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AN OUTLINE OF GASTROPOD CLASSIFICATION[1]

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ABSTRACT

This outline is a compilation of familial and super-familial classification, primarily from the "Handbuch der Paläozoologie" (Wenz and Zilch) and the "Treatise on Invertebrate Paleontology" (Knight and others). These summaries have been supplemented, especially in the shell-less groups, to make the classification as nearly consistent as practicable. Numbers of genera and subgenera are listed for each family, but genera described after publication of the principal sources have been included only rarely, so that the relative size of the groups is indicated only in a general way. Annotations include references to the more important taxonomic groups and explanations of the ways in which divergent classifications have been reconciled.

Gastropods (7324 genera and subgenera) are divided into the two subclasses Streptoneura and Euthyneura. Although the Streptoneura (4218 genera and subgenera) are larger, they are divided into only 3 orders. The Euthyneura (3106 genera and subgenera) are more diverse structurally and are divided into 14 orders.

Several recent publications have summarized the classification of large parts of the class Gastropoda. The Treatise on Invertebrate Paleontology (Knight and others, 1960) covers living and fossil Archaeogastropoda and other Paleozoic gastropods. Zilch (1959-60) has dealt with living and fossil shelled Euthyneura. Wenz (1938-44) is the most recent comprehensive source on living and fossil post-Paleozoic mesogastropods and neogastropods.

We have compiled an outline of gastropod classification from these sources and supplemented it by the works of others as indicated in the notes. This classification extends only to the family level. We have been conservative in recognizing families and superfamilies proposed in sources other than these basic works. Other general and recent works which we have considered are those by Korobkov (1955), Pchelintsev and Korobkov (1960), and Termier and Termier (1952).

In the following outline of classification the number of genera and subgenera is listed for each family. These numbers are taken from the sources mentioned above, with modifications as indicated. Genera described since these works were published have rarely been included. This classification is therefore out of date to varying degrees, and includes many of the weaknesses of the general works quoted.

In some cases, especially among the Neogastropoda, there has been rather uniform disagreement as to Wenz's familial classification. In as much as no recent monographic treatment exists for these groups we have retained Wenz's classification but have listed the common alternatives in parentheses.

The relative size of the orders based on numbers of their genera and subgenera is shown in figures 1 and 2. Our classification, including both living and fossil groups, is the basis of figure 1. Thiele's (1929-35) classification, including living forms only, is the basis of figure 2. The only obvious difference between the graphs is that in figure 2 the Stylommatophora have increased, primarily at the expense of the Archaeogastropoda.

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[2]Separates of this paper may be obtained from the Managing Editor of MALACOLOGIA at cost price.

FIG. 1. Relative size of subclasses and orders of gastropods, recent and fossil. Arcs are proportional to numbers of genera given in this paper. 4, Parasita and Entomotaeniata. 5, Cephalaspidea, Acochlidioidea, and Philinoglossoidea. 6, Thecosomata. 9, Sacoglossa. 10, Anaspidea. 11, Gymnosomata. 12, Notaspidea. 14, Soleolifera.

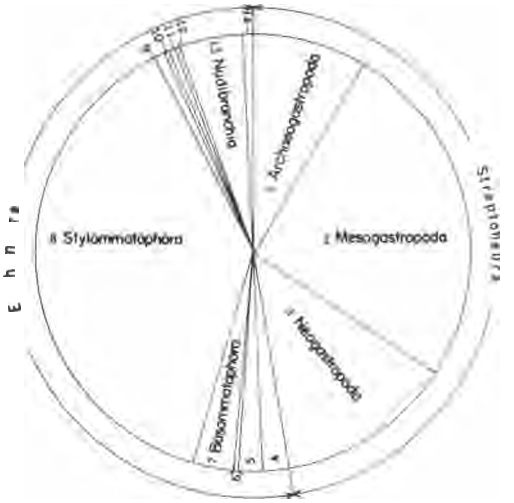

FIG. 2. Relative size of subclasses and orders of recent gastropods. Arcs are proportional to numbers of genera in Thiele's (1929-35) classification. Numbers as in Fig. 1.

In general we believe that the families and superfamilies throughout the gastropods correspond to about the same degree of morphological difference, with the exception of the Archaeogastropoda, where many of the families and superfamilies have relatively few genera. This order has been more finely divided than others.

In accepting the subdivision of the gastropods into Streptoneura and Euthyneura, we have abandoned the familiar threefold division into Prosobranchia, Opisthobranchia, and Pulmonata. We have followed Boettger's (1955) and Zilch's (1959-60) fusion of opisthobranchs and pulmonates into the Euthyneura of Spengel. Streptoneura is preferable to Prosobranchia for the remaining gastropods because of the similar derivation of the name.

CLASSIFICATION

Asterisks denote groups that are known only as fossils.

The left-hand column indicates the number of genera and subgenera for each family. The right-hand column indicates totals for categories above family.

Class GASTROPODA		7324
Subclass STREPTONEURA		4218
1. Order Archaeogastropoda (note 1)		1130
*Superfamily Helcionellacea		4
*Helcionellidae	1	
*Coreospiridae	3	
*Superfamily Bellerophontacea (note 1)		53
*Cyrtolitidae	6	
*Sinuitidae	14	
*Bellerophontidae	33	
*Superfamily Macluritacea		17
*Onychochilidae	10	
*Macluritidae	7	
*Superfamily Euomphalacea		42
*Helicotomidae	8	
*Euomphalidae (note 2)	26	
*Omphalotrochidae	5	
*Weeksiidae (note 2)	3	
Superfamily Pleurotomariacea (note 1)		149
*Sinuopeidae	13	
*Raphistomatidae	21	
*Eotomariidae	26	
*Lophospiridae	7	
*Luciellidae	5	
*Phanerotrematidae	3	
*Gosseletinidae	14	

*Euomphalopteridae	3	
*Portlockiellidae	4	
*Catantostomatidae	1	
*Porcelliidae	3	
*Rhaphischismatidae	1	
*Phymatopleuridae	10	
*Polytremariidae	2	
*Laubellidae	1	
*Schizogoniidae	2	
*Zygitidae	1	
*Kittlidiscidae	1	
*Temnotropidae	1	
Pleurotomariidae	11	
*Trochotomidae	3	
Scissurellidae	5	
Haliotidae	11	
*Superfamily Trochonematacea		7
*Trochonematidae	7	
Superfamily Fissurellacea		56
Fissurellidae	56	
Superfamily Patellacea		55
*Metoptomatidae	3	
*Symmetrocapulidae	2	
Acmaeidae	29	
Patellidae	16	
Lepetidae	5	
Superfamily Cocculinacea		10
Cocculinidae	4	
Lepetellidae	6	
*Superfamily Platyceratacea		26
*Holopeidae	13	
*Platyceratidae	13	
*Superfamily Microdomatacea		10
*Microdomatidae	5	
*Elasmonematidae	5	
*Superfamily Anomphalacea		9
*Anomphalidae	9	
*Superfamily Oriostomatacea		9
*Oriostomatidae	3	
*Tubinidae	6	
Superfamily Trochacea		399
Trochidae	231	
*Ataphridae	7	
Stomatellidae	12	
Turbinidae	91	
Skeneidae (note 3)	46	
Phasianellidae (note 4)	9	
*Velainellidae	1	
Orbitestellidae	2	
Superfamily Neritacea		162
*Plagiothyridae	3	
Neritopsidae	17	
*Dawsonellidae	1	
Neritidae	67	
Helicinidae	60	
*Grangerellidae (note 5)	3	
*Delaniridae	1	
Phenacolepadidae	5	
Hydrocenidae	4	
Titiscaniidae	1	
*Superfamily Murchisoniacea		35
*Murchisoniidae	27	
*Plethospiridae	8	
*Superfamily Clisospiracea		5
*Clisospiridae	5	
*Superfamily Pseudophoracea		15
*Planitrochidae	6	
*Pseudophoridae	9	
*Superfamily Craspedostomatacea		16
*Craspedostomatidae	8	
*Codonocheilidae	6	
*Crossostomatidae	2	
*Superfamily Palaeotrochacea		7
*Palaeotrochidae	4	
*Paraturbinidae	3	
*Superfamily Amberleyacea		28
*Platyceridae	5	
*Cirridae	8	
*Amberleyidae	10	
*Nododelphinulidae	5	
2. Order Mesogastropoda		1969
Superfamily Cyclophoracea (note 6)		146
Cyclophoridae	61	
Maizaniidae	1	
Poteriidae	11	
Pupinidae	26	
Cochlostomatidae	39	
Superfamily Viviparacea (note 6)		47
Viviparidae	30	
Ampullariidae (Pilidae)	17	
Superfamily Valvatacea		14
Valvatidae	14	
Superfamily Littorinacea		158
Lacunidae	28	
Littorinidae	30	
*Purpurinidae	18	
Pomatiasidae	16	
Chondropomidae	66	
Superfamily Rissoacea (note 7)		407
Hydrobiidae (note 8)	103	
Truncatellidae	16	
Hydrococcidae	1	
Stenothyridae	3	
Bithyniidae (Bulimidae) (note 9)	16	
Iravadiidae	2	
Micromelaniidae	47	
Rissoidae (note 9A)	104	
Assimineidae (Syncera-tidae) (note 8)	37	
Aciculidae (note 10)	8	
Vitrinellidae (Adeorbidae, Tornidae) (note 11)	55	
Skeneopsidae (note 12)	3	
Omalogyridae (note 12)	3	
? Trachysmidae	1	
Rissoellidae (note 12)	4	
Cingulopsidae (notes 12, 13)	1	
? Choristidae	2	
? Trochaclisidae	1	

*Superfamily Subulitacea 17
*Subulitidae 14
*Meekospiridae 3
*Superfamily Loxonematacea 65
*Loxonematidae 7
*Palaeozygopleuridae 2
*Pseudozygopleuridae 14
*Zygopleuridae 12
*Coelostylinidae 25
*Spirostylidae 5
*Superfamily Pseudomelaniacea (note 14) 20
*Pseudomelaniidae 16
*Glauconiidae 4
Superfamily Architectonicacea (note 15) 27
Architectonicidae (Solariidae) 25
? Omalaxidae 2
Superfamily Cerithiacea 410
Turritellidae (note 16) 40
Mathildidae (note 15) 15
Vermetidae (note 16) 10
Caecidae 12
Syrnolopsidae (note 7) 5
Thiaridae (Melaniidae) (note 17) 121
Melanopsidae
Pleuroceridae (note 21)
? Abyssochrysidae 1
Planaxidae 9
Modulidae 4
*? Brachytremidae 2
*? Eustomidae 2
*Procerithiidae 33
Potamididae 37
Diastomidae 11
Cerithiidae (note 14) 56
C erithiopsidae 32
Triphoridae (note 18) 19
Seguenziidae (note 19) 1
Superfamily Epitoniacea (Scalacea) (note 19A) 110
Epitoniidae (Scalidae) (note 19A) 103
Janthinidae 7
Superfamily Eulimacea (Melanellacea) (note 20) 48
Aclididae 7
Eulimidae (Melanellidae) 26
Paedophoropodidae 1
Stiliferidae 14
Superfamily Strombacea (note 22) 92
Struthiolariidae 7
Aporrhaidae 32
*Colombellinidae 6
Strombidae 47
Superfamily Hipponicacea 32
Fossaridae 23
Vanikoridae (Naricidae) 1
Hipponicidae (Amaltheidae) 8
Superfamily Calyptraeacea (note 21) 60
Trichotropididae 25
Capulidae 9
C alyptraeidae 19
Xenophoridae (note 22) 7
Superfamily Lamellariacea 38
Lamellariidae 14
Eratoidae (note 22A) 21
Pseudosacculidae 1
Asterophilidae 1
Ctenosculidae 1
Superfamily Cypraeacea (note 22A) 106
Cypraeidae 68
Ovulidae (Amphiperatidae) (note 23) 38
Superfamily Atlantacea 11
Atlantidae 5
Carinariidae 4
Pterotracheidae 2
Superfamily Naticacea 75
Naticidae 75
Superfamily Tonnacea 86
Cas sididae 25
Cymatiidae 35
Bur sidae 11
Tonnidae (note 24) 6
Ficidae 9
3. Order Neogastropoda (note 25) 1119
Suborder Stenoglossa 792
Superfamily Muricacea 154
Muricidae (includes Thaisidae) (note 25) 134
Magilidae (Corallio-philidae) 20
Superfamily Buccinacea 386
Pyrenidae (Columbellidae) 50
Buccinidae
Neptuneidae 175
Buccinulidae
Melongenidae (Galeodidae) (note 26) 27
Nassariidae (Nassidae) (note 25) 68
Fasciolariidae (includes Fusinidae) 66
Superfamily Volutacea 252
Olividae 53
Vasidae (Xancidae) 26
Harpidae 4
Volutidae 97
Cancellariidae 48
Marginellidae 24
Suborder Toxoglossa 327
Superfamily Mitracea 31
Mitridae (note 25) 31
Superfamily Conacea 296
Turridae 246
Conidae 25
Terebridae 25

Subclass EUTHYNEURA (note 27) 3106

4. Order Entomotaeniata (note 28) 171

*Superfamily Nerineacea 36
*Ceritellidae 5
*Nerineidae 13
*Nerinellidae 10
*Itieriidae 8
Superfamily Pyramidellacea 135
Pyramidellidae 131
*Streptacididae 4
5. Order Parasita (note 20) 5
Entoconchidae 2
Enteroxenidae 3
6. Order Cephalaspidea (note 29) 158
Superfamily Acteonacea 66
Acteonidae 43
*Acteonellidae (note 30) 7
Ringiculidae 12
Hydatinidae 4
Superfamily Philinacea 44
Scaphandridae 28
Philinidae 9
Aglajidae 3
Gastropteridae 1
Runcinidae 3
Superfamily Diaphanacea 8
Diaphanidae (note 31)
Notodiaphanidae 1
Superfamily Bullacea 39
Bullidae 5
Atyidae 24
Retusidae 10
Superfamily Cylindrobullacea (note 32) 1
Cylindrobullidae 1
7. Order Acochlidioidea (note 33) 7
Acochlidiidae 1
Hedylopsidae 2
Microhedylidae 4
8. Order Philinoglossoidea (note 34) 2
Philinoglossidae 2
9. Order Thecosomata 23
Superfamily Spiratellacea 17
Spiratellidae 2
Cavolinidae 15
Superfamily Peraclidacea 6
Peraclididae 1
Procymbuliidae 1
Cymbuliidae 3
Desmopteridae 1
10. Order Basommatophora (note 35) 230
Superfamily Siphonariacea 23
Trimusculidae 1
Siphonariidae (note 36) 20
*? Acroreidae 2
Superfamily Amphibolacea (note 36A) 2
Amphibolidae 2
Superfamily Ellobiacea 57
Ellobiidae (note 6) 55
Otinidae 2
Superfamily Unnamed (note 37) 3
Chilinidae 1
Latiidae 1
*Payettiidae (note 37) 1
Superfamily Acroloxacea 3
Acroloxidae (note 38) 3
Superfamily Lymnaeacea (note 38) 37
Lancidae 3
Lymnaeidae 34
Superfamily Ancylacea (note 38) 105
Ancylidae 13
Planorbidae 86
Physidae 6
11. Order Stylommatophora (note 39) 2184
Suborder Orthurethra 266
Superfamily Achatinellacea (note 40) 35
Achatinellidae 23
Partulidae 12
Superfamily Cionellacea (note 41) 23
Amastridae 19
Cionellidae (Cochlicopidae) (note 41) 4
Superfamily Pupillacea 208
Pyramidulidae 1
Vertiginidae 39
Orculidae 5
Chondrinidae 34
Pupillidae 28
Valloniidae 19
Pleurodiscidae 1
Enidae 81
Suborder Mesurethra (note 42) 256
Superfamily Clausiliacea 238
Ceriidae (note 42) 5
*? Filholiidae 1
Clausiliidae 227
Megaspiridae 5
Superfamily Corillacea 8
Corillidae 8
Superfamily Strophocheilacea 10
Dorcasiidae 3
Strophocheilidae 7
Suborder Heterurethra 31
Superfamily Succineacea 27
Succineidae 26
Aillyidae (note 43) 1
Superfamily Athoracophoracea 4
Athoracophoridae (note 44) 4
Suborder Sigmurethra (note 39) 1631
Infraorder Holopodopes 517
Superfamily Achatinacea 166
Ferrussaciidae 20
Subulinidae 80
Achatinidae 23
Spiraxidae (note 47) 43
Superfamily Streptaxacea 90
Streptaxidae (note 45) 90
Superfamily Rhytidacea (note 45) 38
Acavidae 12
Haplotrematidae (note 45) 5
Rhytididae 20
Chlamydephoridae 1

- Superfamily Bulimulacea 223
  - Bulimulidae 94
  - *? Anadromidae 9
  - Odontostomidae 16
  - Orthalicidae 17
  - Amphibulimidae (note 43) 8
  - Urocoptidae 79
- Infraorder Aulacopoda 610
  - Superfamily Endodontacea 137
    - Endodontidae 107
    - Otoconchidae 1
    - Arionidae 25
    - Philomycidae (note 46) 3
    - ? Thyrophorellidae 1
  - Superfamily Zonitacea 165
    - Vitrinidae 14
    - Zonitidae 94
    - Parmacellidae 5
    - Milacidae 4
    - Limacidae 26
    - Trigonochlamydidae 7
    - ? Systrophiidae (note 45) 15
  - Superfamily Ariophantacea 305
    - Trochomorphidae 24
    - Euconulidae 94
    - Helicarionidae 70
    - Ariophantidae 73
    - Urocyclidae 44
  - Superfamily Testacellacea 3
    - Testacellidae 3
- Infraorder Holopoda 504
  - Superfamily Polygyracea (note 47) 49
    - ? Thysanophoridae 10
    - ? Ammonitellidae 5
    - Polygyridae 34
  - Superfamily Oleacinacea 35
    - Oleacinidae (note 47) 13
    - Sagdidae (note 47) 22
  - Superfamily Helicacea 420
    - Oreohelicidae (note 47) 2
    - Camaenidae (note 47) 94
    - Bradybaenidae 80
    - Helminthoglyptidae 51
    - Helicidae 193

12. Order Sacoglossa (note 48) 34
  - Superfamily Oxynoacea 7
    - Arthessidae (note 31) 2
    - Oxynoidae 5
  - Superfamily Elysiacea 22
    - Elysiidae 6
    - Caliphyllidae 3
    - Limapontiidae 2
    - Stiligeridae 10
    - Oleidae 1
  - Superfamily Juliacea 5
    - Juliidae 5

13. Order Anaspidea 17
  - Superfamily Aplysiacea 17
    - Akeratidae (note 29) 1
    - Aplysiidae 16

14. Order Gymnosomata (note 49) 17
  - Laginiopsidae 1
  - Anopsiidae 2
  - Pneumodermatidae 4
  - Cliopsidae 1
  - Notobranchaeidae 3
  - Clionidae 4
  - Thliptodontidae 2

15. Order Notaspidea (note 50) 18
  - Superfamily Umbraculacea 6
    - Umbraculidae 6
  - Superfamily Pleurobranchacea 12
    - Pleurobranchidae 12

16. Order Nudibranchia (note 51) 213
  - Suborder Doridoidea (note 52) 104
    - Infraorder Gnathodoridoidea 2
      - Bathydoridiidae 1
      - Doridoxidae 1
    - Infraorder Cryptobranchia 53
      - Hexabranchidae 1
      - Chromodorididae
      - Doridiidae 52
      - Halgerdidae
    - Infraorder Phanerobranchia 42
      - Superfamily (Nonsuctoria) 22
        - Notodorididae 3
        - Polyceridae 12
        - Triophidae 4
        - Gymnodorididae 3
      - Superfamily (Suctoria) 20
        - Onchidorididae 10
        - Goniodorididae 7
        - Corambidae 2
        - Vayssiereidae 1
    - Infraorder Porostomata 7
      - Dendrodorididae 2
      - Phyllidiidae 5
  - Suborder Rhodopoidea 1
    - Rhodopidae 1
  - Suborder Dendronotoidea (note 53) 29
    - Tritoniidae 10
    - Aranucidae 1
    - Lomanotidae 1
    - Scyllaeidae 3
    - Hancockiidae 1
    - Dendronotidae 1
    - Bornellidae 2
    - Fimbriidae 3
    - Dotonidae 5
    - Phylliroidae 2
  - Suborder Arminoidea (note 54) 17
    - Infraorder Euarminoidea 7
      - Heterodorididae 1
      - Arminidae 5
      - Doridoididae 1
    - Infraorder Pachygnatha 5
      - Antiopellidae 2
      - Madrellidae 2
      - Dironidae 1
    - Infraorder Leptognatha 5
      - Gonieolididae 1
      - Heroidae 1
      - Charcotiidae 3
  - Suborder Eolidoidea (note 55) 62
    - Infraorder Pleuroprocta
      - Notaeolidiidae 1
      - Coryphellidae

Infraorder Acleioprocta		
Eubranchidae		
Pseudovermidae	1	
Cuthonidae	14	
Flabellinidae		
Fionidae	1	
Calmidae	*1*	
Infraorder Cleioprocta		30
Facelinidae	11	
Favorinidae	10	
Aeolidiidae	7	
Glaucidae	2	
Incertae sedis		1
? Myrrhinidae	1	
17. Order Soleolifera (note 56)		27
Superfamily Onchidiacea		6
Onchidiidae	6	
Superfamily Veronicellacea		21
Veronicellidae	16	
Rathouisiidae	5	

NOTES

1. Numbers of genera of many families and superfamilies have been taken directly from Knight and others (1960). Thus several genera unallocated to family have been included in the total number of genera per superfamily. Archaeogastropoda genera inquirenda (Knight and others, 1960) have not been counted. The counts not taken from Knight and others are original; we found the numbers given by Schilder (1947) are wrong in some cases.

2. Sohl (1961, p. 50) has established the family Weeksiidae for three genera formerly included in the Euomphalidae.

3. The Cyclostrematidae of Knight and others (1960) are a composite group. *Cyclostrema* Marryat, 1818, probably belongs to the Turbinidae Liotiinae (Abbott, 1950). The next available family name, Skeneidae (Wenz, 1938-44), is therefore applied to Knight's group. Some of Wenz's Skeneidae and Cyclostrematidae have been transferred to the Vitrinellidae (see note 11).

4. Family rank for the Phasianellidae as well as the integrity of the group has been questioned by Robertson (1958, p. 250-251). Robertson implied that the two subfamilies might be better grouped in the Turbinidae. Marcus and Marcus (1960, p. 192) have suggested that separate family rank for both phasianellid subfamilies may perhaps be warranted.

5. The Grangerellidae, originally described as pulmonates, are included in the Neritacea near the Helicinidae following Zilch (1959-60). *Prograngerella* Russell, 1941, omitted by Zilch, has been added also.

6. The scope of the Cyclophoracea has been changed from that of Wenz (1938-44) to that of Tielecke's (1940) " Cyclophorinaceae" . Thus the Viviparidae and Ampullariidae have been excluded, and we group them in a separate superfamily Viviparacea. This classification is more conservative than that of Volkova, Pchelintsev, and Korobkov (in Pchelintsev and Korobkov, 1960), who recognized separate superfamilies for both the Viviparidae and Ampullariidae.

The families of Cyclophoracea are those of Tielecke (1940). The numbers of genera in these families are those of Wenz's subfamilies, distributed according to Tielecke's classification. The seven genera and subgenera of Wenz's Hainesiinae, Ferussininae, and Craspedopominae have not been allocated to a family. *Carbonispira* Yen, 1949, has been included in the Cyclophoracea following Knight and others (1960). These eight genera of uncertain position have been included in the count of the superfamily. *Maturipupa* Pilsbry, 1927, and *Anthracopupa* Whitfield, 1881, although placed in the Cylophoracea also by Knight and others, are listed here in the Ellobiidae following Zilch (1959-60).

7. The Syrnolopsidae have been transferred from the Rissoacea to the Cerithiacea after Mandahl-Barth (1954). Instead of including the group in the Thiaridae as did Mandahl-Barth, we have followed Leloup (1953) in ranking it as a family, next to the Thiaridae.

8. Wenz's classification of the Hydrobiidae has been modified by transferring the Ekadantinae to the Assimineidae (see Zilch, 1959-60, p. 827).

9. The name Esulimidae used by Wenz has been changed to Bithyniidae in accord with Opinion 475 of the International Commission on Zoological Nomenclature.

9A. Fretter and Graham (1962, p. 622, 642) advocated separation of *Barleeia* Clark, 1855, in an independent family. It is not certain whether they would include all of the Rissoidae Barleeinae of Wenz's classification.

10. The name Acmeidae used by Wenz has been changed to Acieulidae in accord with Opinion 344 of the International Commission on Zoological Nomenclature.

11. Vitrinellidae has been used as the name for this family more often than either Adeorbidae or Tornidae. The scope of the family is that of Pilsbry and Olsson (1945, 1952) and Pilsbry (1953). Many of the genera were included erroneously by Wenz in the archaeogastropods as Skeneidae and Cyclostrematidae. The number of vitrinellid genera is based on Wenz's Tornidae, on some of his Skeneidae and Cyclostrematidae that are not included in Knight and others (1960), and on new genera described by Pilsbry and Olsson.

Genera of Wenz's Skeneidae listed here as Vitrinellidae are *Calceolata* Iredale, 1918; *Caporbis* Bartsch, 1915, *Callomphala* A. Adams and Angas, 1864; *Didianema* Woodring, 1928; *Idioraphe* Pilsbry, 1922; *Leucodiscus* Cossmann, 1918; *Leucorhynchia* Crosse, 1867; *Megatyloma* Cossmann, 1888; *Pseudorotella* P. Fischer, 1857; *Rostellorbis* Cossmann, 1888; *Solariorbis* Conrad, 1865; *Starkeyna* Iredale, 1930; and *Teinostoma* H. and A. Adams, 1853. Genera from Wenz's Cyclostrematidae listed here as Vitrinellidae are *Cithna* A. Adams, *1863;Elachorbis* Iredale, 1915; and *Scissilabra* Bartsch, 1907. *Macromphalina* Cossmann, 1888, was listed erroneously by Wenz as a synonym of *Megalomphalus* Brusina, 1871, in the Fossaridae. It is included in the Vitrinellidae after Pilsbry and Olsson (1952). To these we have further added eighteen genera and subgenera from the papers by Pilsbry and Olsson (1945, 1952) and Pilsbry (1953).

12. Fretter (1948) and Fretter and Graham (1954) have pointed out similarities of *Omalogyra* Jeffreys, 1860, and *Rissoella* Gray, 1847, to the Pyramidellidae (Euthyneura).

The Skeneopsidae, Omalogyridae, Rissoellidae and Cingulopsidae were listed as Rissoacea incertae sedis by Fretter and Graham (1962, p. 622-624, 639-640, 642). They show some euthyneuran characters and perhaps even their ordinal position will be changed.

13. Fretter and Patil (1958) established the family Cingulopsidae for their new genus *Cingulopsis*.

14. Pchelintsev (in Pchelintsev and Korobkov, 1960) has established a superfamily Pseudomelaniacea which we accept with minor modifications. *Meekospira* Ulrich and Scofield, 1897 (including *Cambodgia* Mansuy, 1914) and *Girtyspira* Knight, 1936, of Pchelintsev's Pseudomelaniidae are included in the Meekospiridae of the superfamily Subulitacea following Knight and others (1960). *Trajanella* Popovici-Hatzeg, 1899, and *Paosia* Böhm, 1894, which form Pchelintsev's Trajanellidae, have been retained in the Pseudomelaniidae as in Wenz (1938-44). We accept the Glauconiidae of Pchelintsev without modification. Thus the following genera of Wenz's classification are brought together: *Pseudoglauconia* H. Douville, 1921, from the Cerithiidae; *Glauconia* Giebel, 1852 (including *Gymnentome* Cossman, 1909), from the Thiaridae (see also note 17); and *Pseudomesalia* H. Douville, 1917, from the Vermetidae (see also note 16).

15. The relationships between Architectonicidae and Mathildidae have been pointed out by Thiele (1928), who emphasized the heterostrophic protoconch and common features of the radula. These families were both classed by Thiele among the Cerithiacea. Ovechkin and Pchelinstev (in Pchelintsev and Korobkov, 1960) established a superfamily Solariacea for the Solariidae (= Architectonicidae). Modifying the name of this superfamily to Architectonicacea, we also tentatively add the Omalaxidae, after Wenz.

The classification of the Mathildidae in the Cerithiacea is based entirely upon the information provided by Thiele (1928). The family is similar to some Archi-

tectonicidae in operculum, radula, and heterostrophic protoconch. Risbec (1955, p. 70) has observed that the Architectonicidae have more in common with the euthyneuran Pyramidellidae than the Cerithiacea. Both Mathildidae and Architectonicidae may prove to be primitive shelled Euthyneura.

16. Wenz (1938-44) listed 27 genera and subgenera of Vermetidae. This assemblage is now recognized as composite. We follow Keen (1961) in listing ten genera and subgenera for the family.

The seventeen other genera of Wenz's Vermetidae are transferred elsewhere (Morton, 1951, 1953; Keen, 1961). *Agathirses* Montfort, 1808; *Anguillospira* Cossmann, 1912; *Casimiria* Cossmann, 1899; *Laxispira* Gabb, 1877; *Lilax* Finlay, 1927; *Provermicularia* Kittl, 1899; *Pseudobrochidium* Grupe, 1907; *Pyxipoma* Mörch, 1860; *Siphonium* J. E. Gray, 1850; *Stephopoma* Mörch, 1860; *Tenagodus* Guettard, 1770; and *Vermicularia* Lamark, 1799, are transferred to the Turritellidae. But, considering *Siphonium* a synonym of *Vermicularia* after Keen (1961), we increase Wenz's Turritellidae by eleven genera only. Four of Wenz's vermetids are probably or surely annelids instead of mollusks: *Segmentella, Spiroglyphus, Burtinella,* and *Cryptobia. Serpulorbis* Sassi, 1827, is a valid vermetid genus, but was listed by Wenz as a synonym of *Lemintina* Risso, 1826, which is based on an annelid. *Pseudomesalia* Douvillé, 1917, is transferred to the Glauconiidae following Pchelintsev (in Pchelintsev and Korobkov, 1960). *Dihelice* Schmidt, 1906, is unrecognizable and has not been counted in any family.

17. The Thiaridae of Wenz (1938-44) have been diminished by transferring *Glauconia* Giebel, 1852, and *Gymnentome* Cossmann, 1909, to the Glauconiidae (Pseudomelaniacea) after Pchelintsev (in Pchelintsev and Korobkov, 1960). The rest of the Thiaridae and Wenz's Lavigeridae (Cyclophoracea) and Anaplocamidae (Calyptraeacea) have been rearranged by Morrison (1954) into the three families Thiaridae, Pleuroceridae, and Melanopsidae on the basis of reproductive characters. In the present state of knowledge, it is not practicable to distribute all the genera listed by Wenz into these three families. Therefore, only the total number of genera in the three families is given.

18. Risbec (1955, p. 68-69) advocated removal of the Triphoridae from the Cerithiacea. "One ought to make a special group intermediate, from certain points of view, between the Stenoglossa and the Mesogastropoda, -- a group closer, in my opinion, to the Columbellidae than to the Cerithiidae." [Translated from the original French]. A separate superfamily for the Triphoridae is probably justified, but we have not established one because of uncertainties about where to place it.

19. *Seguenzia* Jeffreys, 1876, has been classified in two ways. Verrill (1884) created a separate family in what are now called the Mesogastropoda on the basis of the taenioglossate radula. Woodring (1928) followed Verrill. Thiele (1925) transferred the genus to the Trochidae in the Archaeogastropoda and this allocation has been maintained by Thiele (1929-35), Wenz (1938-44), and Knight and others (1960). We maintain the Seguenziidae in the Mesogastropoda because no anatomical data have become available since Verrill's work, because the shell features do not agree well with other Trochidae, and because we wish to call attention to the dearth of information about this group. We have placed the Seguenziidae in the Cerithiacea without conviction, and follow Woodring (1928) in listing it after the Triphoridae. Most recently Clarke (1961) has maintained the Seguenziidae as a separate family, placing them doubtfully next to the Trochidae in the Archaeogastropoda.

19A. The names Scalacea and Scalidae used by Wenz (1938-44) are not based upon a valid generic name. Clench and Turner (1951, p. 251) have discussed the reasons why *Epitonium* Röding, 1798, is the oldest name for the genus. Epitoniidae and Epitoniacea are thus preferable names for the family and superfamily.

The family Stenacmidae, included in the Amphibolacea by Zilch (1959-60), is based upon an epitoniid according to Robertson and Oyama (1958).

20. Melanellacea and Melanellidae have been rejected in favor of Eulimacea and Eulimidae on the basis of Winckworth's (1934, p. 12) arguments. The Entoconchidae and Enteroxenidae have been removed from this superfamily to an order Parasita within the Euthyneura after Tikasingh and Pratt (1961).

21. Anaplocamus Dall, 1895, formed Wenz's family Anaplocamidae in the Calyptraeacea. This genus is included in the Pleuroceridae (Cerithiacea) after Morrison (1954).

22. The Xenophoridae have been transferred from the Strombacea to the Calyptraeacea following Morton (1958a).

22A. The Eratoidae are classed in the Lamellariacea instead of Cypraeacea following Fretter and Graham (1962, p. 626-629).

23. The name Amphiperatidae, used by Wenz, is based upon a genus which is nomenclatorially invalid under Opinion 261 of the International Commission on Zoological Nomenclature. Ovulidae is the next most commonly used name.

24. Oocorythidae, ranked as a separate family by Wenz, have been included in the Tonnidae following Turner (1948, p. 181).

25. The arrangement of the Neogastropoda is that of Wenz as modified by Risbec (1955). The composition of the suborders Stenoglossa and Toxoglossa is that of Risbec, so that the Mitridae of Wenz have been divided. The Mitrinae and Cylindrinae made up the restricted family Mitridae, which has been transferred from the Volutacea in the Stenoglossa to the Toxoglossa as a separate superfamily. The Vexillinae have been dissociated and assigned to two different stenoglossan superfamilies: *Pusia* and two included subgenera to the Muricidae; and the fifteen other Vexillinae to the Nassariidae. Risbec's name Terebracea is rejected in favor of the older and more common term Conacea.

The Buccinidae of Thiele (1929-1935) and Wenz (1938-1944) have been divided by Powell (1951) into the three families Buccinidae, Neptuneidae, and Buccinulidae. In the present state of knowledge it is not practicable to distribute the genera and subgenera listed by Wenz into these three families, so the total number only is given.

26. The name Melongenidae is preferable to Galeodidae because *Galeodes* Röding 1798 is a junior homonym (Clench and Turner, 1956).

27. The orders of the Euthyneura are mostly from Zilch (1959-60), listed in the sequence of numbers assigned to them by Boettger (1955, p. 263). The ordinal name Anaspidea is used instead of Aplysiacea, and the Notaspidea are ranked as a separate order, following Odhner (1939).

28. The term Entomotaeniata was proposed by Cossmann (1896, p. 5) as a suborder to include the Nerineidae and relatives (the mesogastropod Nerineacea of later authors). Subsequently Cossmann (1921, p. 209-210) concluded that the Pyramidellidae were descended from the extinct Nerineacea, although he did not formally include the Pyramidellidae in the Entomotaeniata. Cossmann's summary is so incisive that we quote it:

"The origin of the Pyramidellidae seems evident to me: the Cretaceous System includes some *Nerinea-like* shells *(Itieria* and especially *Itruvia)* of which the columellar plication and heterostrophic protoconch have the greatest analogy with those of *Pyramidella.* Furthermore, it seems incontestable that the posterior notch of the lip in the Entomotaeniata, exaggerated to the point where it generates a subsutural band (Essais V, livr. II), could have become reduced in the first pyramidellids to a very weak sinus or even to a simply protractive outline of the posterior part of the outer lip, exactly as in the opisthobranchs which also have the protoconch heterostrophic. Consequently the Pyramidellidae are descended from the latter by way of the Entomotaeniata. But, while the opisthobranchs

have persisted to the present with their primitive and very ancient characters, their indirect heirs the Pyramidellidae are today very distinct in their anatomical features, and they resemble each other only by their protoconch and by the protractive outline of their lip." [Translated from the original French with changes to conform with the conventional orientation of shells].

This inferred phylogeny was doubted by Wenz (1938-1944, p. 64), who thought the Nerineacea and Pyramidellidae more probably had an earlier, common ancestor. Wenz went on to add:

"One might query, whether the Nerineacea should not be recognized as a strongly aberrant side branch of the opisthobranchs, and the Pyramidellacea also brought into closer systematic relationship with them than is usual. Only increasing anatomical investigation of the pyramidellid genera and of the families thought to be related can provide a decision." [Translated from the original German].

An affinity between Pyramidellidae and Nerineacea has been inferred by many paleontologists, for example d'Orbigny (1842-1843, p. 73) and Stoliczka (1867-1868, p. 172). Cossmann's appreciation of the significance of the heterostrophic protoconch reflects keen insight. Now that the Pyramidellidae have been recognized as Euthyneura the inclusion of other many-whorled high-spired shells in the subclass seems less anomalous than previously. We approve the grouping of Pyramidellacea and Nerineacea in one order. Reviving Cossmann' s Entomotaeniata also obviates proposing a new ordinal name for the Pyramidellacea as was suggested by Morton (1958, p. 177).

Within the Nerineacea the classification has been modified slightly from that of Wenz. The Nerinellidae of Pchelintsev (in Pchelintsev and Korobkov, 1960) have been accepted without modification. The family includes 7 genera from Wenz's Nerineidae.

The Pyramidellacea are composed of Pyramidellidae and Streptacididae after Knight and others (1960). The Pyramidellidae are transferred from the Mesogastropoda to the Euthyneura following Fretter and Graham (1949).

29. The scope of the Cephalaspidea is that of Odhner (1939) and Thiele (1929-1935) except that the Akeratidae are included in the Anaspidea after Boettger (1955). The Cephalaspidea of Zilch (1959-1960) are the Cephalaspidea, Acochlidioidea, and Philinoglossoidea of this classification.

Odhner (1939) grouped the families of Cephalaspidea into suborders on the basis of two characters: degree of development of shell, and presence or absence of parapodia. Neither Boettger nor Zilch used formal categories between family and order, but we are establishing superfamilies based on Boettger's inferred lineages. Boettger's hypothetical lines of descent were derived largely from degree of development of six characters: (1) degree of detorsion of the visceral connectives, (2) shortening of the visceral connectives, (3) change in mutual relationship of individual ganglia and their possible fusion, (4) position of the pharyngeal nerve ring before or behind the pharynx, (5) loss of shell, and (6) loss of operculum.

30. The Acteonellinae of Zilch (1959-60) are ranked as a family after Pchelintsev (in Pchelintsev and Korobkov, 1960). In this group we include *Cylindritella* White, 1887, and *Peruviella* Olsson, 1944, after Zilch, but we exclude *Troostella* Wade, 1926, after Pchelintsev.

31. Following Evans (1950) and Morton (1958b)we remove *Volvatella* Pease, 1860, and *Arthessa* Evans, 1950, from the Diaphanidae in the Cephalaspidea and group them as a family Arthessidae in the Sacoglossa.

32. Marcus and Marcus (1956) have established the family Cylindrobullidae for *Cylindrobulla* Fischer, 1857. The genus shows a mixture of primitive and specialized characters, but seems most probably a primitive Cephalaspidean with affinities to the sacoglossan Arthessidae. The Cylindrobullidae do not fit readily into any other group of Cephalaspidea and we have segregated them as a superfamily

Cylindrobullacea.

33. Ordinal rank for Acochlidiidae and relatives is after Odhner (1938, 1939, 1952) and Marcus (1953). Rank of the families and numbers of their genera are after Odhner (1952) and Marcus (1953). Odhner's name Acochlidiacea is changed to Acochlidioideabecause we prefer to restrict the ending -acea to superfamilies.

34. Ordinal rank for the Philinoglosidae is after Odhner (1952) and Marcus 1953). The number of genera is after Marcus (1953). The name Philinoglossacea is changed to Philinoglossoidea because we prefer to restrict the ending -acea to superfamilies.

35. The superfamilies of Basommatophora are those of Zilch (1959-60) with an additional one (unnamed) for the Latiidae and Chilinidae, which Morton (1955) suggested should be dissociated from the Lymnaeacea (see also note 37).

36. Pseudorhytidopilus Cox, 1960 (Knight and others, 1960, p. 237) has been included in the Siphonariidae with similar forms placed there by Zilch (1959-60).

36A. The family Stenacmidae, included in the Amphibolacea by Zilch (1959-60) is based upon an Epitoniid (Mesogastropoda) according to Robertson and Oyama (1958).

37. The Payettiidae were established by Dall (1924) as a subfamily Payettinae for *Payettia* Dall, 1924. The subfamily was listed under the Planorbidae, but perhaps inadvertently. Henderson (1935, p. 267) recorded that Dall "wrote that he had intended to place them in the Ancylidae, but that probably *Payettia* and *Latia* really belong together in a separate group.". The ranking of *Payettia* as a synonym of *Amphigyra* Pilsbry, 1906, by Zilch (1959-60) was probably based on the works by Wenz (1923, p.1704) and Hannibal (1912). Yen (1944) considered the genus as one of the Ancylidae. The Payettiidae may be most closely related to the Latiidae (listed here under an unnamed superfamily), or possible to Walker's (1923) Ancylastruminae (included in the Ancylidae of the Ancylacea). Partly for convenience, and partly to call attention to the uncertain affinities of the group, Dall's Payettinae are ranked as a family and grouped in the same superfamily as the Latiidae.

38. The scope of the Lymnaeacea of Zilch (1959-60) has been reduced by separating off two superfamilies, the Ancylacea and Acroloxacea, mainly on the basis of the classification of Baker (1956) and the work of Bondesen (1950). The numbers of genera are practically all from Zilch. The distinction between Ancylacea and Lymnaeacea was first made by Baker (1956) who distinguished the superfamilies "Ancyloidea" and "Lymnoidea". Baker's names have been modified to conform to the customary superfamily endings in mollusks. The unique features of the Acroloxidae have been recognized previously, although the basic differences were not expressed by ranking them formally as a superfamily.

The present groupings reflect more clearly the relationships of the various limpet-like freshwater snails to the forms with coiled shells. The patelliform groups that were originally united in the composite family "Ancylidae" have gradually been recognized to fall under four separate families: the restricted Ancylidae, Acroloxidae, Lancidae and Latiidae (note 37) in different superfamilies.

The patelliform Acroloxidae (equivalent to the Ancylinae of Walker, 1923) form a distinct family according to Bondesen (1950), who emphasized that they have little in common with other Ancylidae in the broad sense. Not only are they less similar to the Planorbidae in their internal organization than are the restricted Ancylidae (see below), but they are not closely related to other Basommatophora. "As regards the other European patelliform freshwater snail, the dextrorse *Acroloxus lacustris* (L.), a study of its egg capsules leaves the direct impression that we are here concerned with a species with an isolated position in the system. The highly deviating structure of its capsule with the slightly irregular eggs, apparently ar-

ranged without any regular order, and the entire absence of any sign of curving or spiral torsion makes the capsule of this species the most remarkable among the capsules of the freshwater pulmonates." (Bondesen, 1950, p. 111-112). Differences in spermatogenesis also "would tend to further separate *Acroloxus* from other Basommatophora" (Burch, 1961, p. 16). Hubendick (1962) has supported the separate family status of the Acroloxidae and inferred from the structure of the genitalia that they are most closely related to the Latiidae. The distinctive features pointed out by these authors are here formally recognized by grouping the Acroloxidae in a separate superfamily.

Separate family rank for the patelliform Lancidae, instead of subfamily status within the Lymnaeidae, is adopted following Baker (1925b). Only three valid genera or subgenera are recognized. *Zalophancylus* Hannibal, 1912, was based upon the external mold of a fossil fish vertebra (Hanna, 1925).

The number of genera of Lymnaeidae is that of Zilch's (1959-60) Lymnaeinae.

The Ancylidae as listed here are most of Walker's (1923) family, after the removal of the following groups: the Ancylinae Walker (1923) (= Acroloxinae Thiele (1931)), the Protancylinae, Neoplanorbinae and Lancinae. These restricted Ancylidae correspond to the Ancylidae, Ferrissiidae, and Rhodacmeidae of Zilch (1959-60).

The scope of the Planorbidae is basically that of Zilch, with addition of his Neoplanorbidae. Thus from the Ancylidae of Walker (1923) both the Neoplanorbinae and Protancylinae have been transferred to the Planorbidae. The scope of the Neoplanorbinae is that of Walker, so that two genera (instead of only one as in Thiele, 1929-35, v. 1, p. 480) have been added to the Planorbidae. *Protancylus* Sarasin, 1898, forming Walker's Protancylinae, was transferred to the Planorbidae by Pilsbry and Bequaert (1927, p. 132).

The Physidae have been accepted as in Zilch (1959-60).

39. Subdivision of the Stylommatophora into four suborders, and of the Sigmurethra into three infraorders, is after Baker (1955, 1962). The family groupings by Zilch (1959-60) have been maintained except where distributed in different superfamilies by Baker.

40. The Achatinellacea may possibly be an unnatural group. Baker (1956) suggested that the Partulidae may belong either near the Ceriidae (in the Clausiliacea of the Mesurethra), or near the Pupillacea in the Orthurethra. The Achatinellidae he included in the Pupillacea.

Cooke and Kondo (1960) have concluded that the Achatinellidae and Tornatellinidae are most reasonably grouped as one family Achatinellidae.

41. Recognition of a superfamily Cionellacea for the Cionellidae and Amastridae .ows Baker (1956). *Cochlicopa* Ferussac, 1821, is not a senior synonym of *Cionella* Jeffreys, 1829, or even a member of the same family (Kennard, 1942, Pilsbry, 1948, p. 1047). The name Cionellidae, used by Pilsbry, is therefore substituted for Zilch's Cochlicopidae.

42. Baker (1961) ranked the Ceriidae and Clausiliidae as separate families within the same superfamily of the Mesurethra. The Filholiidae are placed in the Clausiliacea with a query after Zilch (1959-60). The Megaspiridae are included after Baker (1961). The Acavidae of Zilch have been divided by Baker (1955, 1962) into Dorcasiidae and Strophocheilidae in the Mesurethra, and Acavidae in the Holopodopes in the Sigmurethra. The high-spired, many-whorled shells of Ceriidae, Clausiliidae, and Megaspiridae have been retained in the superfamily Clausiliacea which has much the same scope as that of Zilch. Corillacea and Strophocheilacea have been added as coordinate categories with the Clausiliacea.

The name Cerionidae has been emended to Ceriidae following Baker (1957).

43. Aillya Odhner, 1927, has been removed from the sigmurethran Amphibulimidae and segregated as the heterurethran family Aillyidae after Baker (1955).

44. The number of genera of Athoracophoridae is from Solem (1959, p. 44).

45. The Systrophiidae have been included with a query in the Zonitacea, following Baker (1956), instead of in a superfamily with the Rhytididae and Haplotrematidae as classified by Zilch (1959-60). *Polygyratia* Gray, 1847, is included in the Systrophiidae after Baker (1925a) rather than in the Camaenidae as Zilch (1959-60) grouped it.

Baker (1956) transferred the three genera of Austroselenitinae from the Haplotrematidae to the Streptaxidae with doubt.

46. The number of genera of Philomycidae is from Solem (1959, p. 77).

47. Baker (1956,1962) has divided the Oleacinidae of previous classifications into two families. The restricted Oleacinidae are included in the holopod superfamily Oleacinacea. The Spiraxidae, with subfamilies Spiraxinae, Streptostylinae and Euglandininae, are included in the infraorder Holopodopes and superfamily Achatinacea. Counts of genera are based on Zilch (1959-60) as follows: Oleacinidae are Zilch's " Varicelleae" and *Oleacina* RUding, 1798, in the strict sense. Spiraxidae are Zilch's Spiraxinae, "Euglandineae", and " Streptostyleae", except for *Oleacina.*

The Ammonitellidae were classified as a subfamily of the Camaenidae by Zilch (1959-60). They were considered a distinct family by Wurtz (1955), and thought by Baker (1956) to belong either in the Polygyracea or Endodontacea.

Baker (1956) ranked the Thysanophoridae as a family of either Polygyracea or Endodontacea. The group was included in the Polygyridae with doubt by Zilch (1959-60).

The Sagdidae have been transferred from the Polygyracea to Oleacinacea after Baker (1956). *Gonostonzopsis* Pilsbry, 1889, was thought to belong to the Sagdidae rather than Camaenidae by Wurtz (1955).

The Oreohelicidae are ranked as a family, instead of a subfamily of Camaenidae, after Wurtz (1955). *Solaropsis* Beck, 1837, is not one of the restricted Camaenidae according to Wurtz (1955), but is nevertheless counted in this family because it cannot be placed readily anywhere else. *Torrechrysias* Moreno, 1936, was treated as a synonym of *Chrysias* Pilsbry, 1929, by Zilch (1959-60) but is considered valid following Wurtz (1955).

48. The subdivision of the Sacoglossa and the ranks of these subdivisions are from Kawaguti and Baba (1959). Their name Tamanovalvidae is rejected because, according to Keen and Smith (1961) and Baba (1961), *Tamanovalva* Kawaguti and Baba, 1959, is invalid and because the older name Juliidae is available. *Julia* Gould, 1862, is known to be a sacoglossan (Morrison, 1961) and hence we accept Thiele's (1929-35) family Juliidae for this group. The number of genera in the family is from Keen and Smith (1961). We here also replace TamanovalvaceaKawaguti and Baba, 1959, byJuliacea. Bertheliniidae Baba, 1961, is a much younger name than Juliidae. In this classification only the one family Juliidae is recognized within its superfamily, and hence the name Bertheliniacea Baba, 1961, is invalid.

49. The number of genera of Gymnosomata is from Thiele (1929-35).

50. The division of the Notaspidea into Umbraculacea and Pleurobranchacea is that of Odhner (1939).

51. Thiele's (1929-35) classification of the Nudibranchia is much out of date, but there is no comprehensive revision of the group available. The outline given here is an attempt to fit Thiele's groups into the framework established by Odhner (1934, 1936, 1939, 1941).

Odhner (1939) and following him Boettger (1955) have divided the nudibranchs into four suborders. To these four, we add a fifth one for the aberrant genus *Rhodope,* following Thiele (1929-35), Hoffman (1932-39, p. 193), and Marcus and Marcus (1952). The endings of the names have been changed to reserve -acea for superfamily rank only.

Thompson (1961) has recognized two types of larval shells in the Nudibranchia and pointed out their significance for classification. Most of the known species have type 1 (spiral) which occurs

also in the orders Notaspidea and Sacoglossa. In the suborders Dendronotoidea and Eolidoidea both type 1 and type 2 (egg-shaped) are present. In the classification outlined herein, the two types never occur within the same family, and within the Eolidoidea they do not occur within even the same infraorder.

52. Odhner (1934) made a twofold primary subdivision of the doridoids, into Gnathodoridacea and Eudoridacea, the latter being divided again into Cryptobranchia and Phanerobranchia. Marcus (1957, 1961) has added Bergh's old group Porostomata as a third primary subdivision. To preserve the family groupings of present classification without introducing more than one category between suborder and superfamily, we introduce a fourfold division of the suborder into the infraorders Gnathodoridoidea, Cryptobranchia, Phanerobranchia, and Porostomata.

The Gnathodoridoidea include two families, monotypic as in Thiele's classification.

The Cryptobranchia include the doridids and close relatives. Doridiidae are split into many families by Pruvot-Fol (1954), but following Odhner (1934) only Chromodorididae, Doridiidae, and Halgerdidae are recognized. These three include all of Thiele's (1929-35) Doridiidae except for the Dendrodoridinae. The Hexabranchidae are monotypic, as in Thiele.

The Phanerobranchia are accepted in the sense of Odhner (1941), who divided them into Suctoria and Nonsuctoria. If these groups are ranked as superfamilies they should have names based on a typical genus, but for present purposes no new formal names are necessary and Odhner's terms are listed in parentheses. The four families of Nonsuctoria are those of Odhner (1941); they form part of Thiele's Polyceridae. The Onchidoridiidae and Goniodorididae of the Suctoria make up the rest of Thiele's Polyceridae. The Corambidae and Vayssiereidae have been accepted in the sense of Thiele.

Two families have been segregated in the Porostomata by Pruvot-Fol (1954) and Marcus (1957). These are the Doridiidae, Dendrodoridinae and Phyllidiidae of Thiele.

53. Odhner's classification (1936) of the Dendronotoidea has been accepted with only minor changes. Tritoniidae has been substituted for Duvauceliidae, and *Tritonia* Cuvier, 1803, has been considered distinct from *Duvaucelia* Risso, 1826, following Odhner (1939). The works of Odhner (1936) and Thiele (1929-35) have been combined in counting the genera of Tritoniidae.

54. The threefold division of the Arminoidea is that of Odhner (1939). In the Euarminoidea, Odhner's three families Heterodoridiidae, Arminidae, and Doridoididae are equivalent to Thiele's Arminidae and Doridoididae. In the Pachygnatha, the families are those of both Odhner and Thiele except that the name Antiopellidae is used following Odhner in place of Thiele's Zephyrinidae. The composition of the Leptognatha is after Odhner (1939). Goniaeolididae is changed in conformity with the original spelling of *Gonieolis* Sars, 1859. This family and also Heroidae are used as in Thiele's classification. The Charcotiidae are accepted in the sense of Odhner (1934), so that *Charcotia* Vayssière, 1906, and *Pseudo tritonia* Thiele, 1912, are removed from Thiele's Notaeolidiidae. *Telarma* Odhner, 1934, is the third genus of this family.

55. Division of the Eolidoidea into three groups is from Odhner (1934,1939). The Pleuroprocta include two families. The Notaeolidiidae as restricted by Odhner (1934) include only one genus. The second pleuroproct family of Odhner (1939), Coryphellidae, is included in Thiele's Flabellinidae.

The Acleioprocta of Odhner (1939) are made up of three families, Eubranchidae, Cuthonidae, and Calmidae. Three additional families, Fionidae, Flabellinidae, and Pseudovermidae are recognized by Marcus and Marcus (1955), Marcus (1961), and Pruvot-Fol (1954). These six families include the Tergipedidae, Fionidae, Calmidae, Pseudovermidae, and most of the Flabellinidae of Thiele's classification.

The cleioproct Eolidoidea are classed by Odhner (1934, 1939) in four families, which are equivalent to Thiele's Aeolidiidae. The four families recognized here are those which Marcus (1955, 1957, 1958) has modified from Odhner's classification. Ranking and numbers of genera of Facelinidae and Favorinidae are after Marcus (1958). Odhner's Aeolidiidae and Spurillidae are combined after Marcus (1955, 1957) into the Aeolidiidae whose number of genera is counted from Thiele's Aeolidiinae. Glaucinae of Thiele are ranked as a family after Odhner.

Thirty-one genera of the Coryphellidae, Eubranchidae, and Flabellinidae have not been allocated to a specific family, but have been included in the count of genera within the Eolidoidea.

The monotypic Myrrhinidae of Thiele's classification have been listed as Eolidoidea incertae sedis.

56. Soleolifera was used by Thiele for the Rathouisiidae and Veronicellidae only, but we follow Zilch in applying this name to the order. For Soleolifera in Thiele's sense we substitute Veronicellacea. The numbers of genera of Onchidiidae are from Solem (1959, p. 37) and of Rathouisiidae and Veronicellidae from Thiele (1929-35).

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ZUSAMMENF*ASSUNG*

UMRISS EINER KLASSIFIKATION DER GASTROPODEN

Die Systematik grösserer Abschnitte der Klasse Gastropoda ist in verschiedenen neueren Veroffentlichungen zusammenfassend behandelt worden. Lebende und fossile Archaogastropoden und andere paläozoische Gastropoden werden von Knight u. a. (1960) erfasst. Zilch (1959-60) behandelt umfassend die lebenden sowie fossilen schalentragenden euthyneuren Schnecken, während Wenz (1938-44) als jüngste umfassende Quelle für lebende und fossile post-paläozoische Meso- und Neogastropoden anzusehen ist.

Unser Umriss einer Einteilung der Gastropoden wurde zwar hauptsächlich aus den obigen Quellen aufgestellt, wurde jedoch, insbesondere für die schalenlosen Gruppen, auch aus anderen Arbeiten erganzt, wie in den Anmerkungen angegeben. Dieser Umriss* reicht nicht unter Familienrang herab, Nur wenige von anderen als unseren Hauptquellen vorgeschlagenen Familien oder Superfamilien wurden darin aufgenommen. Ebenfalls herangezogene neuere und allgemein zusammenfassende Arbeiten sind die von Korobkov (1955) Ptschelintsev und Korobkov (1960) (angeführt unter Pchelintsev) und Termier und Termier (1952). In einigen Fallen, besonders was die Neogastropoden anbelangt, bestehen ziemlich allgemein Meinungsverschiedenheiten über die von Wenz aufgestellten Familien. Wir haben mangels einer jüngeren monographischen Bearbeitung, trotzdem seine Einteilungbeibehalten, haben jedoch die alternativen gebrauchlichen Benennungen in Klammern hinzugefügt. Erklarungen darüber wie die verschiedenartigen Enteilungen in Einklang gebracht wurden sind in den Anmerkungen zu finden.

Die Zahl der Gattungen und Untergattungen in der Gastropoden (7,324) stammt mit nur wenigen Abanderungen aus obigen Arbeiten und ist wann immer moglich für jede der Familien angegeben (linke Spalte der "Classification"). Später beschriebene Gattungen wurden nur selten aufgenommen (wie angemerkt). Unsere Einteilung ist daher zu verschiedenen Graden veraltet und enthält viele der Schwachen der angeführten zusammenfassenden Werke.

Die Gastropoden sind hier in die 2 Unterklassen Streptoneura und Euthyneura eingeteilt, wobei, nach Boettger (1955) und Zilch (1959-60), die altbekannten Opisthobranchia und Pulmonata durch Spengels Euthyneura ersetzt werden, während die Benennung Streptoneura, wegen der parallellen Ableitung des Wortes, den Namen Prosobranchia vorzugsweise ersetzt. Obwohl die Streptoneura (4,218 Gattungen und Untergattungen) die grössere der beiden Gruppen darstellen, sind sie in bloss 3 Gruppen eingeteilt, während die Euthyneura (3,106 Gattungen und Untergattungen) grössere Verschiedenheiten des Aufbaues aufweisen und in 14 Ordnungen zerfallen. Die Grössenverhältnisse dieser Ordnungen, nach der Zahl ihrer Gattungen und Untergattungen berechnet, sind in Abbildungen 1 und 2 dargestellt, wobei die erstere unserer eigenen, sowohl lebende als auch fossile Formenenthaltenden Klassifikation entspricht, und die letztere derjenigen von Thiele (1929-35), welche nur lebende Formen umfasst. Der einzige markante Unterschied zwischen den beiden Darstellungen besteht darin, dass in der letzteren die Stylommatophora, hauptsächlich auf Kosten der Archeogastropoda, umfangreicher sind.

*Die Sternchen bezeichnen durchwegs fossile Gruppen.

Im allgemeinen scheinen innerhalb der Gastropoden, mit Ausnahme der Ordnung Archaogastropoda, die Einschnitte in Familien und Superfamilien ungefahr gleichwertigen morphologischen Unterschieden zu entsprechen. Die genannte Ordnung zeigt eine feinere Einteilung, indem viele Familien und Unterfamilien verhältnismässig wenige Gattungen enthalten.

RÉSUMÉ

ÉBAUCHE D'UNE CLASSIFICATION DES GASTÉROPODES

La classification des principaux groupes de la classe des gastdropodes se trouve rdsumee dans plusieures publications plus ou moins récentes. Ainsi Knight et autres (1960) couvrent les archdogastdropodes vivants et fossiles ainsi que les autres groupes paléozöiques. Récomment, Zilch (1959-60) traite des mollusques euthyneures pourvus de coquilles, vivants et fossiles, tandis que l'oeuvre de Wenz (1938-44) reprdsente la plus rdcente source comprehensive pour les mdso- et ndogasteropodes post-paléozöiques vivants et fossiles.

Notre classification gastdropode a dt6 esquissée principalement d'après ces sources, mais elle a aussi ét suppldmentde par d'autres travaux, surtout en ce qui concerne les groupes atestes, comme indiqud dans les notes. Cette classification* ne descend qu'au niveau familial. Familles et sous-familles proposdes par d'autres auteurs que ceux déjà cites ne sont inclus que dans une faible mesure. Les principaux travaux additionnels récents et généraux pris en considération sont ceux de Korobkov (1955), de Ptchdlintsev et Korobkov (1960) (voir Pchdlintsev) et de Termier et Termier (1952). Dans certains cas, spécialement en ce qui concerne les néogastéropodes, ily a désagrément assez uniforme au sujet de la classification familiale de Wenz. Nous avons pourtant retenu sa classification faute de traitd monographique plus recent, ajoutant toutefois, entre parentheses, les designations alternatives courantes. De quelle manière les classification divergentes ont été réconciliées est expliqud dans les notes.

Le nombre de genres et sous-genres gastdropodes (7,324) est derive principalement des sources indiqudes ci-haut est et donné pour chaque famille (colonne gauche, classification) dans la mesure du possible. Les genres décrits après la publication de ces travaux ne sont que rarement inclus. Notre classification est donc perimée à dégre variable et participe des faiblesses de ces ouvrages généraux.

Les gastdropodes sont ici divisds en 2 sous-classes, les streptoneures et les euthyneures, ces derniers étant formds par la fusion des opisthobranches et des pulmonés, selon Boettger (1955) et Zilch (1959-60), tandis qu'en vertu de sa derivation similaire, le terme streptoneure remplace celui de prosobranche. Quoique les streptoneures (4,218 genres et sous-genres) forment le plus grand de ces 2 groupes, i s ne sont divisés qu'en 3 ordres, pendant que les euthyneures (3,106 genres et sous-genres), de plus grande diversification structurelle, sont divisés en 14 ordres. Les dimensions relatives de ces ordres, selon le nombre de leurs genres et sous-genres, sont illustrdes par les figures 1 et 2, dont la premiere se base sur la présente classification comprenant groupes vivants et fossiles et la seconde sur celle de Thiele (1929-35) ne comprenant que formes vivantes. La seule difference frappante entre ces deux illustrations est, dans la seconde, Paccroissement des stylommatophores au dépens des archéogastéropodes.

Les coupures familales et sur-familiales dans les gastéropodes semblent correspondre à peu près au même degre de differentiation morphologique, à l'exception de l'ordre des archeogastdropodes qui a été plus finement divisd et dont les familles et surfamilles n'ont que relativement peu de genres.

*Les groupes pourvus dun asthisque sont uniquement fossiles.

RESEÑA

UNA RESEÑA DE LA CLASIFICACI6N DE LOS GASTRÓPODOS

Varias publicaciones recientes han resumido la clasificación de gran parte de la clase Gastrdpoda. Knight y otros han estudiado los arqueogastrópodos fósiles y vivientes, asi como otros gastrópodos paleozoicos. Zilch (1959-1960) ha estudiado los fdsiles y vivientes con concha de la subclase Euthyneura. La fuente de información más reciente acerca de mesogastrópodos y neogastrópodos fdsiles y vivientes es Wenz (1938-1944).

Hemos llevado a cabo una reseña de la clasificación de los gastropodos basada principalmente en esta información, suplementándola con información especial para los grupos con o sin conchilla como indicamos en nuestras notas. Esta clasificación* se extiende únicamente a la familia. Nos hemos mostrado conservadores en lo que se refiere al reconocimiento de familias y superfamilias propuestas en otras fuentes de información distintas a las que han servido para estos trabajos básicos. También hemos considerado otros trabajos generales llevados a cabo recientemente por Korobkov (1955), Pchelintsev y Korobkov (1960) y Termier y Termier (1952). La forma en que estas clasificaciones divergentes han sido reconciliadas se explica en nuestras notas.

En algunos casos, especialmente entre los neogastrópodos, existe una discrepanda uniforme en lo que se refiere a la clasificación por familias de Wenz. Debido a que no existe ningún tratamiento monográfico reciente para estos grupos, nos hemos limitado a retener la clasificación de Wenz, dando entre paréntesis una lista de alternativas comunes.

Damos una lista (columna izquierda en la clasificacidn) del número de gdneros y subgdneros de los gastrdpodos (7,324) siempre que nos es posible. Estas figuras han sido tomadas de las fuentes de información mencionadas anteriormente con las modificaciones indicadas. Los gdneros descritos despuds de la publicación de estos estudios se incluyen muy raremente,por lo tantonuestra clasificación esta en cierto modo atrasada incluyendo muchos de los puntos débiles de los trabajos generales ya mencionados.

En este trabajo, los gastrópodos se dividen en 2 sub-clases, Streptoneura y Euthyneura, siendo la ultima mencionada formada por los opistobranquios y pulmonados, dejando el término Steptoneura para los prosobranquios, debido a la derivación similar del nombre. A pesar de que los Streptoneura constituyen el grupo más grande (4,218 géneros y subgdneros) se dividen únicamente en 3 órdenes, mientras que los Euthyneura (3,106 gdneros y subganeros), que son más diversos en su estructura, se dividen en 14 órdenes. La medida relativa de estos órdenes, basadas en el mismo número de géneros y subgdneros, se muestra en las figuras 1 y 2. Nuestra clasificación, incluyendo fósiles y vivientes, constituyen la base de la figura 1. La clasificación de Thiele (1929-1935) incluyendo únicamente las formas vivientes, constituyen la base de la figura 2. La única diferencia entre los dos cuadros es el hecho de que en la figura 2, los Stylommatophora han aumentado principalmente a expensas de los arqueogastrópodos.

En general creemos que las incistones familiares y superfamiliares a traves de los gastrópodos, corresponden en el mismo grado a la diferencia morfológica, con la excepción de que los arqueogastrOpodos se han dividido más finamente que otras órdenes, resultando así que muchas de las familias y superfamilias tienen relativamente muy pocos gdneros.

*Taxa marcada con un asterisco se refiere unicamente a los fósiles.

Очерк систематики брюхоногих

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Настоящий очерк является компиляцией классификации семейств и сверхсемейств, взятых главным образом из трудов: "Handbuch der Paläozoologie" (Wenz and [illegible]) и "Treatise on Invertebrate Paleontology" (Knight and others). К этим двуи системам [illegible] добавления, главным образом в области безраковинных [illegible], чтобы создать более полную классификацию, насколько это возможно. Некоторые роды и подроды приведены для каждого семейства, но [illegible], описанные [illegible] появления в печати упомянутых выше трудов, включены неполностью. Таким образом относительная величина [illegible] [illegible] только в общих чертах. В примечаниях имеются [illegible] наиболее важных групп систематики с объяснениями, каким образом [illegible] согласованы бывшие расхождения в их классификации.

Брюхоногие (7324 [illegible] и [illegible]) разделены на два [illegible]: Streptoneura и Euthyneura. Хотя Streptoneura (4218 родов и подродов) [illegible] [illegible], он разделен только на три [illegible]. Но Euthyneura (3106 родов и подродов) подкласс более разнообразный [illegible] строению своему и поэтому он разделен на 14 отрядов.

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