

The Published Names of TDA Cockerell

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INTRODUCTION

Theodore Dru Alison Cockerell (1866-1948) was an indefatigable scientist, teacher and writer, whose publishing career reputedly started at age 12 and continued until his death at 81. His was a wide-ranging career, encompassing topics as varied as natural history and taxonomy, evolution, genetics and biogeography, as well as social reform and education. As a biological researcher, it may be argued that the diversity of the taxa he studied is second only to Linnaeus, as Cockerell treated mollusks, insects, arachnids, fungi, mammals, fish and plants, and dealt with fossil taxa as well as extant groups. For example, among the extant insect orders, he published descriptions of taxa from Blattodea, Coleoptera, Dermaptera, Diptera, Embiida, Ephemeroptera, Hemiptera, Hymenoptera, Isoptera, Lepidoptera, Mecoptera, Neuroptera, Odonata, Orthoptera, Plecoptera, Psocoptera, Thysanoptera, Thysanura and Trichoptera. Today however, he is probably best known for his work on bees (Insecta: Hymenoptera: Apoidea).

Cockerell was a largely self-taught biologist, his formal higher education limited to attending the Middlesex Hospital Medical School (without obtaining a degree). Cockerell suffered from tuberculosis, which has led some people to speculate that he published quickly in fear that his life would be cut short. When he began his career, the short published note was the most efficient method of mass communication regarding current activities – acting to some extent as e-mail does today – and Cockerell took advantage of this format to treat the hundreds of taxa he came across. Dr. P.H. Timberlake reputedly reported that when traveling by train across the western United States, Cockerell would get out and collect bees at a watering station, and by the time the train made it's next stop, he'd telegraphed a new description to a publisher. Many of his descriptions are short and many of his taxa are distinguished largely by color differences. He was regarded by some of his contemporaries as an extreme "splitter". Thus, it is likely that a significant proportion of Cockerell's names will ultimately prove to be synonyms.

Several biographies of Cockerell have been published, and in 1965 Dr. William Weber, of the University of Colorado, prepared Cockerell's bibliography. Besides traditional research papers which appeared in reputable scientific journals, Weber also included newspaper articles and privately printed papers authored by Cockerell, listing a total of 3904 numbered items. However there has never yet been published a list of the scientific names Cockerell authored or coauthored, although Cockerell kept a running tally of the taxa he named or described – in 1938 (Weber's reference #3687) Cockerell noted that up to that time he had published 5,480 names of specific or subspecific bee taxa, and another 146 names of genera and subgenera.

I became aware of this gap in the literature when recurationg the Apoidea in the Essig Museum of Entomology. Many of the bee names in our collection were ascribed to Cockerell, but I had difficulty tracking down the validity and dates of these taxa. The museum possessed a good collection of Cockerell's reprints, but these were virtually useless without a taxonomic index. Therefore I decided to construct such an index myself, a task I undertook only because of the nexus of three factors: 1). Weber's 1965 listing of Cockerell publications, 2). an almost

complete set of reprints of Cockerell's "Descriptions and Records of Bees" (a series of papers originally published in the *Annals and Magazine of Natural History*) in the Museum (one of several sets which Dr. William Weber had distributed to various entomological institutions after the death of Cockerell), and 3). access to the Library of the University of California, Berkeley, one of the world's premier institutions for accessing older biological literature.

I have endeavored to be as inclusive as possible, but have undoubtedly missed some names or presented other erroneous data. Happily, one of the advantages of presenting taxa lists electronically is the relative ease with which data can be updated and mistakes corrected – which I am most willing to do, should such errata be brought to my attention.

MATERIAL & METHODS

I began the project using Weber's 1965 bibliography of Cockerell as my "bible". I noted each paper listed therein which was likely to include a new scientific name, ignoring newspaper articles and other such non-taxonomical entries. I then endeavored to find and inspect each of these papers, recording each newly proposed name therein. My "area of search" for these papers included both reprint collections from the Essig Museum and the Department of Entomology at the California Academy of Sciences (CAS) in San Francisco, California, as well as the libraries at UC Berkeley and the CAS, and the collection of Cockerell's papers in the Norlin Museum at the University of Colorado, Boulder, Colorado.

Regretfully, I was not able to locate every paper of interest listed in Weber. Most of the missing papers date from the periods 1883-1888 (mostly treating English mollusks and natural history), and from 1892-1893 (including those in several Jamaican journals, published when Cockerell was focused on scale insects). In an effort to double check my results and fill in these missing gaps, I also consulted numerous catalogs, checklists and other references of groups in which Cockerell may have proposed new names, and made liberal use of consulting the internet. Finally, I tracked down a few missing bee names through the assistance of several melittologists, and I found a few names in some Cockerell papers not listed by Weber.

My results comprise Cockerell's available, scientific ("Latinized") names. These include the taxa he originally described or co-described, as well as previously described taxa for which he nominated new names (typically due to preexisting homonymies). I have included not only specific names, but also supraspecific and subspecific names. Within the latter category, I lumped together those taxa originally classified by Cockerell as subspecies, varieties, races, forms, mutations and "monstrosities". Some of these taxa have since been elevated in rank, retained as formal subspecies (or other subspecific rank), or formally synonymized under another name, while others are not recognized by formal nomenclatural rules.

I excluded taxa described by Cockerell to which he did not attach a name (e.g. "variety α "). I also did not include plant hybrids without unique names (e.g. *Aquilegia desertorum* X *chrysantha*), nor did I include taxa which Cockerell described after someone else named them (e.g. *Cecidomyia atriplicis* Townsend, 1893), or those names published in a Cockerell paper that are attributable to another author. I have also excluded published misspellings of taxa named by previous authors (*lapsi calami*), as well as manuscript names attributed to Cockerell "in litt.", but ultimately published by another worker (eg. *Lecanium lidgetti* Fernald, 1903).

Two of the difficulties I encountered were the brevity of many of Cockerell's descriptions, coupled with his unfortunate habit of sometimes "prepublishing" descriptions – that

is, where he gave a brief description of a new taxon in one article, and published a fuller description in a later one (e.g. Part I, ID #1831, *Crocisa insulicola*). In some cases, the description are so brief (especially those of varieties of mollusks that Cockerell named in the 1880's) that an argument may be made that an adequate description is in fact lacking, and those names should rightly be considered as *nomina nuda*. Since I am not an authority on these groups, I chose to adopt the more conservative course of simply listing every name I could find, and leave it to more informed workers to decide the ultimate validity and availability of the names (not including the handful of taxa which are clearly *nomina nuda*).

The results are presented in four parts. Part I comprises the available names of Hymenoptera (Insecta). The bulk of these entries are bees which constitute about 75% of all of Cockerell's names. In this section, I have also endeavored to provide the institution where the type specimen is deposited (not provided in Parts II-IV).

Part II comprises the available names from the other orders of Insecta. About half of these names are from the order Hemiptera, which includes those taxa formerly placed under the separate order Homoptera (most of these names are of scale insects). The higher systematics of this group is still in a state of flux, and so for the purposes of this paper I have purposely separated these taxa into two orders, and used the more readily identifiable terms of Heteroptera (which may actually be a suborder) and Homoptera (which may be a paraphyletic assemblage including the Fulgoromorpha, Cicadomorpha and Sternorrhyncha).

Part III includes the available names for all the non-Insecta (including other invertebrates, vertebrates, plants and microorganisms). Unlike the preceding two sections, this section includes categories for Phylum and Class. Unfortunately, the state of the higher classifications of some of these groups (notably the Plantae and Mollusca) is in even greater flux than any of the insect groups. Additionally (being an entomologist), I am not familiar with many of these groups, and may have used some outmoded terminology in trying to characterize the higher classification of many of these taxa.

Part IV includes the unavailable names from all groups.

Each part is presented in the format of a Microsoft Access database, in a series of up to 15 columns. An asterisk (*) in any column denotes that additional information about that category will be found under the "Comments" column. The categories of the columns are as follows:

ID: Unique number for each name within each of Parts I, II, III and IV but may be duplicated between Parts. The numerical sequence represents the order in which each name was entered into the database.

Taxon name: Epithet given by Cockerell in the original publication. I followed the modern convention of ignoring phonetic marks (diacritic marks, hyphens, numerals, etc.), even though Cockerell used these extensively. I also presented all specific and subspecific names with the initial letter in lower case, even though Cockerell occasionally capitalized these. In some cases, it was difficult to distinguish between the diphthongs "æ" (my "ae") from "œ" (my "oe"), and I may have confused them. If a specific or subspecific name was apparently misspelled in the original paper, I retained the original spelling, but noted the error under the "Comments" column.

Level: Taxonomic level of the taxon as originally described: spf= superfamily, f= family, sf= subfamily, t= tribe, g= genus, sg= subgenus, sec =section, s= species, ss= subspecies, race, variety, form, mutation or monstrosity. In a few cases (e.g. Part I, ID #2381, *Nomia grisella*), Cockerell noted a new taxon may be either a species or subspecies. In these cases, I listed his first-given choice, including the other choice under the “Comments” column.

Genus: Genus of the taxon as originally described. When the entry in “Taxon name” is a genus, the entry in this column is identical. When the taxon is a suprageneric category (tribe or above), this column is left blank. If a taxon has since been placed in a different genus, I noted this in the “Comments” column, although I have undoubtedly missed some of these transfers. If the genus of a new taxon was misspelled in the original paper, I corrected the spelling in the “Genus” column, and noted the lapsus under “Comments”.

Parent species: If a taxon was originally described as a subspecies, race, variety or other sub- or infraspecific form, this column notes the species in which the taxon was originally placed. This column will be blank for taxa originally described at the specific level or above. Rarely, a taxon was described at a subspecific level, without reference to a species (e.g. Part II, ID#7527-7528) – in these cases this field is left blank.

Date: Year of publication, mostly as per Weber. In a few cases the publication date appearing in Weber is wrong, and I have corrected them (e.g. Part I, Refs #3856-3858 were published in 1946, not 1945).

Phylum: Phylum in which the taxon is currently placed (not necessarily that in which it was originally placed). This column is missing in Parts I & II, which are all from the Insecta. For plants, I used the name of the kingdom (Plantae) in this column. For protists, I used the terms “Algae” or “Protozoa” where appropriate, or “Protists” where the placement was unclear.

Class: Class in which the taxon is currently placed (not necessarily that in which it was originally placed). This column is missing in Parts I & II which are all from the Insecta. The higher systematics of plants is currently in a state of chaos, and so for these taxa I used the term “Unplaced” in this column.

Order: Order in which the taxon is currently placed (not necessarily that in which it was originally placed). This column is missing in Part I, since all entries there are in the order Hymenoptera. In Part III, I used the term “Unplaced” in this column for plants for the same reason noted above under Class.

Family: Family in which the taxon is now placed (not necessarily that in which it was originally placed). Bee families are as per Michener (2000). I was not able to place all taxa to family, and for these I entered the term “Unplaced”.

Ref: Reference in which the taxon was published. The numbers are those presented in Weber. If the reference was not included in Weber’s work, I listed the author(s) and date of the paper here, and provided as full a citation as I could determine under References Cited.

First page: First page number in the reference in which the taxon is described. In a few cases, I cited the page(s) preceding the formal description if they included significant descriptive or diagnostic matter pertaining to the taxon in question (e.g. *Philorites*, Part II, ID#5475).

Last page: If a description continues beyond one page, the last page is noted here. In some cases, the ending point of the formal description is not clear, and/or additional text follows. In these cases I included extra pagination containing any relevant discussion which may help in diagnosing or otherwise aiding in distinguishing the taxon. If additional information is included on later (non-continual pages), I noted the extra pagination in the “Comments” column.

Coauthor: Any worker who is considered a coauthor of the taxon is listed here. The authors of a species description are not necessarily congruent with the authorship of the article in which the species description occurs. If another worker is a coauthor of the paper, but not of the taxon itself, that person is noted in the “Comments” column, but not the “Coauthor” column. I did not distinguish between senior and junior coauthors.

Fossil?: Presence of “+” indicates the taxon is extinct, while a blank entry indicates that it is extant. Family and order placement of Insecta follows Carpenter (1992).

Type deposition (Part I only): This column contains a coden denoting where the type specimen of a species or subspecies is supposedly deposited. This information was gleaned from several sources, including two lists hand-written by Cockerell (deposited at the Department of Entomology at the California Academy of Sciences). These lists were originally sent from Cockerell to Isabel McCracken at Stanford Junior University in May and June of 1940, and list the institutions where the holotypes of various bee taxa were supposedly deposited. Supplementary information was gathered from the websites of several institutions, as well as the original publications, and Paul Hurd’s personal *Xylocopa* catalog. I used the codens developed by Evenhuis & Samuelson, available via the Bernice P. Bishop Museum’s website, <http://hbs.bishopmuseum.org/codens/> (these are not necessarily the codens preferred by the institutions themselves). The key to the codens follows:

AMNH – American Museum of Natural History, New York, NY, USA
AMS – Australian Museum, Sydney, NSW, AUSTRALIA
ANIC – Australian National Insect Collection, Canberra, ACT, AUSTRALIA
BMNH – British Museum of Natural History, London, UNITED KINGDOM
BPBM – Bernice P. Bishop Museum, Honolulu, HI, USA
CAS – California Academy of Sciences, San Francisco, CA, USA
CMNH – Carnegie Museum, Pittsburgh, PA, USA
CNC- Canadian National Insect Collection, Toronto, ON, CANADA
DMSA – Durban Museum, Durban, SOUTH AFRICA
MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
MVMA –Museum Victoria, Melbourne, Victoria, AUSTRALIA
QM – Queensland Museum, Brisbane, Queensland, AUSTRALIA
RMCA – Musee Royal de l’Afrique Central, Tervuren, BELGIUM
TMSA – Transvaal Museum, Pretoria, SOUTH AFRICA
UCMC – Colorado University, Boulder, CO, USA

UCR – University of California, Riverside, CA, USA
UMO – Oxford University Museum of Natural History, Oxford, UNITED KINGDOM
UNSM – University of Nebraska State Museum, Lincoln, NE, USA
USNM – National Museum of Natural History, Washington, DC, USA
ZMHB – Museum fur Naturkunde, Berlin, GERMANY
ZMUK – Zoological Museum, University of Königsberg, Kaliningrad, Russia

However, there are many problems with these data. In a recent e-mail posting, Charles Michener, of the University of Kansas, wrote the following:

“In recent literature and verbal discussions, I note signs of confusion about the type material of some species described by T.D.A. Cockerell. Except in his early papers (probably before 1900), when Cockerell described a new species based on a single specimen, he labelled it TYPE. Such specimens are obviously holotypes. When he described a new species based on two or more specimens, he labelled one specimen TYPE; the others were labelled COTYPE. Thus he used TYPE in the sense of holotype. Specimens labelled COTYPE are, in current terminology, paratypes.

Thus it is not necessary to formally designate his TYPE (=holotype) specimens as lectotypes, nor is it legitimate to designate a lectotype from among his cotype (=paratype) specimens unless the TYPE is lost. Like others, Cockerell occasionally made mistakes. I have been told of a species for which two specimens were labelled TYPE. Obviously they should be considered syntypes and one should be selected as the lectotype.

A different matter about Cockerell's types: he did not use red or any other color to make them readily recognizable. Therefore they are easily lost among other specimens. Also his types are not always in the collection where one would expect to find them.”

(Note: In a footnote on page 261 in ref. #2370, S.A. Rohwer noted that Cockerell's cotypes are essentially the same as paratypes).

Comments: Miscellaneous notes, including some synonymies and current valid names, duplicate entries of taxa, errata, authorship notations, etc.

RESULTS

I found a grand total of 9,044 (presumably) available names. Of these, 7,109 (78.7%) were described at the species level, while 1,325 (14.6%) were described at the subspecific level, 385 (4.3%) at the generic level, and 145 (1.6%) at the subgeneric level. Of the remainder, 2 were described as superfamilies, 17 as families, 37 as subfamilies, 22 as tribes, 1 as a subtribe and 1 as a section (each of these categories represent less than 0.5% of the total).

The overwhelming majority of the names (7,859 = 86.9%) represent extant taxa, while 1,185 (13.1%) represent extinct taxa.

The breakdown of names by taxonomic categories is listed below:

| TAXON | NUMBER (% of total, where * = <0.5%) |
|-------|--------------------------------------|
|-------|--------------------------------------|

Part I (Insecta: Hymenoptera)

Symphyta

| | | |
|----------------|--------|--------|
| Anaxyelidae | 1 (*) | |
| Argidae | 2 (*) | |
| Cephidae | 1 (*) | |
| Cimbicidae | 2 (*) | |
| Diprionidae | 1 (*) | |
| Pamphilidae | 1 (*) | |
| Pergidae | 1 (*) | |
| Siricidae | 2 (*) | |
| Tenthredinidae | 24 (*) | |
| Xyelidae | 2 (*) | |
| Unknown family | 1 (*) | |
| Total | | 38 (*) |

“Parasitica”

| | | |
|----------------|--------|-----------|
| Aphelinidae | 2 (*) | |
| Aulacidae | 10 (*) | |
| Braconidae | 21 (*) | |
| Chalcididae | 3 (*) | |
| Cynipidae | 11 (*) | |
| Diapriidae | 5 (*) | |
| Encyrtidae | 2 (*) | |
| Eulophidae | 1 (*) | |
| Figitidae | 1 (*) | |
| Ichneumonidae | 40 (*) | |
| Proctotrupidae | 1 (*) | |
| Pteromalidae | 5 (*) | |
| Scelionidae | 5 (*) | |
| Stephaniidae | 2 (*) | |
| Torymidae | 4 (*) | |
| Trigonalyidae | 2 (*) | |
| Total | | 115 (1.3) |

Apiformes

| | | |
|---------------|-------------|-------------|
| Andrenidae | 729 (10.8) | |
| Apidae | 1684 (24.9) | |
| Colletidae | 782 (11.6) | |
| Halictidae | 1593 (23.6) | |
| Megachilidae | 1565 (23.1) | |
| Melittidae | 43 (*) | |
| Stenotritidae | 5 (*) | |
| Total | | 6401 (70.8) |

Other Aculeata

| | | |
|-------------|-----------|-----------|
| Bethylidae | 7 (*) | |
| Chrysididae | 7 (*) | |
| Formicidae | 19 (*) | |
| Mutillidae | 36 (*) | |
| Pompilidae | 9 (*) | |
| Scoliidae | 3 (*) | |
| Sphecidae | 100 (1.5) | |
| Tiphiidae | 14 (*) | |
| Vespidae | 16 (*) | |
| <hr/> | | |
| Total | | 211 (2.3) |

Subtotal, Hymenoptera: 6765 (74.8)

Part II (Insecta: Non-Hymenoptera)

Thysanura

| | | |
|--------------|-------|-------|
| Lepismatidae | 1 (*) | |
| <hr/> | | |
| Total | | 1 (*) |

Ephemeroptera

| | | |
|--------------------|-------|-------|
| Ephemeridae | 1 (*) | |
| Hexagenitidae | 2 (*) | |
| Oligoneuriidae | 1 (*) | |
| Protereismatidae | 1 (*) | |
| Siphonuridae | 2 (*) | |
| Unplaced to family | 1 (*) | |
| <hr/> | | |
| Total | | 8 (*) |

Odonata

| | | |
|--------------------|--------|--------|
| Aeschnidae | 3 (*) | |
| Aeshnidae | 10 (*) | |
| Agrionidae | 7 (*) | |
| Allopetaliidae | 1 (*) | |
| Brachytronidae | 1 (*) | |
| Calopterygidae | 9 (*) | |
| Coenagrionidae | 4 (*) | |
| Euphaeidae | 2 (*) | |
| Lestidae | 3 (*) | |
| Libellulidae | 3 (*) | |
| Megapodagrionidae | 2 (*) | |
| Synlestidae | 1 (*) | |
| Telephlebiidae | 2 (*) | |
| Zacallitidae | 3 (*) | |
| Unplaced to family | 4 (*) | |
| <hr/> | | |
| Total | | 55 (*) |

Protorthoptera

| | | |
|--------------------|-------|-------|
| Pachytylopsiidae | 2 (*) | |
| Spanioderidae | 1 (*) | |
| Unplaced to family | 5 (*) | |
| Total | | 8 (*) |

Orthoptera

| | | |
|--------------------|--------|--------|
| Acrididae | 13 (*) | |
| Eospilopteronidae | 3 (*) | |
| Eumastacidae | 3 (*) | |
| Gryllacrididae | 1 (*) | |
| Gryllidae | 11 (*) | |
| Haglidae | 3 (*) | |
| Locustopseidae | 1 (*) | |
| Stenopelmatidae | 4 (*) | |
| Tettigoniidae | 3 (*) | |
| Unplaced to family | 1 (*) | |
| Total | | 43 (*) |

Mantodea

| | | |
|----------|-------|-------|
| Mantidae | 5 (*) | |
| Total | | 5 (*) |

Blattodea

| | | |
|-----------------|--------|--------|
| Archimylacridae | 24 (*) | |
| Blattidae | 2 (*) | |
| Mylacridae | 8 (*) | |
| Unplaced | 7 (*) | |
| Total | | 41 (*) |

Isoptera

| | | |
|-----------------|-------|-------|
| Hodotermitidae | 2 (*) | |
| Rhinotermitidae | 1 (*) | |
| Termopsidae | 1 (*) | |
| Total | | 4 (*) |

Dermaptera

| | | |
|-----------------|-------|-------|
| Carcinophoridae | 1 (*) | |
| Labiduridae | 1 (*) | |
| Total | | 2 (*) |

Embiidina

| | | |
|-----------------|-------|-------|
| Embiidae | 1 (*) | |
| Notoligotomidae | 2 (*) | |
| Total | | 3 (*) |

Plecoptera

| | | |
|----------|-------|-------|
| Perlidae | 1 (*) | |
| Total | | 1 (*) |

Psocoptera

| | | |
|----------------|-------|-------|
| Pachytroctidae | 1 (*) | |
| Peripsocidae | 1 (*) | |
| Psocidae | 1 (*) | |
| Psyllipsocidae | 1 (*) | |
| Total | | 4 (*) |

Heteroptera

| | | |
|-----------------|-------|--------|
| Belostomatidae | 1 (*) | |
| Coreidae | 2 (*) | |
| Corixidae | 1 (*) | |
| Cydnidae | 1 (*) | |
| Enicocephalidae | 4 (*) | |
| Gerridae | 1 (*) | |
| Lygaeidae | 2 (*) | |
| Pentatomidae | 6 (*) | |
| Reduviidae | 4 (*) | |
| Tingidae | 2 (*) | |
| Total | | 24 (*) |

Homoptera

| | |
|-------------------|---------|
| Acleridae | 4 (*) |
| Aleyrodidae | 21 (*) |
| Aphididae | 22 (*) |
| Asterolecaniidae | 12 (*) |
| Cercopidae | 7 (*) |
| Cerococcidae | 8 (*) |
| Cicadae | 3 (*) |
| Cicadellidae | 5 (*) |
| Cixiidae | 7 (*) |
| Coccidae | 185 (*) |
| Conchaspidae | 4 (*) |
| Dactylopiidae | 11 (*) |
| Delphacidae | 3 (*) |
| Diaspididae | 189 (*) |
| Eriococcidae | 24 (*) |
| Flatidae | 1 (*) |
| Fulgoridae | 28 (*) |
| Halimococcidae | 2 (*) |
| Kermesidae | 14 (*) |
| Kerriidae | 13 (*) |
| Lecanodiaspididae | 6 (*) |
| Margarodidae | 42 (*) |

| | | |
|--------------------|--------|-----------|
| Ortheziidae | 10 (*) | |
| Phenacoleachiidae | 1 (*) | |
| Phoenicococcidae | 4 (*) | |
| Pseudococcidae | 89 (*) | |
| Psyllidae | 7 (*) | |
| Stictococcidae | 2 (*) | |
| Unplaced to family | 7 (*) | |
| Total | | 731 (8.1) |

| | | |
|----------------|-------|-------|
| Thysanoptera | | |
| Aeolothripidae | 1 (*) | |
| Total | | 1 (*) |

| | | |
|--------------------|-------|--------|
| Neuroptera | | |
| Chrysopidae | 4 (*) | |
| Hemerobiidae | 2 (*) | |
| Inocellidae | 1 (*) | |
| Mantispidae | 1 (*) | |
| Meropidae | 2 (*) | |
| Nemopteridae | 1 (*) | |
| Osmylidae | 2 (*) | |
| Panorpidae | 2 (*) | |
| Raphidiidae | 4 (*) | |
| Unplaced to family | 4 (*) | |
| Total | | 23 (*) |

| | | |
|----------------|--------|--|
| Coleoptera | | |
| Anthicidae | 1 (*) | |
| Anthribidae | 1 (*) | |
| Attelabidae | 1 (*) | |
| Buprestidae | 5 (*) | |
| Calandridae | 4 (*) | |
| Cantharidae | 1 (*) | |
| Carabidae | 22 (*) | |
| Cerambycidae | 12 (*) | |
| Chrysomelidae | 9 (*) | |
| Cleridae | 2 (*) | |
| Coccinellidae | 4 (*) | |
| Colydiidae | 1 (*) | |
| Cryptophagidae | 1 (*) | |
| Curculionidae | 30 (*) | |
| Dascillidae | 2 (*) | |
| Dermestidae | 1 (*) | |
| Dytiscidae | 1 (*) | |
| Elateridae | 10 (*) | |
| Erotylidae | 2 (*) | |

| | | |
|----------------|-------|-----------|
| Hydrophilidae | 1 (*) | |
| Lampyridae | 1 (*) | |
| Meloidae | 3 (*) | |
| Mordellidae | 1 (*) | |
| Otiorhynchidae | 1 (*) | |
| Paussidae | 2 (*) | |
| Pedilidae | 1 (*) | |
| Rhipiphoridae | 1 (*) | |
| Scarabaeidae | 7 (*) | |
| Scolytidae | 2 (*) | |
| Silphidae | 3 (*) | |
| Staphylinidae | 1 (*) | |
| Tenebrionidae | 6 (*) | |
| Throscidae | 1 (*) | |
| Unplaced | 7 (*) | |
| <hr/> | | |
| Total | | 148 (1.6) |

Mecoptera

| | | |
|-------------|-------|-------|
| Eomeropidae | 1 (*) | |
| Panorpidae | 3 (*) | |
| <hr/> | | |
| Total | | 4 (*) |

Diptera

| | |
|-----------------|--------|
| Anthomyiidae | 5 (*) |
| Asilidae | 17 (*) |
| Bibionidae | 25 (*) |
| Blepharoceridae | 5 (*) |
| Bombyliidae | 30 (*) |
| Cecidomyiidae | 27 (*) |
| Chironomidae | 5 (*) |
| Chloropidae | 3 (*) |
| Crosophilidae | 1 (*) |
| Culicidae | 5 (*) |
| Dixiidae | 2 (*) |
| Empididae | 14 (*) |
| Ephrydridae | 2 (*) |
| Glossinidae | 3 (*) |
| Heleomyzidae | 1 (*) |
| Leptidae | 8 (*) |
| Muscidae | 2 (*) |
| Mycetophilidae | 28 (*) |
| Mydidae | 1 (*) |
| Nemestrinidae | 9 (*) |
| Ortalidae | 1 (*) |
| Phoridae | 1 (*) |
| Platypezidae | 3 (*) |

| | | |
|--------------------|--------|-----------|
| Psychodidae | 5 (*) | |
| Ptychopteridae | 1 (*) | |
| Rhyphidae | 1 (*) | |
| Richardiidae | 7 (*) | |
| Scathophagidae | 1 (*) | |
| Sciomyzidae | 1 (*) | |
| Sphaeroceridae | 1 (*) | |
| Stratiomyidae | 8 (*) | |
| Streblidae | 1 (*) | |
| Syrphidae | 9 (*) | |
| Tabanidae | 4 (*) | |
| Tephritidae | 2 (*) | |
| Therevidae | 6 (*) | |
| Tipulidae | 45 (*) | |
| Trypetidae | 2 (*) | |
| Unplaced to family | 2 (*) | |
| <hr/> | | |
| Total | | 294 (3.3) |

| | | |
|--------------------|--------|--------|
| Trichoptera | | |
| Beraeidae | 2 (*) | |
| Hydropsychidae | 1 (*) | |
| Hydroptilidae | 1 (*) | |
| Limnephilidae | 13 (*) | |
| Molannidae | 1 (*) | |
| Odontoceridae | 5 (*) | |
| Philopotamidae | 1 (*) | |
| Phryganeidae | 8 (*) | |
| Unplaced to family | 3 (*) | |
| <hr/> | | |
| Total | | 35 (*) |

| | | |
|-----------------|--------|--|
| Lepidoptera | | |
| Agrotidae | 1 (*) | |
| Arctiidae | 1 (*) | |
| Coleophoridae | 2 (*) | |
| Cossidae | 4 (*) | |
| Crambidae | 2 (*) | |
| Gelechiidae | 2 (*) | |
| Geometridae | 5 (*) | |
| Lycaenidae | 1 (*) | |
| Micropterygidae | 1 (*) | |
| Noctuidae | 10 (*) | |
| Notodontidae | 1 (*) | |
| Nymphalidae | 8 (*) | |
| Papilionidae | 2 (*) | |
| Pieridae | 5 (*) | |

| | |
|--------------------|----------|
| Prodoxidae | 2 (*) |
| Pyralidae | 3 (*) |
| Riodinidae | 1 (*) |
| Saturniidae | 4 (*) |
| Sesiidae | 3 (*) |
| Sphingidae | 3 (*) |
| Syntomidae | 1 (*) |
| Thyrididae | 2 (*) |
| Tineidae | 1 (*) |
| Tortricidae | 2 (*) |
| Unplaced to family | 4 (*) |
| <hr/> | |
| Total | 71 (0.5) |

Unplaced to Order 5 (*)

Subtotal, non-Hymenoptera Insecta: 1511 (16.7)

Part III (Non-Insecta)

Protista

| | |
|------------------|-------|
| Protoza (Lobosa) | 3 (*) |
| Algae | 2 (*) |
| Unplaced | 1 (*) |
| <hr/> | |
| Total Protista | 6 (*) |

Basidiomycota

| | |
|---------------------|-------|
| Urediniomycetes | 1 (*) |
| <hr/> | |
| Total Basidiomycota | 1 (*) |

Plantae

| | |
|---------------|-----------|
| Unplaced | 301 (3.3) |
| <hr/> | |
| Total Plantae | 301 (3.3) |

Porifera

| | |
|----------------|-------|
| Demospongia | 1 (*) |
| <hr/> | |
| Total Porifera | 1(*) |

Cnidaria

| | |
|-----------|-------|
| Anthozoa | 2 (*) |
| Hydrozoa | 1 (*) |
| Scyphozoa | 1 (*) |
| <hr/> | |
| Total | 4 (*) |

Arthropoda (-Insecta)

| | |
|-----------|--------|
| Arachnida | 19 (*) |
| Ostracoda | 1 (*) |

| | | |
|------------------------------|-----------|------------------|
| Malacostraca | 3 (*) | |
| Diplopoda | 2 (*) | |
| Chilopoda | 1 (*) | |
| Total | | 26 (*) |
| Echiurida | | |
| Crinoidea | 1 (*) | |
| Total | | 1 (*) |
| Onychophora | | |
| Unplaced | 8 (*) | |
| Total | | 8 (*) |
| Brachiopoda | | |
| Inarticulata | 1 (*) | |
| Total | | 1 (*) |
| Mollusca | | |
| Aplacophora | 1 (*) | |
| Gastropoda | 335 (3.7) | |
| Bivalvia | 13 (*) | |
| Total | | 352 (3.7) |
| Chordata | | |
| Actinopterygii | 63 (0.7) | |
| Aves | 1 (*) | |
| Mammalia | 3 (*) | |
| Unplaced | 3 (*) | |
| Total | | 70 (0.8) |
| Subtotal, non-Insecta | | 768 (8.5) |

Part IV

In addition to the 9,043 available names noted above, there are an additional 36 names which appear to be unavailable (mostly nomina nuda).

Unresolved items

Two names (“*Limax agrestis* var. *azorica* Ckll” and *Limax agrestis* var. *bimaculata* Cockerell”) are mentioned in Taylor (1902-1907) or Ellis (1926), but neither is listed in Cockerell’s own reviews, and thus are probably manuscript names.

I came across mention of 12 mollusk names, but was unable to track down the actual references in which they may have been described or otherwise noted. Thus I am unable to determine if

these names are formally published, manuscript, or otherwise unavailable. The names (and whatever partial publication data I could find) are:

Arion empiricorum fasciatus 1889.

Arion fasciatus ambiguus subalbida 1891. (?*British Naturalist* 1: 101 as *Arion circumscriptus ambiguus subalbida*)

Arion fasciatus subfuscus atripunctatus 1891.

Helix aspera nigrescens 1888. *Naturalist* (=Yorkshire Naturalist Union)

Helix aspersa semifusca 1888. *Naturalist* (=Yorkshire Naturalist Union): 108

Helix hortensis roseozonata 1888. *Naturalist* (=Yorkshire Naturalist Union):111

Helix (*Lucerna*) *vendryesi* 1892. Junior synonym of *Pleurodonte sloaneana* (Pfeiffer, 1868)

Hesperarion niger maculatus, 1892. Originally described in *Ariolimax*; a description is in Pilsbry & Vaneta (1898): 219-261

Limax flavus nigromaculatus 1893.

Limax marginatus submaculatus 1890.

Limax maximus marmoratus 1885.

Phasianella pullus ziczac 1885. *Naturalist World* 2: 218

Finally, “*Melipona fasciata lutzi*” (Hymenoptera: Apidae) is listed on a webpage detailing the type specimens held at the American Museum of Natural History (<http://research.amnh.org/~carpente/HYMTYPE.HTM>). This is a manuscript name for a specimen in that institution, and as far as I can determine, has never appeared in any other publication.

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