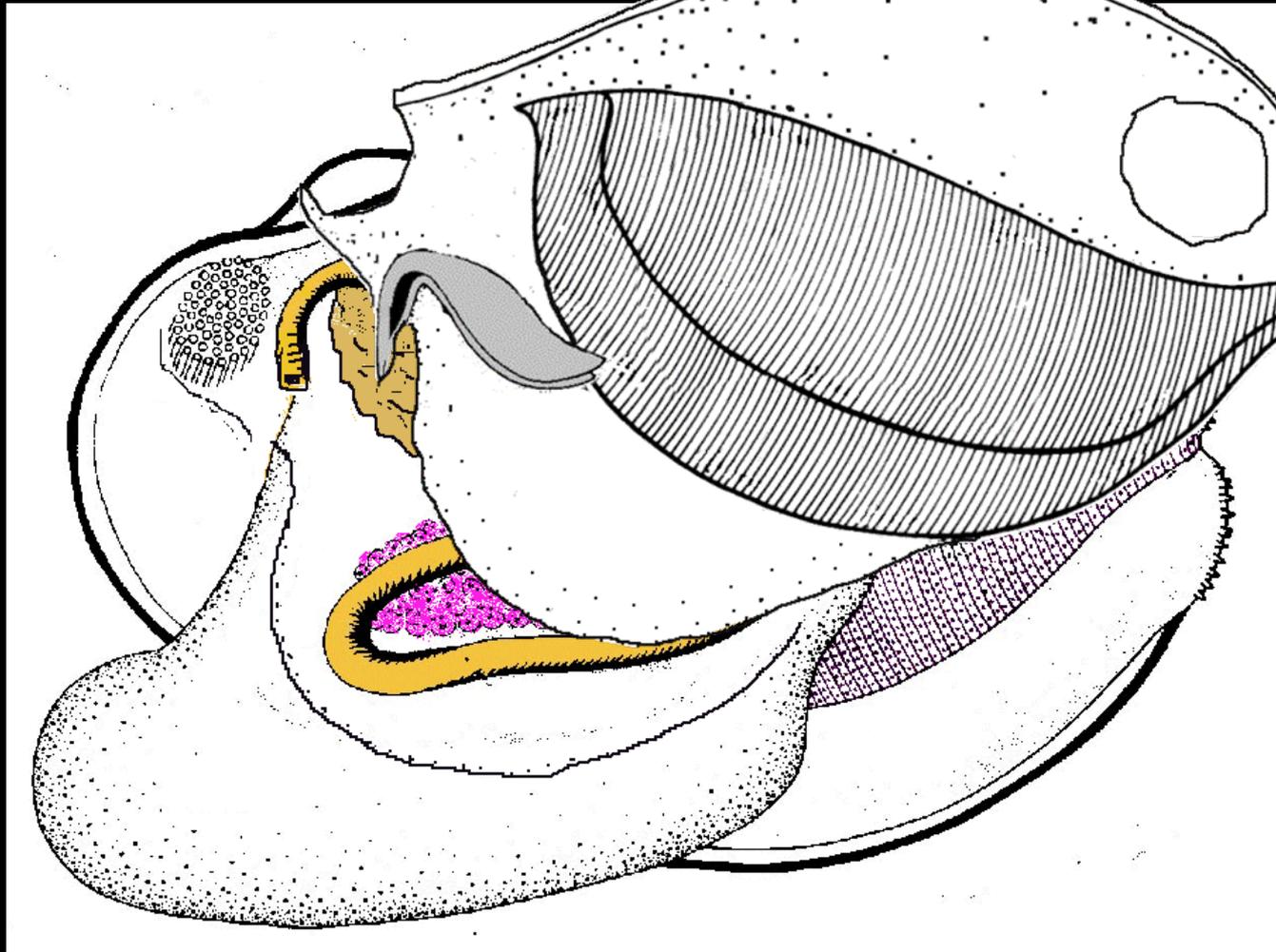
# Internal Anatomy

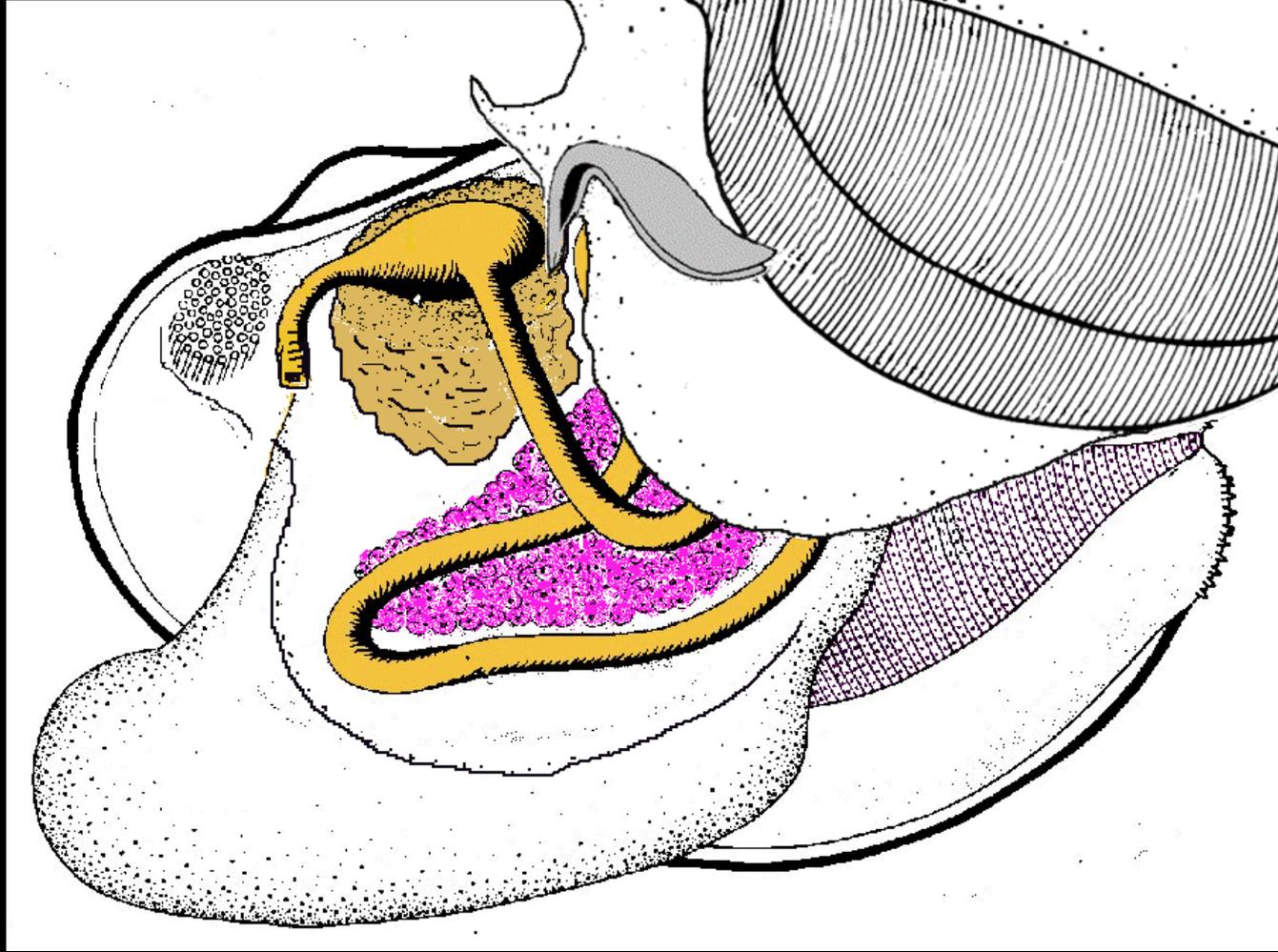


# INTERNAL anatomy: plumbing (circulation)



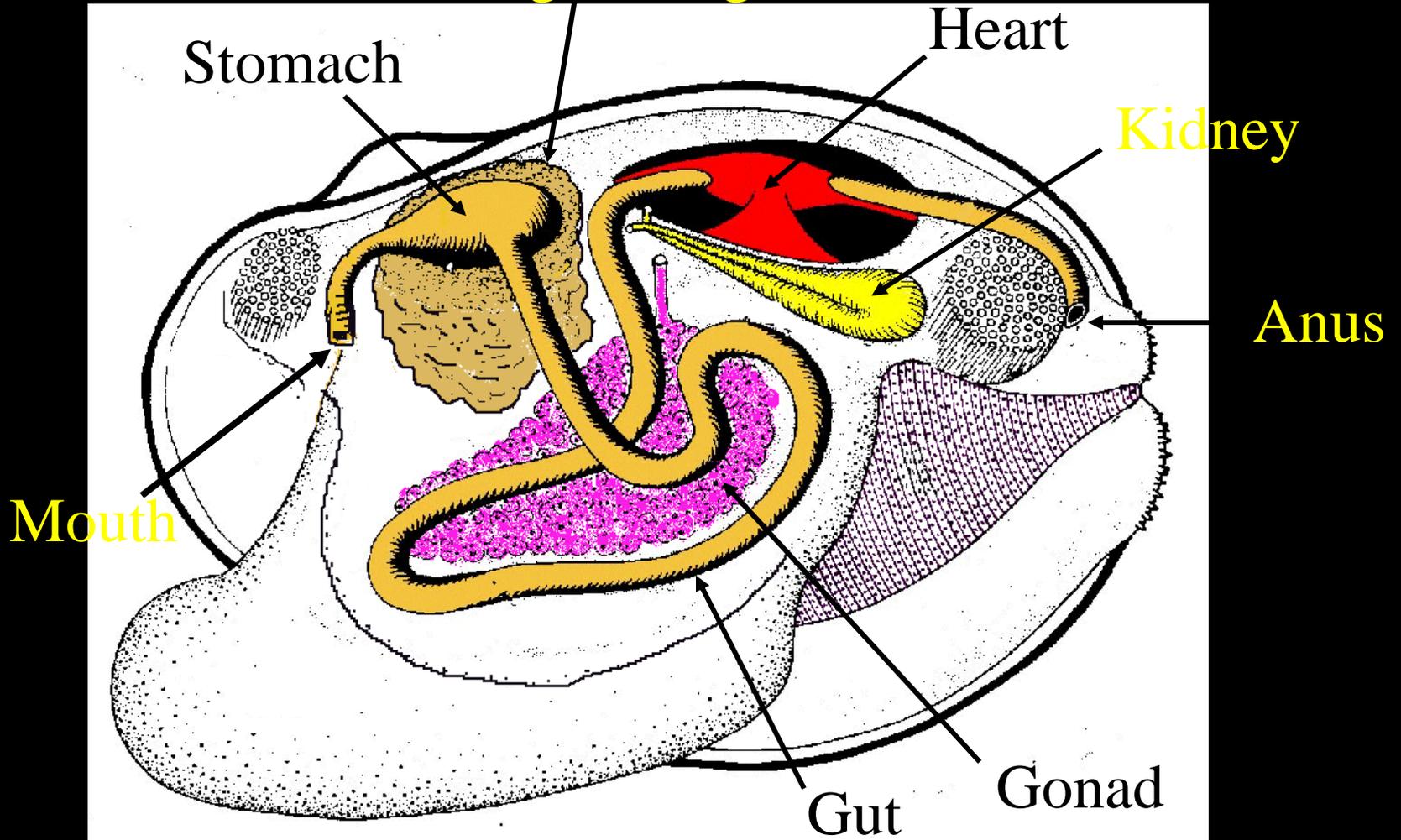




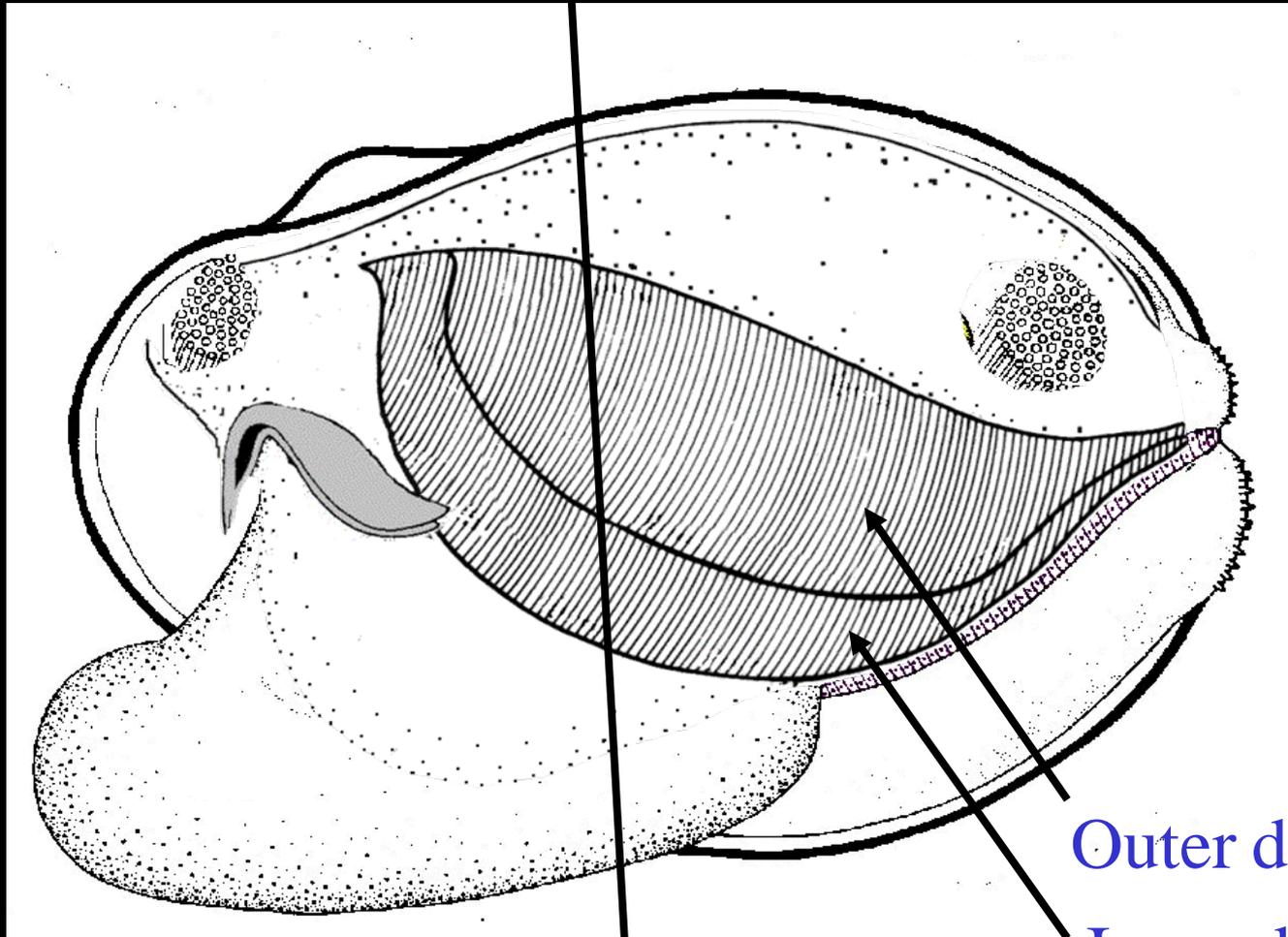




# Digestive gland



## Internal anatomy: respiration



Outer demibranch

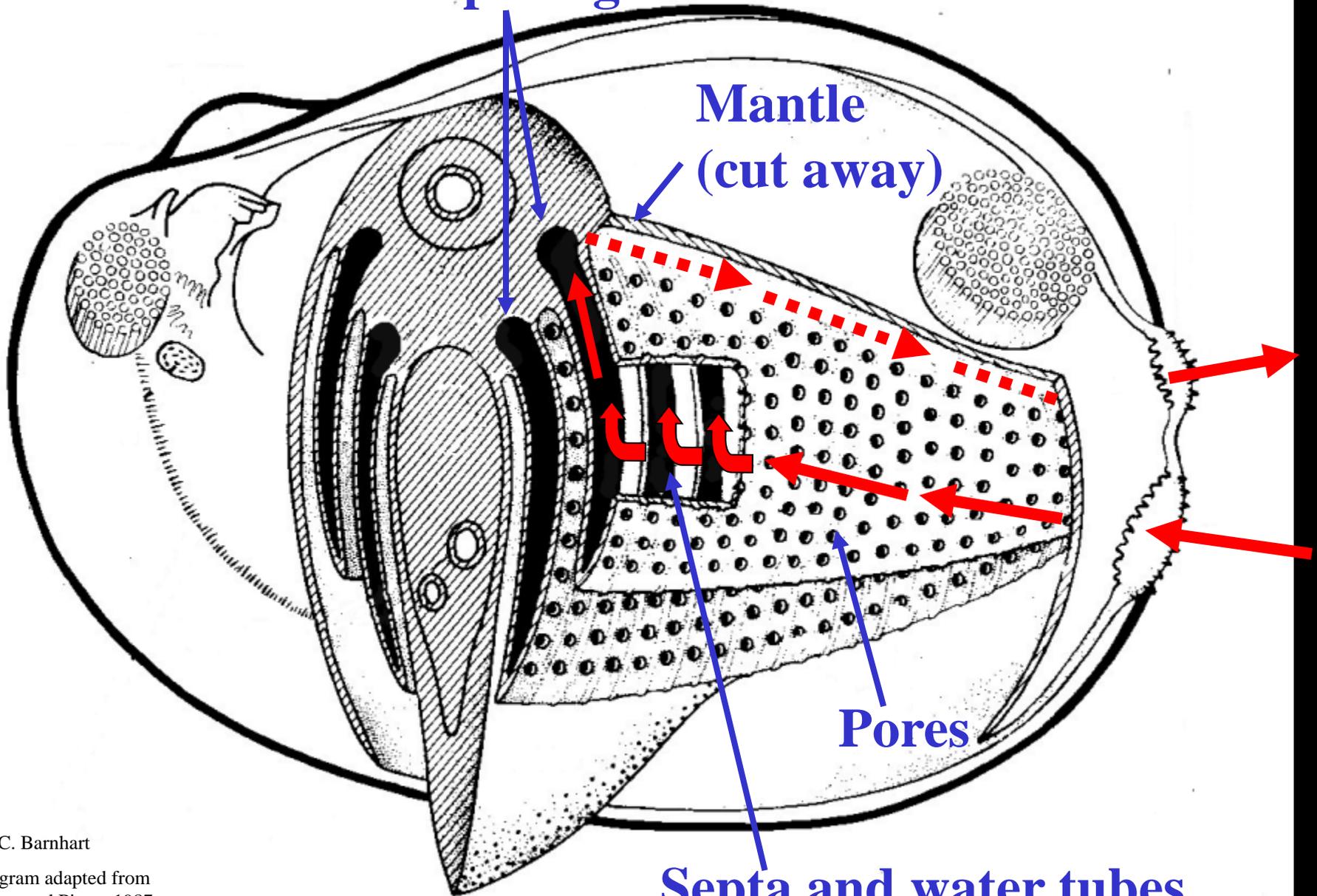
Inner demibranch

**Dorsal passages**

**Mantle  
(cut away)**

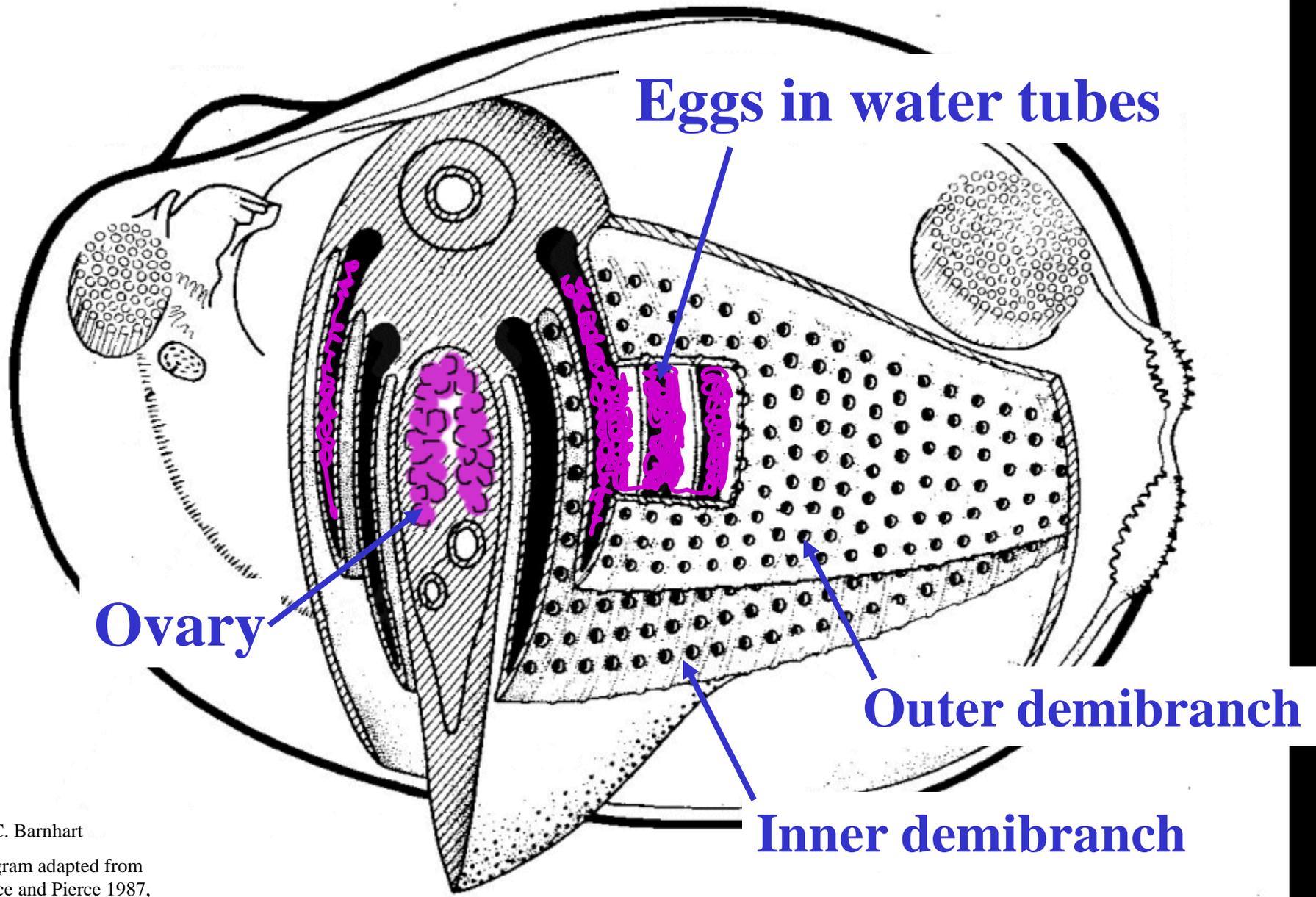
**Pores**

**Septa and water tubes**



M. C. Barnhart

Diagram adapted from  
Pierce and Pierce 1987,  
Invertebrate Zoology



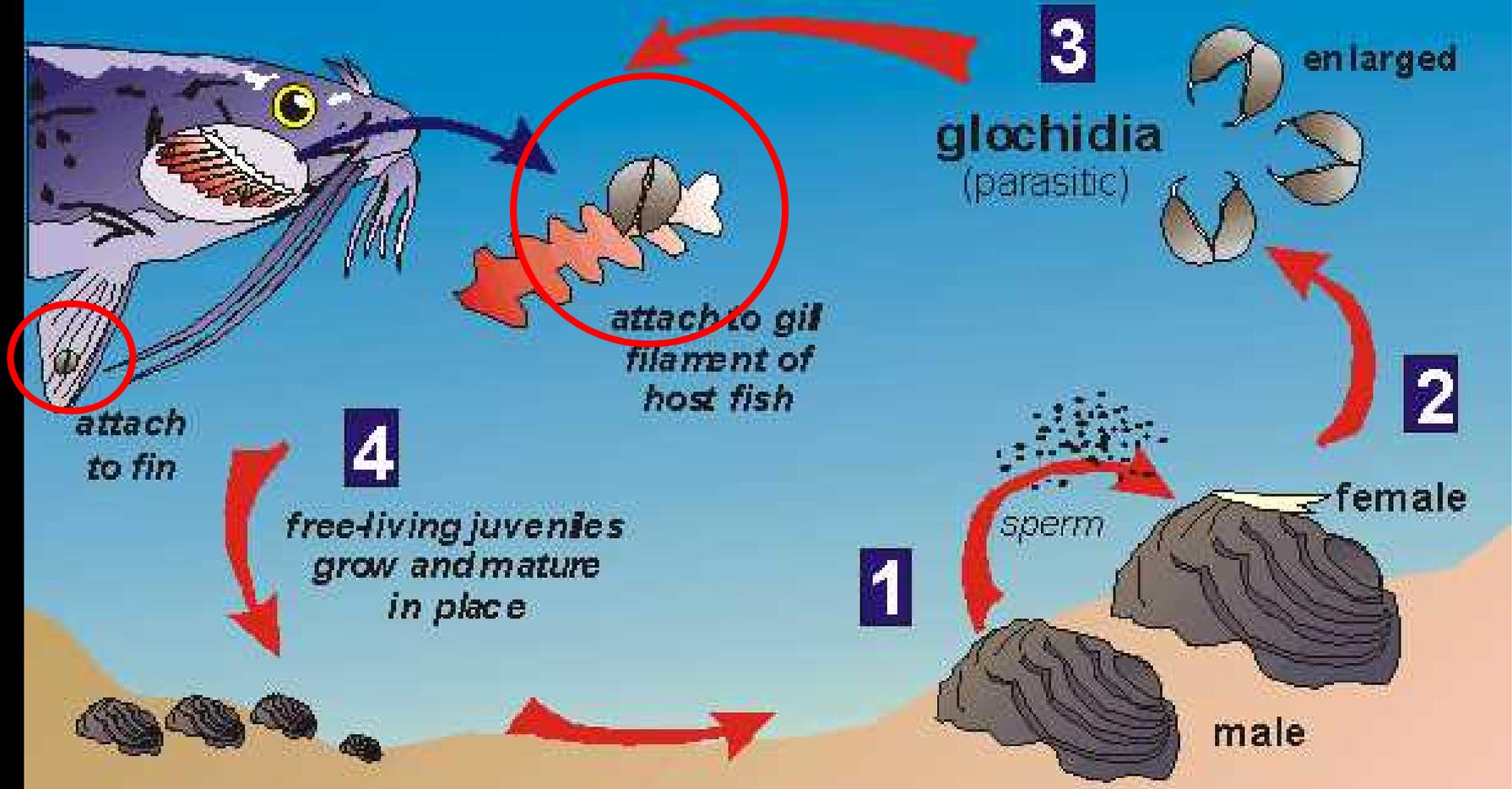
M. C. Barnhart

Diagram adapted from  
Pierce and Pierce 1987,  
Living Invertebrates.

# The Birds and the Bees: **SEX**

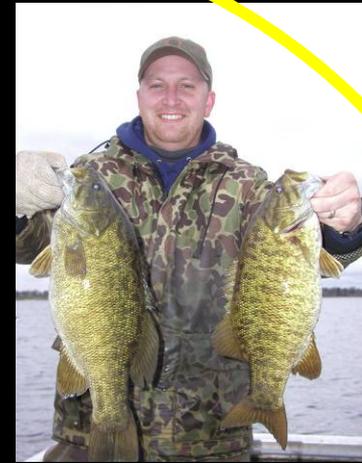


# How do mussels reproduce?





Percids



Centrarchids



Ictalurids



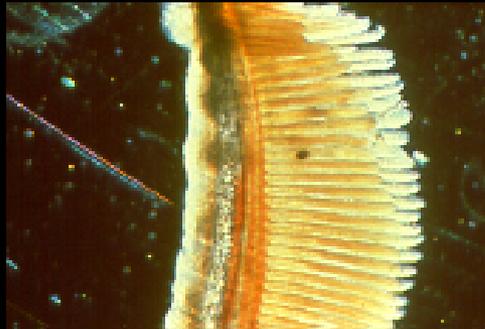
**On Fins**

**“sticky baby”**



M. C. Barnhart 1998

**Close the gap - lure**



**On Gills**

**mimic food**



**Actively “fish”**



Kidneyshell\_conglutinates.wmv

gallery\_snuffbox\_1.wmv

# Four episodes of human - mussel interaction

## 1. Indigenous uses



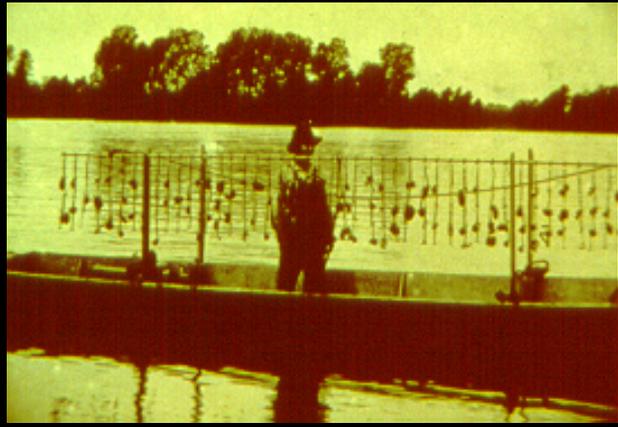
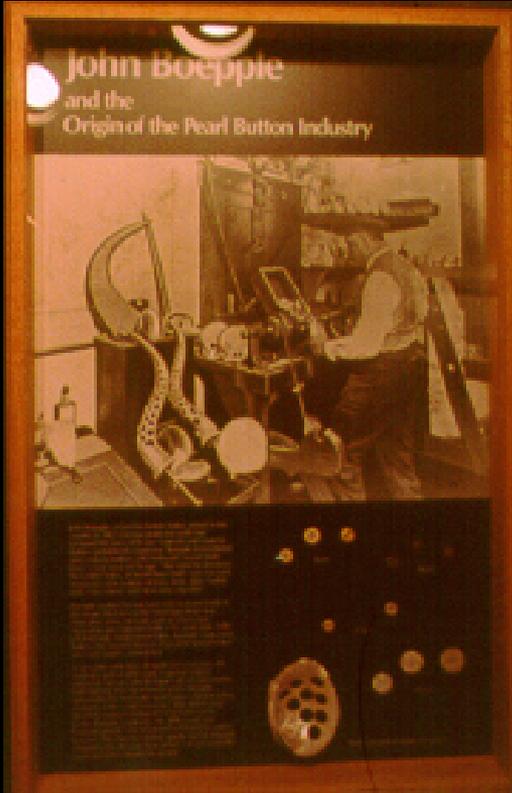
= minimal impact

## 2. Pearl rushes



= wanton waste

### 3. Pearl Button Era

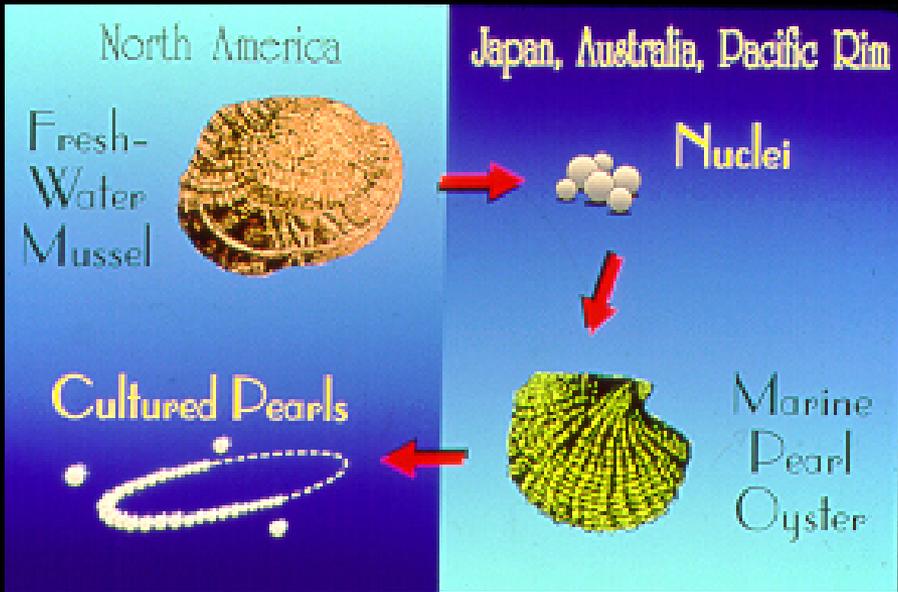


*Pearl  
Button  
Industry*

	TONS
Neosho River (1912)	- 17,063
Mississippi River (1890-1905)	- 750,000

= overharvest + concurrent events affecting rivers ...land use, impoundment, sewage....

# 4. Cultured Pearl Era



= the last straw

OK...cool...so what ?

What good are they ?

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SATTER BLDG. 111 W. DUNN ST.  
PRAIRIE DU CHIEN, WI 53821

## Stream Channelization and the Preservation of Biological Variability\*

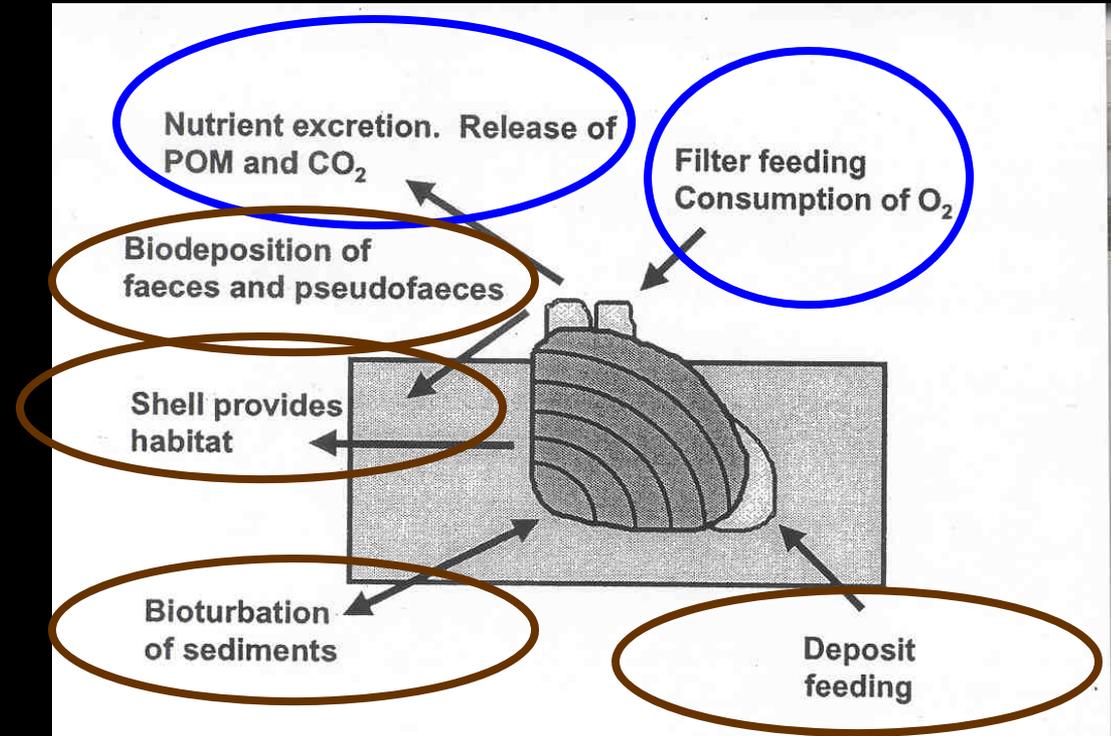
DAVID H. STANSBERY  
*Museum of Zoology  
The Ohio State University  
Columbus, Ohio 43210*

## Why Naiades (Pearly Freshwater Mussels) Should Be Preserved\*

DAVID H. STANSBERY AND CAROL B. STEIN  
*Museum of Zoology  
The Ohio State University  
Columbus, Ohio 43210*

\*Reprinted from STREAM CHANNELIZATION (PART 4). Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-Second Congress, First Session, June 14, 1971: 2177-2179.

# Water Column Processes



# Sediment Processes

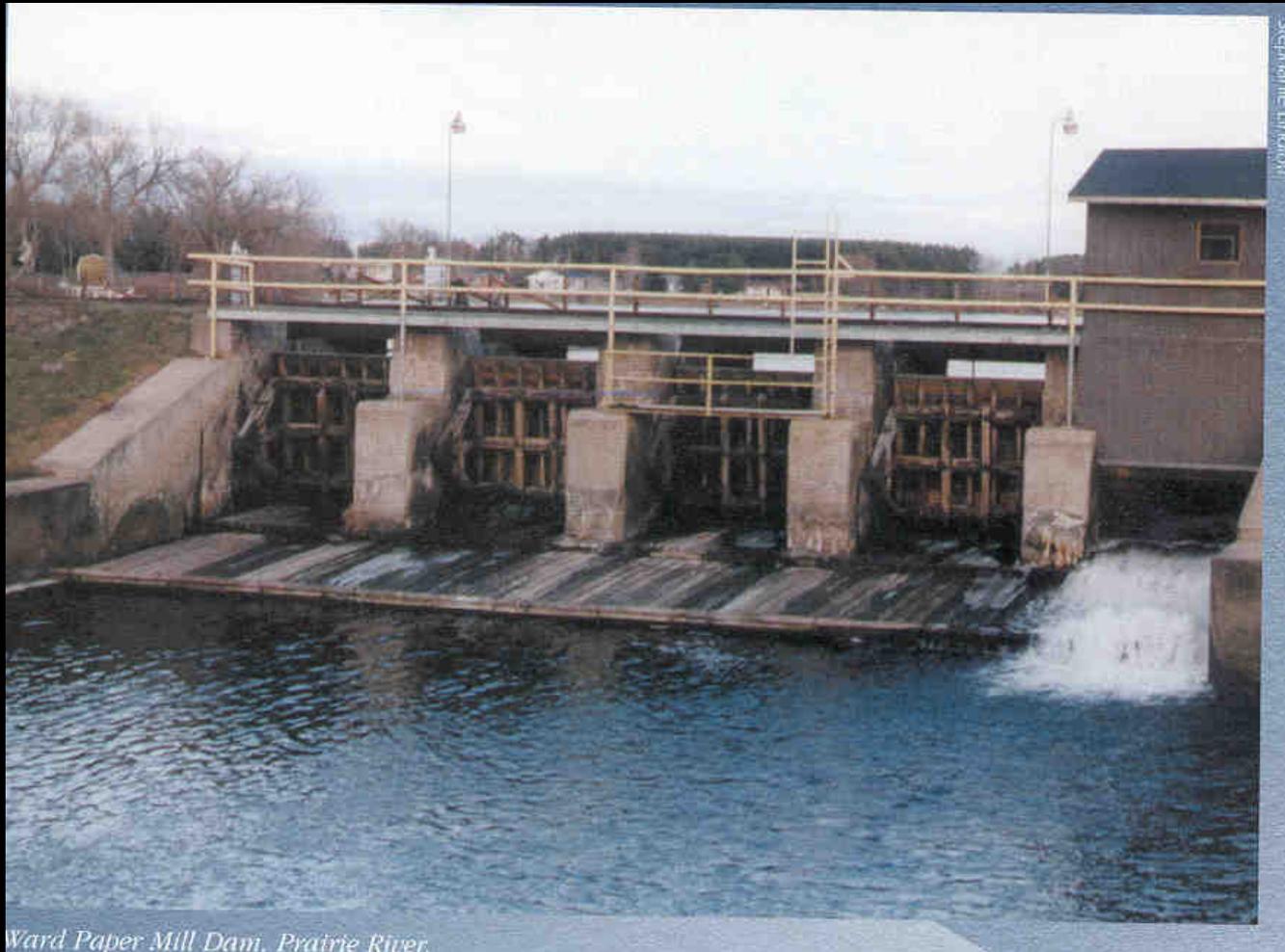


Fig. 1 Potential ecosystem functions performed by burrowing bivalves in freshwater systems.

© 2001 Blackwell Science Ltd, *Freshwater Biology*, 46, 1431-1446

What are the “challenges” ?

## Threats : Impoundments



*Ward Paper Mill Dam, Prairie River.*

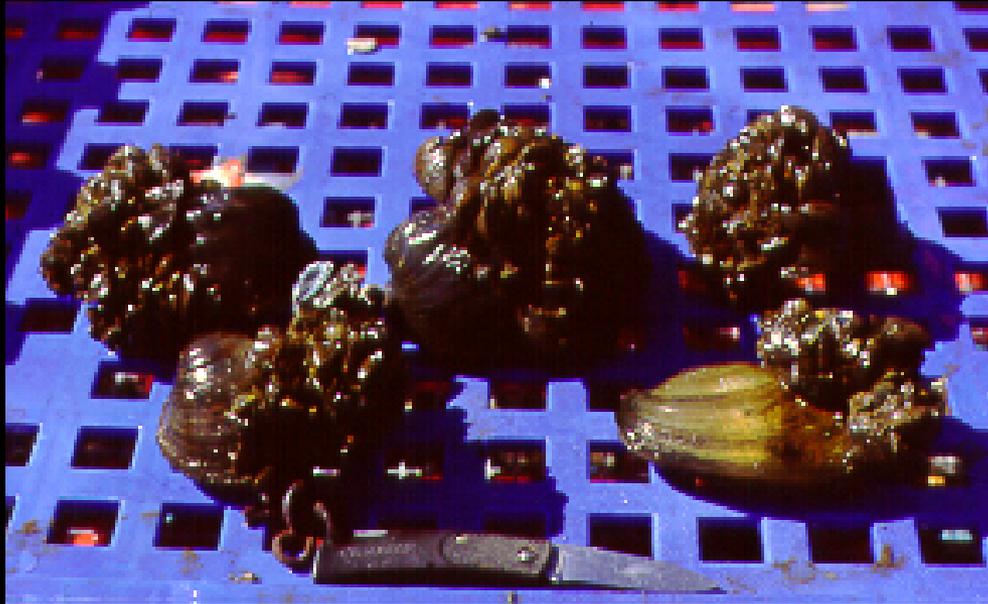
## Threats - Sedimentation ( and the crud it carries with it )



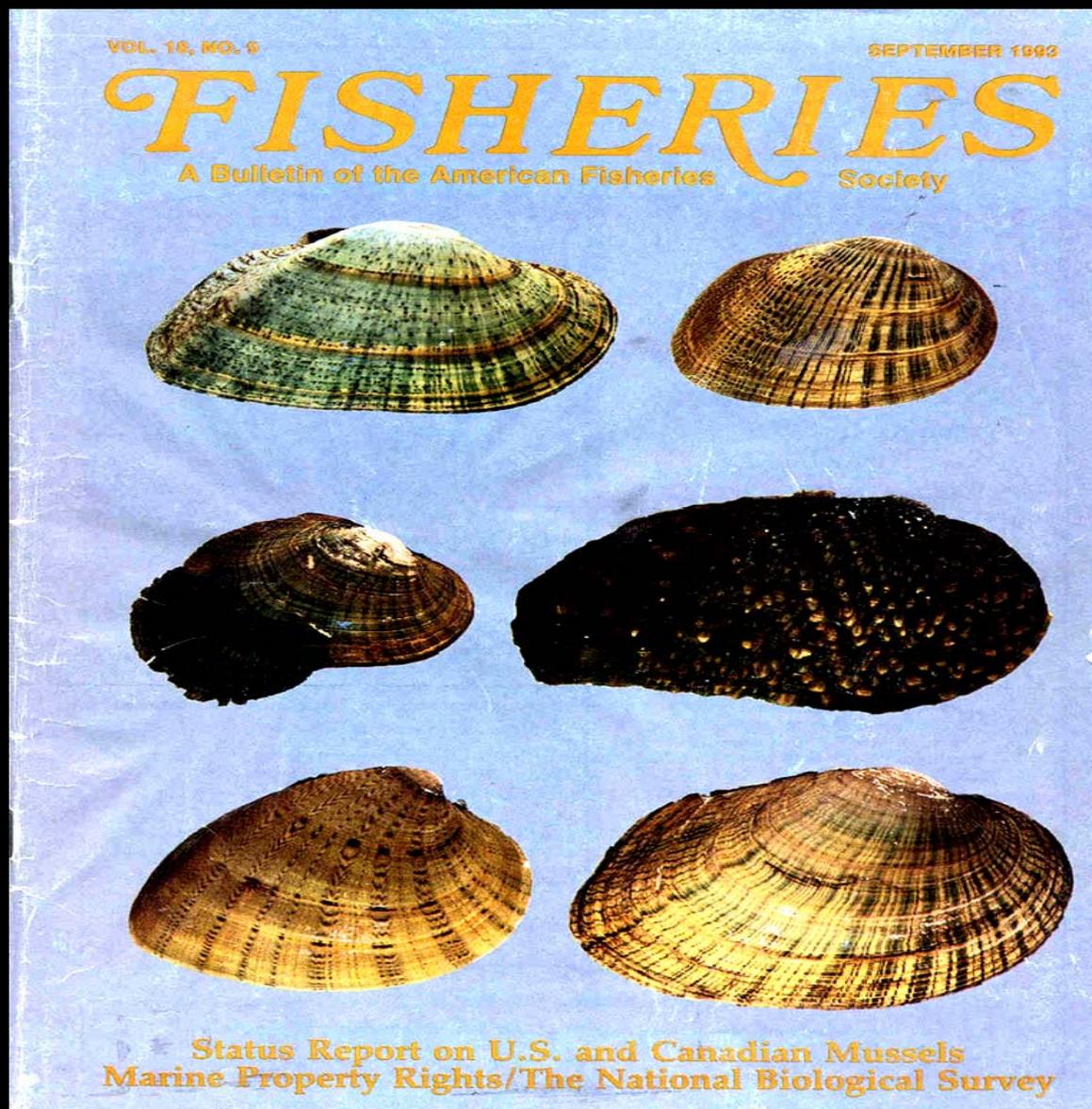
## Threats - Impacts from development and polluted runoff



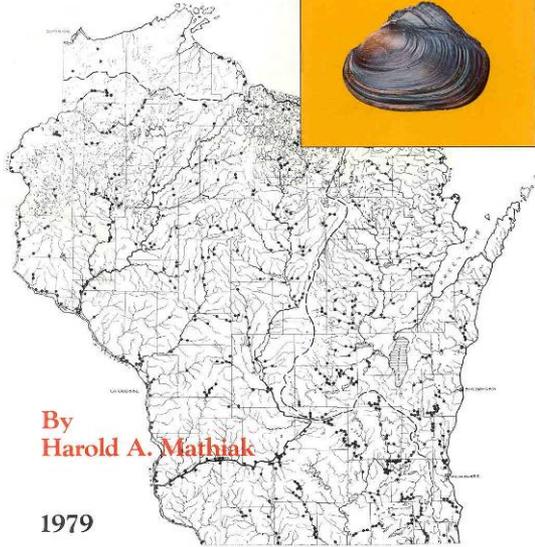
## Threats - Exotics



What does the future hold ?

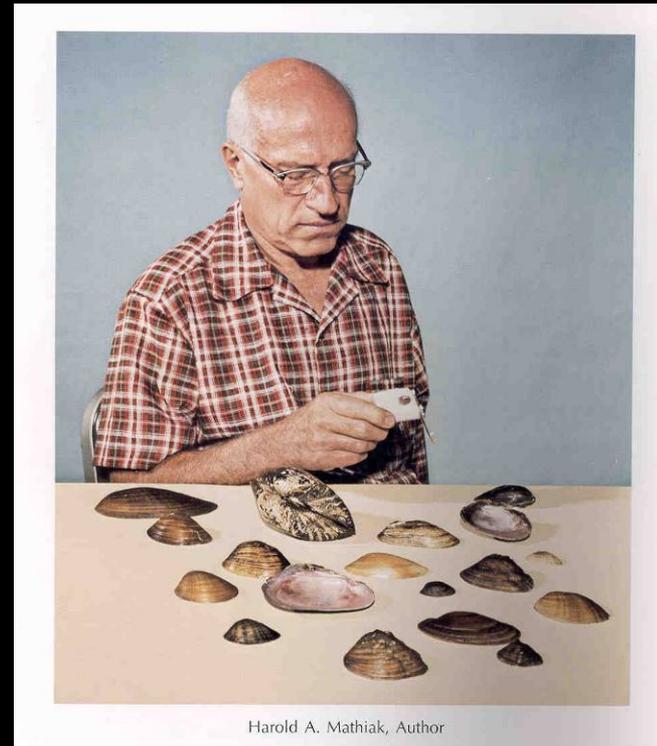


**A RIVER SURVEY  
OF THE UNIONID MUSSELS  
OF WISCONSIN 1973-1977**



**By  
Harold A. Mathiak**

1979



Harold A. Mathiak, Author

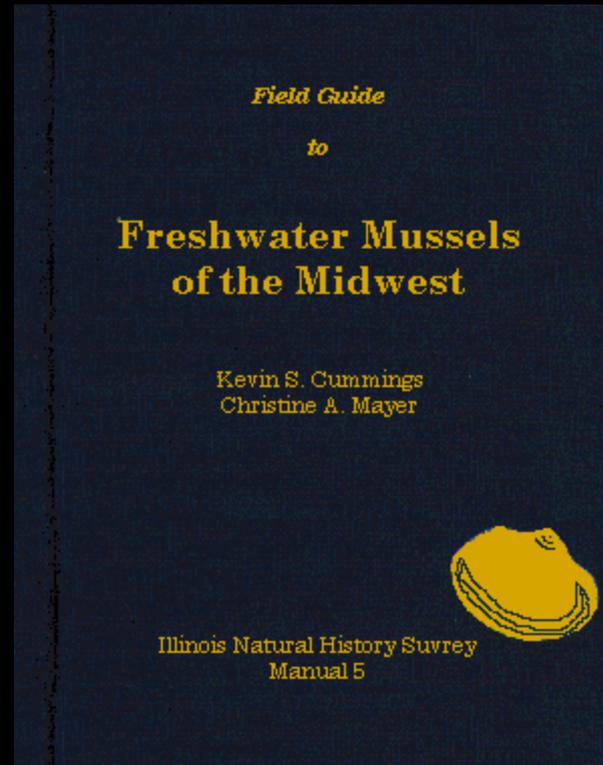
<http://www.mpm.edu/collect/invert/mussels/>

**Alas...all is not doom and gloom...**



# How can I learn more about mussels ?

Pick up a booklet, get a field guide,  
check out the many cool websites.



<http://www.inhs.uiuc.edu/cbd/collections/mollusk/fieldguide.html>



**Freshwater mussels ...*a natural treasure***