The genus *Panacca* in the North Atlantic consists of two species, *P. africana* Fischer and *P. locardi* Dall, off the coast of North Africa, and two off the coast of North America, *P. arata* Verrill and Smith and *P. fragilis* Grieg. All four species are rare and poorly known. Three are found at depths of more than a thousand meters, but *P. arata* lives at the edge of the continental shelf at depths of 130 to 245 m. A new record for *P. arata* now increases the range for this species about 2100 km to the south off Miami. This range extension is surprising since the previously known range occupies a small area south of Cape Cod.

PHOTORECEPTORS OF THE BIVALVE *LYONSIA HYALINA*: THE EYES HAVE IT! Robert S. Prezant, Department of Biological Sciences, University of Southern Mississippi, Hattiesburg.

The siphons of the marine bivalve *Lyonsia hyalina* Conrad are often the only portion of the animal exposed to the outside world. As such they are well endowed with sensitive tentacles for tactile reception and also numerous small photoreptors densely packed along a band on the exhalent siphon. These "eyes" are composed of large, single celled vitreous lenses that are individually capped by an apical dome-shaped nucleus. The lenses, directed into the siphonal lumen, taper into a pigmented receptor portion that in turn is bound by five melanic pigment cells. The photoreceptors show common microstructural features of light gathering organs (i.e. numerous mitochondria, high glycogen concentrations) that includes an expanded photon-receptor region composed of elaborate cell membranes. In many protostomes this receptor region is typically composed of expanded microvillar membranes (i.e. rhabdomeric) but in *L. hyalina* the receptor is composed of whirls of ciliary membranes that form concentric rings in the proximal region of the tapered receptor zone. These flared, concentric membranes are unusual and found only in very few organisms. The ciliary basis of this bivalve's eyes may offer insight into their evolutionary status. *Laternula truncata* (Lamarck), another pandoracean bivalve, also possesses similar receptor structures (Adal and Morton, 1973; *J. Zool., Lond.* 171: 533–556). This common feature, in eyes that otherwise have different macrostructures, may reveal a lineage that is closer than previously suggested.

NEW FAMILIES OF ARCHAEOGASTROPOD LIMPETS IN THE HYDROTHERMAL VENT COMMUNITY. James H. McLean, Los Angeles County Museum of Natural History, California.

Four new limpet families (three of which have two or more species), are variously represented from seven, widely scattered, deep sea sites having the hydrothermal vent community. Gill, radular, and kidney characters are those of archaeogastropods but the families can not even be assigned to living superfamilies. Of these, only the Neomphalidae, represented by *Neomphalus fretterae* McLean, 1981, has yet been described; anatomy has been detailed by Fretter, Graham, and McLean (1981). Fretter and McLean are collaborating on the descriptions of the remaining three families. Each new family differs from the others and from the Trochacea at the superfamily level, which implies that they have common ancestry with trochaceans. It further suggests that the ancestors of the hydrothermal vent limpets, whether limpets or coiled gastropods, entered this community by the early Mesozoic, the time of origin of other living archaeogastropod superfamilies, a time at which archaeogastropods were the dominant gastropods in shallow seas. Basic anatomical and radular characters of the hydrothermal vent limpets are considered to be those of unrecognized archaeogastropod clades that otherwise suffered extinction in the late Paleozoic or early Mesozoic.

DISTRIBUTION PATTERNS OF FRESHWATER MUSSELS AT NORTH HOLSTON FORD, NORTH FORK HOLSTON RIVER, VIRGINIA. Helen E. Kitchel, Virginia Cooperative Research Unit, Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute and State University, Blacksburg.

During 1981 and 1982, 16 species of freshwater mussels were collected at North Holston Ford, North Fork Holston River. A mean density of 10.6 mussels/m^2 was estimated from sixty random 0.5m^2 quadrat samples, indicating a population of roughly 31,000 adult mussels for the study area. Quadrat samples contained 10 mussel species: *Actinonaias pectorosa, Fusconaia edgariana, Lampsilis fasciola, Lexingtonia dolabelloides, Medionidus conradicus, Pleurobema oviforme, Ptychobranchus fasciolaris, P. subtentum, Villosa nebulosa, V. vanuxemi.* Six additional species were collected in muskrat middens or by handpicking: *Alasmidonta marginata, A. minor, Fusconaia barnesiana, Lampsilis ovata, Lasmigona costata, Toxolasma lividus.* Mussel densities varied according to location at the site. Water depth, current velocity, and substrate composition followed a consistent longitudinal zonation throughout the study area. Shallow water and low velocity were associated with the left ascending bank, whereas deep water and high velocity were associated with the right ascending bank. Substrate samples exhibited similar zonation patterns, and increased in particle size from left to right ascending bank. The distribution of mussels appeared to be most closely correlated with substrate composition, and high species densities were associated with mixed sand, gravel, and pebble substrates. Habitat of the endangered *F. edgariana* was associated with areas of high mussel density and diversity, along the left ascending bank and around seasonally vegetated areas.

FRESHWATER MOLLUSCAN SURVEY OF THE ROANOKE, TAR AND NEUSE RIVER SYSTEMS, N.C. Arthur H. Clarke, Ecosearch, Inc. Mattapoisett, Massachusetts

Systematic surveys of freshwater mollusks in northeastern North Carolina, sponsored by the Smithsonian Institution and the U.S. Department of the Interior, Fish and Wildlife Service, were carried out from 1977 to 1983. The Tar River System received special attention (72 study sites) because it contains *Elliptio* (*Canthyria*) *steinstansana* Johnson

s Clarke, a rare spiny mussel proposed for inclusion on the ederal List of Endangered Species. Supplementary studies ere also done in the lower Roanoke River System (13 sites) nd the lower Neuse River System (14 sites) to assess the ossibility of occurrence of *E. steinstansana* there.

The Tar River System is highly productive and, except or a reach below Rocky Mount, has good water quality. We ound 26 species there of which 14 are Unionidae. The whole valve fauna is being impacted by *Corbicula fluminea* which as introduced there in 1979 or 1980. By the summer of 982 it was dominant (ca, 1000/M^2) below Old Sparta and ad reached N.C. Hwy. 44 north of Tarboro. By the summer 1983 it had ascended an additional 40 miles to near Spring ope and it will soon be conspicuous throughout the system.

The Roanoke River below Lake Gaston is heavily ed. It revealed only fresh empty shells of *Anodonta implicata* and *Elliptio complanata* and abundant *Corbicula*. In a er-lake of the Cashie River (a Roanoke tributary), we found mpty shells of *Anodonta implicata* and *Lampsilis ochracea*, ge specimens of *Ligumia nasuta*, and no *Corbicula*. The euse River between Raleigh and Seven Springs yielded y *Elliptio complanata*, a rare unionid of unknown identity, nd *Corbicula*. Among Neuse tributaries, the Trent River is olluted below Trenton and apparently has no mollusks ere, but the Little River is productive and supports a diverse una.

RECENT NAIAD MOLLUSCS OF THE DETROIT RIVER. **Thomas M. Freitag,** U.S. Army Corps of Engineers, Detroit istrict.

Although not a planned survey, qualitative mussel hell collections were made at two shore sites on the Detroit iver: a dredge site near the mouth in Gibraltar, Michigan, in 982, and from near the head of the river on Belle Isle, De- it Michigan, in 1983 and 1984. Dredge site shells, although ften appearing recent, are probably from long-dead in- ividuals. Shells from Belle Isle were from muskrat middens nd most had vestiges of flesh. Some live individuals were ound. Juveniles of several species suggest that reproduction s taking place. Species composition was similar at both ites. A total of 29 recent species were found at Belle Isle. Michigan endangered species were: *Dysnomia torulosa ranina*, *Simpsoniconcha ambigua*, and *Villosa fabalis*. hreatened species were: *Dysnomia triquetra* and *Obovaria ubrotunda*. Detroit River museum specimens of species not ound in this survey were: *Alasmidonta marginata, Alasmidonta viridis, Lampsilis fasciola* and *Quadrula quadrula*. Literature records of *Anodonta imbecillis, Lasmigona compressa* and *Quadrula pustulosa* are probably accurate since these species are found in adjacent waters. However, the literature record of *Fusconaia subrotunda* is probably in error and the record of *Leptodea leptodon* is doubtful. The presence of the Federally endangered species, *Dysnomia sulcata delicata*, in the Detroit River is doubtful, since the identity of museum specimens is uncertain and no recent specimens have been found. The original fauna of the Detroit River consisted of about 36 species.

Additional Species Found

Actinonaias carinata
Amblema plicata
Anodonta grandis grandis
Anodontoides ferussacianus
Carunculina parva
Cyclonaias tuberculata
Elliptio dilatata
Fusconaia flava
Lampsilis radiata siliquoidea
Lampsilis ventricosa
Lasmigona complanata
Lasmigona costata
Leptodea fragilis
Ligumia nasuta
Ligumia recta
Obliquaria reflexa
Obovaria olivaria
Pleurobema coccineum
Proptera alata
Ptychobranchus fasciolare
Strophitus undulatus
Truncilla donaciformis
Truncilla truncata
Villosa iris

AN EXAMINATION OF SOME C.S. RAFINESQUE NORTH AMERICAN UNIONID TAXA (BIVALVIA: UNIONIDAE). **Arthur E. Bogan,** Department of Malacology, Academy of Natural Sciences of Philadelphia, Pennsylvania, **Lynn B. Starnes,** Tennessee Valley Authority, Knoxville and **James D. Williams,** Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, DC.

The work of Samuel C. Rafinesque during the early half of the 19th century in natural history has long been a source of confusion and aggravation. His work examined here is restricted to those papers which discuss freshwater bivalves (1818–1832). Rafinesque's publications follow close upon the heels of Lamarck and Say's work on North American unionids and are contemporary with the works of Barnes, Conrad, Hildreth and the early work of Isaac Lea. Major problems with Rafinesque's freshwater bivalve work have been claimed by numerous authors. These problems include: lack of type materials or the deposition of materials in collections where the specimens could be examined, poor and inadequate descriptions, inadequate or no illustrations, and publication in obscure or inaccessible journals. A point of major concern at the time was Rafinesque's excessive splitting of what were then considered good species or genera. A major factor in the rejection of Rafinesque's unionid work was Isaac Lea's publication of a list of 108 Rafinesquean specific names as unidentifiable, while recognizing only 16 Rafinesquean specific names in his four synopses of the Unionidae (1836–1870). This attitude was further entrenched by the observations of Amos Binney about the sad state of Rafi-