DOCUMENT 25/11

(*continued from page* 740)

The Designation of Official Names for Higher Taxa of Invertebrates

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Introduction

In the course of a recent review of the higher taxa of nemas (nematodes) and related organisms, the writer has recognised many problems of a nomenclatural nature. Some of these bear on the entire policy of selection and designation of such names, as proposed by pp. 59×69, *Copenhagen Decisions on Zoological Nomenclature* and Article 12, *Bull. zool. Nomencl.* **14** : 92–94. As the writer understands it, the *Official Lists* of Phyla, Classes and Orders are to be agreed upon by committees of specialists and passed upon by vote of the International Commission on Zoological Nomenclature.

The field of zoology is so broad that specialists seldom, if ever, are familiar with all of the names of higher taxa and the circumstances under which they were proposed—outside of their own specialties. A clear need, then, for the satisfactory functioning of the proposed committees, is a constant interchange of findings among zoologists.

A comparison of the Copenhagen Decisions with the *International Code of Botanical Nomenclature* may be helpful in considering these nomenclatural problems. Whereas, in zoology, all names for purposes of priority begin 1st January 1758 (with one or two exceptions), in botany the dates accepted

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for purposes of priority depend upon the group (Lanjouw, *et al.*, 1956). The table below demonstrates this :

Publication	Groups
Linnaeus, " Species Plantarum ", ed. 1, 1st May 1753	Spermatophyta, Pteridophyta, Sphagnaceae, Hepatacea, Lichenes, Algae (with exceptions below), Myxomycetes, Bacteria
Hedwig, " Species Muscorum ", 31st Dec. 1801	Musci (Sphagnaceae excepted)
Persoon, " Synopsis Methodica Fungorum ", 31st Dec. 1801	Fungi (Uredinales, Ustilaginales, Gasteromycetes)
Fries, " Systema Mycologicum " v. 1, 1st Jan. 1821	Fungi Caeteri
Ralfs, " British Desmideae ", 1848	Desmidaceae
Hirn, " Monographie und Iconographie der Oedogoniaceen ", *Acta Soc. Sci. Fenn.* **27**(1), 1900	Oedogoniaceae
Gomont " Monographie des Oscillariées ", *Ann. Sci. Nat. Bot. VII* **15** : 263–368 ; **16** : 91–264, 1892–1893	Nostacaceae Homocysteae
Bornet and Flahault, " Revision des Nostacacées hétérocystées ", *Ann. Sci. Nat. Bot. VII.* **3** : 323–381 ; **4** : 343–373 ; **5** : 51–129 ; **7** : 177–262, 1886–1888	Nostacaceae Heterocysteae

The writer believes that this action showed considerably more wisdom than the action of zoologists in dating all priority of animal names to the Tenth Edition of Linnaeus's *Systema Naturae*, 1st Jan. 1758 (exception : 1 pre-1758). The present year marks only the 200th anniversary of the beginning of official systematic nomenclature in Zoology—the microscope has been in general use little longer. In fact, the taxonomy of many of our groups is in its infancy, or at most in its adolescence. Thus we find the Kingdoms Animalia

and Plantae recognised by most workers, though even in this case we must note that Linnaeus's dichotomous separation is contested today by many sound biologists.

In the Tenth Edition of the *Systema Naturae*, Linnaeus proposed the Kingdom Animalia (p. 9) which he divided into six classes : Mammalia (p. 12), Aves (p. 12), Amphibia (p. 12), Pisces (p. 12), Insecta (p. 13) and Vermes (pp. 13 and 641). Of these, the Classes Mammalia, Aves, and Pisces have survived with minor alterations. The Class Amphibia has been retained nomenclaturally with the Class Reptilia separated out. The Class Insecta has survived nomenclaturally for the majority of entomologists ; and the vernacular term insect (modified according to language) is universal, even though the group as originally proposed is nearly ludicrous in the eyes of present day zoologists. (Because of the motley assortment of organisms originally included in the Class Insecta by Linnaeus, many sound entomologists prefer the more exact name Hexapoda.) Linnaeus' Class Vermes can hardly be accepted in the light of today's knowledge. Since it contained segmented and unsegmented worms, some arthropods, coelenterates, sponges, protozoa and even mollusca, it has been dropped by the majority of present day workers.

The subdivisions or orders of Vermes included : Intestina (p. 647) [including *Gordius*, *Furia*, *Lumbricus*, *Ascaris* (all p. 648), *Fasciola* (p. 648), *Hirudo* (p. 649), *Myxine* (p. 650) and *Teredo* (p. 651)] ; Mollusca ; Testacea ; Lithophyta ; (all p. 642) and Zoophyta (p. 643). Most of these ordinal names have, like the Class, disappeared from the literature because of the unsatisfactory groupings involved.

Unquestionably, the botanists' method of priority dating permits much more correlation between nomenclature and advances in taxonomy than does the scheme in use by zoologists.

For convenience, the writer has divided the rest of this article into Early History (1808–1896) and Recent History (1900–1958) of Higher Taxa ; Discussion of Higher Taxa ; and Uniform Endings for Higher Taxa.

Early history of taxa of unsegmented worms

In 1808–1809, Rudolphi proposed a Class Helmintha (pp. 252, 324, and 55 resp.), subdividing it into five orders : Trematoda (p. 251), Cestoidea (v. 2(2) pp. 18, 222), Cystica (v. 2(2) p. 215), Nematoidea (p. 252), and Acanthocephala (pp. 251, 356). His Class Helmintha was patently artificial, since it was defined as internally parasitic [in animals] worms. It is no longer used, except

in a vernacular sense, by zoologists. His orders Trematoda and Cestoidea were somewhat natural groups (though the former contained leeches), and have been preserved in a modified condition up to now. His order Cystica was admitted to be a possibly artificial group at the time of its proposal and, with the advance in knowledge of tapeworm life histories, has been dropped. The order Acanthocephala has been promoted, first to class, then to phylum rank.

Rudolphi's fifth order, Nematoidea, was less fortunately constituted. He apparently held to his overall diagnosis of the Helmintha and omitted all "free-living" and plant parasitic species, together with the free-living stages of animal parasites—apparently because the life histories of many of these were unknown at the time. The matter is quite confusing. On pp. 55–56 of volume 2 (1809), he definitely stated that he omitted the genus *Gordius* and that there had been a great deal of confusion between gordiids and nematoids. Unfortunately, so far as the writer has been able to determine, he gave no physical or structural means of distinguishing between them. He transferred many species originally described in the genus *Gordius* Linn., 1758 (pp. 644, 647) to the genus *Filaria* Mueller, 1787 (pp. 64–67); we can only conclude that his separation was based on whether or not the specimens were collected from other invertebrates. Thus he did not distinguish between mermithids and gordiids. The lack of knowledge relative to the free-living part of the life history of "horse-hair worms" and "cabbage worms" was the primary cause of the difficulty. By the same token, Rudolphi omitted the genus *Anguina* Scopoli, 1767 (p. 373, parasitic in plants), as well as the genus *Vibrio* Mueller, 1773 (pp. 39–49) in which the vinegar and paste eels had been described.

The ordinal name Nematoidea has been explained as being derived from the Greek noun *νῆμα, νηματος*, plus the noun *εἶδος*, yielding the meaning *thread-form* or *thread-like*. (Rudolphi obviously avoided the classic Greek adjective *νηματώδης* meaning *in filaments* or *filamentous*.) An interesting sidelight in the history of the word nematode has been offered by Dr. Dougherty, who has informed the writer that modern Greeks now use the word *νηματώδης* for an unsegmented roundworm in the vernacular sense; and another Greek word *ἰνώδης* [m.f.], *ἰνῶδες* [n.] for the adjectival meaning *sinewy* or *fibrous* [? loosely filamentous]. This is beside the point in the present discussion, however, since Rudolphi could not have known about modern Greek usages, though he was quite a scholar of classic Greek.

De Blainville (1816, pp. 105–127) divided the Animal Kingdom into three Subkingdoms: Artiomorphes (p. 107); Rayonnes or Actinomorphes (p. 107); and Hétéromorphes (p. 107). In his Artiomorphes he divided into Types:

I. Vertebrés or Ostéozoaires and

II. Invertebrés or Anostéozoaires;

and further divided the latter into Subtype Malacozoaires, Subtype Entomozoaires and Subtype Articulés with the Append. Entomozoaires including the Class X Héxapodes (p. 107). [This is apparently the origin of the Class Hexapoda.] In his Subkingdom Rayonnes or Actinomorphes he included :

I. Subarticulate Classes—XVIII Annulaires and XIX Echinodermaires and

II. True Classes—XX Arachnodermaires, XXI Actinaires, XXII Polypaires, and XXIII Zoophytaires.

In his third Subkingdom, Hétéromorphes, he included Classes XXIV Spongiaires and XXV Agastraires. In more detail (p. 123), he grouped articulated or many-footed Hétéromorphes in " Cl. X–XVII, Insectes & Vers ". Members of the Subkingdom without lateral appendages were placed in " Cl. VIII Apodes (Vers Intestinaux, SubCl. I. Sang-Sues, SubCl. II. Entozoires " ; with a footnote stating that the latter group probably contained highly diversified animals, citing *Ascaris* and *Ligule*. Aside from the name Hexapodes and the limitation of insects, the writer sees little merit in this effort.

Cuvier (1817) divided the Animal Kingdom (v. 1) into several " Grandes divisions " :

Animalia vertebrata (p. 58)

Animalia mollusca (p. 59)

Animalia articulata (p. 60)

[v. 4] Animaux Rayonnés (p. 1)

les Zoophytes (p. 1).

Classes Echinodermes (p. 6) and Intestinaux (p. 26 = Entozoa Rudolphi), with the order Les Cavitaires (p. 28 = p. 29, Ent. Nematoidea Rud.), included such diverse genera as *Filaria*, *Hamularia*, *Trichocephalus*, *Oxyuris*, *Cucullanus*, *Ophiostomi*, *Ascaris*, *Strongylus*, *Liorhynchus*, *Prionoderma*, *Lernaea* and *Nemertes* Cuv. Cuvier also proposed :

Classe des Parenchymateux (p. 28), [including the families Acanthocéphales, Trématodes, Ténoïdes, and Cestoïdes],

Classe Acéphales,

Classe Polypes, and

Classe Infusoires (p. 89), [including the Order Rotifères (p. 89) as well as the Order Infusoires Homogènes (p. 92) in which he included *Cercaria*, various protozoans, *Vibrio glutini*, and *V. aceti* (p. 92)].

It is obvious from his groupings that the contribution was weak, to the extent that it dealt with unsegmented worms.

Lamarck (1817) divided unsegmented animals into ten classes, the Vermes (p. 131) being the fourth Classe des Animaux. He divided the Vermes into three Ordres :

VERS MOLLASSES [p. 145—subdivided into three Sections :

LES VESICULAIRES (Bicorne, Hydatide, Hydatigère, Cénure, and Echinocoque) ;

LES PLANULAIRES (Toenia, Bothryocéphale, Tricuspidaire, Ligule, Linguatule, Polystome, and Fasciole) ; and

LES HÉTÉROMORPHES (Monostome, Amphistome, Géraffle, Tétragule, Massette, Tentaculaire, and Sagittule)—all p. 146].

VERS RIGIDULES [p. 147—included Entozoa nematoidea Rud. v. 2,. pp. 55–196 (Porocéphale, Echinorhinque, Strongle, Cucullan, Fissule, Oxyure, Trichure, Ascaride, Hamulaire, Liorhynque, Filaire, and Dragonneau [*Gordius*]—all on p. 147)].

VERS HISPIDES [p. 147—included Naïde, Stylaire, and Tubifex].

From the erratic grouping it is obvious this classification had no merit.

Later, De Blainville (1828) divided Onchocephala, (the Classe Entomozoaires Apodes or Vers, (p. 530)) into Ordres :

Ordre Oxycéphales (p. 534) [with genera including *Filaria*, *Gordius*, *Vibrio*, *Trichosoma*, *Ophiostoma*, *Sclerostoma*, *Physaloptera*, *Spiroptera*, *Thelazia*, *Liorhynchus*, and *Hamularia*] ;

Ordre Probocephala (p. 549) [with the Fam(illes) Acanthocephala (p. 550), Proteocephala (p. 552), and Sipunculidea (p. 533)] ;

Ordre Mycocephala (p. 555) [with the Fam(illes) Monocotyla (p. 556) and Polycotyla (p. 569)].

The Subclass Parentomozoaires or Subannélidaires (p. 573) be divided into :

Ordre Aporocephala (p. 573) [with Fam(illes) Teretularia (p. 573) and Planariae (p. 577)] ;

Ordre Porocephala (p. 580) ; and

Ordre Bothriocephala (p. 588) [with the Fam(illes) Polyrhynchia (p. 589), Monorhynchia (p. 596), and Anorhynchia (p. 600)].

While this classification probably contributed somewhat to the knowledge of flat worms and did group free-living nemas with the parasites, it did not aid

in removing horse-hair worms from the same group as *Ascaris*, and the writer can see no merit in preservation of the name Oxycephala.

In 1828, Bory de Saint Vincent (p. 682) stated : " Rotiferae. Micr. Ordre ", fifth-class " Microsquopiques ".

In 1831 (1828), Ehrenberg divided the Phytozoa into the Polygastricha and Rotatoria, placing the Classis Rotatoria in the Polygastricha with :

Ordo Nuda [Sectio. Monotrocha, Schizotrocha, Polytrocha, and Zygotrocha] ;

Ordo Loricata [with the same Sectio.].

The Phytozoa Entozoa—Pseudo-polygastrica, Entozoa s. Suctoria, Pseudo-polygastricha were given the subdivisions :

(a) Nematoidea Pseudo-Polygastricha [genera *Amblyura* and *Anguillula* ; Familia Ascarideorum] ;

(b) Trematoda Pseudo-Polygastrica.

Classis Phytozoa Turbellaria was divided :

Ordo Dendrocoela

Ordo Rhabdocoela

Sectio I. Amphisterea

Sectio II. Monstera [Familia IV Gordiea]

Sectio III. Amphiporina [" Familia VIII Nemertina, *Nemertes* (Cuvier), Familia Nemertinorum "].

In this article, Ehrenberg seems to have included free-living nemas in the Nematoidea and to have excluded horse-hair worms from the group for the first time. He proposed, as well, the Class Turbellaria ; and a family based on the genus *Ascaris*. Here also is found the first use of a higher taxon (Family) based on the genera *Nemertes* and *Gordius*, as well as the establishment of the name Rhabdocoela. Since Ehrenberg gave no morphologic means of separating *Gordius* from the Nematoidea, the present writer can see no reason for attributing the group to him. In 1837 (p. 235), Ehrenberg promoted the Nematoidea to class rank, including therein *Gordius*, *Anguillula*, and *Enchelidium*.

Von Siebold (1843, 1848) transferred many of the species originally described in the genus *Gordius* and transferred by Rudolphi (1809, 1818) to the genus *Filaria* back to the genus *Gordius* and to the genus *Mermis* Dujardin,

1842 (pp. 117–119). In 1843, von Siebold proposed the Order Gordiacea (pp. 302–303) [to contain *Gordius* and *Mermis*], placing it in the Class Helmintha (p. 302) together with the Orders Nematoidea (p. 310), Acanthocephala (p. 316), Trematoda (p. 316), Cestoidea (p. 328), and Cystica (p. 330). In 1848, both von Siebold (p. 112) and Leuckart (p. 77) emended the spelling of Rudolphi's Order Nematoidea to the Order Nematodes, including horse-hair worms in the order. Considerably later, Diesing (1861, p. 598) further emended the spelling of this ordinal name to Nematoda, and included horse-hair worms as well as free-living and plant-parasitic nemas in the group. The writer feels that both of these emendations of Rudolphi's name Nematoidea were entirely unjustified, both on linguistic and on scientific grounds, as previously noted.

É. Blanchard (1847, **7** : 106 ; **8** : 141) proposed the Classe Anevormi for the flat worms, including the nemertans. Thereafter, Leuckart (1848, p. 44) referred to the Vermes as a " Grosse Abteilung des Tierreichs ", and subdivided it thus :

Klassen	Ordnungen
Anenterati (p. 68)	Cestodes (p. 68) and Acanthocephali (p. 68)
Apodes (p. 70)	Nemertini, Turbellarii, Trematodes, and Hirudinei (p. 70)
Ciliati (p. 74)	Bryozoa (p. 74) and Rotiferi (p. 74)
Annelides (p. 75 = Annulati Burmeister excluding Nemertini)	Nematodes (p. 77), Lumbricini (s. Terricolae) (Scoléides M. Edw.) [to unit Abranches sétigerès Cuv. with Branchiaten] and Branchiati.

Leuckart's next " Grosse Abteilung " was the Arthropoda, followed by the Mollusca.

Van der Hoeven (1850) subdivided the Class Entozoa (p. 154) as follows :

Ordines	Familiae
Coelelmintha s. Parenchymatosa (p. 167)	Cystica (p. 167), Cestoidea (p. 169), Acanthocephala (p. 172), and Trematoda (p. 173)
Coelelmintha s. Utricularia (p. 176)	Nematoidea [including such diverse forms as Phalanx I Acanthotheca —*Pentastoma*, *Linguatula* (p. 176), and Phalanx II Strongyloidea, with various genera from *Rictularia* to *Odontobius* (pp. 177–178)].

He created an Appendix to Entozoa containing *Chaos redivivum* (p. 181) and the Family Gordiacea including *Gordius* and *Mermis* (p. 182). Van der Hoeven also recorded the Class Rotatoria (p. 183) and the Class Annulata (p. 194) with the Orders Turbellaria (p. 208), Suctoria (p. 213—with family Hirudinea), and Order Setigera (p. 217—with family Lumbricini).

Schultze (1851, p. 3) recognised the Classis Turbellaria Ehrenberg, with :

I. Subclassis Aprocta (Dies., 1850) Schultze, 1851

Ordo Dendrocoela Ehr.

Ordo Rhabdocoela Ehr.

II. Subclassis Proctucha (Dies., 1850) Schultze, 1851

Ordo Arynchia ?Troschel, 1849 or Schultze, 1851

Ordo Rhynchocoela (Nemertina) Schultze, 1851.

The next year (1852), he further subdivided the Nemertina (p. 183) into the Anopla (p. 183) and Enopla (p. 183) ; but the writer found no clear statement of the ranks of these groups, only that they were placed in the Turbellaria—presumably as suborders.

Vogt (1851) proposed the Class Nematelmia (pp. 174, 175)—including in it the Order Nematoidei (p. 181—excluding mermithids) ; the Order Gordiacei (p. 181—including *Mermis*) ; the Order Acanthocephala (p. 180) ; and the Order Gregarinidea (!) (p. 178). In the same article, he proposed the Class Platyelmia (p. 185)—to include the Orders Cestoidea (p. 190) ; Ligulida (p. 195) ; Taenida (p. 195) ; Trematoda (p. 197) ; Planarida (p. 205) ; Nemertina (p. 207—Nemertida, p. 209) ; the Class Rotatoria (p. 210) ; and the Class Annelida [(p. 217)—with the Orders Hirudinea (p. 224), Scoleina (p. 229), Gephyrea (p. 228), and Tubicola (p. 230)].

Huxley, in 1853 (1854, p. 16) and 1864, referred to the Class Rotifera. Leuckart (1859, p. 18) changed the name of his Apodes to Platodes. Gegenbaur (1859) placed the Rotatoria (p. 194) as a Classe of Arthropoda, subdividing as follows :

Ordnung Sessilia (p. 194)

Ordnung Natantia (p. 195).

He also used the name Classe Platelminthes (p. 137) with :

Ordnung Turbellaria (p. 137)

Ordnung Trematoda (p. 137)

Ordnung Cestoda (p. 137).

The Ordnung Turbellaria was subdivided (no ranks given) into :

Rhabdocoela [Rhynchocoela (Nemertina) and Arhynchia (p. 137)]

Dendrocoela (p. 137).

The Classe Nemathelminthes (p. 137) was subdivided into :

Ordnung Nematoidea [Gordiacei (*Mermis* and *Gordius*) and Nematoden (*Strongylus*, *Ascaris*, and *Oxyuris*), no ranks given—all p. 137]

Ordnung Acanthocephala (p. 137).

The Classe Annulata was subdivided into :

Ordnung Branchiata (*Vagantia* and *Tubicola*)

Ordnung Scoleina [p. 138, *Lumbricus*, *Chaetogaster*, *Nais*, *Enchytraeus*]

Ordnung Suctoria—Hirudinea

Ordnung Gephyrea.

Hyman (1951, p. 53) discussed the legitimacy of these emendations. The present suggested rule is the only basis on which the writer can see justification for the continued use of a phylum Platyhelmintha(-es) since Minot, who first limited the group as at present, used that spelling. Aside from reviving the phylum Vermes, Gegenbaur's groupings offered nothing original.

Huxley (1864) proposed a Class Scolecida (p. 47) for unsegmented worms, including therein the Orders Turbellaria, Trematoda, Taeniada, Nematoidea, Gordiacea, Acanthocephala, and Rotifera (p. 47). In the same article, he stated that he was doubtful whether these latter groups should be considered orders or classes, in a group of higher rank. At the time he gave no indication of how to distinguish between the Nematoidea and Gordiacea, though additional information had been obtained concerning them since Rudolphi (1808–1809). This is unfortunate, since later (1877, p. 679) Huxley reversed himself by including the Gordiacea within the Nematoidea.

The name Echinodera has been attributed by Zelinka (1928) to Gosse (1864, p. 403, n.v.) and the vernacular name Echinoderen to Graeffe (1869, n.v.).

Haeckel (1866, p. 400) proposed the ranks Phylum and Subphylum, giving the latter rank to the Vermes and including therein :

Cladus Scolecida (Helminthes)

Classe Platyelminthes

Ordnungen Turbellaria (—all p. LXXIX), Cestoda, Hirudinea, Onycophora (—all p. LXXX), and Nemertini (p. LXXXI)

Classe Rhynchelminthes

Ordnungen Gephyrea and Acanthocephala (—all p. LXXXII)

Classe Nematelminthes

Ordnungen Chaetognatha and Nematoda (—all p. LXXXII; including Gordiaceen, doubtfully, in the latter group)

Cladus Rotatoria (p. LXXXV).

Metchnikoff (1865) proposed the Order Gastrotricha (p. 450). This is one of the very few names of higher taxa that appears never to have been challenged, merely promoted—first to class, then to phylum, in more recent years.

Bütschli (1876, p. 392) named a group Nematorhyncha, placing within it the Gastrotricha and the Atricha [of equal rank, presumably orders in a class], the latter subdivision being for the reception of the genus *Echinoderes* Claparède, 1863. In a text figure, he represented the Annulata, Nemertina, Cestoda, Trematoda, Turbellaria, Rotatoria, Nematoda, Nematorhyncha, and Arthropoda as equal in rank and type size. He apparently derived the Annulata and Arthropoda from two extremes of the same original stock. On p. 406 he stated that, in his view, alignment of the " Tardigraden " with the "Arachnoiden " wholly failed. Further (p. 407), he stated that he must recognise the " Tardigraden " as "Arthropodenformen ". He then returned to comment of the comparison of the " Rotatorien, Nematorhynchen und Nematoden " as probably in the general line of ancestry of the "Arthropoden ". Though Bütschli did not so state, one can only conclude that he considered all of these groups as classes. In the writer's opinion, this is the most original and thought-provoking article among those here reviewed.

Minot (1876) stated that the Class Platyhelminthes (p. 19) was formerly divided into:

1. Turbellarians (Rhabdocoela, Dendrocoela, and Nemertines);
2. Trematodes; and
3. Cestods [*sic* !].

On p. 19, he officially removed the nemertines from the Class Platyhelminthes and, on p. 24, presented his own classification of the Class Platyhelminthes:

Rhabdocoela (Acoela, Apharyngea, Pharyngocoela [Rhabdocoela, Dendrocoela]);

Vaginiferae (Trematods [*sic* !] and Cestods [*sic* !]).

He stated he did not know where to place nemertans, but that they did not belong in this class.

Lankester (1877) promoted Vogt's class Platyelmia to phylum rank (p. 441) with the Classes Planariae, Nemertina, Trematoidea, Cestoidea, and Hirudinea (p. 444). At the same time, he promoted Rudolphi's order Nematoidea to phylum rank (p. 441), subdividing it directly into the families Ascaridae, Gordiidae, and Enoplidae (p. 449) ; and he recognised the Branch Rotifera.

The higher taxa Ectoprocta and Entoprocta are commonly attributed to Nitsche (1870) but, although he did name both groups (p. 34) and cited the derivation " ἐντο und πρωχτός ", he called the Entoprocta a Familie (p. 34) and relegated the remaining Bryozoen to the Ectoprocta. As far as the writer has determined, the first use above the family group for either name is that of Leuckart and Nitsche (1877, p. 133), where both groups were termed orders in the Class Bryozoa. In the same article, on p. 118, mention was made of the Order Nematodes.

Huxley (1877) apparently had undergone quite a change of thought since his 1864 article. In 1877, discussing the classification of invertebrates, he wrote of the :

Protozoa

I. Zoophytic Series (including Porifera and Coelenterata)

II. Annuloid Series (including the Trichoscolices as a Division which included the Turbellaria)

Annelida

III. Arthrozoic Series (composed of the Arthropoda and the Division Nematoscolices [further subdivided into orders : Rotifera, Nematorhyncha (Gastrotricha included), Nematoidea (included *Gordius* and *Mermis*), and ?Chaetognatha])

IV. Malacozoic Series (with the Polyzoa-Ectoprocta and Mollusca)

V. Pharyngopneustal Series (Tunicata and Enteropneusta)

VI. Echinodermata.

In another part of the same work he had :

Section I. Monera

Section II.	Porifera, Hydrozoa, Ctenophora (Coralligena)
Section III.	Turbellaria, Rotifera (Nematorhyncha), Trematoda, Cestoidea
Section IV.	Hirudinea, Oligochaeta, Polychaeta, Gephyrea
Section V.	Crustacea, Arachnida (Pycnogonida, Tardigrada, Pentastomida), Myriapoda, Insecta
Section VI.	Polyzoa, Brachiopoda, Lamellibranchiata, Odontotophora
Section VII.	Echinodermata
Section VIII.	Tunicata or Ascidioidea
Section IX.	Peripatidea, Myzostomata, Enteropneusta, Chaetognatha, Nematoidea, Physemaria, Acanthocephala, Dicyemida.

Apparently Huxley used a double system of classification in this publication, classifying according to what he considered immediate relationships (horizontally) and in series of evolutionary development (vertically). The influence of other workers' views, particularly some of Bütschli's, is evident.

It was not until 1886 that Vejdovský proposed the ordinal name Nematomorpha (p. 427) for the horse-hair worms and demonstrated how they could be separated from the Nematoidea. He removed them entirely from the latter vicinity, placing the order in the Annelida.

Reinhard (1887, p. 401) proposed the Class or Order Kinorhyncha, to include the genus *Echinoderes* Claparède, 1863. Dewitz (1892) classified the unsegmented parasitic worms in the (?) Class Platodes or Platyhelminthes (p. 1) ; mentioning the Cestodes (p. 2), the Trematodes (p. 102), and the (?) Class Nemathelminthes (p. 1) with the Nematodes and the Acanthocephali. He is credited by some authors with having excluded the nemertans from the Platyhelminthes for the first time, but since the title of his book would not justify their inclusion, and no mention of them is found therein, the present writer cannot affirm the credit.

Hatschek (1888) subdivided the Metazoa into the Protaxonia (= Coelenterata) and the Heteraxonia (Bilateria). The latter he grouped as Type Zygoneura, Sub-Type Autoscolecida (= Protonephridozoa) with the Cladus Scolecida (p. 40). He proposed Classes Platodes, Rotifers, Entoprocta, Nematodes, Acanthocephala ; and Appendage Nemertini (all p. 40), in contrast to Sub-Type Aposcolecida (= Metanephridozoa) which included the Annelida, Onycophora, Arthropoda, Pharonida, Bryozoa (Ectaprocta) as classes ; and the Cladus Mollusca.

Haeckel (1894, p. 90) divided the four Kingdoms of the Organic World as follows [his Hauptclassen for the Protophyta, Metaphyta, and Protozoa are not shown in the table below] :

Kingdoms	Phyla	Hauptclassen
I. Protophyta	1. Archephyta	
	2. Algariae	
	3. Algettae	
II. Metaphyta	4. Thallophyta	
	5. Diaphyta	
	6. Anthophyta	
III. Protozoa	7. Archeozoa	
	8. Fungilla	
	9. Rhizopoda	
	10. Infusoria	
IV. Metazoa		
IVa. Coelenterata or Acoelomaria	11. Gastereades	
	12. Spongiae	
	13. Cnidaria	
	14. Platodes	(1) Turbellaria, (2) Trematodes, (3) Cestodes
IVb. Bilateria or Coelomaria	15. Helminthes	(1) Rotatoria, (2) Strongylaria, (3) Rhynchelminthes, (4) Prosopygia
	16. Mollusca	
	17. Articulata	(1) Annelida, (2) Crustacea, (3) Tracheata
	18. Echinoderma	
	19. Tunicata	
	20. Vertebrata	

Haeckel very soon (1896) saw the need for expansion and revision of this system as it applied to animals and classified invertebrates. He suggested nine phyla as follows :

Phylon Gastraeda

Phylon Spongiae (Porifera)

Phylon Cnidaria (Acephalea)

Phylon Platodes (= Plathelminthes, p. 238)

Classe Platodaria (pp. 239, 346, = Archelminthes, p. 248)

Order Archicoela (pp. 246, 249)

Order Pseudacoela (p. 246 = Acoela, p. 240)

Classe Platodinia (= Plathelminthes, pp. 246, 252)

Order Turbellaria (pp. 246, 253)

Order Trematoda (pp. 246, 255)

Order Cestoda (pp. 246, 255)

Phylon Vermalia (= Helminthes, p. 261)

Cladoma Rotatoria (= Trochelminthes, p. 264)

Classe Provermalia (= Archipygia, p. 264, hypothetical)

Classe Gastrotricha (p. 264)

Classe Trochozoa (= Trochophoralia, p. 264)

Classe Rotifera (= Räderthiere, p. 264)

Cladoma Prosophygia (= Brachelminthes, p. 264)

Classe Bryozoa (= Polyzoa, p. 264)

Classe Brachiopoda (= Spirobranchia, p. 264)

Classe Phoronaria (= Phoronia)

Classe Sipuncularia (= Gephyrea, p. 264)

Cladoma Strongylaria (= Nemathelminthes, p. 264)

Classe Echinocephala (p. 264, = Kinorhyncha auct. insert.)

Classe Acanthocephala (p. 264)

Classe Nematoda (p. 264)

Subclasse Ascarideen (p. 299)

Subclasse Gordiaceen (p. 299)

Classe Chaetognatha (p. 264)

Cladoma Frontonia (= Rhynchelminthes, p. 264)

Classe Nemertina (p. 264)

Classe Enteropneusta (p. 264)

Classe Prochordonia (p. 264)

Phylon Chordonia

Subphylum Tunicata

Phylon Echinodermen

Phylon Mollusken

Phylon Articulaten

Cladoma Annelida

Classe Archannelida

Classe Chaetopoda

Order Protochaeta

Order Polychaeta

Order Oligochaeta

Order Spaniochaeta

Classe Stelechopoda

Order Myzostomia

Order Arctisconia (= Tardigrada)

Order Linguatonia

Cladoma Crustacea

Cladoma Tracheata.

Finally, Braun (1889, p. 224) quoted Gegenbaur as having used the Ordo Scolecina (Vogt) in the " Classis Annulaten ".

Recent history of higher taxa of unsegmented worms

Lankester (1900, p. 5) divided the Grade Coelomocoela into the phyla Platyelmia, Nematoidea, Echinoderma, Chaetognatha, Vertebrata, Appendiculata, Mollusca, Nemertina, and Acanthocephala ; and the Subphylum Rotifera. The next year Benham (1901, p. 159), in Lankester's own Treatise on Zoology, recognised the Phylum Rhynchocoela with the Class Nemertina, Branch Dimyaria, Orders Protonemertini, Mesonemertini, and Metanemertini ; and the Branch Trimyaria with the Order Heteronemertini. He considered the Anopla and Enopla of Schultze unnecessary groups.

Ward (1903) subdivided the Phylum Nemathelminthes (p. 205) into the Class Nematoda (p. 205), with the Subclasses Eunematoda (p. 205), and Gordiacea (p. 205) ; and the Appendix Acanthocephala (pp. 205, 224). No orders were recognized in these groups.

Von Linstow (1905) divided the Class Nematoda into the Ordnungen Secernentes (p. 272), Adenophori, Resorbentes, and Pleuromyarii (p. 273) ; basing them primarily on the excretory system, secondarily on the musculature and hypodermis. The diagnoses of the first two orders were eminently satis-

factory, as were his included genera. The second two orders, however, were based on what we now know to be misinterpretations, and his included genera were less uniform. In 1909 he gave additional examples of all four of his orders, but, by limiting the examples to animal parasites and basing his information both upon his own and other misinterpretations, he brought considerable discredit on his classification.

Zelinka (1907, pp. 131, 135) used the name Echinoderida, without designating rank. He clearly intended it to be a superordinal taxon, however, since he included the Ordnungen Homalorhagae (p. 135), Conchorhagae (p. 135), and Cyclorhagae (p. 136) ; with the Suborders Nomosomata (p. 136) and Xenosomata (p. 136). He had previously used several of these names without specifying ranks.

Bütschli (1910) proposed the Subphylum Amera (p. 37) as a division of the Phylum Vermes (p. 37) and placed therein :

Klasse Platyhelminthes (p. 37)
Subclass Turbellaria (p. 37)
Subclass Trematoda (p. 37)
Subclass Cestodes (p. 38)
Subclass Nemertina (p. 38)

Klasse Nemathelminthes (p. 38)
Subclass Rotatoria (p. 38)
Subclass Nematorhyncha (p. 38)
Order Gastrotricha (p. 38)
Order Echinodera (p. 38)

Klasse Nematodes (p. 39)
Order Eunematodes (p. 39)
Order Gordiida (p. 39)

Subclass Acanthocephala (p. 39)

Grobben (1909) recognised the Subkingdoms Protozoa and Metazoa. The latter he divided as follows :

Division (a) Coelenterata

Phyla Spongiaria, Cnidaria, Ctenophora

Division (b) Coelomata

Phylum Protostomia (Zygoneura)
- Kladus Scolecida
  - Klassen Platyhelminthes, Aschelminthes, Entoprocta, Nemertini
- Kladus Annelida
- Kladus Arthropoda
- Kladus Mollusca
- Kladus Molluscoidea

Phylum Deuterostomia
- Subtype Amulacralia
  - Kladus Echinodermata
  - Kladus Enteropneusta
- Subtype Homalopterygia
  - Kladus Chaetognatha
- Subtype Chordonia
  - Kladus Tunicata
  - Kladus Acrania
  - Kladus Vertebrata
    - Klassen Cyclostomata, Pisces, Amphibia, Reptilia, Aves, and Mammalia (with the last four grouped by the unofficial designation Tretapoda).

Grobben's Klasse Aschelminthes contained the Rotatoria or Rotifera, Gastrotricha, Kinorhyncha, Nematoda, Gordiacea, and Acanthocephala.

Poche (1911) divided the Kingdom Animalia (p. 67) into Supersubkingdoms, Subkingdoms, Phyla, Subphyla, Supersuper Klassen, Super Klassen, and Klassen. In his system, our unsegmented worms came under the following classifications:

Subkingdom Coelomatodea (p. 87)
- Subsubkingdom " Coelomatali, 1877, p. 441 " (p. 88)
  - Supersuper Phylum Zygoneura
    - Phylum Platodaria (p. 89)
      - Subphylum Platodes
        - Klassen Planarioidea, Cestoidea
      - Subphylum Nemertarii (p. 90)
        - Klasse Nemertoidea
    - Phylum Articulata
      - Subphylum Vermarii (p. 91)

Supersuper Klasse Rotiferomorpha
Klassen Gastrotricha, Rotifera (pp. 91, 92)

Supersuper Klasse Echinoderomorpha
Super Klasse Echinoderoidea

Supersuper Klasse Gordiomorpha
Klassen Gordioidea Tratsach, 1889, p. 20 ; Nectonematoidea (p. 93)

Supersuper Klasse Tardigradomorpha
Klasse Tardigrada Sieb., 1848, p. 506 (r. 94)

Supersuper Klasse Vermomorpha
Super Klasse Vermes
Klassen Dinophiloidea, Histriobdelloidea, Annulata

Subsuper Klasse Gephyrea
Klassen Echiuroidea, Epithetosomatoidea, Priapuloidea, Sipunculoidea

Subphylum Peripatorii
Klasse Onycophora

Subphylum Linguatularii
Klasse Linguatuloidea

Subphylum Arthropoda
Super Klasse Carcinomorphae
Subsuper Klasse Carcinomorphi
Klasse Carcinoidea

Subsuper Klasse Pycnogonomorphi
Klasse Pycnogonoidea

Subsuper Klasse Arachnomorphi
Klasse Arachnoidea

Super Klasse Tracheata
Subsuper Klasse Progoneata
Klassen Pauropoda, Diplopoda, Insecta

Phylum Nemathelminthes (p. 101)
Klasse Nematoidea Rud., 1808, p. 252, 1809, p. 324

Phylum Acanthocephalaria (p. 101)
Klasse Acanthocephaloidea

Phylum Bryozoaria
Supersubphylum Actinotrochariae
Klasse Actinotrochoidea
Supersubphylum Bryozoa
Subsuperphylum Ectoproctadae
Klasse Ectoprocta Nitsche, 1869, p. 34
Subsubphylum Entoproctadae
Klasse Entoprocta Nitsche, 1869, p. 34.

Ward (1917) further subdivided the Eunematoda into the Suborders Myosyringata (p. 9) and Trichosyringata (p. 9).

Cobb (1919) proposed the Phylum Nemates (p. 214), listing " Nematoidea sensu restricto " as a synonym ; at the same time proposing :

Subphylum	Class	Subclass	Order	Representative Genus or Genera
Alaimia	Alaima	Manitinia	Litinia	*Bastiania*
		Kinetinia	Bolbinia	*Laxus*
Laimia	Anonchia	Anodontia	Cytolaimia	*Monhystera*
			Isolaimia	*Rhabdolaimus*
			Polylaimia	*Bathylaimus*, *Plectus*
		Odontia	Apodontia	*Axonolaimus*
			Synodontia	*Teratocephalus*
	Onchia	Homonchia	Synonchia	*Enoplus*
			Mesonchia	*Fimbrilla* (?)
			Aponchia	*Chromadorella*
			Triplonchia	*Tylenchus*
		Heteronchia	Axonchia	*Dorylaimus*
			Anaxonchia	*Oncholaimus*

(All representative genera in the above table were found on p. 216 of Cobb's 1919 publication ; all higher taxa on p. 214.)

Since Cobb plainly stated (p. 216) that the representative genera were temporary, and the type genera were to be designated later, those he cited cannot be regarded as type genera. In 1920, he published new genera in all of his orders ; usually where one genus has the same stem as the ordinal name,

such a genus might conceivably be designated type genus, but Cobb did not do so. This is a very awkward business because, by designating by selection any genus listed as a representative genus in 1919 or described in 1920 in the Order, one could have sufficient orders to accommodate the greater part of the nemic genera ; with a very few exceptions, Cobb's (1919–1920) orders, classes, and subclasses would have priority. However, in every single case, between his 1919 and 1920 articles, Cobb mixed up his subphyla, classes, subclasses, and orders to such an extent that he appeared ridiculous.

Cobb's great contribution was the naming of the phylum Nemates (p. 214) and excluding all other types of organisms (including gordiids) from it. Cobb definitely deserves the credit for first recognising the group as a phylum and making the logical exclusions. The writer feels that even Dr. Cobb would approve of the suppression of all his other higher taxa to the cause of the phylum name Nemates (or the emended name Nemata). In 1931, Cobb gave a satisfactory diagnosis of the phylum Nemates by his criticism of zoologists for their mishandling of the group. While it was not the best way to " win friends and influence people ", Cobb at that time had fought for his concepts, including the use of the vernacular word *nema* and its derivatives, since 1917, when he first introduced it. The writer, having been one of his employees at the time he wrote his polemic (1931) and his article on the " English Word 'Nema' " in 1932, knows he retired with a feeling of defeat, having converted so few people to his views. Dr. Cobb, in the writer's opinion, was one of the greatest zoologists of any age. The recognition of his phylum Nemates (emended Nemata) is the least that we can do to make up for his " persecution " during his life. Upon Cobb's retirement and death, neither the present writer, nor his other former associates, were convinced that the group warranted phyletic rank. In the face of a united front from the parasitologists, the writer himself did not feel up to battling for Cobb's views. It has only been recently, after a survey of the literature, that the writer, being convinced of Cobb's correctness in this regard and desiring to see belated justice done, has taken up the cause. Although it has no bearing on official zoologic nomenclature, the writer would like to note in passing that the word *nema* is now in Webster's New International Dictionary, Unabridged (1954, p. 1639).

In the period from 1913 to 1916, several workers were active in proposing superfamilies and suborders of nemas ; particularly Railliet and Henry in France and Skrjabin in Russia ; later, Travassos in Brazil. These names, as well as those that followed, were primarily higher taxa of animal parasites, and were based on generic names and presumptive type genera. Since we tend to follow priority in these cases, no discussion is necessary (except for the " homonymy " of the names in series [see p. 885 of the present article]).

In 1926, Yorke and Maplestone published a book on the nemic parasites of vertebrates, in which they divided the Class Nematoda Rud., 1808 emend.

Dies., 1861 into the orders Eunematoda Ward, 1916, and Gordiacea Siebold, 1848 (all on p. 15). Within the order Eunematoda they went directly to the superfamilies Rhabdiasoidea (p. 26), Trichuroidea (p. 20), Strongyloidea (p. 33), Dioctophymoidea (p. 176), Oxyuroidea (p. 181), Ascaroidea (p. 254), Spiruroidea (p. 288), and Filarioidea (p. 387)—all of these groups being attributed to previous authors.

Baylis and Daubney also came out with a book in 1926, in their case treating the families and genera of the Class Nematoda. Within the class they recognised five orders : Ascaroidea (p. 1), Strongyloidea (p. 150), Filarioidea (p. 193), Trichinelloidea (p. 237), and Dioctophymoidea (p. 235). They, like Yorke and Maplestone, attributed all their higher taxa to previous authors (even though several of the prior usages of the words had been at the superfamily level) ; but they omitted suborders and superfamilies, proceeding directly to the families. They deserve credit for assembling the information on all types of nemas. Their handling of free-living forms, however, was quite inadequate.

In 1929, Filipjev suggested a much more satisfactory classification of the Nematoda, recognising 11 orders : Anguillulata (p. 284), Enoplata (p. 284), Chromodorata (p. 284), Desmoscolecata (p. 285), Monhysterata (p. 285), Dioctophymata (p. 285), and Trichurata (p. 285). No authorships were cited for any of these orders ; but the second to fifth, inclusive, were definitely new. The stems of the remainder of the names had all be used for higher taxa by other authors previously—mostly for suborders with the same spellings, though in one or two cases, with the -oidea ending, for superfamilies.

Rauther (1930a) proposed a classification of the Class Nematodes—Nematoidea (p. 249), in which he divided them into two orders :

Order Hologonia (p. 365)
- Suborder Dioctophymoidea (p. 365)
- Suborder Trichuroidea (p. 366)

Order Telogonia (p. 367)
- Suborder Filaroidea (p. 367)
- Suborder Strongyloidea (p. 375)
- Suborder Ascaroidea (p. 379).

Rauther's chief division was based on the origin of germ cells in the reproductive system. As such it worked rather well ; but we now know that though the forms grouped under Hologonia are related, similar origins of germ cells occur occasionally in forms placed in his Telogonia, and that certain telogonic forms are more closely related to some of the hologonic forms (trichuroids) than the

two suborders of Hologonia are to each other. As a consequence these names have been dropped, but with no discredit to the author. As a matter of fact, his handling of free-living nemas was definitely superior to that of Baylis and Daubney (1926), though not as good as that of Filipjev (1929). Rauther (1930b) also classified the Class Nematomorpha (p. 403) into two orders: Gordioidea (p. 445) and Nectonematoidea (p. 446).

Potts (1932), possibly stimulated in part by Cobb's (1931) article, promoted the Nematoda (p. 209) and Rotifera (p. 204) to phylum rank. Shortly thereafter (1935) he also promoted the Nematomorpha (p. 527) to phylum rank.

DeConinck and Stekhoven (1938) published a classification of free-living nemas very similar to that of Filipjev (1929), but using the -oidea ending for orders. They listed the Chromadoroidea (p. 25), Monhysteroidea (p. 25), Araeolaimoidea (p. 93), and Enoploidea (p. 25) as orders. No suborders and superfamilies were proposed.

Stimulated by Filipjev's work, the writer and M. B. Chitwood (1933) proposed a division of the Class Nematoda into two subclasses: Phasmidia (p. 131) and Aphasmidia (p. 131); basing their classification primarily upon the nervous system (phasmids) but citing other systems as supplementary. Later (1937), the present writer offered the complete classification down to superfamily (listing families) and, with M. B. Chitwood (1937), gave a more extended account. It was not until 1940 that M. B. and B. G. Chitwood realised their subclasses were actually synonyms of von Linstow's (1905) orders Secernentes (p. 127) and Adenophori (p. 132), and so indicated. In the meantime Pearse (1936) had promoted the subclasses to classes Phasmidea (p. 10) and Aphasmidea (p. 10). The writer (1940, p. 202) came to the conclusion that the phylum Nemata as proposed by Cobb was a valid group, and that the subclasses Phasmidia and Aphasmidia should take the rank of classes. Therefore it is reasonable to say that, though continuing to use the Phasmidia and Aphasmidia in other chapters of the book, M. B. and B. G. Chitwood promoted the Secernentes and Adenophori to the ranks of class in 1940.

Pearse (1942) made several new subclasses: Rhabditia (p. 137), Spiruria (p. 146), Enoplia (p. 155), and Chromadoria (p. 136). He recognised the following orders:

Rhabditida Chitw., 1933, p. 131

Strongylida [Looss, 1911] Sprehn, 1927 [Baylis and Daubney, 1926] Pearse, 1942, p. 136

Ascarida [Baylis and Daubney, 1926] Sprehn, 1927, Pearse, 1942, p. 136

Spirurida Chitw., 1933, p. 135

Dioctophymatida Pearse, 1942, p. 158

Dorylaimida Pearse, 1942, p. 156

Monhysterida, p. 136

Camallanida [(Chitw., 1937)] Pearse, 1942, p. 146

Spirurida [(Railliet and Henry, 1915)] Chitw., 1933, p. 131.

He also promoted many of the previous superfamilies to subordinal rank, and thereby formed many more " homonyms " [see p. of the present discussion].

Thorne (1949) proposed the Order Tylenchida (p. 37) and several other promotions in lower ranks. Orders and suborders of both " free-living " and plant-parasitic nemas have been proposed since—with great diversity in endings, re-emphasising the need for prescribed endings [see p.].

In 1950, the writer unfortunately did not follow the 1940 decision that the names Phasmidia and Aphasmidia were rightfully synonyms of Secernentes and Adenophori, although the statement referring to this was left in the revision of his book. In the preface, however, he excused himself for not making the changes in nomenclature (at that time particularly uniform endings), because of the number of changes that would be necessary. He also failed to use the phylum name Nemata, continuing to use the name Nematoda. This whole matter was an unwillingness to flaunt zoologic public opinion, since at the time he was also aware that the very name Phasmidia was a homonym of an insect group. He did, however, characterise the Subkingdom Scolecida (p. 204), mention the name Aschelmintha (p. 199), and place the Vermes Amera (p. 203) as an alternative name for the Scolecida. (Whether this constitutes promotion of the Amera Bütschli, 1910, to Subkingdom rank is a matter for the International Commission to pass upon.)

Discussion of higher taxa

(a) Subkingdom.—Our discussion must, of necessity, begin with the subkingdom. Whether or not Scolecida (Huxley, 1864) Chitw., 1950 is a homonym of the Ordnung Scoleina Vogt, 1851 (for Oligochaeta) is a question for the International Commission to decide. Vogt did not cite his derivation. There are a number of Greek words with similar stems that have been used in zoology, including σκώληξ, scolex, *worm*, stem scolec-, and σκώλος, *thorn* or *prickle*, stem scol-. Either word might be applied to oligochaetes. In quoting Gegenbaur (1859, p. 138), Braun (1889, p. 224) purposely or inadvertently emended the spelling of Vogt's name to Scolecina. Assuming it is ruled that Scolecida Huxley, 1864, is a homonym of Scoleina Vogt, 1851, then Amera

Bütschli, 1910, becomes the first available synonym. Whether or not the present writer (1950, p. 203) effected its promotion to subkingdom by mentioning Vermes Amera as an alternative name, is a matter of opinion.

(b) **Phylum Names.**—The phylum names Nemerta [[(Oersted, 1844)] Lankester, 1900] Chitw., 1950, p. 199, and Rhynchocoela (Schultze, 1851) Benham, 1901, are up for ruling or choice. In this case it is clear that Lankester (1900, p. 5) first promoted the Nemertina to phylum rank ; but Benham (1901, p. 159)—in Lankester's own series, presumably with the editor's permission—promoted the Rhynchocoela to phylum rank, preserving the Nemertina at class level.

The phylum names Echinodera and Kinorhyncha are another case for choice. Pearse (1936, p. 10) promoted the Echinodera to phylum rank, and placed Kinorhyncha in parenthesis. The Kinorhyncha is preferred by many because of the similarity of the name Echinodera to Echinoderma or Echinodermata.

The phylum names Nemata [[(Rud., 1808 ?)] Cobb, 1919] Pearse, 1936, p. 10 ; Nematoidea (Rud., 1808) Lankester, 1877, p. 441, restricto Cobb, 1919, p. 214 ; and Nematoda (Diesing, 1861) Potts, 1932, p. 209, are subject to a ruling. In this case the writer, on the grounds of the derivation of the word, can see no justification for the name Nematoda. He would prefer to see the matter settled objectively by a committee of specialists being appointed to examine, if possible, the specimens placed by Rudolphi in the genus *Filaria* and transferred by von Siebold to *Gordius* and *Mermis*. If von Siebold was correct, and some of these were nematomorphs, the phylum Nemata would be the obligatory name. If Rudolphi was correct, and they really are not nematomorphs, the phylum Nematoidea would be obligatory.

The names for the phyla Gastrotricha (Metchnikoff, 1865) Pearse, 1936, p. 10 ; Nematomorpha (Vejdovský, 1886) Potts, 1935, p. 527 ; Entoprocta (Leuckart and Nitsche, 1877) Storer, 1951, p. 380 ; and Acanthocephala (Rudolphi, 1808) Lankester, 1900, p. 5, seem to be subject to no deliberation. The phylum Rotifera (Cuvier, 1817) Potts, 1932, p. 204, would have precedence over Rotatoria (Ehrenberg, 1831) Pennak, 1953, p. 10, by the published opinions of many workers. Since Minot (1876) first excluded nemertans from the flat worm phylum and used the spelling Platyhelminthes—presently emended to Platyhelmintha, the writer would tend to cite this name Phylum Platyhelmintha [(Vogt, 1851) Minot, 1876] Pearse, 1936, p. 8 ; but it could also justifiably be rendered Platyelmia (Vogt, 1851) Lankester, 1900, p. 5, sensu restricto Minot, 1876, p. 24, or Platyelma [([Vogt, 1851] Minot, 1876) Lankester, 1900] ortho mut. nov.

(c) **Classes and Orders.**—There is a choice between Cestoidea (Rud., 1808) Poche, 1911, p. 89 ; Cestodea [(Rud., 1808)] Pearse, 1936, p. 10, and Taeniea [Huxley, 1864] ortho mut. nov., for the tapeworms.

For a good many years, the writer has been aware that the Subclass and Class names Phasmidia, Phasmidea proposed by Chitwood and Chitwood (1933) for a group of nemas is a homonym of the insect Order or Suborder variously rendered Phasmida, Phasmatodea, Phasmoidea, Phasmodea ; based on the genus *Phasma* Lichtenstein, 1796 (*Cat. Rerum Nat.* **3** : 49). The writer must confess that he has by no means exhausted the entomologic literature on the subject. In the little tracing done, however, he has concluded that without uniform endings by the rules in the past, even for families, the entomologists have had as much trouble as helminthologists are now having in determining the ranks given names by various authors. Brues and Melander (1932) recognised an Order Phasmatodea (pp. 17, 61), listing as synonyms : Phásmida, Phasmòdea, Phasmòidea, and Gressòria. Krauss and Wolff (1919) placed the insect Order Phasmida in the " Ordnungsgruppe " Orthopteroidea (p. 171), first mentioning the Phasmida as an order on p. 69, and later discussing the group (pp. 157, 159). The Order Phasmida has been attributed to Leach (1815)—but according to Krauss (1902, p. 534), this was only what Leach called the group (1817–1818), not an Order, and the same is supposed to have been true in the case of Phasmodea Burmeister, 1838, and Karsch, 1893. The " Gruppe " Phasmodea (p. 540) was placed by Krauss (1902) in the middle of the series of Familie Phasmidae and Unterfamilie Phasminae. Verhoeff (1902, p. 30) named the Insectenordnung Phasmodea, placing it in the Saltatoria. Handlirsch (1903) placed the Ordnung Phasmoidea (p. 727) in the Unterkl. Orthopteroidea. Poche (1903, p. 239) emended the spellings to Fam. Phasmatidae, Unterfam. Phasmatinae and " Gruppe " Phasmatodea. From the writer's standpoint further documentation is unnecessary, inasmuch as the use of Phasmodea, Phasmoidea, and Phasmida as orders definitely antedates our use of Phasmidia (1933) as a subclass, by 14 to 31 years.

The writer (1951) verified Cobb's (1928) observation of a phasmid-like structure on *Syringolaimus smarigdus* (p. 647, fig. 9K) and illustrated similar areas on the tails of *Tricoma spinosa* and *T. spinusoides* (p. 644, figs. 8H, 8D–E, resp.). He proposed for these areas the term phasma. Other workers have illustrated structures which they thought were phasmids in various " aphasmidian " nemas, and both the writer and others have been wholly unable to demonstrate even the rudiments of phasmids in a large part of the Order Tylenchida.

No action of the Commission appears necessary on this case of homonymy, inasmuch as the name character itself, *i.e.*, presence or absence of organs termed *phasmids* in the Nemata seems to have been an error, and, in addition, both the names Secernentes and Adenophori von Linstow, 1905, have priority. The writer is only too glad to withdraw the names Phasmidia and Aphasmidia in favour of Secernentea and Adenophorea. Von Linstow's names—emphasising the excretory system—definitely tie the Secernentea, through the tubular character of the system, to the other protonephridial forms. The character thus appears quite fundamental. Whether or not the promotion of Secernentes

and Adenophori von Linstow to class rank was effected by M. B. and B. G. Chitwood (1940, pp. 127, 132) or by B. G. Chitwood (1940, p. 202), is a matter of opinion.

Although Dr. Dougherty has called the writer's attention to the fact that Enopla Schultze, 1852 (Nemerta or Rhynchocoela) antedates Enoplata Filipjev, 1929 (Nemata, Nematoidea or Nematoda), the writer takes the attitude that since Enopla Schultze, 1852, is not based on an included genus, but that the genus *Enoplus* Dujardin, 1844 (p. 230) antedates it, the stem Enopl- must be preserved for the nemic group. Benham (1901) stated that the orders Anopla and Enopla Schultze were unsound, and they have been dropped by many specialists of the group—despite their promotion to class rank by Coe (1943, p. 222). Some of the order names in the phylum Nemerta or Rhynchocoela will have to be decided upon, since there have been differences of opinion. The writer has preferred to leave this matter in abeyance for the time being, as also the classes and orders of Rotifera, so that the histories of the various names may be studied by specialists of these groups.

Suggestions.—In general, it would appear wise for the Commission to rule against names of higher taxa denoting likeness to any group of animals not included in the same taxa. The writer can see only difficulties in their acceptance, *e.g.*, *Phasma* Lichtenstein, 1796, *loc. cit.* (insect)—*Phasmidia* (nema). Also—*Bdella* Latreille, 1795, *Mag. encyclop.* 3(13) : 18 ; 1796, *Précis Caract. Ins.* : 180 (arachnid) ; *Bdellia* Westwood, 1840 *in* Blyth's Cuvier, *Anim. Kingd.* : 399 (leech) (pro *-la* Savigny, 1822) not *Bdellia* Enderlein, 1928, *Z. angew. Ent.* **14** : 359 (dipteran fly) ; *Bdella* (Savigny, 1822, *Descr. Egypte* 1(3) (Ann.) : 112 (leech)—Bdelloidea auct. (rotifer higher taxon).

The writer has searched in vain for any single formula that would justify all of the presently used higher taxa. The closest he could come would be to suggest as a formula that the name used by the first worker to rank the group as presently ranked (excluding all necessary forms and including the then known necessary forms) be accepted, providing the name does not indicate any similarity to any group of animals excluded from the group. For placement on an *Official List* a waiting period of fifty years after original publication might well be required.

Regardless of what decisions are made as to higher taxa by the International Congress, the writer heartily endorses the attitude that scientists who disagree with the International Commission on the validity of particular names for scientific reasons should not be proscribed from using the names they believe to be correct in scientific journals. A contrary view would amount to censorship of scientific writings and might well discourage many good systematists. In democracies it is quite common for the majority to be in error. Progress in science, as in other community efforts, depends to a large degree on the dissident minority groups.

Uniform endings for higher taxa

The writer has noted in the Copenhagen Decisions (Decision 67) the recommendation of the Colloquium that the matter of uniform endings for names in the Order/Class Group and the Phylum-Group be brought to the attention of the Specialist Committee ; but the Colloquium was of the opinion that there should be no prescribed terminations for such names.

The very fact that instructions to investigate such questions were issued is evidence of the need. The writer feels there should be no reason to drop the matter at this time despite opposed views. The writer has no idea who first started the practise of uniform endings for higher taxa. But, when the matter was first called to our attention about 1932–1933, those of us in the field of helminthology in the U.S.A. immediately agreed to it—despite the fact that it meant changing the terminations of many commonly used group names in this country. At that time Baylis and Daubney (1926) had recently published a book using the -oidea ending for orders. Yorke and Maplestone in their book published in the same country, England, and in the same year (1926), had used the -oidea ending for superfamilies. The latter endings previously had been used for superfamilies by Railliet and Henry, in France, who also used the -ata ending for suborders. In addition to these " systems ", there was Rauther's (1930) use of the " -oidea " ending for orders and the " -iformes " ending for superfamilies. The present writer does not even know who originated the system of uniform endings that we all eventually adopted in 1936. But since A. S. Pearse (1936) was the man whose name appeared on the A.A.A.S. report, he will call it the Pearse system. Tracing back, one notes that F. Poche (1911) proposed another system of uniform endings ; that at least H. B. Stenzel (1950), C. Hubbs (1953), and Berg (quoted by Hubbs, 1953) proposed such systems. All of these systems have their good points, the greatest of which is that the reader would not need to know the taxonomic level intended by an author to be able to interpret his writings.

Nomenclature in the field of helminthology has improved a bit since 1936 but uniformity in endings to indicate rank is still far from international. In the field of nematology today there are apparently several systems extant. Assuming we did agree to accept the system used by some other group of workers, however, without its incorporation in the International Rules we would have no assurance that they might not change the system. The writer believes he represents in this the majority of helminthologists in the U.S.A. when he says that he would accept any set of uniform endings incorporated in the International Rules. He feels this is more important than *Official Lists* of higher taxa, and should be a corollary of such lists. At the present time some workers on continental Europe use the termination " -oidea " for orders, and do not bother with suborders or superfamilies. Others use the -oidea ending

for superfamilies and the termination " -ata " for suborders, while still others have adopted the " Pearse system " in which " -oidea " is used for superfamilies and " -ina " for suborders. In our field the chief difficulty is encountered with the -oidea ending, since one never knows whether it is meant as a superfamily or order. In fact, it is so bad that unless an author states the rank intended, one can only guess from the context. One cannot " tell a player without a program ". The various systems of terminations that the writer has encountered in a far from exhaustive search of the literature are as follows :

Various systems of terminations for higher taxa

RANK	AUTHOR				
	Poche	" Pearse "	Berg	Stenzel	Hubbs
Kingdom		-ia			
Supersubkingdom	-odea				
Subkingdom	-odeae	-a			
Subsubkingdom	-odei	-a			
Supersuperphylum	-acea				
Superphylum	-aceae				
Subsuperphylum	-acei				
Phylum	-aria	-a			
Supersubphylum	-ariae				
Subphylum	-arii				
Supersuperclass	-omorpha				
Subsuperclass	-omorphae				
Superclass	-omorphi				
Class	-oidea	-ea			
Subclass		-ia			
Superorder				-ica	-oilei
Order		-ida	-(i)formes	-ida	-oidei
Suborder		-ina	-oidei	-ina	-oinei
Superfamily		-oidea	-oidea	-icae	-ilae
Family (Official)	-idae	-idae	-idae	-idae	-idae
Subfamily (Official)	-inae	-inae	-inae	-inae	-inae
Supertribe			-idi	-ici	-ali
Tribe (Subsubfamily)		-acea	-ini	-idi	-adi
Subtribe			-ina	-ini	-ani

At the time of the adoption of the " Pearse system " by the A.A.A.S. Committee, some protests were raised by entomologists and ichthyologists

who did not want to change the terminations of their ordinal names. In the field of helminthology, the sole formal protest was from Dr. G. Steiner (Pearse, 1936, p. 3), who stated that changing from the subordinal -ata ending to the -ina ending would be " objectionable because identical names already have good standing as genera in the same group (Rhabditina Cobb, 1922 ; Chromadorina Filipjev, 1926) ". The present writer never bothered to answer this criticism since he could not at that time (and still has not) locate any article in which Cobb named a genus *Rhabditina*, and at that time the genus *Chromadorina* Filipjev, 1926, had been synonymised. At any rate, it is the custom to italicise generic names even when appearing without a specific name. Since that time the genus *Chromadorina* Filipjev, 1926, has been revived with additional species having been described. Scientists of the U.S.S.R. persist in using the -ata termination for suborders but, apparently, use the -ida termination for orders. The writer would like very much to see the International Commission settle these differences by designating " Official Uniform Endings for Higher Taxa ", regardless of which group wins or even if it is a compromise. In his opinion, it would do more for stabilising nomenclature than the Official Lists of Phyla, Classes, and Orders.

References

Baylis, H. A., & Daubney, R. (1926), *A synopsis of the families and genera of Nematoda* : Brit. Mus. Nat. Hist., London : 1–277

Benham, W. B. (1901), " The Platyhelmia, Mesozoa, and Nemertini " Part IV in : *Treatise on Zoology* : (Lankester) Adam & Charles Black, London : **4** : 1–204

de Blainville, H. [=H.M.D.] (1828), *Vers. in Dict. Sc. Nat.* **57** : 365–628, pls. 27–28

Bory de Saint Vincent, J. B. G. M. (1828), *Dictionnaire classique d'Histoire Naturelle* : Rey & Gravier, Le Normant, Paris : **57** : 1–628

Braun, M. (1889), *Vermes. Bronn's Klassen und Ordnung des Thierreichs* : C. F. Winter'sche Verlags., Leipzig : **4** : Abt. 1a, Lief 7 : 257–304, figs. 1–2

Brues, C. T., & Melander, A. L. (1932), " Classification of insects ", *Bull. Mus. Comp. Zool. Harvard College* : **73** : 1–672, illust.

von Bütschli, O. (1876), " Untersuchungen über freilebende Nematoden und die Gattung *Chaetonotus* ", *Ztschr. Wiss. Zool.* 26(4) : 363–413, pls. 23–26

—— (1910), *Vorlesungen über vergleichende Anatomie*, 1. *Lieferung* : *Einleitung* ; *Vergleichende Anatomie der Protozoen* ; *Integument und Skelet der Metozoen* : W. Engelmann, Leipzig : 1–401, figs. 1–264

Carpenter, W. B. (1858), *Zoology*, a new edition revised by W. S. Dollas : Henry G. Bohn, Covent Garden, London : **2** : 1–588, illust.

Carus, J. V. (1863), *Handbuch der Zoologie, Raderthiere, Würmer, Echinodermen, Coelenteraten und Protozoen* : Wilhelm Engelmann, Leipzig ; **2** : 1–642

delle Chiaje, S. (1841), *Descrizione e notomia degli animali invertebrati del regno di Napoli* :

or (1841), *Descrizione e notomia degli animali invertebrati della Sicilia citoreriore, osserveti vivi negli anni* 1882–1830 : **4**, fol. 2 v. atlas Napoli

or (1843), Untersuchengen über das Polystoma in menschichen Blut. (Abst. 1835) *Isis* (Oken) (1) 151

Chitwood, B. G. (1937), "A revised classification of the Nematoda." Papers on Helminthology, 30 Year Jubileum, K. J. Skrjabin, All-Union Lenin Akad. Agric. Sc., Moscow : 67–79

—— (1940), " Nemic relationships " Chapt. XIII in : Chitwood, B. G., & Chitwood, M. B., *An Introduction to Nematology*, Sect. I, Pt. 3 : Leader Press, Babylon, N.Y. : 190–204, illust.

—— (1950), " Nemic relationships " Chapt. XIII in : *An Introduction to Nematology*, Sect. I, Rev. Ed.: Monumental Printing Co., Baltimore, Md.: 191–213, illust.

—— (1951), " North American marine nematodes ", *Texas J. Sc.* **3**(4) : 617–672, illust.

Chitwood, M. B., & Chitwood, B. G. (1940), " The excretory system " Chapt. IX in : *An Introduction to Nematology*, Sect. I, Pt. 3 : Leader Press, Babylon, N.Y. : 125–134, illust.

Cobb, N. S. (1917), "A new parasitic nema found infesting cotton and potatoes " *J. Agric. Res.* **11**(1) : 27–33, figs. 1–5

—— (1919), " The orders and classes of nemas " *Contrib. Sc. Nemat.* **8** : 213–216

—— (1920), " One hundred new nemas (types of 100 new genera) " *Contrib. Sc. Nemat.* **9** : 217–343, illust.

—— (1928), "A new species of the nemic genus *Syringolaimus* " *Contrib. Sc. Nemat.* **19** : 398–402, figs. 1–3

—— (1931), " Some recent aspects of nematology " *Science* **73** (1880) : 22–29

—— (1932), " The English word ' nema ' " *J. Amer. Med. Assoc.* **98**(1) : 75

Coe, W. R. (1943), " Biology of the nemerteans of the Atlantic Coast of North America ", *Trans. Conn. Acad. Arts. & Sci.* **35** : 129–329, illust.

de Conick, L. A. & Stekhoven, J. H. S. (1933), " Free living marine nemas of the Belgian Coast. ii. With general remarks on the structure and system of nemas " *Mém. Mus. Hist. Nat. Belg.* **58** : 1–163, figs. 1–163

Cuvier, G. (1817), Le règne animal distribué d'apres son organisation : Fortin Masson et Cie, Paris : **4** : i–viii + 1–255, pls. 1–15

—— (1829), *Idem.* 2 ed. **5** : i–xxiv + 1–556

Dewitz, J. (1892), Die Eingeweidewürmer der Haussäugetiere : Paul Parey, Berlin : 1–180, illust.

Diesing, C. M. (1851), *Systema Helminthum.* : W. Braumüller, Vindobonae : **2** : 1–588

Dujardin, F. (1842), " Mémoire sur les *Gordius* et les *Mermes* " *Compt. Rend. Acad. Sc. Paris* **15**(3) : 117–119

Dutrochet, H. (1817), " Note sur un annélide d'un genre nouveau " *Bull. Sc. Soc. Philomat., Paris* : 3 s. (1817) : 130–131

Ehrenberg, C. G. (1831 [1828]), *Symbolae physicae seu icones et descriptiones corporum naturalium novorum aut minus coquitorum quae ex itineribus per Libyam, Ægyptum, Arabiam et Habessiniam publico institutis sumptu . . . studio annis* 1820–1825 *rediderunt. Pars zoologica.* Decas prima : Berolini ex Oficina (title page, 1828 [*i.e.*, plates ; 1831 : text]) unpaged [1–128], pls. I–VI, I–II, I–II

—— (1836–1837), *Die Acephalen des Rothen Meeres und der Organismus der Mudusen der Ostsee erläutert und auf Systematik angewedet* : Berlin : 1–82, pls. 1–8

—— (1837), *Ibid.* Abhandl. Akad. Wiss. Berlin (1835), Physikal Abhandl. : 181–260, pls. 1–8

—— (1838), Die Infusorienthieren als Kommene Organismen. Fol Leipzig

Filipjev, I. N. (1929), " Classification of free living Nematoda and relations to parasitic forms " *J. Parasitol.* **15**(4) : 281–282

Gegenbaur, C. (1859), *Grundsüge der vergleichenden Anatomie* : Leipzig : I–XIV + 1–606, figs. 1–198. Obtained from John Crerar Library, Chicago

Grobben, K. (1909), " Die systematische Einteilung des Thierreichs " *Verhandl. K. K. Zool. Bot. Gesellsch. Wien* (1908) **58**(10) : 491–511, figs. 1–3

Haeckel, E. (1866), *Generelle Morphologie der Organismen. Allgemeine Anatomie der Organismen* : Georg Reimer, Berlin : **1** : 1–574, **2** : 1–462

—— (1894), *Systematische Phylogenie der Protista und Pflanzen.* 1. Theil : Georg Reimer, Berlin : 1–400, illust.

—— (1896), *Systematische Phylogenie der Wirbellosen Thiere* (*Invertebrata*). 2. Theil : Georg Reimer, Berlin : 1–720, illust.

Handlirsch, A. (1903), " Zur Phylogenie der Hexapoden " *Vienna Akad. Sitzungsb., Math.-Naturw. Kl.* **112** : 716–738

Hatschek, B. (1888), *Lehrbuch der Zoologie* : Gustav Fischer, Jena : 1–432, illust.

Hemming, F. (1953), *Copenhagen Decisions on Zoological Nomenclature* : Internat. Trust for Zoological Nomenclature, London : 1–135

—— (1957), " Professor J. Chester Bradley's Draft : Names, Nomenclatural Regulations and Their Interrelations with Taxonomy " *Bull. Zool. Nomenclature* **14** : 1–190, 191–286

van der Hoeven, J. (1850), *Handbuch der Zoologie* : Wirbellosen Thiere, Leopold Voss, Leipzig : **1** : 1–821, pls. 1–15

Hubbs, C. (1853), " Proposed modifications of the Stenzel system " *Copeia* **4** : 251–252

Huxley, T. H. (1864), *Lectures on the elements of comparative anatomy* : London : 1–303

—— (1853[1852]), " Lacinularia socialis. A contribution to the anatomy and physiology of the Rotifera " *Tr. Micr. Soc. Lond.* n.s. **1** : 1–19

—— (1876[1874]), " On the classification of the Animal Kingdom " *Journ. Linn. Soc. London Zoology* **12** : 199–226

—— (1877), *A manual of the anatomy of invertebrated animals* : J. & A. Churchill, London : i–viii + 1–698 + figs. 1–158

Hyman, L. B. (1940), *Protozoa through Ctenophora. The Invertebrates* : McGraw-Hill, New York : **1** : 1–726, illust.

—— (1951), *Platyhelminthes and Rhynchocoela. The acoelomate Bilataria* : *Ibid.* : **2** : 1–550, illust.

—— (1951), *Acanthocephala, Aschelminthes, and Entoprocta* : *Ibid.* : **3** : 1–572, illust.

Krauss, H. A. (1902), " Die Namen der ältesten Dermopteren (Orthopteren-) Gattungen und ihre Verwendung für Familien und Unterfamilien-Benungen auf Grund der jetzigen Nomenclaturregeln " *Zool. Anz.* **25** : 530–543

Krauss, A., & Wolff, M. (1919), " Einer Übersicht über die bischer aufgestellten fossilen und rezenten Insektordnungen " *Arch. Naturgesch. J.* 85, Abt. A (3) : 151–171

Lamark, J. B. P. A. (1816), *Histoire naturelle des animaux sans vertèbres* : Verdière, Paris : **3** : 1–586

Lanjouw, J., et al (1956), *International Code of Botanical Nomenclature. I.U.B.S.-U.N.E.S.C.O. Internat. Bur. Plant Taxonomy and Nomenclature of the International Association for Plant Taxonomy* : Lange Nieuwstraat 106, Utrecht, Netherlands : 1–337

Lankester, E. R. (1877), " Notes on the embryology and classification of the Animal Kingdom " *Quart. J. Micro. Sc.* s. 2, **17** : 399–454

—— (1900), *A Treatise on Zoology* : Adam and Charles Black, London : **2** : 1–178, illust.

Leuckart, K. G. F. R. (1848), *Ueber die Morphologie und die Verwantschafts-verhältnisse der wirbellosen Thieren. Ein Beitrag sur Charakteristik und Classification der thierischen Formen* : Friedrich Vierweg & Sohn, Braunschweig : 1-180, 1 pl.

—— (1859), " Bericht über die wissenschatliche Leistungen in der Naturgeschichte der niederen Thiere während des Jahres 1858 " *Arch. Naturg.* 25 J. **2** : 97–255

Linnaeus, C. (1758), " Systema Naturae. per Regna *Tria Naturae* " Laurentii Salvi, Holmiae, 10 ed., **1** : 1–823

von Linstow, O. (1905), " Neue Helminthen " *Arch. Naturg.* 71 J. **1**(3) : 267–276, pl. 10, figs. 1–17

—— (1909), " II. Parasitische Nematoden " *Die Süsswasserfauna Deutschlands* : Gustav Fischer, Jena : **15** : 47–83, figs. 1–80

Metchnikoff, E. (1865), " Ueber einige wenig bekannte hiedere Thiereformen " *Ztschr. Wiss. Zool.* **15** : 450–463, pl. 35

Minot, C. S. (1876), " On the classification of some of the lower worms " *Proc. Boston Soc. Nat. Hist.* **19** : 17–25

Mueller, O. F. (1777), *Zoologiae Danicae seu Animalium Daniae et Norvegiae rariorum ac minus notorum icones* : Hallageriis, Havniae : Fasc. 1 : [3-]4, pls. 1–40

—— (1783), "Anmerkungen beym, Durchlesen einiger Aufsätze in den 10 ersten Stücken des Naturforschers " *Naturforscher*, Halle : **19** : 159–176

—— (1787), " Verzeichniss der bischer entdeckten Eingeweidewürmer, der Thiere, in weichen sei gefunden worden, und besten Schriften, die derselben erwähnen " *Naturforscher*, Halle : **22** : 33–86

Nitsche, H. (1870), " Beiträge zur Kenntnis der Bryozoen " *Ztschr. Wiss. Zool.* **20** : 1–36, pls. 1–2

Oersted, A. S. (1844), *Entwurf einer systematischen Einteilung und speciellen Beschreibung der Plattwürmer* : Kopenhagen : i–viii + 1–96, figs. 1–18, pls. 1–3, figs. 1–56

Pearse, A. S. (1936), *Zoological Names, A list of Phyla, Classes, and Orders* : Sect. F, A.A.A.S., Duke Univ. Press, Durham, N.C. : 1–24

—— (1942), *An Introduction to Parasitology* : Charles C. Thomas, Springfield, Baltimore : 1–375, illust.

—— (1947), *Zoological Names. A list of Phyla, Classes, and Orders* : Sect. F, A.A.A.S., Duke Univ. Press, Durham, N.C. : 1–22

Pennak, R. W. (1953), *Fresh-water invertebrates of the United States* : Ronald Press, New York : 1–769, illust.

Poche, F. (1903), " Zur Nomenclatur der Orthopteren, nebst einigen allgemein nomenclatorischen Bemerkungen in Hinsicht auf die neuen internationalen Nomenclaturregeln " *Zool. Anz.* **26**(693) : 233–241

—— (1911), " Die Klassen und höheren Gruppen des Thierreichs " *Arch. Naturg.* J. 77, **1** (suppl. 1) : 63–136

Potts, F. A. (1932), in : Borradaile, L. A., & Potts, F. A. : *The invertebrata ; a manual for the use of students* : Cambridge Univ. Press ; Cambridge : 1–645, illust.

—— (1935), *Ibid.*, 2 ed. : 1–725, illust.

Rauther, M. (1930), " Fünfte Klasse des Cladus Nemathelminthes " *Handb. der Zoologie* : (Kükenthal u. Krumbach), Walter de Gruyter & Co., Berlin & Leipzig : **2**, Lief. 10 (4) : 249–402, figs. 1–426

Reinhard, W. (1887), " Kinorhyncha (*Echinoderes*) ihr anatomischer Bau und ihre Stellung im System " *Ztschr. Wiss. Zool.* **45** : 401–467, pls. 20–22, figs. 1–97

Rudolphi, C. A. (1808), *Entozoorum sive vermium intestinalium historia naturalis* : Amstelaedami : **1** : 1–527, pls. 1–6

—— (1809), *Idem.* **2** : 1–457, pls. 7–12

Schultze, M. (1851), " Beiträge zur Naturgeschichte der Turbellarien " 1 Abt. : C. A. Koch, Greifswald : 1–77, pls. 1–7

—— (1852), " Zoologische Skizzen " *Ztschr. Wiss. Zool.* **4** : 178–195

Scopoli, G. A. (1777), *Introductio ad Historiam naturalem sistens genera Lapidum, Plantarum, et Animalium* : Wofgangum Gerle, Prague : 1–373

von Siebold, C. T. (1843), " Bericht über die Leistungen im Gebiete der Helminthologie während des Jahre 1842 " *Arch. Naturg.* 9 J., **2** : 300–335

—— (1848), " Lehrbuch der vergleichenden Anatomie der wirbellosen Thiere " in : von Siebold & Stannius, *Lehrbuch der vergleichenden Anatomie* : Veit, Berlin : 1 Theil, i–xiv + 1–679 + [1]

Stenzel, H. B. (1950), " Proposed uniform endings for names of higher categories in zoological systematics " *Science* **112** : 94

Storer, T. I. (1951), *General Zoology*, 2 ed. : McGraw-Hill, New York : 1–832, illust.

Thorne, G. (1949), " On the classification of the Tylenchida, new order (Nematoda, Phasmidia) " *Proc. Helminth. Soc. Wash.* **16**(2) : 37–73, illust.

Vejdovský, F. (1886), " Zur Morphologie der Gordiiden " *Ztschr. Wiss. Zool.* **43**(3) : 369–433, pls. 15–16

Verhoeff, K. W. (1902), " Über bie Nerven des Metacephalensegmentes und die Insectenordnung Oothecaria " *Zool. Anz.* **26** : 21–31, figs. 1–9

Vogt, K. C. (1851), *Zoologische Briefe. Naturgeschichte der lebenden und untergangen Thiere für lehrer, höhere schulen und gebildete aller stände* : Literarische Anstalt (J. Rütten), Frankfurt : **1** : 1–719, figs. 1–925

Ward, H. B. (1903), " Nematoda " in : Buck, A. H. (E. A.) : *Ref. Handbook Med. Sci.* **6** : 205–225

—— (1916), " Nematoda " in : Buck, A. H. (E. A.) : *Ref. Handb. Med. Sci.* 3 ed. **6** : 676–704, figs. 4075–4116

—— (1917), " On the structure and classification of North American parasitic worms " *J. Parasitol.* **4**(1) : 1–12, pl. 1, figs. 1–14

Webster's New International Dictionary of the English Language (1954), 2 ed., unabridg. : G. & C. Merriam & Co., Springfield, Mass. : 1–3194, illust.

Yorke, W., & Maplestone, P. A. (1926), *The nematode parasites of vertebrates* : P. Blakiston's Son & Co., Philadelphia : 1–536, illust.

Zelinka, C. (1907), " Zur Kenntnis der Echinoderida " *Zool. Anz.* **32** (5/6) : 130–136