

## Other Stimuli

Garikiewicz (1922) caused closed clams to open with electrical shocks. Barnes (1935) found that small or large changes in temperature did not cause opening.

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## THE EARLIEST NAMES FOR NORTH AMERICAN NAIADS

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In the time of Linnaeus 1758 there were mussels or mussels (*Mytilus*) marine and freshwater. Only a few freshwater mussels from North America had reached Europe early enough to be in Dr. Lister's 1685 picture book of shells. Perhaps the commonest species from Virginia was named [*Elliptio complanatus*] by Lightfoot in the Duchess of Portland Catalogue 1786. Gmelin in the 13th Edition of the *Systema Naturae*, 1791, named two more of Lister's figured species from Virginia [*Lampsilis radiata*] and [*Anodonta fluviatilis*]. Spengler in 1793 renamed [*complanatus*] as *violaceus* and named another species *truncatus* to preoccupy a well known name of Rafinesque. Schumacher named the genus *Margaritifera* in 1816, but did not know it was also in North America.

It wasn't until Americans started studying the North American naiads that the names began to multiply, mirroring the much greater number of N. American species in contrast to very few in European waters. Thomas Say in the American Edition of Nicholson's Encyclopedia named several species including *alatus* and *costata* in 1817. Lamarck in 1819 named some of the common Mississippi drainage species including *ligamentina* and *luteola*, that had been sent back to France.

Rafinesque in 1818 named the genus *Potamites* from the Ohio region; in 1819 he gave a generic outline or prodrome, and in 1820 published his "Ohio River Monograph." Unfortunately for the clarity of North American names, this was published in Brussels, in French, and was unnoticed by most American workers for some years. Rafinesque introduced 108 names (65

species and 43 varieties). He placed them in 23 generic groups, most of which we know today are biologically valid genera and subgenera.

The fog over the earliest names for North American naiads was laid down when Isaac Lea got steamed up in personal prejudice. Lea proved he knew Rafinesque's 1820 names when in 1829 he renamed one of the 3 homonyms created by Rafinesque. Barnes 1823, Valenciennes 1827, Hildreth 1828, Say 1829, Lea 1829, Swainson 1829, Say 1830, Lea 1830, and Say 1831 all published additional new names for North American species before Rafinesque in Nov. 1831 published his "Continuation of the Ohio River Monograph." In Dec. 1831 and later Isaac Lea ignored [professed ignorance of] and refused to accept any of Rafinesque's names that he could avoid in any way possible.

When Say and Conrad were sent copies of Poulson's 1832 translation of Rafinesque 1820, they published synonymies, accepting all the Rafinesque names they could recognize from the very brief descriptions concerned. Férussac in 1835 printed his synonymy with paratypes from Rafinesque, and all of Isaac Lea's names in front of him.

The fog has continued over Rafinesque's and a few other names to the present, because some people are prejudiced against changing any part of their own status quo. As Rafinesque printed in 1820, "such naturalists cannot accept name changes made necessary by new discoveries." Bryant Walker in 1917 (*Nautilus* 20: 43-47) first stated and then for two pages tried to deny that Rafinesque had printed so many of his specific names under *Unio*. As a matter of simple fact many of Rafinesque's species and variety names of 1820 were printed under three generic names, and so preoccupy later names in all three genera. The binomials and trinomials of Rafinesque have been available to all since they were indexed in Binney and Tryon's 1864 reprint of Rafinesque's works on mollusks. On the other hand neither Simpson in 1900 and in 1914, nor Haas in 1969 have even listed or indexed all of the earliest names.

The efforts of Ortmann, Walker, and Pilsbry (1922) to straighten out many tangles of synonymy are seriously incomplete for two reasons. The then incomplete crystallization of the international rules allowed them to decide against first priority of dates and type-species fixations. Secondly they did not approach Rafinesque's monograph with all the Ohio and Kentucky species laid out, to determine what Rafinesque called each form. In other words they did not attempt to fix all of Rafinesque's names, but took only selected adult ones under study.

The first step out of the fog is a complete indexing of all early naiad names, particularly those published before the December 1831 work of Isaac Lea. The second step is the adoption of the earliest name for each taxon without prejudice against priority. To stay out of the fog we must use names that are not preceded by any other for the same biological taxonomic entity. If we do not accept the names of the accompanying list, the next critical student to follow can do so, and truthfully say we were not quite scientific enough.

*Lasmigona badia* Raf. 1831 (= *holstonia* Lea 1838)  
*Asamidonta viridis* Raf. 1820 (= *calceola* Lea 1829)

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*Alasmidonia atropurpureum* Raf. 1831 (= *raveneliana* Lea 1834)  
*Fusconia lateralis* Raf. 1820 (= *undata* Barnes 1823)  
*Fusconia pusilla* Raf. 1820 (= *ebena* Lea 1831)  
*Fusconia polita* Say 1834 (= *subrotunda* Lea 1831 preocc.)  
*Megalonias nervosa* Raf. 1820 (= *gigantea* Barnes 1823)  
*Quadrula bullata* Raf. 1820 (= *pustulosa* Lea 1831)  
*Plethobasus pachosteus* Raf. 1820 (= *clatricosus* Say 1829)  
*Plethobasus striatus* Raf. 1820 (= *cooperianus* Lea 1834)  
*Pleurobema obliquata* Raf. 1820 (= *pyramidalis* Lea 1834)  
*Pleurobema obliquum* Lamarck 1819 (= *cordatum* Raf. 1820)  
*Pleurobema stictoxia* Raf. 1820 (= *solidum* Lea 1838)  
*Pleurobema premorsa* Raf. 1831 (= *plenum* Lea 1840)  
*Cyprogenia stegaria* Raf. 1820 (= *irrorata* Lea 1829)  
*Ellipsaria ligamentina* Lamarck 1819 (= *carinata* Barnes 1823)  
*Grenodonta lineolata* Raf. 1820 (= *securis* Lea 1829)  
*Truncilla vermiculata* Raf. 1820 (= *truncata* Raf. 1820 preocc.)  
*Potamilius alatus* Say 1817 (monotype of *Potamilius* in 1818)  
*Potamilius ohioensis* Raf. 1820 (= *laevissima* Lea 1829)  
*Toxotasma livida* Raf. 1831 (= *glans* Lea Dec. 1831)  
*Lemiox rimosus* Raf. 1831 (= *caelatus* Conrad 1834)  
*Villosa tenellus* Raf. 1831 (= *taeniata* Conrad 1834)  
*Lampalis teres* Raf. 1820 (= *fallaciosa* Smith 1899)  
*Lampisilis luteola* Lamarck 1819 (= *siliquoides* Barnes 1823)  
*Lampisilis cardiacum* Raf. 1820 (= *ventricosa* Barnes 1823)  
*Lampisilis abruptus* Say 1831 (= *orbiculatus* Lea not Hildreth 1828)  
*Plagiola interruptus* Raf. 1820 (= *brevitens* Lea 1831)  
*Plagiola ridibundus* Say 1831 (= *sulcatus* Lea 1829 preocc.)  
*Plagiola perobliqua* Conrad 1837 (= *delicata* Simpson 1900)  
*(Epioblasma) flexuosa* Raf. 1820 (= *foliata* Hildreth 1828)

EARLY WORKERS ON THE NORTH AMERICAN NAIADS

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There is a rather imposing list of people who were interested in the rich naiad fauna of North America. Prior to 1800 only a very few species had been described, and these few were described by European zoologists. Thomas Say's article on conchology in the American edition of Nicholson's British Encyclopedia of 1817 was the first report by an American worker to appear in the United States. Shortly thereafter Rafinesque, a European who had been appointed Professor of Botany and Natural History in Transylvania University of Lexington, Kentucky, started to publish on freshwater mollusks of the Ohio River system. Since this early beginning there have been many who have left a heritage of material and publications regarding this important group of mollusks.

There are four rather distinct categories which form a basis for our present knowledge of this group: 1. the collectors such as T. Say, H. H. Smith, A. E. Ortmann and a host of others who had brought together much of the material upon which later studies were based; 2. the describers such as T. Say, Isaac Lea, J. G. Anthony and others who made known by the printed page the existence of the genera and species of naiads; 3. the monographers such as T. Conrad, I. Lea, C. T. Simpson who brought together in systematic order the vast amount of isolated data which had accrued during the early history of this group; 4. the geographic monographers such as T. Say, T. Conrad, R. E. Call, B. Walker, and A. E. Ortmann who worked out the patterns of distribution of the various genera and species composing the freshwater mussels of North America.

EFFECTS OF POLLUTION ON THE NAIADS OF THE ILLINOIS RIVER. William C. Statreit, Illinois Natural History Survey, Havana, Illinois.  
 (no abstract submitted)

EGG CASES OF NITIDELLA OCELLATA GMELIN AND AN ANACHIS

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A single adult specimen of *Nitidella ocellata* Gmelin was taken in the Key Vaca area of the Florida Keys November 26 or 27, 1968 and kept in an aerated container of sea water with several other mollusks. On January 30, 1969 egg cases were discovered, having been deposited in concealed areas such as niches in coral rocks and in the hinge sockets of clam shells. Deposits continued at intervals until mid-February with a total of twenty cases, none of which were observed at the time of deposit. The egg cases were sturdy yellowish bulbs, globular-oval, 1.5 mm long, firmly attached to the substrate at a 1 mm base plus a narrow, irregular rim. The thinner hatch area (comparatively large for the size of the case) was 1 mm in length, situated off center, rather saddle shaped, and characterized by a flaring collar. In the twenty cases found, the number of yellowish eggs varied from eight to fourteen at best count without dissection. However, no more than three embryos developed beyond the veliger stage in any one case, and no more than two juveniles hatched crawling from a single case, the third (and/or second) veliger being either underdeveloped or its shell crushed as the case became crowded.

Time of incubation was not determined but it is apparently rather long, as two cases that when discovered contained moving embryos did not hatch their crawling young until 49 days later. The smooth dark brown shell of the newly hatched averaged .8 mm in height and was about 2/3 at the overall widest. Having rasped and pushed their way through the hatch area, the young fed almost immediately on tiny crushed mussel spat (*Mytilus edulis* Linné). At three days there was new growth, showing two rows of the white spots that are characteristic of *Nitidella ocellata*.