

BULLETIN
OF THE
FLORIDA STATE MUSEUM

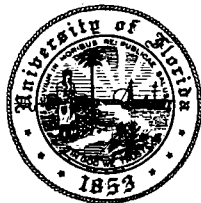
BIOLOGICAL SCIENCES

Volume 7

Number 4

CATALOGUE OF FOSSIL BIRDS

Pierce Brodkorb



UNIVERSITY OF FLORIDA
Gainesville
1963

Numbers of the BULLETIN OF THE FLORIDA STATE MUSEUM are published at irregular intervals. Volumes contain about 300 pages and are not necessarily completed in any one calendar year.

OLIVER L. AUSTIN, JR., *Editor*

Consultants for this issue:

Elliot W. Dawson
Hildegarde Howard
Alexander Wetmore

Communications concerning purchase or exchange of the publication and all manuscripts should be addressed to the Editor of the Bulletin, Florida State Museum, Seagle Building, Gainesville, Florida.

Published 19 June 1963

Price for this issue \$1.40

CATALOGUE OF FOSSIL BIRDS

Part I (Archaeopterygiformes through Ardeiformes)

PIERCE BRODKORB¹

SYNOPSIS: The first installment of a catalogue of the fossil birds of the world covers 49 families in 15 orders of birds, or nearly half of the orders and about one-fourth of the families known. The species treated number 374, of which 273 are extinct, and 101 represent living species recorded from fossil or prehistoric sites. For the paleospecies the data include citation of the original description, synonyms, nature and repository of types, reference to pertinent revisionary papers, and detailed geological and geographic ranges, with bibliographic reference to their occurrence.

Major taxonomic changes include recognition of three subclasses, Sauriuræ for *Archaeopteryx*, Odontoholcæ for the Hesperornithidae, and Ornithuræ for the remaining birds. Three infraclasses of Ornithuræ are recognized, Dromaeognathia (for the Tinamidae), Ratitæ, and Carinatae.

Changes in position include transfer of the family Opisthodauctylidae to the Rheiformes, Enaliornithidae to the Gaviiformes, and Bapornithidae to the Podicipediformes.

On priority the ordinal name Ciconiiformes yields to Ardeiformes. Prior family names adopted include Emeidæ for Anomalopterygidae, Oceanitidae for Hydrobatidae, and Plataleidae for Threskiornithidae.

New taxa proposed are Colymboidinæ (new subfamily, Gaviidae), *Cayetanornis* (new genus, Tinamidae), and *Palæeudyptes marplei* (new species, Spheniscidae). The misprinted name Pelagodornithidae is emended to Plegadornithidae, to conform with the spelling of the type-genus.

¹The author is Professor of Biological Sciences at the University of Florida, Gainesville. Manuscript received 28 January 1963.—Ed.

TABLE OF CONTENTS

INTRODUCTION	186
CLASS AVES Linnaeus	189
SUBCLASS †SAURIURAE Haeckel	189
†ARCHAEOPTERYGIFORMES Fürbringer	189
†Archaeopterygidae Huxley	189
† <i>Archaeopteryx</i> Meyer	189
SUBCLASS †ODONTOHOLCAE Stejneger	191
†HESPERORNITHIFORMES (Fürbringer)	191
†Hesperornithidae Marsh	191
† <i>Hesperornis</i> Marsh	191
† <i>Coniornis</i> Marsh	192
SUBCLASS ORNITHURAE Haeckel	193
INFRACLASS DROMAEOGNATHAE Huxley	193
TINAMIFORMES (Huxley)	193
Tinamidae Gray	193
† <i>Tinamisornis</i> Rovereto	193
† <i>Cayetanornis</i> Brodkorb	194
† <i>Querandiornis</i> Rusconi	194
<i>Nothura</i> Wagler	194
Neospecies of Tinamidae	194
INFRACLASS RATITAE Merrem	196
STRUTHIONIFORMES (Latham)	196
†Eleutherornithidae Wetmore	196
† <i>Eleutherornis</i> Schaub	196
Struthionidae Vigors	196
<i>Struthio</i> Linnaeus	196
Neospecies of Struthionidae	199
-RHEIFORMES (Forbes)	200
†Opisthodactylidae Ameghino	200
† <i>Opisthodactylus</i> Ameghino	200
Rheidae (Bonaparte)	200
† <i>Heterorhea</i> Rovereto	200
<i>Rhea</i> Brisson	200
<i>Pterocnemia</i> Gray	201
Neospecies of Rheidae	201
CASUARIIFORMES (Sclater)	202
Casuariidae Kaup	202
<i>Casuaris</i> Brisson	202
Dromiceidae Wetmore	202
<i>Dromiceius</i> Vieillot	202
Neospecies of Dromiceidae	203
†Dromornithidae Fürbringer	203
† <i>Dromornis</i> Owen	203
† <i>Genyornis</i> Stirling and Zietz	203
†AEPYORNITHIFORMES (Newton)	205
†Aepyornithidae (Bonaparte)	205
†Eremopezinae Lambrecht	205
† <i>Eremopezus</i> Andrews	205

†Aepyornithinae (Bonaparte)	205
† <i>Stromeria</i> Lambrecht	205
† <i>Mullerornis</i> Milne-Edwards and Grandidier	206
† <i>Aepyornis</i> Geoffroy	206
†DINORNITHIFORMES (Gadow)	208
†Emeidae (Bonaparte)	208
†Anomalopteryginae (Oliver)	208
† <i>Anomalopteryx</i> Reichenbach	208
† <i>Megalapteryx</i> Haast	209
† <i>Pachyornis</i> Lydekker	210
†Emeinae Bonaparte	212
† <i>Emeus</i> Reichenbach	212
† <i>Euryapteryx</i> Haast	213
† <i>Zelornis</i> Oliver	214
†Dinornithidae Bonaparte	215
† <i>Dinornis</i> Owen	215
APTERYGIFORMES (Haeckel)	219
Apterygidae (Gray)	219
† <i>Pseudapteryx</i> Lydekker	219
Neospecies of Apterygidae	219
INFRACLASS CARINATAE Merrem	220
GAVIIFORMES Wetmore and W. D. Miller	220
†Enaliornithidae Fürbringer	220
† <i>Enaliornis</i> Seeley	220
†Lonchodytidae Brodkorb	221
† <i>Lonchodytes</i> Brodkorb	221
Gaviidae Allen	222
†Colymboidinae Brodkorb	222
† <i>Eupterornis</i> Lemoine	222
† <i>Colymboides</i> Milne-Edwards	222
†Gaviellinae Wetmore	223
† <i>Gaviella</i> Wetmore	223
Gaviinae (Allen)	223
<i>Gavia</i> Forster	223
Neospecies of Gaviinae	224
PODICIPEDIFORMES (Fürbringer)	226
†Baptornithidae American Ornithologists' Union	226
† <i>Baptornis</i> Marsh	226
† <i>Neogaeornis</i> Lambrecht	226
Podicipedidae (Bonaparte)	226
<i>Podiceps</i> Latham	227
† <i>Pliodytes</i> Brodkorb	228
Neospecies of Podicipedidae	228
SPHENISCIFORMES Sharpe	231
Spheniscidae Bonaparte	231
†Palaeudyptinae Simpson	231
† <i>Palaeudyptes</i> Huxley	231
† <i>Pachydyptes</i> Oliver	232
† <i>Archaeospheniscus</i> Marples	232
† <i>Dunthroonornis</i> Marples	232

† <i>Platydyptes</i> Marples	233
† <i>Korora</i> Marples	233
† <i>Anthropodytes</i> Simpson	234
† <i>Notodyptes</i> Marples	234
† <i>Anthropornis</i> Wiman	234
† <i>Orthopteryx</i> Wiman	234
† <i>Eosphaeniscus</i> Wiman	235
† <i>Delphinornis</i> Wiman	235
† <i>Ichtyopteryx</i> Wiman	235
† <i>Arthrodytes</i> Ameghino	235
†Palaeospheniscinae Simpson	236
† <i>Palaeospheniscus</i> Moreno and Mercerat	236
† <i>Perispheniscus</i> Ameghino	237
† <i>Paraspheniscus</i> Ameghino	238
†Paraptenodytinae Simpson	238
† <i>Paraptenodytes</i> Ameghino	238
† <i>Isotremornis</i> Ameghino	239
† <i>Pseudospheniscus</i> Ameghino	239
† <i>Neculus</i> Ameghino	240
Spheniscinae Bonaparte	240
Neospecies of Spheniscinae	240
PROCELLARIIFORMES Fürbringer	241
Diomedidae (Gray)	241
† <i>Gigantornis</i> Andrews	241
† <i>Manu</i> Marples	241
<i>Diomedea</i> Linnaeus	241
Neospecies of Diomedidae	242
Procellariidae (Boie)	242
<i>Puffinus</i> Brisson	242
† <i>Argyrodyptes</i> Ameghino	245
† <i>Plotornis</i> Milne-Edwards	245
Neospecies of Procellariidae	245
Oceanitidae (Salvin)	246
<i>Oceanodroma</i> Reichenbäch	247
Neospecies of Oceanitidae	247
Pelecanooididae (Gray)	247
Neospecies of Pelecanooididae	247
PELECANIFORMES Sharpe	248
SULAE Sharpe	248
†Elopterygidae Lambrecht	248
† <i>Elopteryx</i> Andrews	248
† <i>Argillornis</i> Owen	248
† <i>Eostega</i> Lambrecht	249
Phalacrocoracidae (Bonaparte)	249
†Graculavinae Fürbringer	249
† <i>Graculavus</i> Marsh	249
Phalacrocoracinae Bonaparte	250
† <i>Actiornis</i> Lydekker	250
<i>Phalacrocorax</i> Brisson	250
† <i>Pliocarbo</i> Tugarinov	254

Neospecies of Phalacrocoracinae	254
Anhingidae Ridgway	256
† <i>Protoplotus</i> Lambrecht	256
<i>Anhinga</i> Brisson	256
Neospecies of Anhingidae	257
Sulidae (Reichenbach)	257
<i>Sula</i> Brisson	257
† <i>Microsula</i> Wetmore	259
<i>Morus</i> Vieillot	259
† <i>Palaeosula</i> Howard	260
† <i>Miosula</i> L. Miller	260
Neospecies of Sulidae	261
PHAETHONTES Sharpe	261
Phaethontidae (Bonaparte)	261
† <i>Prophaeton</i> Andrews	261
Neospecies of Phaethontidae	262
†ODONTOPTERYGIA Spulski	262
†Odonopterygidae Lambrecht	262
† <i>Odonopteryx</i> Owen	262
†Pseudodontornithidae Lambrecht	262
† <i>Pseudodontornis</i> Lambrecht	262
† <i>Osteodontornis</i> Howard	263
†Pelagornithidae (Fürbringer)	263
† <i>Pelagornis</i> Lartet	263
†CLADORNITHES Wetmore	264
†Cladornithidae Ameghino	264
† <i>Cladornis</i> Ameghino	264
†Cyphornithidae Wetmore	264
† <i>Cyphornis</i> Cope	264
† <i>Palaeochenoides</i> Shufeldt	264
PELECANI Sharpe	265
Pelecanidae Vigors	265
<i>Pelecanus</i> Linnaeus	265
† <i>Liptornis</i> Ameghino	267
Neospecies of Pelecanidae	267
FREGATAE (Sharpe)	268
Fregatidae Garrod	268
Neospecies of Fregatidae	268
ARDEIFORMES (Wagler)	269
PHOENICOPTERI Fürbringer	269
†Torotigidae Brodkorb	269
† <i>Gallornis</i> Lambrecht	269
† <i>Parascaniornis</i> Lambrecht	269
† <i>Torotix</i> Brodkorb	270
†Scaniornithidae Lambrecht	270
† <i>Scaniornis</i> Dames	270
†Telmabatidae Howard	270
† <i>Telmabates</i> Howard	270
†Agnopteridae Lambrecht	270
† <i>Agnopterus</i> Milne-Edwards	271

Phoenicopteridae Bonaparte	271
† <i>Elornis</i> Aymard	271
† <i>Tiliornis</i> Ameghino	272
<i>Phoenicopterus</i> Linnaeus	272
Neospecies of Phoenicopteridae	273
†Palaelodidae (Stejneger)	274
† <i>Palaelodus</i> Milne-Edwards	274
† <i>Megapaloelodus</i> A. H. Miller	276
PLATALEAE A. Newton	276
†Plegadornithidae (Wetmore)	276
† <i>Plegadornis</i> Wetmore	276
Plataleidae Bonaparte	277
Threskiornithinae (Richmond)	277
† <i>Ibidopsis</i> Lydekker	277
† <i>Ibidopodia</i> Milne-Edwards	277
<i>Eudocimus</i> Wagler	278
† <i>Protibis</i> Ameghino	278
<i>Plegadis</i> Kaup	278
<i>Carphibis</i> Reichenbach	279
Plataleinae Bonaparte	279
<i>Platalea</i> Linnaeus	279
Neospecies of Plataleidae	279
ARDEAE Wagler	280
Ardeidae Vigors	280
† <i>Proherodius</i> Lydekker	280
† <i>Eoecornis</i> Shufeldt	280
† <i>Botauroides</i> Shufeldt	280
† <i>Proardea</i> Lambrecht	281
† <i>Goliathia</i> Lambrecht	281
† <i>Ardeacites</i> Haushalter	281
† <i>Botaurites</i> Ammon	281
<i>Ardea</i> Linnaeus	282
<i>Nycticorax</i> Forster	283
† <i>Palaeophox</i> McCoy	283
<i>Butorides</i> Blyth	283
Neospecies of Ardeidae	284
Cochleariidae Ridgway	286
Scopidae (Bonaparte)	286
Balaenicipitidae (Bonaparte)	286
CICONIAE Bonaparte	286
Ciconiidae (Gray)	286
Ciconiinae Gray	286
† <i>Pelargopappus</i> Stejneger	287
† <i>Propelargus</i> Lydekker	287
† <i>Palaeohippiorhynchus</i> Lambrecht	288
† <i>Ciconiopsis</i> Ameghino	288
† <i>Amphipelargus</i> Lydekker	288
<i>Leptoptilos</i> Lesson	289
<i>Ciconia</i> Brisson	289
† <i>Pelargosteon</i> Kretzoi	290

† <i>Prociconia</i> Ameghino	290
† <i>Palaeopelargus</i> DeVis	291
† <i>Xenorhynchopsis</i> DeVis	291
<i>Xenorhynchus</i> Bonaparte	291
Mycteriinae American Ornithologists' Union	292
<i>Ibis</i> Lacepède	292
<i>Mycteria</i> Linnaeus	292
Neospecies of Ciconiidae	292

INTRODUCTION

Our knowledge of fossil birds has increased greatly during the thirty-year interval since the publication of Lambrecht's *Handbuch der Palaeornithologie* in 1933. Re-evaluation of the classical forms and the discovery of new Mesozoic material afford an entirely different perspective of the earliest birds: We now believe that the theory of the toothed birds was mostly fictitious; we realize that a number of modern orders existed during the Age of Reptiles; and we may even hint at a possible polyphyletic origin of the class Aves. Discovery of more than a dozen new families gives greater breadth and depth to our understanding of the evolution of birds. New collecting techniques have resulted in an increase of the known fossil species by more than a third and the filling in of the fossil record of many living species. It therefore seems time to bring the list of fossil birds of the world up to date.

The classification adopted here is, with modifications, that of Wetmore (1960, Smithsonian misc. Coll., vol. 139, no. 11, pp. 1-37), which has many advantages over the several other recent attempts to classify birds. Its many editions have benefited from the author's rich experience with both living and fossil birds, whereas for some strange reason other systems totally ignore the fossil record. The use of uniform endings for order-group taxa and their formation from valid generic names are useful mnemonics, unfortunately abandoned by certain other authors. And the recognition of intermediate, non-mandatory taxa is helpful in suggesting relationships.

In matters of nomenclature I attempt to follow the International Code of Zoological Nomenclature adopted by the XV International Congress of Zoology (London, 1961), not without certain misgivings, however. The new edition of the Code for the first time sets up rules to cover family-group names, but unfortunately these do not all quite follow the same principles that govern genus-group and species-group names. Exercise of the Commission's plenary powers in suspending the rules at its discretion, the establishment of different effective dates for an increasing number of rules, and the numerous lists of "nomina conservanda" impose a seemingly greater bibliographic and legalistic chore than would the rigid application of the law of priority.

Abbreviation of serial publications follows Romer, Wright, Edinger, and Van Frank (1962, Bibliography of fossil vertebrates exclusive of North America, 1509-1927, Geological Society of America, Memoir 87). Sources not listed in Romer *et al.* are given in full when first cited and abbreviated thereafter.

The catalogue includes all higher taxa of birds. Families with no fossil record are included with appropriate notation, to emphasize gaps in our knowledge. Bibliographic reference is given to the apparent first valid publication of names employed for order-group and family-group taxa; such data are not otherwise summarized in ornithological works of the last hundred years. Complete principal synonymies are included only where necessary to substantiate change from current usage. Above the level of the species, daggers in the headings differentiate paleotaxa from neotaxa. Insofar as compatible with phylogenetic considerations, the arrangement of taxa follows geological sequence.

The catalogue admits palaeospecies when validly described on diagnostic parts of the skeleton. Unless later corroborated by identifiable bones, species founded upon indeterminate elements, eggshells, feather impressions, footprints, or other unsatisfactory evidence are relegated to the category of *Incertae Sedis*. These will be listed at the end of the catalogue, as will *nomina nuda* and non-avian forms originally described as birds.

The coverage under the fossil species includes reference to the original description, synonyms, nature of holotypes and museum where preserved, and reference to certain revisionary work. Distributional data include details of the geological horizon and geographic range, with bibliographic references to such occurrences. Paleospecies are numbered consecutively within a family.

Each family concludes with a list of its living species known as fossils, with bibliographic citation to their geographic occurrence as fossils. Localities from prehistoric deposits (marked with asterisks) are incorporated insofar as they have come to my attention, although a thorough search of the anthropological literature was not made. Neospecies are numbered separately within each family.

Much difference of opinion exists regarding the boundaries of geological time units. For this reason I have stressed formations or other rock units, rather than so-called provincial faunal ages. Upon completion of the catalogue a correlation chart is planned.

The National Science Foundation aided preparation of the catalogue through grant number G19595. Hildegard Howard of Los Angeles was good enough to read the bulk of the manuscript, and Elliot W. Dawson of Wellington, New Zealand, kindly criticized the section on the moas. Throughout this work I have benefited greatly through repeated discussion with Alexander Wetmore of the United States National Museum. Extensive correspondence with James Fisher of London has proved most useful. Others who have been helpful in

providing specimens or information include Oscar Arredondo, Habana, Cuba; Walter Auffenberg, Boulder, Colorado; Oliver L. Austin, Jr., Gainesville, Florida; Ripley P. Bullen, Gainesville; William A. Clemens, Jr., Lawrence, Kansas; Walter W. Dalquest, Wichita Falls, Texas; Georges Dementiev, Moscow, USSR; J. C. Dickinson, Jr., Gainesville; A. Gordon Edmund, Toronto, Canada; J. S. Erskine, Wolfville, Nova Scotia; Richard Estes, Boston, Massachusetts; W. D. Frankforter, Grand Rapids, Michigan; Joseph T. Gregory, Berkeley, California; J. Hill Hamon, Terre Haute, Indiana; Claude W. Hibbard, Ann Arbor, Michigan; J. Alan Holman, Normal, Illinois; Marie L. Hopkins, Pocatello, Idaho; Philip S. Humphrey, Washington, D. C.; H. G. Kugler, Basel, Switzerland; John F. Lance, Tucson, Arizona; John J. McCoy, Jacksonville, Florida; Alden H. Miller, Berkeley; Loye Miller, Davis, California; Rachel H. Nichols, New York, New York; Stanley J. Olsen, Tallahassee, Florida; Bryan Patterson, Cambridge, Massachusetts; Clayton E. Ray, Gainesville; Donald E. Savage, Berkeley; J. Arnold Shotwell, Eugene, Oregon; Elwyn L. Simons, New Haven, Connecticut; George Gaylord Simpson, Cambridge, Massachusetts; Bob H. Slaughter, Dallas, Texas; R. A. Stirton, Berkeley; Robert W. Storer, Ann Arbor; Dwight W. Taylor, Washington; Richard H. Tedford, Riverside, California; Harrison B. Tordoff, Ann Arbor; William D. Turnbull, Chicago, Illinois; Robert D. Weigel, Normal; Druid Wilson, Washington; John A. Wilson, Austin, Texas; Robert W. Wilson, Rapid City, South Dakota; Elizabeth S. Wing, Gainesville; and David B. Wingate, Hamilton, Bermuda.

The present installment covers the orders Archaeopterygiformes through Ardeiformes, exclusive of the Ichthyornithiformes, which will be treated later. The two or three further installments needed to complete the work will, it is hoped, appear at frequent intervals. The literature of avian paleontology is so scattered that it is difficult to avoid overlooking important papers. Therefore authors are urged to send additions and corrections for inclusion in a supplement to be published on conclusion of the work.

Class AVES Linnaeus

Aves Linnaeus, *Systema Naturae*, ed. 10, vol. 1, pp. 12, 78 (class).

Subclass †SAURIURAE Haeckel

Sauriuræ Haeckel, 1866, *Generelle Morphologie der Organismen*, vol. 2, p. cxxxix (Subklasse).—*Saururi* Vogt, 1879, *Rev. sci. (Paris)*, vol. 17, p. 247.—*Saururæ* Stejneger, 1885, *Stand. nat. Hist.*, vol. 4, p. 21 (sub-class).—*Saurura* Steinmann, 1907, *Einführung in die Paläontologie*, ed. 2, p. 460 (Unterklasse).
Archaeornithes Gadow, 1893, *Bronn Klass. Ordn., Vögel*, pt. 2, pp. 86, 299 (Unterklasse).

Order †ARCHAEOPTERYGIFORMES Fürbringer

Saururæ Huxley, 1867, *Proc. zool. Soc. London*, p. 418 (order, ex subclass *Sauriuræ* Haeckel; not based on generic name).—Cope, 1889, *Amer. Natural.*, vol. 23, p. 869 (superorder).—*Saurura* Steinmann and Döderlein, 1890, *Elemente der Paläontologie*, p. 668 (Ordnung).
Ornithopappi Stejneger, 1885, *Stand. nat. Hist.*, vol. 4, p. 21 (order; not based on generic name).
Archornithes Fürbringer, 1888, *Untersuchungen zur Morphologie und Systematik der Vögel*, vol. 2, p. 1565 (ordo; not based on generic name).—*Archornithiformes* Shufeldt, 1903, *Amer. Natural.*, vol. 37, no. 433, p. 34 (supersuborder).
Archaeopterygiformes Fürbringer, 1888, *op. cit.*, p. 1565 (subordo; type *Archaeopteryx* Meyer).—*Archaeopteryges* Fürbringer, 1888, *op. cit.*, p. 1565 ("gens," between suborder and superfamily).—Sharpe, 1891, *Review of Recent Attempts to Classify Birds*, p. 67 (order).—*Archaeopterygomorphi* Hay, 1930, *Publ. Carnegie Instn. Washington*, no. 390, vol. 2, p. 276 (order).
Saurornithes Beddard, 1898, *Structure and Classification of Birds*, p. 529 (order; not based on generic name).

Family †ARCHAEOPTERYGIDAE Huxley

Archaeopterygidae Huxley, 1872, *Manual of the Anatomy of Vertebrated Animals*, p. 233 (type *Archaeopteryx* Meyer).—*Archaeopteridae* Shufeldt, 1903, *Amer. Natural.*, vol. 37, no. 433, p. 34.
Archornithidae Carus, 1875, *Håndbuch der Zoologie*, vol. 1, p. 368 (not based on generic name).
Archaeornithidae Petronievics, 1925, *Geol. An. balkan. Pöluos.*, vol. 18, p. 67 (type *Archaeornis* Petronievics).

Genus †*Archaeopteryx* Meyer

Archaeopteryx H. von Meyer, 1861 (after Sept. 30), *Neues Jahrb. Min. Geol. Pal.*, p. 679 (type by monotypy *Archaeopteryx lithographica* Meyer).
Archaeopterix Anonymous, 1861, *Neues Jahrb. Min. Geol. Pal.*, p. v (lapsus or emendation).
Archeopteryx Owen, 1864, *Philos. Trans. Roy. Soc. London* for 1863, vol. 153, p. 33 footnote (emendation or lapsus).
Griphosaurus A. Wagner, 1861 (after Nov. 9), *Sitz-Ber. bayer. Akad. Wiss.*, vol. 2, p. 153 (type by monotypy *Griphosaurus problematicus* Wagner).

- Gryphosaurus* "A. Wagner," Marschall, 1873, Nomenclator Zoologicus, p. 49 (lapsus).
- Griphornis* "Owen, 1862, Rev. Nat. Hist., p. 313," H. Woodward, 1962 (Dec.), Intellectual Observer, vol. 2, no. 5, p. 317 (new name for *Griphosaurus*).
- Griphornis* "Owen, 1862, p. 313," Lambrecht, 1933, Handbuch der Paläornithologie, p. 80 (lapsus).
- Archaeornis* Petronievics, 1917 (Apr. 20), Proc. zool. Soc. London, pt. 1, p. 5 footnote (type by monotypy *Archaeopteryx siemensii* Dames).

1. *Archaeopteryx lithographica* Meyer

- Archaeopteryx lithographica* H. von Meyer, 1861 (after Sept. 30), Neues Jahrb. Min. Geol. Pal., p. 679 (type from Köhler's cut, feather impression in Berlin Mus., reverse in Munich Mus.).
- Griphosaurus problematicus* A. Wagner, 1861 (after Nov. 9), Sitz.-Ber. bayer. Akad. Wiss., vol. 2, p. 146 (type skeleton from Ottman's cut, Brit. Mus. no. 37001).
- Griphosaurus longicaudatus* Owen, 1862, Rev. Nat. Hist., p. 313 (new name for *Griphosaurus problematicus* Wagner).
- Archaeopteryx macrura* Owen, 1864, Philos. Trans. Roy. Soc. London for 1863, vol. 153, p. 33 note, pl. 1-4 (new name for *Griphornis longicaudatus* Owen).
- Archaeopteryx macroura* Kleinschmidt, 1951, Proc. X. internat. orn. Congress, p. 631 (emendation or lapsus).
- Archaeopteryx oweni* Petronievics, 1917, Proc. zool. Soc. London, p. 5 (new name for *Archeopteryx macrura* Owen).

UPPER JURASSIC, PORTLANDIAN (Solnhofener Plattenkalk). BAVARIA: Köhler's cut in community quarry at Solnhofen (Meyer, 1861); Ottman's cut (Wagner, 1861) and Opitsch's quarry (Heller, 1959, Erlanger geologische Abhandlungen, vol. 31, p. 9) at Langenaltheimer Haardt near Pappenheim.

2. *Archaeopteryx siemensii* Dames

- Archaeopteryx siemensii* Dames, 1897 (Aug. 9), Sitz.-Ber. Akad. Wiss. Berlin, vol. 38, p. 829 [p. 12 of separate], fig. 1-2 (type skeleton from Dorr cut, Berlin Mus.).

UPPER JURASSIC, PORTLANDIAN (Solnhofener Plattenkalk). BAVARIA: Dorr cut at Blumberg near Eichstatt.¹

¹As pointed out by Wetmore (1960, Smithsonian misc. Coll., vol. 139, no. 11, pp. 1-3), the arguments for specific identity with *A. lithographica* are not wholly convincing.

Subclass †ODONTOHOLCAE Stejneger

Odontoholcae Stejneger, 1885, Stand. nat. Hist., vol. 4, p. 27 (subclass, ex order *Odontolcae* Marsh; type *Hesperornis* Marsh).

Order †HESPERORNITHIFORMES (Fürbringer)

Odontolcae Marsh, 1875, Amer. Jour. Sci., ser. 3, vol. 10, p. 407 (order; type *Hesperornis* Marsh).

Odontolgae Forbes, 1884, Ibis, ser. 5, vol. 2, no. 5, p. 119 (order).

Odontornithes Forbes, 1884, Ibis, ser. 5, vol. 2, no. 5, p. 119 (superorder for *Archaeopteryx*, *Hesperornis*, and *Ichthyornis*).

Dromaeopappi Stejneger, 1885, Stand. nat. Hist., vol. 4, p. 27 (order; type *Hesperornis* Marsh).

Hesperornithes Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, pp. 1165, 1438, 1541 ("gens;" type *Hesperornis* Marsh).—*Hesperornithiformes* Sharpe, 1899, Hand-list of the Genera and Species of Birds, vol. 1, p. 116 (order).—*Hesperornithomorphi* Hay, 1930, Publ. Carnegie Instn. Washington, no. 390, vol. 2, p. 277 (order).

Odontognathae Wetmore, 1930, Proc. U. S. nat. Mus., vol. 76, art. 24, p. 1 (superorder for *Hesperornithiformes* and *Ichthyornithiformes*);

Family †HESPERORNITHIDAE Marsh

Hesperornidae Marsh, 1872, Amer. Jour. Sci., ser. 3, vol. 3, p. 363 (type *Hesperornis* Marsh).—*Hesperornithidae* Marsh, 1876, Amer. Jour. Sci., ser. 3, vol. 11, p. 509.—*Hesperornithoidea* Shufeldt, Amer. Natural., vol. 37, no. 433, p. 59 (superfamily).

Genus †*Hesperornis* Marsh

Hesperornis Marsh, 1872, Amer. Jour. Sci., ser. 3, vol. 3, p. 57 (nomen nudum); p. 360 (type by monotypy *Hesperornis regalis* Marsh).

Lestornis Marsh, 1876, Amer. Jour. Sci., ser. 3, vol. 11, p. 509 (type by monotypy *Lestornis crassipes* Marsh).

Hargeria Lucas, 1903, Proc. U. S. nat. Mus., vol. 26, p. 552 (type by monotypy *Hesperornis gracilis* Marsh).

1. *Hesperornis regalis* Marsh

Hesperornis regalis Marsh, 1872, Amer. Jour. Sci., ser. 3, vol. 3, p. 57 (nomen nudum); p. 360 (lectotype from 20 miles east of Wallace, partial skeleton, Yale Peabody Mus. no. 1200, designated by Marsh, 1880).

UPPER CRETACEOUS, CONIACIAN (Niobrara formation, Smoky Hill chalk member). KANSAS: Logan County: south bank of Smoky Hill River, 20 miles east of Wallace (Marsh, 1872, l.c.); Smoky Hill River, 12 miles east of Wallace (Marsh, 1880, *Odontornithes*, p. 195); Two Mile Creek (Wetmore, 1940, *Smiths. Misc. Coll.*, vol. 99, no. 4, p. 3).

2. *Hesperornis crassipes* (Marsh)

Lestornis crassipes Marsh, 1876, Amer. Jour. Sci., vol. 11, p. 509 (type from western Kansas, incomplete postcranial skeleton, Yale Peabody Mus. no. 1474).

UPPER CRETACEOUS, CONIACIAN (Niobrara formation, Smoky Hill chalk member). KANSAS: probably from Smoky Hill River in Wallace County, as the type was collected by G. P. Cooper in April 1876.

3. *Hesperornis gracilis* Marsh

Hesperornis gracilis Marsh, 1876, Amer. Jour. Sci., ser. 3, vol. 11, p. 510 (type left tarsometatarsus, Yale Peabody Mus. no. 1478).

UPPER CRETACEOUS, CONIACIAN (Niobrara formation, Smoky Hill chalk member). KANSAS: Smoky Hill River (probably in Wallace County, as the type was collected by G. P. Cooper in April 1876).

Genus †*Coniornis* Marsh

Coniornis Marsh, 1893 (Jan.), Amer. Jour. Sci., ser. 3, vol. 45, no. 265, p. 82. (type by monotypy *Coniornis altus* Marsh).

4. *Coniornis altus* Marsh

Coniornis altus Marsh, 1893 (Jan.), Amer. Jour. Sci., ser. 3, vol. 45, no. 265, p. 82, fig. 1-3 (type distal half of right tibiotarsus, Yale Peabody Mus. no. 515).
Hesperornis montana Shufeldt, 1915 (June), Auk, vol. 32, no. 3, p. 293, pl. 18, fig. 4, 6, 8, 10, 12 (type 23d vertebra, U. S. Nat. Mus. no. 8199).¹

UPPER CRETACEOUS, CAMPANIAN (upper part of Claggett formation). MONTANA: Fergus County: 1 mile above mouth of Dog Creek, near mouth of Judith River.

¹The two names are based on elements of comparable size from the same horizon and locality. The supposition that the type locality of *C. altus* lay near the base of the fresh-water Judith River formation rather than in the underlying marine Claggett formation resulted in part from early usage of the term "Judith River beds" in a general sense to include all the later-named Cretaceous formations in the area. Marsh stated that the type was collected with marine fossils.

Subclass ORNITHURAE Haeckel

- Ornithurae* Haeckel, 1866, *Generelle Morphologie der Organismen*, vol. 2, p. 139 (Subklasse).
Odontornithes Marsh, 1873, *Amer. Jour. Sci.*, ser. 3, vol. 5, pp. 161, 162 (sub-class; type *Ichthyornis* Marsh).
Odontormae Stejneger, 1885, *Stand. nat. Hist.*, vol. 4, p. 23 (sub-class for *Ichthyornis*).—*Odontotormae* Menzbier, 1887, *Bull. Soc. Natural. Moscou*, no. 2, p. 63 (Unterclasse, ex order *Odontotormae* Marsh).
Neornithes Gadow, 1893, *Bronn Klass. Ordn., Vögel*, pt. 2, pp. 90, 299 (Unter-classe).¹

Infraclass DROMAEOGNATHAE Huxley²

- Dromaeognathae* Huxley, 1867, *Proc. zool. Soc. London*, p. 456 (suborder; not based on generic name).

Order TINAMIFORMES (Huxley)

- Tinamomorphae* Huxley, 1872, *Manual Anatomy Vertebrated Animals*, p. 234 (suborder?; type *Tinamus* Hermann).
Crypturi Sclater and Salvin, 1872, *Nomenclator Avium Neotropicalium*, p. 152 (type *Crypturus* Illiger, a junior synonym of *Tinamus* Hermann).

Family TINAMIDAE Gray

- Crypturidae* Bonaparte, 1831, *Saggio di una Distribuzione Metodica degli Animali Vertebrati*, p. 53 (type *Crypturus* Illiger, a junior synonym of *Tinamus* Hermann).
Tinamidae G. R. Gray, 1840, *List Genera Birds*, p. 63 (type *Tinamus* Hermann).

Genus †*Tinamisornis* Rovereto

- Tinamisornis* Rovereto, 1914, *An. Mus. nac. Buenos Aires*, vol. 25, p. 161 (type *Tinamisornis intermedius* Rovereto, designated by Richmond, 1927, *Proc. U. S. Nat. Mus.*, vol. 70, no. 2664, p. 35; *Tinamisornis parvulus* Rovereto was designated by Brodkorb, 1961, *Auk*, vol. 78, p. 257, in oversight of Richmond's action).
Roveretornis Brodkorb, 1961, *Auk*, vol. 78, no. 2, p. 257 (type by original designation *Tinamisornis intermedius* Rovereto).

1. *Tinamisornis intermedius* Rovereto

- Tinamisornis intermedius* Rovereto, 1914, *An. Mus. nac. Buenos Aires*, vol. 25, pp. 161, 162, pl. 25, fig. 2-2c only (lectotype from Monte Hermoso, left humerus, Buenos Aires Mus., designated by Brodkorb, 1961).

UPPER PLIOCENE (Monte Hermoso formation). ARGENTINA: PROV. Buenos Aires: Monte Hermoso.

¹About 36 other subclass names have been proposed for various groups of living birds.

²New rank.

Genus †*Cayetanornis* Brodkorb¹2. *Cayetanornis parvulus* (Rovereto)

Tinamisornis parvulus Rovereto, An. Mus. nac. Buenos Aires, vol. 25, pp. 161-162, pl. 25, fig. 3-3c (lectotype right humerus, Buenos Aires Mus., designated by Brodkorb, 1961).

UPPER PLIOCENE (Monte Hermoso formation). ARGENTINA: PROV. Buenos Aires: Monte Hermoso.

Genus †*Querandiornis* Rusconi

Querandiornis Rusconi, 1958, Rev. Mus. Hist. nat. Mendoza, vol. 11, nos. 1-4, p. 157 (type by monotypy *Querandiornis romani* Rusconi).

3. *Querandiornis romani* Rusconi

Querandiornis romani Rusconi, 1958, Rev. Mus. Hist. nat. Mendoza, vol. 11, nos. 1-4, p. 157.

UPPER PLIOCENE (Monte Hermoso formation). ARGENTINA: PROV. Buenos Aires: Monte Hermoso.

Genus *Nothura* Wagler

Nothura Wagler, 1827, Systema avium, vol. 1, folio 19 (type *Tinamus boraquira* Spix).

4. *Nothura paludosa* Mercerat

Nothura paludosa Mercerat, 1897, An. Soc. cien. argentina, vol. 43, p. 239 (type femur, La Plata Mus.).

UPPER PLEISTOCENE (Pampas formation). ARGENTINA: PROV. Buenos Aires: Arrecifes.

Neospecies of Tinamidae from Pleistocene sites:

1. *Tinamus major* (Gmelin). BRAZIL: Minas Geraes: Lapa da Escrivania near Lagoa Santa (O. Winge, 1887, E Mus. Lund., vol. 1, no. 2, p. 16).

2. *Crypturellus obsoletus* (Temminck). BRAZIL: Minas Geraes: Lapa do Bahu, Lapa do Capão Secco, Lapa da Escrivania, Lapa do Marinho, and Lapa do Taquaral (Winge, op. cit., p. 16).

3. *Crypturellus noctivagus* (Wied). BRAZIL: Lapa da Escrivania (Winge, op. cit., p. 16).

4. *Crypturellus parvirostris* (Wagler). BRAZIL: Lapa da Escrivania (Winge, op. cit., p. 17).

5. *Crypturellus tataupa* (Temminck). BRAZIL: Lapa da Escrivania, Lapa do Marinho, and Lapa do Capão Secco (Winge, op. cit., p. 16).

¹New genus. Type *Tinamisornis parvulus* Rovereto. For characters see Brodkorb (1961, Auk, vol. 78, p. 257). Named for Cayetano Rovereto.

6. *Rhynchotus rufescens* (Temminck). BRAZIL: Lapa da Escrivania and Lapa da Lagoa do Sumidouro (Winge, op. cit., p. 18).

7. *Nothoprocta cinerascens* (Burmeister). ARGENTINA: Buenos Aires: Luján (Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 446).

8. *Nothura maculosa* (Temminck). BRAZIL: Lapa da Escrivania and Lapa da Lagoa do Sumidouro (Winge, op. cit., p. 17). ARGENTINA: Luján (Ameghino, op. cit., p. 446).

9. *Nothura minor* (Spix). BRAZIL: Lapa da Escrivania (Winge, op. cit., p. 17).

10. *Taoniscus nanus* (Temminck): BRAZIL: Lapa da Escrivania (Winge, op. cit., p. 17).

Infraclass RATITAE Merrem¹

Aves Ratitae Merrem, 1813, Abh. Akad. Wiss. Berlin, p. 259.

Palaeognathae Pycraft, Trans. zool. Soc. London, vol. 15, p. 149.—*Palaeognathae* Wetmore, 1930, Proc. U. S. nat. Mus., vol. 76, art. 24, p. 2 (superorder).

Order STRUTHIONIFORMES (Latham)

Struthiones Latham, 1790, Index ornithologicus, pp. xv, 662 (type *Struthio* Linnaeus).—*Struthioniformes* Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, pp. 1540, 1565 (subordo).

Family †ELEUTHERORNITHIDAE Wetmore

Eleutherornithidae Wetmore, 1951 (Nov. 1), Smithsonian misc. Coll., vol. 117, no. 4, pp. 3, 14 (type *Eleutherornis* Schaub).

Genus †*Eleutherornis* Schaub

Eleutherornis Schaub, 1940, Eclogae geol. Helvetiae, vol. 33, no. 2, p. 283 (type by monotypy *Eleutherornis helveticus* Schaub).

1. *Eleutherornis helveticus* Schaub

Eleutherornis helveticus Schaub, 1940, Eclogae geol. Helvetiae, vol. 33, no. 2, p. 283, fig. 1-4 (type pelvis from Böhnerz, Basel Mus. no. Eh 781).

LOWER MIDDLE EOCENE (Egerkingen gamma). SWITZERLAND:
Böhnerz.

Family STRUTHIONIDAE Vigors

Struthionidae Vigors, 1825, Trans. Linn. Soc. London, vol. 14, pp. 478, 480 (type *Struthio* Linnaeus).

Genus *Struthio* Linnaeus

Struthio Linnaeus, 1758, Syst. Nat., ed. 10, vol. 1, p. 155 (type *Struthio camelus* Linnaeus, Recent).

Struthiolithus Brandt, 1873, Bull. Acad. Sci. St. Petersburg, vol. 18, p. 158 (type by monotypy *Struthiolithus chersonensis* Brandt).

Megaloscelornis Lydekker, 1879, Rec. geol. Surv. India, vol. 12, p. 53 (type by monotypy *Megaloscelornis sivalensis* Lydekker).

Palaeostruthio Burchak-Abramovich, 1953, Akad. Nauk Azerbaidzhanskoi S.S.R., p. 81 (type by original designation *Palaeostruthio sternatus* Burchak-Abramovich).

Pachystruthio Kretzoi, 1953, Acta geologica, vol. 2, pp. 231-242 (subgenus; type by monotypy *Struthio (Pachystruthio) panmonicus* Kretzoi).

¹New rank. Whether the ratites form a natural group is still a far from settled question, and it is likely to remain unanswered until their origins can be traced in the fossil record. Both ratites and carinates could have arisen from a tinamou-like stock.

1. *Struthio asiaticus* Milne-Edwards

- Struthio palaeindica* Falconer, 1868, Palaeontological Memoirs, vol. 1, pp. xxi, 554 (nomen nudum; 15 elements from Siwalik Hills listed, with Brit. Mus. cat. nos., from unpublished Plate R).
- Struthio asiaticus* Milne-Edwards, 1871, Oiseaux Foss. France, vol. 2, sheet 74, p. 587 (brief description; type tarsometatarsus from Siwalik Hills, Brit. Mus.).
- Megaloscelornis sivalensis* Lydekker, 1879, Rec. geol. Surv. India, vol. 12, p. 56, part (types from Siwalik Hills, tibiotarsus and fibula, Indian Mus., Calcutta, casts in Brit. Mus.).
- Struthio indicus* Bidwell, 1904, Ibis, ser. 9, vol. 4, p. 760, fig. 7 (types from Nullas, 7 eggshell fragments, Brit. Mus., Tring Mus., and Calcutta Mus.).

LOWER PLIOCENE (Siwalik series). INDIA: UNITED PROVINCES: Siwalik Hills, probably near Hardwar (Falconer, 1868); Nullas on Ken River in Banda district (Bidwell, 1904).

2. *Struthio chersonensis* (Brandt)¹

- Struthiolithus chersonensis* Brandt, 1873, Bull. Acad. Sci. St. Petersburg, vol. 18, p. 158 (type egg from Malinovka destroyed, cast said to be in St. Petersburg Acad. Sci.).
- Struthio karatheodoris* Forsyth Major, 1888, C. R. Acad. Sci. Paris, vol. 107, p. 1178 (type from Samos, femur, Barbey coll., Valleyres).
- Struthio novorossicus* Alexejew, 1916, Animaux fossiles du village Novo-Elisavetovka, p. 388, fig. 55-56 (types from Novo-Elisavetovka, distal portions of 3 tarsometatarsi, Novorossyisk Univ. nos. 1559-1561).
- Struthio brachydactylus* Burchak-Abramovich, 1939, Priroda, no. 5, p. 95; re-described 1949, Doklady Akad. Nauk SSSR, vol. 67, no. 1, p. 14, fig. 1-4 (type from Grebeniki, skeleton lacking sternum, wings, and sacrum, Acad. Sci. Moscow).
- Palaeostruthio sternatus* Burchak-Abramovich, 1953, Akad. Nauk Azerbaidzhan-skoi SSSR, p. 81, pl. 18, fig. 1 (type from Grebeniki, sternum, Acad. Sci. Moscow no. 408/367).

LOWER PLIOCENE (Pannonian). GREECE: Samos Island (Forsyth-Major, 1888). UKRAINE: Malinovka near Kherson (Brandt, 1873); Kuyalnik estuary near Odessa, Vyshiva (Novo-Pokrovsk), and Novo-Elisavetovka (Alexejew, 1916); Grebeniki (Burchak-Abramovich, 1939). KAZAKSTAN: Pavlodar (Howard, 1939, Fortsch. Pal. vol. 2, p. 313). Probably referable here are specifically undetermined records from Maragheh in Iran and from Garêt-el-Muluk, Egypt (Lambrecht, 1933, Handb. Palaeorn., pp. 103-104).

¹That more than one species of ostrich existed during the early Pliocene has not been proved.

3. *Struthio wimani* Lowe

- Struthio wimani* Lowe, 1931, Pal. sinica, ser. C, vol. 6, fasc. 4, p. 18, pl. 1, fig. 1; pl. 2, fig. 2; pl. 3; pl. 4, fig. 1, 4 (type from Locality 30, T'ai Chia Kou, pelvis, Palaeont. Mus., Upsala).
- Struthio mongolicus* Lowe, 1931, Pal. sinica, ser. C, vol. 6, fasc. 4, p. 34, pl. 4, fig. 5 (types eggshell fragments, Upsala Mus.; locality of type not stated, but figured specimen is from Olan Chorea).

LOWER PLIOCENE (*Hipparion* red clays): CHINA: Prov. Shansi: T'ai Chia Kou in Pao-te Hsien (Lowe, 1931); Hsiang-ning Hsien (Lambrecht, 1933, Handb. Palaeorn., p. 106). Prov. Kansu: Ching Yang Fu (Lambrecht, 1933).

LOWER PLIOCENE (Ertemte stage). MONGOLIA: Ertemte, Olan Chorea, Tjelgol-Tabool, and Doshen (Lowe, 1931); Choei Tong K'ou, Sjara Osso Gol, Hong-Tcheng, Shabarakh Ussu, Djadochta, and Hung Kurek (Lambrecht, 1933).

4. *Struthio pannonicus* Kretzoi

- Struthio (Pachystruthio) pannonicus* Kretzoi, 1953, Acta geologica, vol. 2, pp. 231-242, pl. 1-3 (type from Kisláng, right pedal phalanx 1 of digit III).

LOWER PLEISTOCENE (upper Calabrian). HUNGARY: Transdanubia: Kisláng.

5. *Struthio oldawayi* Lowe

- Struthio oldawayi* Lowe, 1933, Ibis, ser. 13, vol. 3, no. 4, pp. 652, 654 (type from Oldaway, pelvis and sacrum, apparently in Brit. Mus.).

LOWER PLEISTOCENE (Olduvai series, bed 1). TANGANYIKA: Olduvai (Oldaway).

6. *Struthio anderssoni* Lowe

- Struthio anderssoni* Lowe, 1931, Pal. sinica, ser. C, vol. 6, fasc. 4, p. 26, fig. 2 (type complete eggshell from Honan, Brit. Mus. no. A.1308; femora later recorded by Boule and Teilhard de Chardin, 1928; Howard, 1939).

UPPER PLEISTOCENE (Sanmen series, Fenho stage). CHINA: Prov. Hopeh: Yao Kuan Chuang; Ching Hsing coal mine; K'ou-An; Chou-K'ou-tien. Prov. Shantung: Sha-Wa-Tsun. Prov. Shansi: Tang-T'ai-Chuang; Liang-Chia T'an. Prov. Honan: K'ih on Wei River; Wu-An Hsien; Chengchow Hsien; Han Wanh Cheng in Ho Yin Hsien; SSu-shui Hsien; Chao Kon in Kung Hsien; Ts'ai Chia Chuang, Hsia Juo Yü, and Tung Huang Nü Yüan in Hsi An Honein; Feng Ming P'o, Kuo Yü Kou, and Yang Shao Tsun in Mien Chih Hsien (Lambrecht, 1933, Handb. Palaeorn., p. 104).

Neospecies of Struthionidae from Pleistocene and *prehistoric sites:

1. *Struthio camelus* Linnaeus. ALGERIA: Hassi-el Ratmaia in the Grand Erg and Mouilah-Maatalah (Lambrecht, 1933, Handb. Palaeorn., p. 108). ARABIA: Tuwairifa, 'Ain Sala, Umm al Qurun, Umm Tina, Qa'amiyat, Abu Sabbau, *Summan Mahadir, and *Bani Ma'aridh (Lowe, 1933, Ibis, p. 658). BURYAT-MONGOL REPUBLIC: Troitzkosavask, Selenga River, and Chorenchoi (Lambrecht, 1933, p. 107). OUTER MONGOLIA: Shabarakh Ussu and Djadochta (Lambrecht, 1933, p. 108).

Order RHEIFORMES (Forbes)

Rheae Forbes, 1884 (Jan.), *Ibis*, ser. 5, vol. 2, no. 5, p. 119 (type *Rhea* Brisson).—
Rheiformes Fürbringer, 1888, *Untersuch. Morph. Syst. Vögel*, vol. 2, pp. 1540, 1565 (subordo).

Family †OPISTHODACTYLIDAE Ameghino

Opisthodactylidae Ameghino, 1895, *Bol. Inst. geog. argentino*, vol. 15, p. 81 (type *Opisthodactylus* Ameghino).

Genus †*Opisthodactylus* Ameghino¹

Opisthodactylus Ameghino, 1891 (Dec.), *Rev. argentina Hist. nat.*, vol. 1, p. 453 (type by monotypy *Opisthodactylus patagonicus* Ameghino).

1. *Opisthodactylus patagonicus* Ameghino

Opisthodactylus patagonicus Ameghino, 1891 (Dec.), *Rev. argentina Hist. nat.*, vol. 1, p. 453 (type distal portion of tarsometatarsus, *Brit. Mus.*).

LOWER EOCENE (Casamayor formation). ARGENTINA: southern Patagonia.

Family RHEIDAE (Bonaparte)

Rheinae Bonaparte, 1853, *C. R. Acad. Sci. Paris*, vol. 37, no. 18, p. 646 (sous-famille; type *Rhea* Brisson).

Genus †*Heterorhea* Rovereto

Heterorhea Rovereto, 1914, *An. Mus. nac. Buenos Aires*, vol. 25, p. 160 (type by monotypy *Heterorhea dabbenei* Rovereto).

1. *Heterorhea dabbenei* Rovereto

Heterorhea dabbenei Rovereto, 1914, *An. Mus. nac. Buenos Aires*, vol. 25, p. 160, pl. 25, fig. 1 (type tarsometatarsus, Buenos Aires Mus.).

UPPER PLIOCENE (Monte Hermoso formation). ARGENTINA: Prov. Buenos Aires: Monte Hermoso.

Genus *Rhea* Brisson

Rhea Brisson, 1760, *Ornithologia*, vol. 1, p. 46 (type *Struthio americanus* Linnaeus, Recent).

¹Transferred from the Phororhacoidae to the rheas by Patterson and Kraglievich (1960, *Publ. Mus. municipal Cien. nat. y trad. Mar del Plata*, vol. 1, no. 1, p. 11) without any supporting evidence. The characters of the distal end of the tarsometatarsus mentioned by Ameghino, namely the concavity of the plantar surface above the trochleae and the facet for a hind toe, would preclude its reference to the Rheidae as currently understood.

2. *Rhea anchorenensis* C. Ameghino and Rusconi

Rhea americana anchorenense C. Ameghino and Rusconi, 1932, An. Soc. cien. argentina, vol. 114, p. 38, fig. 1 (type distal half of tarsometatarsus, Museo La Plata).

LOWER PLEISTOCENE (basal Enseñadan). ARGENTINA: PROV. Buenos Aires: Anchorena.

Genus *Pterocnemia* Gray

Pterocnemia Gray, 1871, Hand-list Birds Brit. Mus., vol. 3, p. 2 (type *Rhea pennata* d'Orbigny, Recent).

3. *Pterocnemia fossilis* (Ameghino)

Rhea fossilis F. Ameghino, 1882, Catalogue spécial de la Section anthropologique et paléontologique de la République Argentine, Exposition universelle de 1878, Group second, Classe huitième, p. 42 (type from Olivera, incomplete skeleton, Museo La Plata nos. 200-228).

Rhea pampeana Moreno and Mercerat, 1891, An. Mus. La Plata, Pal. arg., vol. 1, pp. 27, 70, pl. 19, fig. 1, 3-10, 13; pl. 20, fig. 1-4; pl. 21, fig. 1-4 (same type as *R. fossilis* Ameghino).

[?] *Rhea nana* Lydekker, 1894, Knowledge (London), vol. 17, p. 265 (type a runt egg of unknown age and locality).

UPPER PLEISTOCENE (Pampas formation, upper level). ARGENTINA: Prov. Buenos Aires: Olivera.

Neospecies of Rheidae from Pleistocene sites:

1. *Rhea americana* (Linnaeus). BRAZIL: Minas Geraes: Lapa de Anna Felicia, Lapa da Anta no. 1, and Lapa da Escrivania no. 1 (O. Winge, 1887, E Mus. Lund., vol. 1, no. 2, p. 18). ARGENTINA: PROV. Buenos Aires: Luján (Ameghino, 1891, Rev. arg. Hist. nat., vol. 1, p. 448); Mar del Plata (*Rhea fossilis* Moreno and Mercerat, 1891; see below).

Fossil synonyms of this species (fide Ameghino, 1891) include: *Rhea fossilis* Moreno and Mercerat, 1891, An. Mus. La Plata, Pal. arg., vol. 1, pp. 28, 71, pl. 19, fig. 2, 11, 16; pl. 20, fig. 2; pl. 21, fig. 6 (types from Mar del Plata, fragmentary right tibiotarsus, fragmentary right and left tarsometatarsi, Mus. La Plata nos. 229-233); *Rhea subpampeana* Moreno and Mercerat, 1891, op. cit., pp. 27, 70, pl. 20, fig. 22 (type right outer digital trochlea, Mus. La Plata no. 199, said to be from Laguna de Vitel, but both locality and age erroneous according to Ameghino).

Order CASUARIIFORMES (Sclater)

Casuarii Sclater, 1880, Ibis, ser. 4, vol. 4, no. 16, pp. 410, 411 (order; type *Casuarus* Linnaeus).—Casuariiformes Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, pp. 1541, 1565 (subordo).

Family CASUARIIDAE Kaup

Casuariidae Kaup, 1847, fide Gray, 1870, Hand-list Gen. Sp. Birds, pt. 3, p. 2 (type *Casuarus* Linnaeus).

Genus *Casuarus* Brisson

Casuarus Brisson, 1760, Ornithologia, vol. 1, p. 46 (type *Struthio casuarus* Linnaeus, Recent).

1. *Casuarus lydekkeri* Rothschild

Casuarus lydekkeri Rothschild, 1911, Verh. V. internat. ornith. Kongr. Berlin 1910, pp. 151, 162 (type from Wellington Valley, distal part of right tibiotarsus, Australian Mus. no. MF 1268; cast Brit. Mus. no. A.158 = B.10394; see A. H. Miller, 1962, Rec. Austral. Mus., vol. 25, p. 235).

UPPER PLEISTOCENE (cave deposit). NEW SOUTH WALES: Wellington Valley.

Family DROMICEIIDAE Richmond

Dromaiinae Gray, 1870, Hand-list Gen. Sp. Birds, pt. 3, pp. v, 2 (subfamily; type *Dromaius* Vieillot, 1818, a junior synonym of *Dromiceius* Vieillot).

Dromaeidae A. Newton, 1896, Dictionary of Birds, p. 213 (type "*Dromaeus*" Vieillot).

Dromiceiidae Richmond, 1908, Proc. U. S. nat. Mus., vol. 35, no. 1656, pp. 598, 651 (type *Dromiceius* Vieillot).

Genus *Dromiceius* Vieillot

Dromiceius Vieillot, 1816, Analyse nouv. orn. élém., p. 54 (type *Casuarus novaehollandiae* Latham, Recent).

1. *Dromiceius patricius* (DeVis)

Dromaius patricius DeVis, 1888, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. 3, p. 1290, pl. 36, fig. 13a-c (types from King's Creek, proximal and distal ends of right tibiotarsus, left coracoid, probably in Queensland Mus.).

UPPER PLEISTOCENE (Chinchilla beds). QUEENSLAND: King's Creek.

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: Wurdulumankula near Lake Eyre (DeVis, 1906, Ann. Queensland Mus., no. 6, p. 25).

UPPER PLEISTOCENE (cave deposits). NEW SOUTH WALES: Wellington Valley (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 352).

2. *Dromiceius gracilipes* (DeVis)

Dromaius gracilipes DeVis, 1892, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. 6, p. 445, pl. 23, fig. 7 (type tarsometatarsus).

UPPER PLEISTOCENE (Chinchilla beds). QUEENSLAND:

3. *Dromiceius minor* (Spencer)

Dromaeus minor Spencer, 1906, Victoria Naturalist, vol. 23, p. 140 (type partial skeleton).

Dromaeus bassi Legge, 1907, Emu, vol. 6, p. 119.

Dromiceius spenceri Mathews, 1912, Novit. zool. (London), vol. 18, p. 176 footnote.

QUATERNARY. AUSTRALIA: King Island in Bass Strait.

Recently extinct species of Dromiceidae from the Pleistocene:

1. *Dromiceius diemenianus* (Jennings). AUSTRALIA: Kangaroo Island (Lam-brecht, 1933, Handb. Palaeorn., p. 114).

Family †DROMORNITHIDAE Fürbringer

Dromornithidae Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, pp. 1435, 1565 (type *Dromornis* Owen).

Genus †*Dromornis* Owen

Dromornis Owen, 1872, Proc. zool. Soc. London, p. 682 (type by monotypy *Dromornis australis* Owen).

1. *Dromornis australis* Owen

Dromornis australis Owen, 1872, Proc. zool. Soc. London, p. 682 (type from Peak Downs, right femur, Sydney Mus., cast in Brit. Mus.).

Dromaius australis Woods, 1883, Proc. Linn. Soc. N. S. Wales, vol. 7, p. 387 (types from Penola, 2 tibiae, 2 tarsometatarsi, coll. Rev. J. E. Tenison Woods, perhaps now in Penola Institute).

[?] *Dinornis queenslandiae* DeVis, 1884, Proc. Roy. Soc. Queensland, vol. 1, p. 23, pl. 3-4 (type from King's Creek, proximal end of femur, Queensland Mus.).

UPPER PLEISTOCENE (Chinchilla beds). QUEENSLAND: Peak Downs (Owen, 1872); King's Creek? (DeVis, 1884).

UPPER PLEISTOCENE. SOUTH AUSTRALIA: Penola in Gambier Range (Woods, 1883).

Genus †*Genyornis* Stirling and Zietz

Genyornis Stirling and Zietz, 1896, Trans. Roy. Soc. S. Australia, vol. 20, p. 182 (type by monotypy *Genyornis newtoni* Stirling and Zietz).

2. *Genyornis newtoni* Stirling and Zietz

Genyornis newtoni Stirling and Zietz, 1896, Trans. Roy. Soc. S. Australia, vol. 20, p. 182 (type from Lake Callabonna, skeleton, South Australian Mus. in Adelaide).

UPPER PLEISTOCENE. SOUTH AUSTRALIA: Lake Callabonna (Stirling and Zietz, 1896); Normanville, Baldina Creek near Burra, Parroo River, and Mount Gambier (Lambrecht, 1933, Handb. Palaeorn., p. 117). NEW SOUTH WALES: Gorec and Canadian Gold Lead, near Mudgee (Lambrecht, 1933).

Order †AEPYORNITHIFORMES (Newton)

Aepyornithes A. Newton, 1884, Encyclop. brit., ed. 9, vol. 18, p. 44 (type *Aepyornis* Geoffroy).—*Aepiornithes* Stejneger, 1885, Stand. nat. Hist., vol. 4, p. 47.—*Aepyornithiformes* Fürbringer, 1888, Untersuch. Morph. Syst. Vogel, vol. 2, pp. 1541, 1565 (intermediäre subordo).—*Aepiornithiformes* Ridgway, 1901, Bull. U. S. nat. Mus., no. 50, pt. 1, p. 9.

Family †AEPYORNITHIDÆ (Bonaparte)

Epyornithinae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (sous-famille; type "*Epyornis*" Geoffroy).—*Aepyornithidae* A. Newton, 1884, Encyclop. brit., ed. 9, vol. 18, p. 44.

Subfamily †EREMOPEZINAE Lambrecht

Eremopezinae Lambrecht, 1933, Handb. Palaeon., p. 216 (type *Eremopezus* Andrews).

Genus †*Eremopezus* Andrews

Eremopezus Andrews, 1904, Proc. zool. Soc. London, p. 163 (type by monotypy *Eremopezus eocaenus* Andrews).

[?] *Psammornis* Andrews, 1911, Verh. V internat. ornith. Kongr. Berlin 1910, p. 169 (type by monotypy *Psammornis rothschildi* Andrews).

1. *Eremopezus eocaenus* Andrews

Eremopezus eocaenus Andrews, 1904, Proc. zool. Soc. London, p. 163, pl. 5 (type from Birket-el-Qurun, distal end of tibiotarsus, Brit. Mus.).

[?] *Psammornis rothschildi* Andrews, 1911, Verh. V internat. ornith. Kongr. Berlin 1910, p. 169 (types from east of Touggourt, eggshell fragments, Brit. Mus. and Tring Mus.).

[?] *Psammornis lybicus* Moltoni, 1928, Ann. Mus. Storia nat. Giacomo Doria, vol. 52, p. 399, fig. (types from south of Hatiet el-Huedda and south of Giarabub, eggshell fragments).

UPPER EOCENE (Fayum formation, Birket-el-Qurun stage). EGYPT: Fayum: north of Birket-el-Qurun (Andrews, 1904).

EOCENE? LYBIA: 27 kilometers south of Hatiet el-Huedda and south of Giarabub? (Moltoni, 1928). ALGERIA: 12 miles east of Touggourt, Biskra, Ouargla, El Golea, and Temacine (Andrews, 1911). ARABIA: Shuqqat al Khalfat (Lowe, 1933, Ibis, p. 656).

Subfamily †AEPYORNITHINAE (Bonaparte)

Genus †*Stromeria* Lambrecht

Stromeria Lambrecht, 1929, Abh. bayer. Akad. Wiss., Math.-Naturw. Abt., F. 4, p. 1 (type by monotypy *Stromeria fajumensis* Lambrecht).

2. *Stromeria fajumensis* Lambrecht

Stromeria fajumensis Lambrecht, 1929, Abh. Bayer. Akad. Wiss., Math.-Naturw. Abt., F. 4, p. 1, pl. 2 (type from Dimeh, distal third of right tarsometatarsus, Munich Mus.).

Stromeria fayumensis Lambrecht, 1933, Handb. Palaeorn., p. 193.

LOWER OLIGOCENE (Fayum formation, Qatram stage). EGYPT: Fayum: north of Dimeh.

Genus †*Mullerornis* Milne-Edwards and Grandidier

Mullerornis Milne-Edwards and Grandidier, 1894, C. R. Acad. Sci. Paris, vol. 118, p. 125 (type *Mullerornis betsilei*, designated by Richmond, 1902, Proc. U. S. Nat. Mus., vol. 24, p. 697).

Flacourtia Andrews, 1895, Novit. zool. (London), vol. 2, p. 23 (type *Mullerornis rudis* Milne-Edwards and Grandidier).

3. *Mullerornis betsilei* Milne-Edwards and Grandidier

Mullerornis betsilei Milne-Edwards and Grandidier, 1894, C. R. Acad. Sci. Paris, vol. 118, p. 125 (types tibia, tarsometatarsus, Paris Mus.).

QUATERNARY. MADAGASCAR: Antsirabé, in center of island.

4. *Mullerornis agilis* Milne-Edwards and Grandidier

Mullerornis agilis Milne-Edwards and Grandidier, 1894, C. R. Acad. Sci. Paris, vol. 118, p. 125 (type tibia, Paris Mus.).

QUATERNARY. MADAGASCAR: southwest coast near Mouroundava.

5. *Mullerornis rudis* Milne-Edwards and Grandidier

Mullerornis rudis Milne-Edwards and Grandidier, 1894, C. R. Acad. Sci. Paris, vol. 118, pl. 26 (types tibia, tarsometatarsus, Paris Mus.).

QUATERNARY. MADAGASCAR: west coast between Bélo and Mouroundava.

Genus †*Aepyornis* Geoffroy

Aepyornis I. Geoffroy-Saint-Hilaire, 1851 (after Jan. 27), C. R. Acad. Sci. Paris, vol. 32, no. 4, p. 104 (type by monotypy *Aepyornis maximus* Geoffroy).

Aepiornis Geoffroy, 1851, Rev. Mag. Zool. (Paris), ser. 2, vol. 3, p. 52 (emendation).

Epiornis Müller and Baldamus, 1851, Naumannia, vol. 1, no. 4, p. 48 (emendation).

Epyornis Bonaparte, 1854, Ann. Sci. nat. (Paris), ser. 4, vol. 1, fasc. 3, p. 139 (emendation; *Epyornis* used as a common name by Geoffroy, 1851, C. R., l.c.).

6. *Aepyornis maximus* Geoffroy

Aepyornis maximus I. Geoffroy-Saint-Hilaire, 1851 (after Jan. 27), C. R. Acad. Sci. Paris, vol. 32, no. 4, p. 104 (types from Masikoro, egg and lower end of left metatarsus, Paris Mus.).

Aepyornis modestus Milne-Edwards and Grandidier, 1869, Ann. Sci. nat. (Paris), ser. 5, vol. 7, p. 314 (type from Ambolisatra, Paris Mus.).

Aepyornis titan Andrews, 1894 (Jan. 12), Geol. Mag., no. 355 = n.s., decade 4, vol. 1, no. 1, p. 18 (type from Itampulu Vé, left tibiotarsus, Brit. Mus.).

Aepyornis ingens Milne-Edwards and Grandidier, 1894 (after Jan. 13), C. R. Acad. Sci. Paris, vol. 118, no. 3, p. 124 (types from west coast between Bélo and Mouroundava, femur, tibia, Paris Mus.).

QUATERNARY. MADAGASCAR: Ambolisatra or Amboulitsate (Milne-Edwards and Grandidier, 1869); Masikoro or Machicora (Milne-Edwards and Grandidier, 1894); Mouroundava, between Bélo and Mouroundava, and Itampulu Vé (Andrews, 1894); Lamboharana (Lambrecht, 1933, Handb. Palaeorn., p. 198).

7. *Aepyornis medius* Milne-Edwards and Grandidier

Aepyornis medius Milne-Edwards and Grandidier, 1866, Recherches sur la faune ornithologique éteinte des Îles Mascareignes et de Madagascar, p. 97, note 2 (type, Paris Mus.).

Aepyornis grandidieri Rowley, 1867, Proc. zool. Soc. London, p. 892 (type from Cape Sainte Marie, eggshell fragment, coll. Alfred Grandidier).

Aepyornis cursor Milne-Edwards and Grandidier, 1894 (after Jan. 15), C. R. Acad. Sci. Paris, vol. 118, no. 3, p. 124 (type tarsometatarsus, Paris Mus., locality not stated).

Aepyornis lentus Milne-Edwards and Grandidier, 1894 (after Jan. 15), C. R. Acad. Sci. Paris, vol. 118, no. 3, p. 124 (type tarsometatarsus, Paris Mus., locality not stated).

QUATERNARY. MADAGASCAR: Cape Sainte-Marie; probably between Bélo and Mouroundava (Milne-Edwards and Grandidier).

8. *Aepyornis hildebrandti* Burckhardt

Aepyornis hildebrandti Burckhardt, 1893, Pal. Abh., vol. 6, p. 127, pl. 13-16 (type tarsometatarsus, Berlin Mus.).

Aepyornis mülleri Milne-Edwards and Grandidier, 1894 (after Jan. 15), C. R. Acad. Sci. Paris, vol. 118, no. 3, p. 124 (type from Antsirabé, nearly complete skeleton, Paris Mus.).

QUATERNARY. MADAGASCAR: Antsirabe.

9. *Aepyornis gracilis* Monnier

Aepyornis gracilis Monnier, 1913, Ann. Pal. (Paris), vol. 8, p. 15, pl. 8, fig. 10 (type femur, Paris Mus.).

QUATERNARY. MADAGASCAR.

Order †DINORNITHIFORMES (Gadow)

Immanes A. Newton, 1884, Encyclop. brit., ed. 9, vol. 18, p. 44.

Dinornithes Gadow, 1893, Bronn Klass. Ordn., Vögel, pt. 2, pp. 105, 299 (type *Dinornis* Owen).—*Dinornithiformes* Ridgway, 1901, Bull. U. S. Nat. Mus., no. 50, pt. 1, p. 9.

Family †EMEIDAE (Bonaparte)

Emeinae Bonaparte, 1854, Ann. Sci. nat. (Paris), vol. 1, p. 48 (type *Emeus* Reichenbach).

Anomalopterygidae Oliver, 1930, New Zealand Birds, p. 28 (type *Anomalopteryx* Reichenbach).

Subfamily †ANOMALOPTERYGINAE (Oliver)

Anomalopteryginae Archey, 1941 (May 29), Bull. Auckland Inst. and Mus., no. 1, pp. 11, 77 (sub-family).

Genus †*Anomalopteryx* Reichenbach

Anomalopteryx Reichenbach, 1852, Avium Systema Naturale, p. xxx (type by monotypy *Dinornis didiformis* Owen).

Graya Bonaparte, 1856 (after Nov. 3), C. R. Acad. Sci. Paris, vol. 43, no. 18, p. 841 (type by present designation *Dinornis dromaeoides* Owen).

Anomalornis Hutton, 1897 (June), Trans. N. Zealand Inst., vol. 29, p. 543 (new name for *Anomalopteryx* Reichenbach).

1. *Anomalopteryx antiquus* Hutton

Anomalopteryx antiquus Hutton, 1892 (May), Trans. N. Zealand Inst., vol. 24, p. 124 (lectotype tibia, Canterbury Mus., designated by Archey, 1941, p. 29).

UPPER MIOCENE OR LOWER PLOCENE, NEW ZEALAND: SOUTH ISLAND: Gleniti Valley near Timaru.

2. *Anomalopteryx didiformis* (Owen)

Dinornis didiformis Owen, 1844 (June 5), Trans. zool. Soc. London, vol. 3, pt. 3, p. 242, pl. 27, fig. 3-6 (type from Poverty Bay, metatarsus, Royal College of Surgeons; cast Brit. Mus. no. 18595).

Dinornis dromaeoides Owen, 1844 (June 5), Trans. zool. Soc. London, vol. 3, pt. 3, p. 253, pl. 22, fig. 1-2; pl. 23, fig. 1 (type from Poverty Bay, femur, Roy. Coll. Surg. no. f:16; cast Brit. Mus. no. 18598; cast Canterbury Mus.).

Dinornis dromioides Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, pp. 46, 47 (emendation or lapsus).

Dinornis parvus Owen, 1883 (Jan.), Trans. zool. Soc. London, vol. 11, pt. 8, no. 1, p. 233, pl. 51-58 (type from Pokororo, skeleton, Brit. Mus. no. A.3).

Anomalopteryx fortis Hutton, 1893 (May), Trans. N. Zealand Inst., vol. 25, p. 9 (lectotype from Glenmark, Canterbury Mus., designated by Archey, 1941).

QUATERNARY, NEW ZEALAND: NORTH ISLAND: Poverty Bay (Owen, 1844); Waingongoro and Te Rangatapu (Lydekker, 1891, Cat. Foss.

Birds Brit. Mus., p. 666); Waipu, Akaitio, Karamu, Moawhango, Pataua, Martinborough, Rotorua, Opito, Te Aute, and Lyall Bay (Lambrecht, 1933, Handb. Palaeorn., p. 143); Nuhaka, Awamarino, Te Anga, Mangaotaki, and Waikaremoana (Archey, 1941, Bull. Auckland Inst. Mus., no. 1, p. 137); Tukituki River, Hangatiki, Tahora, Pohue, Coonor, Makirikiri, Mangaone, Kaiwi, Wanganui, Lake Kaitoke, and Levin (Oliver, 1955, N. Zealand Birds, ed. 2, p. 582); Gisborne, Whangarei, and Coromandel (Scarlett, 1957, Proc. N. Zealand ecol. Soc., no. 4, p. 17). SOUTH ISLAND: Pokororo (Owen, 1883); 40 miles north of Nelson, Waikouaiti, Ruamoā near Oamaru, and Otago (Lydekker, 1891, pp. 278, 666); Glenmark (Hutton, 1893); Takaka Hill, Hamilton Swamp, Waiāu, Cheviot, Aorere River, and Kapua (Lambrecht, 1933, p. 144); Castle Rocks, Collingwood, and Mount Arthur (Archey, 1941); Shag River, Broken River, and Papatowai (Oliver, 1955). Although birds from the South Island average slightly smaller, the differences are too slight to permit subspecific separation.

Genus †*Megalapteryx* Haast

- Megalapteryx*, Haast, 1886 (Dec.), Trans. zool. Soc. London, vol. 12, pt. 5, p. 161 (type by monotypy *Megalapteryx hectori* Haast).
Palaeocasuaris Forbes, 1892 (May), Trans. N. Zealand Inst., vol. 24, p. 189 (nomen nudum).—Forbes, 1893 (July), Ibis, ser. 6, vol. 5, no. 19, p. 450 (generic characters; included species *P. haasti* and *P. velox*, both nomina nuda at this point).—Rothschild, 1907 (Nov. 12), Extinct Birds, p. 219 (type by original designation *Palaeocasuaris haasti* "Forbes").

3. *Megalapteryx didinus* (Owen)

- Dinornis didinus* Owen, 1883 (Jan.), Trans. zool. Soc. London, vol. 11, pt. 8, p. 257, pl. 59-61 (type from Queenstown, incomplete skeleton, Brit. Mus. no. A.16).
Megalapteryx hectori Haast, 1886 (Dec.), Trans. zool. Soc. London, vol. 12, pt. 5, p. 161, pl. 30 (type from Takaka, leg bones, Nelson Mus.).
Megalapteryx tenuipes Lydekker, 1891 (Apr. 25), Cat. Fossil Birds Brit. Mus., p. 251, fig. 69a (type from Lake Wakatipu, right tibiotarsus, Brit. Mus. no. 49990).
Palaeocasuaris haasti Forbes, 1893 (July), Ibis, ser. 6, vol. 5, no. 19, p. 451 (nomen nudum).—Rothschild, 1907 (Nov. 12), Extinct Birds, p. 220 (type from Manitoto, femur, Liverpool Mus.).
Palaeocasuaris velox Forbes, 1893 (July), Ibis, ser. 6, vol. 5, no. 19, p. 451 (nomen nudum).—Rothschild, 1907 (Nov. 12), Extinct Birds, p. 220 (type from Manitoto, femur, Liverpool Mus.).
Palaeocasuaris elegans Rothschild, 1907 (Nov. 12), Extinct Birds, p. 220 (type from Manitoto, femur, Liverpool Mus.).
Megalapteryx hamiltoni Rothschild, 1907 (Nov. 12), Extinct Birds, p. 197 (type from Waingongoro, left femur, Brit. Mus. no. 32145).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Queenstown near Lake Wakatipu (Owen, 1883); Takaka (Haast, 1886); Maniototo (Rothschild, 1907); Buller River, Kapua, and Nelson (Lambrecht, 1933, Handb. Palaeorn., p. 142); Mount Arthur, Inangahua, Old Man Range, and Aniseed Valley (Archey, 1941, Bull. Auckland Inst. Mus., no. 1, pp. 31, 33, 138); D'Urville Island, Pokororo, Glenmark, Cromwell, Manuhērikiā, Kingston, Papatowai, and Te Anau (Oliver, 1955, N. Zealand Birds, ed. 2, p. 583); Inangahua Junction (Scarlett, 1957; Proc. N. Zealand ecol. Soc., no. 4, p. 17). NORTH ISLAND: Waingongoro (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 251; doubtful, fide Oliver); Makirikiri (Archey, 1941, p. 35).

4. *Megalapteryx benhami* Archey

Megalapteryx benhami Archey, 1941 (May 29), Bull. Auckland Inst. Mus., no. 1, pp. 35, 138 (type from Mount Arthur, femur, Auckland Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Mount Arthur (Archey, 1941); Wairangi (Oliver, 1955, N. Zealand Birds, ed. 2, p. 585).

Genus †*Pachyornis* Lydekker

Pachyornis Lydekker, 1891 (Apr. 25), Cat. Fossil Birds Brit. Mus., p. 316 (type *Dinornis elephantopus* Owen, by original designation).

5. *Pachyornis elephantopus* (Owen)

Dinornis elephantopus Owen, 1856 (July 30), Proc. zool. Soc. London, pt. 24, p. 54 (lectotype from Awamoa, left metatarsus, Brit. Mus. designated by Archey, 1941, Bull. Auckland Inst. Mus., no. 1, p. 36).

Dinornis crassus var. *major* Hutton, 1875 (July), Trans. N. Zealand Inst., vol. 7, pp. 276-278 (lectotype from Hamilton Swamp, metatarsus, designated by Archey, 1941, p. 38).

Pachyornis immanis Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 343, fig. 66B (type from South Island, left tarsometatarsus, Brit. Mus. no. A.168).

Euryapteryx ponderosus Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 249 (lectotype from Hamilton Swamp, metatarsus, Otago Mus., designated by Archey, 1941, p. 36).

Pachyornis rothschildi Lydekker, 1892 (Apr.), Proc. zool. Soc. London for 1891, no. 33, p. 479 (types from unknown locality, associated right femur, tibiae, metatarsi, Tring Mus.).

Pachyornis inhabilis Hutton, 1893 (May), Trans. N. Zealand Inst., vol. 25, p. 11 (type from "probably somewhere in Canterbury," incomplete skeleton, Canterbury Mus. no. 9.2.23).

Pachyornis valgus Hutton, 1893 (May), Trans. N. Zealand Inst., vol. 25, p. 12 (types from Enfield, right and left tibiae, Canterbury Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Awamōā (Owen, 1856); Hamilton Swamp (Hutton, 1875); Ruamoa and Glenmark Swamp (Lydekker, 1891, Cat., p. 321); Kapua, Waitaki River, and

Stewart Island (Oliver, 1930, N. Zealand Birds, p. 51); Waikouaiti, Broken River, Motunau, Riverton Beach, Takaka Hill, and Shag Point (Lambrecht, 1933, Handb., pp. 150-151); Enfield (Hutton, 1893); Pyramid Valley (Archey, 1941, p. 138); Tarakohe, Herbert, and Papatowai (Oliver, 1955, N. Zealand Birds, ed. 2, p. 576).

6. *Pachyornis pygmaeus* (Hutton)

Euryapteryx pygmaeus Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 249 (lectotypes from Takaka, right and left metatarsi, Nelson Mus., designated by Hutton, 1892, Trans. N. Zealand Inst., vol. 24, p. 139).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Takaka tableland.

7. *Pachyornis mappini* Archey

Pachyornis mappini Archey, 1941 (May 29), Bull. Auckland Inst. Mus., no. 1, p. 41, pl. 4, fig. 4; pl. 5, fig. 4; pl. 7, fig. 3; pl. 9, fig. 4; pl. 10, fig. 4; pl. 11, fig. 4; pl. 12, fig. 5; pl. 15, fig. 1a-c (type from Mangaotaki, skeleton, Auckland Mus. no. 124).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Mangaotaki, Waikaremoana, Doubtless Bay, Coromandel, Makirikiri, Karamu, and Amodeo Bay (Archey, 1941); Waipu, Gisborne, Mangaone, Nuhaka, Te Aute, Coonoor, Martinborough, and Eketahuna (Oliver, 1955, N. Zealand Birds, ed. 2, p. 574).

8. *Pachyornis oweni* (Haast)

Dinornis oweni Haast, 1885, Proc. zool. Soc. London for 1885, no. 31, p. 482 (nomen nudum).—Haast, 1886 (Dec.), Trans. zool. Soc. London, vol. 12, pt. 5, p. 171, pl. 31-32 (type from Pataua near Whangarei, skeleton, Auckland Mus. no. A.M. 384).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Pataua (Haast, 1886); Tom Bolling Bay, Doubtless Bay, Waikawau, and Westmere near Auckland (Archey, 1941, Bull. Auckland Inst. Mus., no. 1, p. 44); Lake Ohia, Te Aute, Martinborough, and Makirikiri (Oliver, 1955, N. Zealand Birds, ed. 2, p. 582).

9. *Pachyornis septentrionalis* Oliver

Pachyornis septentrionalis Oliver, 1949, Moas N. Zealand Australia, p. 61 (type from Pohue, incomplete skeleton, Dominion Mus. at Wellington).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Pohue (Oliver, 1949); Doubtless Bay, Whangarei, Bay of Plenty, Waikaremoana, Te Aute, and Martinborough (Oliver, 1955, N. Zealand Birds, ed. 2, p. 574); Coonoor and Wanganui (Scarlett, 1957, Proc. N. Zealand ecol. Soc., no. 4, p. 17).

10. *Pachyornis murihiku* Oliver

Pachyornis murihiku Oliver, 1949, Moas N. Zealand Australia, p. 67 (type from Greenhills, skeleton, Southland Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Greenhills near Bluff.

11. *Pachyornis australis* Oliver

Pachyornis australis Oliver, 1949, Moas N. Zealand Australia, p. 70 (type from Salisbury tableland, skull and neck vertebrae, Dominion Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Salisbury tableland at headwaters of Takaka River (Oliver, 1949); Southland and Nelson (Oliver, 1955, N. Zealand Birds, ed. 2, p. 575).

Subfamily †EMEINAE Bonaparte

Emeinae Bonaparte, 1854, Ann. Sci. nat. (Paris), vol. 1, p. 48 (type *Emeus Reichenbach*).

Genus †*Emeus* Reichenbach

Emeus Reichenbach, 1852, Avium Systema Naturale, p. xxx (type by monotypy *Dinornis crassus* Owen).

Syornis Reichenbach, 1852, Avium Systema Naturale, p. xxx (type *Dinornis casuarinus* Owen).

Meionornis Haast, 1874 (June), Trans. N. Zealand Inst., vol. 6, p. 426 (type *Dinornis casuarinus* Owen, designated by Archey, 1941, Bull. Auckland Inst. Mus., no. 1, p. 45).

Mesopteryx Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 248 (type by monotypy *Dinornis huttonii* Owen).

12. *Emeus crassus* (Owen)

Dinornis crassus Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, p. 46 (lectotype from Waikouaiti, now lost, designated by Lydekker, 1891, Cat., p. 307; casts, Brit. Mus. no. A.186, Auckland Mus. no. A.M. 298).

Dinornis casuarinus Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, p. 47 (lectotype from Waikouaiti, now lost, designated by Lydekker, 1891, p. 257).

[?] *Dinornis rheides* Owen, 1851 (Jan. 1), Trans. zool. Soc. London, vol. 4, pt. 1, p. 8 (indeterminate?).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Waikouaiti (Owen, 1846); Glenmark (Lydekker, 1891, Cat., p. 257); Enfield, Kapua, Hamilton Swamp, Awamoa, Dunedin, and Earnsclough Cave (Lambrecht, 1933, Handb., p. 147); Pyramid Valley and Kia Ora (Archey, 1941, pp. 51, 149); Waitaki, Shag River, Ohai, Papatowai, Greenhills, Riverton, and Wakapatu (Oliver, 1955, N. Zealand Birds, ed. 2, p. 577). NORTH ISLAND: Martinborough and Te Aute (according to Archey, 1941, p. 51, these are the only valid records from the North Island). Recorded from Stewart Island by Lambrecht, but not confirmed by subsequent authors.

13. *Emeus huttonii* (Owen)

Dinornis huttonii Owen, 1879, *Extinct Birds* N. Zealand, p. 430 (lectotype from Hamilton Swamp, right metatarsus, Otago Mus., designated by Archey, 1941, p. 52).

Euryapteryx compacta Hutton, 1893 (May), *Trans. N. Zealand Inst.*, vol. 25, p. 11 (type from Enfield, tibia, Canterbury Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Hamilton Swamp (Owen, 1879); Enfield (Hutton, 1893); Kapua (Hutton, 1896, *Trans. N. Zealand Inst.*, vol. 28, p. 636); Glenmark (Hutton, 1897, *op. cit.*, vol. 29, p. 559); Takaka (Lambrecht, 1933, *Handb.*, p. 148); Wakapatu and Pyramid Valley (Archey, 1941, pp. 53, 140); Broken River, Waireka, Castle Rock, Waikouaiti, Papatowai, and Waipapa (Oliver, 1955, p. 559).

Genus †*Euryapteryx* Haast

Cela Reichenbach, 1852, *Avium Systema Naturale*, p. xxx (type by monotypy *Dinornis curtus* Owen). Preoccupied by *Cela* Moehring, 1758; *Cela* Oken, 1816; *Cela* Illiger, 1826.

Celeus Bonaparte, 1856 (after Nov. 3), *C. R. Acad. Sci. Paris*, vol. 43, no. 18, p. 841 (new name for *Cela* Reichenbach). Preoccupied by *Celeus* Boie, 1831.

Euryapteryx Haast, 1874 (June), *Trans. N. Zealand Inst.*, vol. 6, p. 427 (type *Dinornis gravis* Owen, designated by Archey, 1941, p. 53).

14. *Euryapteryx gravis* (Owen)

Dinornis gravis Owen, 1870 (Jan.), *Trans. zool. Soc. London*, vol. 7, pt. 2, p. 141, pl. 14 (type from Kakanui, skull, coll. Baroness A. Burdett Coutts).

Emeus gravipes Lydekker, 1891 (Apr. 25), *Cat. Foss. Birds Brit. Mus.*, p. 297 (type from Kakanui, metatarsus, *Brit. Mus.* no. A.1591).

Emeus boothi Rothschild, 1907 (Nov. 12), *Extinct Birds*, p. 210 (type from Shuy River, skull, *Brit. Mus.*?).

Euryapteryx kuranui Oliver, 1930, *N. Zealand Birds*, p. 52 (type from Castle Point, skeleton, Canterbury Mus.).

QUATERNARY. NEW ZEALAND: STEWART ISLAND (Benham, 1910, *Trans. N. Zealand Inst.*, vol. 42, p. 354). SOUTH ISLAND: Kakanui River (Owen, 1870); Shuy River and Shag River (Rothschild, 1907); Mount Arthur, Riverton, and Pyramid Valley (Archey, 1941, *Bull. Auckland Inst. Mus.*, no. 1, pp. 56, 141); Herbert, Earnsclough Cave, and Wakapatu (Oliver, 1955, *N. Zealand Birds*, ed. 2, p. 578). NORTH ISLAND: Castlepoint (Oliver, 1930); Portland Island and Waikaremoana (Archey, 1941, p. 56) Te Aute, Hunterville, and Nga Rata (Oliver, 1955).

15. *Euryapteryx geranoides* (Owen)

Palapteryx geranoides Owen, 1848 (Apr. 13), *Proc. zool. Soc. London*, pp. 1,

7 (measurements of skull).—Owen, 1848 (Apr. 22); Trans. zool. Soc. London, vol. 3, pt. 5, p. 361, pl. 54, fig. 1-5 (type from Te Rangatapu, skull).

Dinornis expunctus Archey, 1927 (Aug. 15), Trans. N. Zealand Inst., vol. 58, p. 152 (new name for *Palapteryx geranoides* Owen).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Te Rangatapu (Owen, 1848); Doubtless Bay and Tom Bolling Bay (Archey, 1941, Bull. Auckland Inst. Mus., no. 1, pp. 57, 141); Te Aute, Oakanga River, Coonoor, Martinborough, and Seatoun (Oliver, 1955, N. Zealand Birds, ed. 2, p. 578). SOUTH ISLAND: Takaka, Broken River, Herbert, and Papatowai (Oliver, 1955).

16. *Euryapteryx curtus* (Owen)

Dinornis curtus Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, p. 48 (lectotype from East Coast district, tibia, designated by Lydekker, 1891, Cat., p. 281).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Doubtless Bay (Archey, 1941, Bull. Auckland Inst. Mus., no. 1, pp. 60, 142); Lake Ohia, Waipu, Clevedon, Poverty Bay, Te Aute, and Makirikiri (Oliver, 1955, N. Zealand Birds, ed. 2, p. 577).

17. *Euryapteryx tane* Oliver

Euryapteryx tane Oliver, 1949, Moas N. Zealand Australia, p. 105 (type from Doubtless Bay, skeleton, Auckland Mus.).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Doubtless Bay, Waipu, Lake Ohia, Clevedon, Waiootapu, Te Aute, Te Rangatapu, Waikupa, and Makirikiri (Oliver, 1955, N. Zealand Birds, ed. 2, p. 577); Wanganui and Napier (Scarlett, 1957, Proc. N. Zealand ecol. Soc., no. 4, p. 17).

Genus †*Zelornis* Oliver

Zelornis Oliver, 1949, Moas N. Zealand Australia, p. 117 (type *Euryapteryx exilis* Hutton).

18. *Zelornis exilis* (Hutton)

"*Anomalopteryx*(?) *geranoides* (?Owen)," Lydekker, 1891, Cat. Fossil Birds Brit. Mus., p. 288, fig. 65C (simply a misapplication of *Palapteryx geranoides* Owen, not a new name).

Euryapteryx exilis Hutton, 1897 (June), Trans. N. Zealand Inst., vol. 29, p. 552, pl. 48, fig. C (type from Wangaehu, skeleton, Wanganui Mus.).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Wangaehu River mouth (Hutton, 1897); Rangatapu (Lydekker, 1891); Doubtless Bay and Waitapu (Archev, 1941, Bull. Auckland Inst. Mus., no. 1, p. 141); Wanganui and Napier (Scarlett, 1957, Proc. N. Zealand ecol. Soc., no. 4, p. 17).

19. *Zelornis haasti* (Rothschild)

Emeus haasti Rothschild, 1907 (Nov. 12), Extinct Birds, p. 210 (type from Glenmark, skull).

Emeus parkeri Rothschild, 1907 (Nov. 12), Extinct Birds, p. 211 (type from Shag Point, skull).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Glenmark and Shag Point (Rothschild, 1907); Enfield and Riverton (Oliver, 1955, N. Zealand Birds, ed. 2, p. 580).

Family †DINORNITHIDAE Bonaparte

Dinornithidae Bonaparte, 1853 (after Oct. 31), C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 646 (type *Dinornis* Owen).—*Dinornithinae* Bonaparte, 1853, op. cit., p. 646 (sous-famille).—*Dinornithoideae* Stejneger, 1884, Sci. Rec., vol. 2, p. 155.

Palapteryginae Bonaparte, 1854, Ann. Sci. nat. (Paris), vol. 1, p. 48 (type *Palapteryx* Owen).—*Palapterygidae* Haast, 1874 (June), Trans. N. Zealand Inst., vol. 6, p. 419.

Genus †*Dinornis* Owen

Dinornis Owen, 1843 (July), Proc. zool. Soc. London, pt. 11, no. 121, p. 10 (type by monotypy *Dinornis novae-zealandiae* Owen).

Megalornis Owen, 1843, Proc. zool. Soc. London, pt. 11, no. 122, p. 19 (*Dinornis* substituted for manuscript name *Megalornis* Owen in paper read at previous meeting; preoccupied by *Megalornis* Gray, 1841).

Palapteryx Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, p. 46 (type *Dinornis ingens* Owen, designated by Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 224).

Movia Reichenbach, 1852, Avium systema naturale, p. xxx (type by monotypy *Dinornis ingens* Owen).

Moa Reichenbach, 1852, Avium systema naturale, p. xxx (type by monotypy *Dinornis giganteus* Owen).

Owenia Gray, 1855, Cat. Genera Subgenera Birds, p. 152 (type *Dinornis struthoides* Owen; see Bonaparte, 1856, C. R. Acad. Sci. Paris, vol. 43, no. 18, p. 841).

Tylopteryx Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 247 (type *Dinornis gracilis* Owen, designated by Richmond, 1902, Proc. U. S. nat. Mus., vol. 24, no. 1267, p. 720; *Dinornis torosus* Hutton, designated by Archev, 1941, Bull. Auckland Inst. Mus., no. 1, p. 61, in oversight of Richmond's action).

1. *Dinornis novae-zealandiae* Owen

Dinornis novae zealandiae Owen, 1843 (July), Proc. zool. Soc. London, pt. 11, no. 121, p. 8 (lectotypes from Poverty Bay, left femur, left metatarsus, Royal College of Surgeons, nos. f12, m3, designated by Archey, 1941, p. 64; casts, Brit. Mus. nos. 18588, 18590).

Dinornis struthoides Owen, 1844 (March), Proc. zool. Soc. London for 1843, pt. 11, no. 129, p. 144 (brief description).—Owen, 1844 (June 5), Trans. zool. Soc. London, vol. 3, pt. 3, p. 244 (type from Poverty Bay, metatarsus, Roy. Coll. Surg., no. m3).

Dinornis struthioides Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 242 (emendation).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Poverty Bay (Owen, 1843); Wanganui, Hastings, Doubtless Bay, Karamu, Mangaotaki, Waikaremoana, and Haupouri (Archey, 1941, pp. 64, 67, 142); Waipu, Tahora, Te Aute, Martinborough, Makirikiri, and Paremata (Oliver, 1955, N. Zealand Birds, ed. 2, p. 585).

2. *Dinornis torosus* Hutton

Dinornis torosus Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 247 (type from Takaka, Auckland Mus. no. A.M. 352).

Palapteryx plenus Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 248 (lectotype from South Island, tibia, selected by Archey, 1941, p. 70).

Dinornis strenuus Hutton, 1893 (May), Trans. N. Zealand Inst., vol. 25, p. 8 (lectotype from Enfield, metatarsus, selected by Archey, 1941, p. 70, Canterbury Mus. no. 1.14.13).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Takaka (Hutton, 1891); Enfield (Hutton, 1893); Mount Arthur, Glenmark, Timaru, and Hamilton Swamp (Archey, 1941, pp. 70, 143); Kapua (Hutton, 1896, Trans. N. Zealand Inst., vol. 28, pp. 634, 642); Broken River, Herbert, Shag River, Castle Rock, Takaka Hill, and Slovens Creek (Oliver, 1955, N. Zealand Birds, ed. 2, pp. 585, 586); Rahu (Scarlett, 1957, Proc. N. Zealand ecol. Soc., no. 14, p. 17).

3. *Dinornis ingens* Owen

Dinornis ingens Owen, 1844 (June 5), Trans. zool. Soc. London, vol. 3, pt. 3, p. 247 (type from Poverty Bay, tibiotarsus, Roy. Coll. Surg. no. t2; cast Brit. Mus.).

Dinornis gracilis Owen, 1855 (Apr. 11), Proc. zool. Soc. London for 1854, pt. 22, p. 246 (lectotype from North Island, metatarsus, Brit. Mus. no. 32272, selected by Lydekker, 1891, Cat., p. 248).

Dinornis firmus Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 247 (lectotypes from Poverty Bay, femur, tibia, metatarsus, coll. of Rev. W. Colenso, selected by Archey, 1941, p. 68).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Poverty Bay (Owen, 1844); Karuma, Mangaotaki, Waikaremoana, Te Aute, Patangata, Kaiwaka, Hastings, and Makirikiri (Archey, 1941, pp. 68, 143); Ruakaka, Matapouri, Clevedon, Te Kuiti, Moawhango, Coonoor, Martinborough, Karori, Paekakariki, and Kaiwi (Oliver, 1955, N. Zealand Birds, ed. 2, p. 586).

4. *Dinornis robustus* Owen

Dinornis ingens var. *robustus* Owen, 1846 (July), Proc. zool. Soc. London, pt. 14, p. 48 (lectotype from South Island, metatarsus, Roy. Coll. Surg., now apparently lost, selected by Archey, 1941, p. 71).

Dinornis potens Hutton, 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 247 (types from Heathcote, femur, tibia, metatarsus, Canterbury Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Waikouaiti (Owen, 1851, Trans. zool. Soc. London, vol. 3, pt. 4, pp. 321, 329); Hamilton Swamp (Hutton, 1875, Trans. N. Zealand Inst., vol. 7, p. 279); Heathcote (Hutton, 1891); Greymouth (Hutton, 1892, Trans. N. Zealand Inst., vol. 24, p. 113); Kapua and Enfield (Hutton, 1896, Trans. N. Zealand Inst., vol. 28, pp. 633, 645); Castle Rock, Timaru, Glenmark, Knobby Range, Tiger Hill, and Pyramid Valley (Archey, 1941, p. 144); Takaka Hill, Westport, Broken River, Papatowai, Clyde, and D'Urville Island (Oliver, 1955, p. 586).

5. *Dinornis giganteus* Owen

Dinornis giganteus Owen, 1844 (March), Proc. zool. Soc. London for 1843, pt. 11, no. 129, p. 144 (type from Poverty Bay, tibia, Roy. Coll. Surg. no. 2170; cast Brit. Mus. no. 18588).

Dinornis excelsus Hutton 1891 (Nov.), N. Zealand Jour. Sci., new issue, vol. 1, no. 6, p. 247 (lectotype from Te Aute, tibia, selected by Archey, 1941, p. 69).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Poverty Bay (Owen, 1844); Te Aute (Hutton, 1891); Doubtless Bay, Awhitu, Moawhango, Makirikiri, Maungaraki Gorge, and Hawke Bay (Archey, 1941, p. 143); Coonoor, Oamaru, and Martinborough (Oliver, 1955, p. 588).

6. *Dinornis maximus* Owen

Dinornis maximus Owen, 1867, Proc. zool. Soc. London for 1867, no. 57, p. 891 (nomen nudum).—Owen, in Haast, 1869 (May), Trans. N. Zealand Inst., vol. 1, p. 87 (types from Glenmark Swamp, femur, tibia, and part of metatarsus, Canterbury Mus.).—Owen, 1869 (June 1), Trans. zool. Soc. London, vol. 6, pt. 8, p. 497, pl. 89-90 (types from Glenmark Swamp, from same individual as Haast's types, left femur, left tibiotarsus, right tarsometatarsus, coll. of Major J. Michael, now supposed to be in Madras Mus. but apparently lost; casts Brit. Mus. no. A.161, Auckland Mus. no. A.M. 385).

- Dinornis altus* Owen, 1879, *Extinct Birds New Zealand*, pp. 253, 361, pl. 79, fig. 4 (type from South Island, left metatarsus, Brit. Mus. no. 35832).
Dinornis validus Hutton, 1891 (Nov.), *N. Zealand Jour. Sci.*, new issue, vol. 1, no. 6, p. 247 (type from Glenmark Swamp, skeleton, Canterbury Mus.).

QUATERNARY. NEW ZEALAND: SOUTH ISLAND: Glenmark Swamp (Haast, 1869); Kapua, Enfield, and Riverton (Hutton, 1896, *Trans. N. Zealand Inst.*, vol. 28, pp. 632, 646, 652); Pyramid Valley, Broken River, Shag Valley, Waikouaiti, and Sumner (Archey, 1941, p. 144); Raki's Table, Herbert, Awamoa, Seacliff, Colac Bay, and Invercargill (Oliver, 1955, p. 588).

7. *Dinornis gazella* Oliver

- Dinornis gazella* Oliver, 1949, *Moas N. Zealand and Australia*, p. 166 (type from Te Aute, pelvis, Dominion Mus., Wellington).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Te Aute (Oliver, 1949); Karamu, Makirikiri, and Paremata (Oliver, 1955, p. 585).

8. *Dinornis hercules* Oliver

- Dinornis hercules* Oliver, 1949, *Moas N. Zealand and Australia*, p. 174 (type from Coonoor, tibia, Dominion Mus., Wellington).

QUATERNARY. NEW ZEALAND: NORTH ISLAND: Coonoor (Oliver, 1949); Waitomo, Mangaone, Te Aute, Makirikiri, Doubtless Bay, Moawhango, Poverty Bay, and Awhitu (Oliver, 1955, p. 588).

Order APTERYGIFORMES (Haeckel)

Apterygia Haeckel, 1866, *Generelle Morphologie der Organismen*, vol. 2, p. 139 (type *Apteryx* Shaw).

Family APTERYGIDAE (Gray)

Apteryginae Gray, 1840, *List Genera Birds*, p. 63 (type *Apteryx* Shaw, Recent).

Genus †*Pseudapteryx* Lydekker

Pseudapteryx Lydekker, 1891 (Apr. 25), *Cat. Foss. Birds Brit. Mus.*, p. 218 (type by monotypy *Pseudapteryx gracilis* Lydekker).

1. *Pseudapteryx gracilis* Lydekker

Pseudapteryx gracilis Lydekker, 1891 (Apr. 25), *Cat. Foss. Birds Brit. Mus.*, p. 218, fig. 53A (type left tarsometatarsus, Brit. Mus. no. 32237a).

PLEISTOCENE. NEW ZEALAND.

Neospecies of Apterygidae from Quaternary sites:

1. *Apteryx australis* Shaw. NEW ZEALAND: SOUTH ISLAND: Timaru and Nelson (Lydekker, 1891, p. 216); Pyramid Valley (Scarlett, 1955, *Rec. Canterbury Mus.*, vol. 6, no. 4, p. 261). NORTH ISLAND: Waingongoro (Lydekker, 1891, p. 217).

2. *Apteryx owenii* Gould. NEW ZEALAND: SOUTH ISLAND? (Lydekker, 1891, p. 218). NORTH ISLAND: Akiteo, Kamao, Opito, Hukanui, Pigeon Bush, and Rangatapu Pa (Scarlett, 1962, *Notornis*, vol. 10, p. 84).

3. *Apteryx haastii* Potts. NEW ZEALAND: SOUTH ISLAND: Nelson (Lydekker, 1891, p. 217).

Infraclass CARINATAE Merrem¹

- Aves Carinatae* Merrem, 1813, Abh. Akad. Wiss. Berlin, p. 259.—*Carinatae* Huxley, 1887, Proc. zool. Soc. London, p. 418 (order).
Neognathae Pycraft, 1900, Trans. zool. Soc. London, vol. 15, p. 149.

Order GAVIIFORMES Wetmore and W. D. Miller

- Enaliornithes* Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, p. 1543 ("gens;" type *Enaliornis* Seeley).
Colymbiformes Sharpe, 1891, Review Recent Attempts to Classify Birds, p. 71 (order; type *Colymbus* Linnaeus, i.e. loons).—*Colymbi* Gadow, 1893, Bronn Klass. Ordn., Vögel, pt. 2, pp. 76, 121, 299 (Unterordnung, for loons).
Gaviiformes Wetmore and W. D. Miller, 1926 (July), Auk, vol. 43, no. 3, p. 340 (type *Gavia* Forster).

Family †ENALIORNITHIDAE Fürbringer

- Enaliornithidae* Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, pp. 1152, 1426 note, 1543, 1565 (type *Enaliornis* Seeley).

Genus †*Enaliornis* Seeley

- Palaeocolyntus* [sic] Seeley, 1864, Proc. Cambridge philos. Soc., vol. 1, p. 228 (nomen nudum, title only, no text).
Pelargonis [sic] Seeley, 1864, op. cit., p. 228 (nomen nudum, title only).
Pelargonis Seeley, 1866, Ann. Mag. nat. Hist., ser. 3, vol. 18, p. 110 (nomen nudum).—Seeley, 1876, Quart. Jour. geol. Soc. London, vol. 32, p. 497 footnote (type by monotypy *Pelargonis sedgwicki* Seeley; name available from this date, but rejected by Seeley and preoccupied by *Pelargonis* Lartet, 1857).
Enaliornis Seeley, 1869, Index to the fossil remains of Aves, Ornithosauria, and Reptilia from the secondary system of strata arranged in the Woodwardian Museum of the University of Cambridge, p. xvii (nomen nudum; the reference to p. 7 of this work is merely a list of elements, without description or name).—Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 499 (name valid from this date; type by present designation *Enaliornis barretti* Seeley).
Palaeocolymbus Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 497 footnote (name available from this date, but rejected by Seeley; type by monotypy *Palaeocolymbus barretti* Seeley).

1. *Enaliornis barretti* Seeley

- Palaeocolyntus* [sic] *Barretti* Seeley, 1864, Proc. Cambridge philos. Soc., vol. 1, p. 228 (nomen nudum, title of article only).
Pelargonis Barretti Seeley, 1866, Ann. Mag. nat. Hist., ser. 3, vol. 18, p. 110 (nomen nudum).—Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 496.
Enaliornis Barretti Seeley, 1869, Index Aves Woodwardian Mus., p. xvii (nomen nudum).—Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 499, pl. 26, fig. 1-11, 14-27; pl. 27, fig. 1-5, 19-25 (original description;

¹New rank.

lectotype by present designation from near Cambridge, distal end of left tarsometatarsus, coll. of T. Jesson; cast Brit. Mus. no. A.1112).
Palaeocolymbus Barretti Seeley, 1876, op. cit., p. 497 footnote.

LOWER CRETACEOUS, ALBIAN (Upper Greensand). ENGLAND: Cambridgeshire: probably near Coldham Common or Granchester.

2. *Enaliornis sedgwicki* Seeley

Pelargonis [sic] *Sedgwicki* Seeley, 1864, Proc. Cambridge philos. Soc., vol. 1, p. 228 (title of article only).

Enaliornis Sedgwicki Seeley, 1869, Index Aves Woodwardian Mus., p. xvii (nomen nudum).—Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 501, pl. 26, fig. 12-13; pl. 27, fig. 6-7, 9-11, 13-18 (original description; lectotype by present designation, from near Cambridge, proximal end of right tibiotarsus, Woodwardian Mus.).

Pelagornis Sedgwicki Seeley, 1876 (after June 7), Quart. Jour. geol. Soc. London, vol. 32, p. 497 footnote.

LOWER CRETACEOUS, ALBIAN (Upper Greensand). ENGLAND: Cambridgeshire: probably near Coldham Common or Granchester.

Family †LONCHODYTIDAE Brodkorb

Lonchodytidae Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000 (type *Lonchodytes* Brodkorb).

Genus †*Lonchodytes* Brodkorb

Lonchodytes Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000 (type by original designation *Lonchodytes estesi* Brodkorb).

1. *Lonchodytes estesi* Brodkorb

Lonchodytes estesi Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000, fig. 1-2 (type from Lance Creek, distal part of right tarsometatarsus, Univ. Calif. Mus. Paleo. no. 53954).

UPPER CRETACEOUS, MAESTRICHTIAN (Lance formation). WYOMING: Niobrara County: Lance Creek.

2. *Lonchodytes pterygius* Brodkorb

Lonchodytes pterygius Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000, fig. 3 (type from Lance Creek, distal part of left carpo-metacarpus, Univ. Calif. Mus. Paleo. no. 53961).

UPPER CRETACEOUS, MAESTRICHTIAN (Lance formation). WYOMING: Niobrara County: Lance Creek.

Family GAVIDAE Allen

- Colymbidae* "Leach," Vigors, 1825, Trans. Linn. Soc. London, vol. 14, p. 498 (type *Colymbus* Linnaeus, i.e., loons, in contrast with *Podiceps* Latham).
Colymbinae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 62 (subfamily for loons).
Urinatoridae Ridgway, 1887, Man. N. Amer. Birds, pp. 4, 6 (type *Urinator* Cuvier, 1800, a junior synonym of *Gavia* Forster, 1788).
Gaviidae J. A. Allen, 1897 (July), Auk, vol. 14, no. 3, p. 312 (type *Gavia* Forster).

Subfamily †COLYMBOIDINAE Brödkorb¹Genus †*Eupterornis* Lemoine

- Eupterornis* Lemoine, 1878, Recherches sur les oiseaux fossiles des terrains tertiaires inférieurs des environs de Reims, vol. 1, p. 56 (type by monotypy *Eupterornis remensis* Lemoine). Position tentative.

1. *Eupterornis remensis* Lemoine

- Eupterornis remensis* Lemoine, 1878, op. cit., pp. 12, 56, pl. 5, fig. 1-6 (types distal half of left ulna, phalanx 1 of index finger).

UPPER PALEOCENE (conglomerate de Cernay). FRANCE: Dept. Marne: Châlons-sur-Vesle near Soissons.

Genus †*Colymboides* Milne-Edwards

- Colymboides* Milne-Edwards, 1867, Ois. Foss. France, vol. 1, pl. 54, fig. 1-14; Milne-Edwards, 1868, op. cit., vol. 1, sheet 38, p. 297 (type by monotypy *Colymboides minutus* Milne-Edwards).
Hydrornis Milne-Edwards, 1867, Ois. Foss. France, vol. 1, pl. 57, fig. 18-22; Milne-Edwards, 1868, op. cit., vol. 1, sheet 46, p. 362 (type by monotypy *Hydrornis natator* Milne-Edwards).
Dyspetornis Oberholser, 1905 (May 13), Smithsonian misc. Coll., vol. 48, pt. 1, no. 1579, p. 61 (new name for *Hydrornis* Milne-Edwards, preoccupied by *Hydrornis* Blyth, 1843).

2. *Colymboides anglicus* Lydekker

- Colymboides anglicus* Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 192, fig. 43 (type left coracoid, Brit. Mus. no. 30330).

UPPER EOCENE (Hordwell beds). ENGLAND: Hampshire: Hordwell.

¹New subfamily. Type *Colymboides* Milne-Edwards. Storer (1956, Condor, vol. 58, pp. 413-426, fig. 1-4) enumerates many morphological differences between *Colymboides* and modern loons. In addition the hypotarsus of *Colymboides* presents an almost procellariine appearance, with two or three closed canals followed by grooves behind, and with the main hypotarsal ridges far separated on the plantar surface. In *Gavia* a single immense ring, formed by fusion of the main hypotarsal ridges, encloses all the plantar tendons.

3. *Colymboides minutus* Milne-Edwards

Colymboides minutus Milne-Edwards, 1867, Ois. Foss. France, pl. 54, fig. 1-14; 1868, vol. 1, sheet 38, p. 297 (types right humerus, right ulna, 2 left femora, Paris Mus.).

Hydrornis natator Milne-Edwards, 1867, Ois. Foss. France, vol. 1, pl. 57, fig. 18-22; 1868, sheet 46, p. 362 (type right tarsometatarsus, Paris Mus.).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy.

Subfamily †GAVIELLINAE Wetmore

Gaviellinae Wetmore, 1940 (Jan. 2), Jour. Morphol., vol. 66, no. 1, p. 30 (type *Gaviella* Wetmore).

Genus †*Gaviella* Wetmore

Gaviella Wetmore, 1940 (Jan. 2), Jour. Morphol., vol. 66, no. 1, p. 28 (type by original designation *Gavia pusilla* Shufeldt).

4. *Gaviella pusilla* (Shufeldt)

Gavia pusilla Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 70, pl. 13, fig. 106 (type proximal portion of left carpometacarpus, Yale Peabody Mus. no. 864).

OLIGOCENE (White River group). WYOMING: Niobrara County: near Lusk.

Subfamily GAVIINAE (Allen)

Gaviinae Wetmore, 1940 (Jan. 2), Jour. Morphol., vol. 66, no. 1, p. 30.

Genus *Gavia* Forster¹

Colymbus Linnaeus, 1758, Syst. Nat., ed. 10, vol. 1, p. 135 (type *Colymbus arcticus* Linnaeus, designated by Gray, 1855, Cat. Gen. Subgen. Birds, p. 125, and by Lawrence, 1858, Rept. Expl. Surv. R.R. Pac., vol. 9, p. 887). Generic name suppressed by the International Commission, when it could not decide which was the type species.²

Gavia Forster, 1788, Enchiridion historiae naturali, p. 38 (type *Colymbus immer* Brunnich; see Allen, 1907, Bull. Am. Mus. nat. Hist., vol. 23, p. 290).

¹*Gavia*, sp. indet., recorded from Middle Miocene (Calvert formation) near Plum Point, Calvert County, Maryland (Wetmore, 1941, Auk, vol. 58, p. 567).

²It would seem that *Colymbus* should be restored as the generic name of the loons, with the names of the corresponding higher taxa altered accordingly. The designation of *Colymbus arcticus* as type of the genus long antedates the designation of a grebe, *Colymbus cristatus* Linnaeus, by Baird, Brewer, and Ridgway (1884, Water Birds N. Amer., vol. 2, p. 425) and by Hellmayr and Conover (1948, Field Mus. Publ., zool. ser., vol. 13, pt. 1, no. 2, p. 18). The action of Brisson (1760, Ornithologia, vol. 6, p. 33) in "eliminating" the loons from *Colymbus* appears to have no bearing under the rules as written, in spite of the urging of Stejneger (1882, Proc. U. S. nat. Mus., vol. 5, p. 42) and Allen (1897, Auk, vol. 14, p. 312), who were operating under a different code. Salomonsen (1951, Proc. X internat. ornith. Congress, pp. 149-154) has outlined the history of this nomenclatorial controversy. I use *Gavia* here, with reluctance, in deference to the International Commission.

5. *Gavia palaeodytes* Wetmore

Gavia palaeodytes Wetmore, 1943 (June 23), Proc. New England zool. Club, vol. 22, p. 64, fig. 1-2 (type from Pierce, left coracoid, Mus. Comp. Zool. Harvard no. 2369; cast Brodkorb coll.).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Pierce (Wetmore, 1943); Brewster (Brodkorb, 1953, Condor, vol. 55, p. 212).

6. *Gavia concinna* Wetmore

Gavia concinna Wetmore, 1940 (Jan. 2), Jour. Morphol., vol. 66, no. 1, p. 25, fig. 1-4 (type from Sweetwater Canyon, proximal portion of left ulna, U. S. Nat. Mus. no. 16160).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: near Brewster (Brodkorb, 1953, Condor, vol. 55, p. 211).

MIDDLE PLIOCENE (Etchegoin formation). CALIFORNIA: Monterey County: Sweetwater Canyon east of King City (Wetmore, 1940).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego (Howard, 1949, Publ. Carnegie Instn. Washington, no. 584, p. 185).

7. *Gavia howardae* Brodkorb

Gavia howardae Brodkorb, 1953 (July 20), Condor, vol. 55, no. 4, p. 212, fig. 1B (type from San Diego, distal portion of left humerus, Los Angeles Mus. no. 2111).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego. Reported in error from Florida (Wetmore, 1956, Smithsonian misc. Coll., vol. 131, no. 5, p. 7).

8. *Gavia portisi* (Regàlia)

Colymbus portisi Regàlia, 1902, Palaeontogr. italiana, vol. 8, p. 231, pl. 27, fig. 19-20 (type from Orciano Pisano, cervical vertebra, Roberto Lawley coll. on deposit in Istituto di Studi Superiori in Florence).

MIDDLE PLIOCENE (argille marine). ITALY: provincia di Pisa: Orciano Pisano near Valle di Fine.

Neospecies of Gaviidae from Pleistocene and *prehistoric sites:

1. *Gavia stellata* (Pontoppidan). DENMARK: Mejlgård, Havnøe, Erteboelle, Gudumlund, Klintesøe, Havelse, Soelager, Orum Aa, and *Kolding Fjord

(H. Winge, 1903, Vidensk. Meddel. naturh. Foren. Copenhagen, vol. 6, p. 91). IRELAND: Shandon cave (Lydekker, 1891, Ibis, p. 394). ENGLAND: Mundesley (E. T. Newton, 1883, Geol. Mag., p. 97, pl. 3). ITALY: Grotta Romanelli and Grotta dei Colombi? (Lambrecht, 1933, Handb. Palaeorn., p. 731). ALASKA: *St. Lawrence Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 86); *Amaknak Island and *Cape Denbeigh (Friedmann, 1934, op. cit., pp. 231, 237); *Kodiak Island (Friedmann, 1935, op. cit., vol. 25, p. 46); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405). CALIFORNIA: Newport Bay (Howard, 1958, Condor, vol. 60, p. 136); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 326).

2. *Gavia arctica* (Linnaeus). DENMARK: Fannerup, Mejlgaard, Erteboelle, Maglemose, Klintese, Soelager, *Borresbjerg, and *Kolding Fjord (H. Winge, 1903, Vidensk. Meddel. naturh. Foren. Copenhagen, vol. 6, p. 91). ALASKA: *St. Lawrence Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 86); *Kodiak Island (Friedmann, 1935, op. cit., vol. 25, p. 46); *Dutch Harbor (Friedmann, 1937, op. cit., vol. 27, pp. 432, 435); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405). WASHINGTON: *Puget Sound (L. Miller, 1960, Wilson Bull., vol. 72, p. 394). CALIFORNIA: San Pedro and *Newport Bay (Howard, 1949, Condor, vol. 51, p. 21); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228).

3. *Gavia immer* (Brünnich). NORWAY: Vardo (Lambrecht, 1933, Handb. Palaeorn., p. 731). IRELAND: Edenvale Cave (Lambrecht, 1933). ALASKA: *Kodiak Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 234); *Little Kiska Island (Friedmann, 1937, op. cit., vol. 27, p. 436); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405). WASHINGTON: *Puget Sound (L. Miller, 1960, Wilson Bull., vol. 72, p. 394). CALIFORNIA: San Pedro? (L. Miller, 1914, Univ. Calif. Publ. Geol., vol. 8, p. 33); Del Rey Hills? (Howard, 1936, Condor, vol. 38, p. 211); Lomita? (Howard, 1944, Bull. S. Calif. Acad. Sci., vol. 43, pt. 2, p. 75); Newport Bay (Howard, 1949, Condor, vol. 51, p. 21); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 325). NOVA SCOTIA: *Bear River and *Timber Island Brook (Halifax Mus.). MARYLAND: between Chesapeake Beach and Plum Point (Wetmore, 1962, Smithsonian misc. Coll., vol. 145, no. 2, p. 3). FLORIDA: Lake Monroe (Brodkorb, 1953, Condor, vol. 55, p. 214); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185); Wakulla Spring (Brodkorb coll.); *Big Pine Key (Wetmore, 1935, Auk, vol. 52, p. 300); *Good's shellpit (Neill, Gut, and Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388); *Green Mound (Hamon, 1959, Auk, vol. 76, p. 533); *Summer Haven (Brodkorb, 1960, Auk, vol. 77, p. 342). The supposed records from DENMARK (Lambrecht, loc. cit.) refer to *Gavia arctica*.

4. *Gavia adamsii* (Gray). ALASKA: *St. Lawrence Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 86); *Amaknak Island, *Cape Denbeigh, and *Kowieruk (Friedmann, 1934, op. cit., pp. 231, 237); *Kodiak Island (Friedmann, 1935, op. cit., vol. 25, p. 46); *Dutch Harbor and *Little Kiska (Friedmann, 1937, op. cit., vol. 27, pp. 432, 435-436); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405).

Order PODICIPEDIFORMES (Fürbringer)

Podicipitiformes Fürbringer, 1888, *Untersuch. Morph. Syst. Vögel*, vol. 2, pp. 1543, 1565 (subordo; type *Podiceps* Latham).—*Podicipediformes* Sharpe, 1891, *Review Recent Attempts to Classify Birds*, p. 71 (order).—*Podicipedes* Gadow, 1893, *Bronn Klass. Ordn., Vögel*, pt. 2, pp. 76, 121, 299 (Unterordnung).

Family †BAPTORNITHIDAE American Ornithologists' Union

Baptornithidae American Ornithologists' Union, 1910, *Check-list North Amer. Birds*, ed. 3, p. 378 (type *Baptornis* Marsh).

Genus †*Baptornis* Marsh

Baptornis Marsh, 1877, *Amer. Jour. Sci.*, ser. 3, vol. 14, p. 86 (type by monotypy *Baptornis advenus* Marsh).

1. *Baptornis advenus* Marsh

Baptornis advenus Marsh, 1877, *Amer. Jour. Sci.*, ser. 3, vol. 14, p. 86 (type from Wallace Co., juvenile right tarsometatarsus, Yale Peabody Mus. no. 1465).

UPPER CRETACEOUS, CONIACIAN (Smöky Hill chalk member of Niobrara formation). KANSAS: Wallace County (Marsh, 1877); Butte Creek in Logan County (Lambrecht, 1933, *Handb. Palaeorn.*, p. 258).

Genus †*Neogaeornis* Lambrecht

Neogaeornis Lambrecht, 1929, *Pal. Zeitschr.*, vol. 11, p. 121 (type by monotypy *Neogaeornis wetzeli* Lambrecht).

2. *Neogaeornis wetzeli* Lambrecht

Neogaeornis wetzeli Lambrecht, 1929, *Pal. Zeitschr.*, vol. 11, p. 121, fig. 1-4 (type from San Vicente Bay, tarsometatarsus, Kiel Univ. Mus.).

UPPER CRETACEOUS, MAESTRICHTIAN (Quiriquina beds). CHILE: Prov. Concepción: west end of San Vicente Bay, Tumbes peninsula (Lambrecht, 1929); Cerro del Conejo, Vegas del Gualpen, southeast of San Vicente in Dept. Talcahuano (Schneider, 1940, *Revista Chilena Hist. Nat.*, p. 51).

Family PODICIPEDIDAE (Bonaparte)

Podicepinae Bonaparte, 1831, *Saggio di una distribuzione metodica degli Animali Vertebrati*, p. 62 (type *Podiceps* Latham).—*Podicipidae* Bonaparte, 1853, *C. R. Acad. Sci. Paris*, vol. 37, no. 18, p. 646.—*Podicipedidae* Coues, 1880 (Sept. 30), *Bull. U. S. geol. geog. Surv. Terr.*, vol. 5, no. 4, p. 1039.—*Podicipitidae* Forbes, 1884 (Jan.), *Ibis*, ser. 5, vol. 2, no. 5, p. 119.—*Podicipetidae* Allen, 1907 (Apr. 15), *Bull. Amer. Mus. Nat. Hist.*, vol. 23, p. 287.

Genus *Podiceps* Latham

Podiceps Latham, 1787, Supplement to the General Synopsis of Birds, vol. 1, p. 294 (type *Colymbus cristatus* Linnaeus).

1. *Podiceps oligoceanus* (Shufeldt)

Colymbus oligoceanus Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 54 (type distal part of left femur, Yale Peabody Mus. no. 983).—Wetmore, 1937, Proc. California Acad. Sci., ser. 4, vol. 23, no. 13, p. 197, fig. 6-7 (type restudied).

LOWER MIOCENE (John Day formation). OREGON: Malheur County: lower reaches of Willow Creek.

2. *Podiceps pisanus* (Portis)

Eulica pisanus Portis, 1889, Gli ornitoliti del Valdarno superiore e di alcune altre località plioceniche di Toscana, p. 13, fig. 24-25 (type distal part of right humerus, Istituto di Studi Superiori, Florence).—*Podicipes pisanus* Regalia, 1902, Palaeontogr. ital., vol. 8, p. 233, pl. 27 (1), fig. 21-22 (type restudied).

MIDDLE PLIOCENE (argille marine). ITALY: prov. di Pisa: Orciano Pisano near Valle di Fine.

3. *Podiceps subparvus* (L. Miller and Bowman)

Colymbus subparvus L. Miller and Bowman, 1958 (March 6), Los Angeles County Mus., Contr. in Sci., no. 20, p. 6, fig. 5 (type distal part of right femur, Los Angeles Mus. no. 2568).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego (Washington Boulevard freeway south of University Avenue).

4. *Podiceps parvus* (Shufeldt)

Colymbus parvus Shufeldt, 1913 (July 9), Bull. Amer. Mus. Nat. Hist., vol. 32, art. 6, p. 136 in part, p. 155 in part, pl. 39, fig. 477 only (lectotype from Fossil Lake, right tarsometatarsus, Am. Mus. Nat. Hist. no. 3570, selected by Wetmore, 1937, Proc. California Acad. Sci., ser. 4, vol. 23, p. 199, fig. 14-15).

LOWER PLEISTOCENE (Tulare formation). CALIFORNIA: Kern County: Standard Oil Company well, Title and Guaranty and Trust no. 1, in section 1, Township 25 South, Range 23 East (Wetmore, 1937).

MIDDLE PLEISTOCENE (Fossil Lake formation). OREGON: Lake County: Fossil Lake (Shufeldt, 1913).¹

¹Records from the Middle Pliocene San Diego formation of California (Miller and Bowman, 1958) probably refer to some other species.

5. *Podiceps dixi* Brodkorb

Podiceps dixi Brodkorb, 1963 (in press), Quart. Jour. Florida Acad. Sci., vol. 26, no. 1, p. 000, fig. 1-2 (type from Reddick, proximal part of right carpo-metacarpus, Brodkorb no. 1113).

MIDDLE PLEISTOCENE (Reddick beds). FLORIDA: Marion County: Dixie Lime Products Company mine, 1 miles south of Reddick.

Genus †*Pliodytes* Brodkorb

Pliodytes Brodkorb, 1953 (Dec.), Ann. Mag. nat. Hist., ser. 12, vol. 6, p. 953 (type by original designation *Pliodytes lanquisti* Brodkorb).

6. *Pliodytes lanquisti* Brodkorb

Pliodytes lanquisti Brodkorb, 1953 (Dec.), Ann. Mag. Nat. Hist., ser. 12, vol. 6 p. 953, fig. (type from Brewster, right coracoid, Brodkorb no. 299).

LOWER PLIOCENE (Boné Valley gravel). FLORIDA: Polk County: south of Brewster.

Neospecies of Podicipedidae from Pleistocene and *prehistoric sites:

1. *Podiceps ruficollis* (Pallas). DENMARK: Ertebølle and Soelager (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 90). IRELAND: Newhall Cave and Edenvale Cave (Lambrecht, 1933, Handb. Palaeorn., p. 731). ITALY: Grotta dei Colombi (Lambrecht, 1933). GERMANY: Weimar-Taubach (Lambrecht, 1933).

2. *Podiceps dominicus* (Linnaeus). BRAZIL: Lapa da Escrivania (O. Winge, 1887, E Mus. Lünd., vol. 1, no. 2, p. 25).

3. *Podiceps rufopectus* (Gray). NEW ZEALAND: *Pyramid Valley Swamp (Scarlett, 1955, Rec. Canterbury Mus., vol. 6, p. 261).

4. *Podiceps auritus* (Linnaeus). ITALY: Grotta Romanelli, Terra d'Otranto, and Grotta dei Colombi (Lambrecht, 1933, Handb. Palaeorn., p. 731). HUNGARY: Pilisszanto (Lambrecht, 1913, Aquila, vol. 20, p. 428). MONGOLIA: Sjara-Ossogol, Ordos (Lambrecht, 1933, p. 731). ALASKA: *Kodiak Island (Friedmann, 1935, Jour. Washington Acad. Sci., vol. 25, p. 46). CALIFORNIA: San Pedro? (Howard, 1949, Condor, vol. 51, p. 21). NOVA SCOTIA: *Whynacht (Halifax Mus.). TENNESSEE: bone caves (Shufeldt, 1897, Amer. Natural., vol. 31, p. 646). FLORIDA: Seminole Field (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 12); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185). Eocene records include Fossil Lake, Oregon (Shufeldt, 1892, Jour. Acad. nat. Sci. Philadelphia, vol. 9, p. 396; corrected by Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, p. 148), and Itchtucknee River, Florida (Wetmore, 1931, p. 12), the latter based on a large humerus of *Podilymbus podiceps*, formerly Florida Geol. Surv. no. V-4619, now Brodkorb no. 8001.

5. *Podiceps caspicus* (Hablizl). HUNGARY: Nagyharsany Berg? (Lambrecht, 1916, Aquila, vol. 22, p. 174). WASHINGTON: *Puget Sound (L. Miller, 1960, Wil-

son Bull., vol. 72, p. 394). OREGON: Fossil Lake (Shufeldt, 1892, Jour. Acad. nat. Sci. Philadelphia, vol. 9, p. 396). CALIFORNIA: San Pedro (Howard, 1949, Condor, vol. 51, p. 21); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). NEVADA: Smith Creek Cave (Howard, 1952, Bull. S. Calif. Acad. Sci., vol. 51, pt. 2, p. 54). KANSAS: Jones Sink (Downs, 1954, Condor, vol. 56, p. 209). Recorded also from Middle Pliocene Edson beds of Ogallala formation, Sherman County, Kansas (Wetmore, 1937), Condor, vol. 39, p. 40), but needs comparison with newly described forms.

6. *Podiceps cristatus* (Linnaeus). DENMARK: Mejlgaard, Havnoe, Krabbeholm, Virksund, Erteboelle, Maglemose, Klintesoe, Hoensehals, Havelse, Soelager, Aalborg, and *Roesborg Soe (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 90). SWEDEN: near Önnarup (Lambrecht, 1933, Handb. Palaeorn., p. 731). IRELAND: Kesh Cave, Edenvale Cave, Bantick Cave, and Newhall Cave (Lambrecht, 1933). ENGLAND: Cambridgeshire fens (Milne-Edwards, 1868, Ibis, p. 364). ITALY: Grotta Romanelli (Lambrecht, 1933).

7. *Podiceps grisegena* (Boddaert). DENMARK: Erteboelle (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 90). CZECHOSLOVAKIA: Certova dira (Capek, 1910, Ber. V Internat. Orn. Kongr. Berlin, p. 941). ITALY: Grotta dei Colombi? (Lambrecht, 1933, Handb. Palaeorn., p. 731). ALASKA: *Kodiak Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 234). WASHINGTON: *Puget Sound (L. Miller, 1960, Wilson Bull., vol. 72, p. 394). NOVA SCOTIA: *Whynacht (Halifax Mus.). Recorded in error from Fossil Lake, Oregon (Shufeldt, 1892, Jour. Acad. nat. Sci. Philadelphia, vol. 9, p. 396; see Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, pp. 148, 190).

8. *Aechmophorus occidentalis* (Lawrence). WASHINGTON: *Puget Sound (L. Miller, 1960, Wilson Bull., vol. 72, p. 394). OREGON: Fossil Lake (*Aechmophorus lucasi* L. Miller, Feb. 4, 1911, Univ. Calif. Publ. Geol., vol. 6, no. 4, p. 83, fig. 1-3; types tarsometatarsus, coracoid, femur, Univ. Calif. Mus. Paleo. nos. 12603-12605). CALIFORNIA: Rodeo and San Pedro (L. Miller, 1912, Univ. Calif. Publ. Geol., vol. 7, pp. 112, 115); Manix (Compton, 1934, Condor, vol. 36, p. 168); Del Rey Hills (Howard, 1936, Condor, vol. 38, p. 211); Newport Bay (Howard, 1949, Condor, vol. 51, p. 21); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 329); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). Specimens from Fossil Lake and some of the Californian localities average large and are perhaps recognizable as a temporal subspecies, *Aechmophorus occidentalis lucasi* L. Miller.

9. *Podilymbus podiceps* (Linnaeus). OREGON: Fossil Lake (*Podilymbus magnus* Shufeldt, July 9, 1913, Bull. Amer. Mus. nat. Hist., vol. 32, art. 6, pp. 136, 155 in part, pl. 38, fig. 439-440, 449 only; types two left tarsometatarsi, AMNH no. 3574). CALIFORNIA: McKittrick (L. Miller, 1925, Univ. Calif. Publ. Geol. Sci., vol. 15, p. 307); Rancho La Brea (Howard, 1936, Condor, vol. 38, p. 34); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). NEVADA: Smith Creek Cave (Howard, 1952, Bull. S. Calif. Acad. Sci., vol. 51, pt. 2, p. 54). ARIZONA: *Grand Falls (Hargrave, 1939, Condor, vol. 41, p. 207). TEXAS: Groesbeck Creek (Midwestern Univ.). ARKANSAS: *Lake Texarkana (Southern Methodist Univ.). FLORIDA: Seminole Field and Itchtucknee River (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 12); Haile (Brodkorb, 1953, Wilson Bull., vol. 65, p. 49); Reddick (Brodkorb, 1957, Jour. Paleont.,

vol. 31, p. 134); Arredondo (Brodkorb, 1959, Bull. Florida State Mus., vol. 4, p. 273); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185); Vero Beach, stratum 2 (Weigel, 1963, Florida geol. Surv. Spec. Publ., no. 10, p. 25); Santa Fe River (Brodkorb, 1963, Auk, vol. 80, p. 115); Jennys Spring, Hornsby Spring, and Lake Monroe (Brodkorb coll.); Bradenton (Univ. Florida); Bluffton, *Good's shellpit, *Lemon Bluff, and *Silver Glen Springs (Neill, Gut, and Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388); *South Indian Field (Weigel, 1959, Florida Anthropologist, vol. 12, p. 73). PUERTO RICO: *Barrio Canas (Wetmore, 1938, Auk, vol. 55, p. 53). MEXICO: near Tepexpan (Wetmore, 1949, Condor, vol. 51, p. 150). BRAZIL: Lapa da Escrivania (Ó. Winge, 1887, E Mus. Lund., vol. 1, pt. 2, pp. 4, 25). Specimens from Fossil Lake and some of the Floridian localities average large and are perhaps recognizable as a temporal subspecies, *Podilymbus podiceps magnus* Shufeldt.

Order SPHENISCIFORMES Sharpe

Sphenisciformes Sharpe, 1891, Review of Recent Attempts to Classify Birds, p. 71 (type *Spheniscus* Brisson).

Family SPHENISCIDAE Bonaparte¹

Spheniscidae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 62 (type *Spheniscus* Brisson).

Subfamily †PALAEUDYPTINAE Simpson

Palaeudyptinae Simpson, 1946 (Aug. 8), Bull. Amer. Mus. nat. Hist., vol. 87, p. 69 (type *Palaeudyptes* Huxley).

Anthropornithinae Simpson, 1946 (Aug. 8), Bull. Amer. Mus. nat. Hist., vol. 87, p. 69 (type *Anthropornis* Wiman).

Genus †*Palaeudyptes* Huxley

Palaeudyptes Huxley, 1859, Quart. Jour. geol. Soc. London, vol. 15, p. 670 (type by monotypy *Palaeudyptes antarcticus* Huxley).

1. *Palaeudyptes marplei* Brodkorb²

UPPER EOCENE (Burnside marl). NEW ZEALAND: SOUTH ISLAND: Burnside near Dunedin in Otago.

UPPER EOCENE (Transitional marl member of Blanche Point marls). SOUTH AUSTRALIA: Witton Bluff, at south end of Christie's Beach, 16 miles south of Adelaide (*Palaeudyptes* cf. *antarcticus* Simpson, 1957, Rec. S. Austr. Mus., vol. 13, no. 1, p. 52, fig. 1; S. Austr. Mus. no. P10870).

2. *Palaeudyptes antarcticus* Huxley

Palaeudyptes antarcticus Huxley, 1859, Quart. Jour. geol. Soc. London, vol. 15, p. 670, fig. 1-2 (type from Kakanui, right tarsometatarsus, Brit. Mus. no. A.1048).

LOWER OLIGOCENE (type apparently from Kakanui limestone; others from the younger Maerewhenua greensand). NEW ZEALAND: SOUTH ISLAND: Kakanui near Oamaru (Huxley, 1859); Duntroon, Earth-

¹A fragmentary femur of an unidentified penguin has been recorded from the Lower Eocene Heretaungan stage at Gore Bay, Cheviot, New Zealand (Marples, 1952, Pal. Bull., N. Zealand geol. Survey no. 20, p. 51).

²New species. Type from Burnside marl, left tarsometatarsus, Otago Mus. no. C.50.28; associated elements, Otago Mus. nos. C.50.25-47; referred specimens, Otago Mus. nos. C.48.73-81. Tarsometatarsus large and stout, with internal edge of shaft strongly concave (in *P. antarcticus* tarsometatarsus smaller, with internal edge nearly straight). Femur likewise large. Humerus short, with shaft sigmoid instead of straight. Ulna small. See Marples, 1952, Pal. Bull. N. Zealand geol. Surv., no. 20, pp. 31, 53, 55, 56, pl. 2, fig. 1; pl. 4, fig. 5; pl. 5; fig. 3, 6; pl. 8, fig. 1, 10, 11.

quakes near Duntroon, and Seal Rock near Brighton (Marples, 1952, Pal. Bull. N. Zealand geol. Surv., no. 20, p. 28).

MIDDLE OLIGOCENE (Burnside greensand). NEW ZEALAND: SOUTH ISLAND: Burnside near Dunedin (Marples, 1952).

MIDDLE? OLIGOCENE (Gambier limestone). SOUTH AUSTRALIA: Pritchard Brothers' Quarry, 7½ miles WNW of Mt. Gambier (Palaeodiptinae, gen. et sp. indet., A, Simpson, 1957, Rec. S. Austral. Mus., vol. 13, p. 56, fig. 3; S. Austral. Mus. no. P 10863); referral tentative.

Genus †*Pachydyptes* Oliver

Pachydyptes Oliver, 1930, New Zealand Birds, p. 86 (type *Pachydyptes ponderosus* Oliver.)

3. *Pachydyptes ponderosus* Oliver

Pachydyptes ponderosus Oliver, 1930, N. Zealand Birds, p. 86, fig. (type from Fortification Hill, humerus, Dominion Mus. at Wellington no. 1450).

UPPER EOCENE (Runangan stage). NEW ZEALAND: SOUTH ISLAND: Fortification Hill near Oamaru (Oliver, 1930); Taylor's quarry at Cormacks near Oamaru (Marples, 1952, N. Z. Geol. Surv. Pal. Bull. 20, p. 37).

Genus †*Archaeospheniscus* Marples

Archaeospheniscus Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 40 (type by original designation *Archaeospheniscus lowei* Marples).

4. *Archaeospheniscus lowei* Marples

Archaeospheniscus lowei Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 40, pl. 2, fig. 4; pl. 4, fig. 4 (type incomplete skeleton, Otago Mus. no. C.47.20).

LOWER OLIGOCENE (Maerewhenua greensand). NEW ZEALAND: SOUTH ISLAND: Duntroon in North Otago.

5. *Archaeospheniscus lopdelli* Marples

Archaeospheniscus lopdelli Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 41, text-fig. 2, pl. 3, fig. 9; pl. 4, fig. 6; pl. 5, fig. 4; pl. 8, fig. 5 (type postcranial skeleton, Otago Mus. no. C.47.21).

LOWER OLIGOCENE (Maerewhenua greensand). NEW ZEALAND: SOUTH ISLAND: Duntroon.

Genus †*Duntroonornis* Marples

Duntroonornis Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 42 (type by original designation *Duntroonornis parvus* Marples);

6. *Dunroonornis parvus* Marples

Dunroonornis parvus Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 42, pl. 8, fig. 3-4 (type left tarsometatarsus, Otago Mus. no. C.47.31).

LOWER OLIGOCENE (Maerewhenua greensand). NEW ZEALAND: SOUTH ISLAND: Dunroon.

Genus †*Platydyptes* Marples

Platydyptes Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 37 (type by original designation *Pachydyptes novaezealandiae* Oliver).

7. *Platydyptes novaezealandiae* (Oliver)

Pachydyptes novaezealandiae Oliver, 1930, N. Zealand Birds, p. 86 (types from Oamaru district, humerus, radius, ulna, scapula, 2 vertebrae, Dominion Mus. no. 1451).

LOWER OLIGOCENE (Maerewhenua greensand). NEW ZEALAND: SOUTH ISLAND: Dunroon (Marples, 1952, Pal. Bull. N. Zealand geol. Surv., no 20, p. 38; needs confirmation, radius and ulna only).

LOWER? OLIGOCENE (Wharekuri limestone?). NEW ZEALAND: SOUTH ISLAND: Waitaki Valley? (not Oamaru as labeled?, Marples, 1952).

MIDDLE? OLIGOCENE (Waitakian stage?). NEW ZEALAND: SOUTH ISLAND: Oamaru district (Oliver, 1930).

8. *Platydyptes amiesi* Marples

Platydyptes amiesi Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 39, pl. 4, fig. 3; pl. 5, fig. 5 (types from Hakataramea valley, humerus; radius, Otago Mus. no. C.50.61).

MIDDLE OLIGOCENE (Waitakian stage). NEW ZEALAND: SOUTH ISLAND: Hakataramea valley in South Canterbury (Marples, 1952); White Rocks near Dunroon (Marples, 1952; possibly Dunroonian age).

Genus †*Korora* Marples

Korora Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20, p. 43 (type by original designation *Korora oliveri* Marples).

9. *Korora oliveri* Marples

Korora oliveri Marples, 1952 (May), Pal. Bull. N. Zealand geol. Surv., no. 20 p. 43, pl. 8, fig. 7-8 (type tarsometatarsus, Otago Mus. no. G.48.7).

MIDDLE OLIGOCENE (Waitakian stage). NEW ZEALAND: SOUTH ISLAND: Hakataramea valley in South Canterbury.

Genus †*Anthropodytes* Simpson

Anthropodytes Simpson, 1959 (July 23), Proc. Roy. Soc. Victoria, vol. 71, pt. 2, p. 113 (type by original designation *Anthropodytes gilli* Simpson).

10. *Anthropodytes gilli* Simpson

Anthropodytes gilli Simpson, 1959 (July 23), Proc. Roy. Soc. Victoria, vol. 71, pt. 2, p. 113, fig. 1 (type right humerus, Nat. Mus. of Victoria, no. P 17167).

LOWER? MIOCENE (Balcombian stage). AUSTRALIA: western Victoria: south end of Devil's Den, on east bank of Glenelg River, north of Dartmoor.

Genus †*Notodyptes* Marples

Notodyptes Marples, 1953 (June), Scient. Rept. Falkland Is. Depend. Surv., no. 5, p. 11 (type by original designation *Notodyptes wimani* Marples).

11. *Notodyptes wimani* Marples

Notodyptes wimani Marples, 1953 (June), Sci. Rept. Falkland Is. Depend. Surv., no. 5, p. 11, pl. 2, fig. 2 (type left tarsometatarsus, Brit. Mus. no. A.3331).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Anthropornis* Wiman

Anthropornis Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 249 (type by monotypy *Anthropornis nordenskjöldi* Wiman).

Pachypteryx Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 250 (type by monotypy *Pachypteryx grandis* Wiman).

12. *Anthropornis nordenskjöldi* Wiman

Anthropornis nordenskjöldi Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 249, pl. 12, fig. 6 (type left tarsometatarsus, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

13. *Anthropornis grandis* (Wiman)

Pachypteryx grandis Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 250, pl. 12, fig. 3 (type distal part of right tarsometatarsus, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Orthopteryx* Wiman

Orthopteryx Wiman, 1905, Wiss. Ergebn. Schwed. Südpolarexped., vol. 3, no. 1, p. 27 (type by monotypy *Orthopteryx gigas* Wiman).

14. *Orthopteryx gigas* Wiman

Orthopteryx gigas Wiman, 1905, Wiss. Ergebn. Schwed. Südpolarexped., vol. 3, no. 1, p. 27, pl. 8, fig. 2 (type pelvis, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Eosphaeniscus* Wiman

Eosphaeniscus Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 280 (type by monotypy *Eosphaeniscus gunnari* Wiman).

Eospheniscus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 97, 132, 165 (emendation).

15. *Eosphaeniscus gunnari* Wiman

Eosphaeniscus gunnari Wiman, 1905, Bull. Geol. Inst. Upsala, vol. 6, p. 280, pl. 12, fig. 5 (type right tarsometatarsus, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Delphinornis* Wiman

Delphinornis Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 250 (type by monotypy *Delphinornis larsenii* Wiman).

16. *Delphinornis larsenii* Wiman

Delphinornis larsenii Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 250; pl. 12, fig. 1 (type left tarsometatarsus, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Ichtyopteryx* Wiman

Ichtyopteryx Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 251 (type by monotypy *Ichtyopteryx gracilis* Wiman).

Ichthyopteryx Lambrecht, 1933, Handb. Palaeorn., p. 231 (emendation).

17. *Ichtyopteryx gracilis* Wiman

Ichtyopteryx gracilis Wiman, 1905, Bull. geol. Instn. Upsala, vol. 6, p. 251, pl. 12, fig. 4 (type distal part of right tarsometatarsus, Upsala Mus.).

LOWER MIOCENE (Seymour Island beds). SEYMOUR ISLAND.

Genus †*Arthrodytes* Ameghino

Arthrodytes Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 143 (type by original designation *Paraptenodytes grandis* Ameghino).

Arthrodytes Simpson, 1957 (Apr. 30), Rec. S. Australian Mus., vol. 13, no. 1, p. 68 (lapsus or misprint for *Arthrodytes*; only included species *Arthrodytes? andrewsi* [Ameghino]).

18. *Arthrodytes grandis* (Ameghino)

Paraptenodytes grandis Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (lectotype from San Julián, distal part of left femur, Ameghino coll. or Buenos Aires Mus., selected by Simpson, 1946, Bull. Amer. Mus. nat. Hist., vol. 87, p. 34).—*Arthrodytes grandis* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 144, 166, pl. 5, fig. 35; pl. 6, fig. 36 (types re-studied).

LOWER MIOCENE (Juliense member of Patagonia formation).
ARGENTINA: Ter. Santa Cruz: San Julián.

Subfamily †PALAEOSPHENISCINAE Simpson

Palaeospheniscinae Simpson, 1946 (Aug. 8), Bull. Amer. Mus. nat. Hist., vol. 87, art. 1, p. 69 (type *Palaeospheniscus* Moreno and Mercerat).

Genus †*Palaeospheniscus* Moreno and Mercerat

Palaeospheniscus Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 16, 29 (type *Palaeospheniscus patagonicus* Moreno and Mercerat, designated by Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 447).

Apterodytes Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (type by monotypy *Apterodytes ictus* Ameghino). Preoccupied by *Apterodytes* J. Hermann, 1783, Tabl. Affin. An., p. 235.

Palaeoapterodytes Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 156 (new name for *Apterodytes* Ameghino, because of similarity to "*Apterodyta* Sop. 1786," i.e. *Apterodita* Scopoli, 1786, Deliciae florae et faunae insubricae, pt. 2, p. 91).

19. *Palaeospheniscus gracilis* Ameghino

Palaeospheniscus gracilis Ameghino, 1899 (July), Sinopsis geológico-paleontológica, Suplemento, p. 9 (type from "Guaranítico de Patagonia," right tarsometatarsus, Ameghino coll.).—Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 111, 163, pl. 2, fig. 9 (type from golfo de San Jorge, re-described).

Apterodytes ictus Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (type from Golfo de San Jorge, proximal half of right humerus, Ameghino coll., perhaps now in Buenos Aires Mus.).—*Palaeoapterodytes ictus* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 120, 164, pl. 3, fig. 16 (type re-described).

Palaeospheniscus medianus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 108, 162, pl. 1, fig. 6 (type from Trelew, right tarsometatarsus, Museo La Plata).

LOWER MIOCENE (Patagonia formation, Juliense member).¹
ARGENTINA: Ter. Chubut: Gulf of San Jorge and Trelew (Ameghino, 1905).

20. *Palaeospheniscus patagonicus* Moreno and Mercerat

Palaeospheniscus patagonicus Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 16, 31; 1891 (Aug. 5), pl. 1, fig. 7-9, 12-13,

¹Type of *P. gracilis* attributed to Oligocene Deseado formation, but according to Simpson, 1946, probably drift from basal part of Patagonian.

15-16, 21, 23, 27; pl. 2, fig. 5 (lectotype from Trelew, left tarsometatarsus, La Plata Mus. no. 34, designated by Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 447).

LOWER MIOCENE (Patagonia formation, Juliense member). ARGENTINA: Ter. Chubut: Trelew.

21. *Palaeospheniscus menzbieri* Moreno and Mercerat

Palaeospheniscus menzbieri Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 17, 33; 1891 (Aug. 5); pl. 1, fig. 3, 5-6, 10-11, 14, 17, 22, 24; pl. 2, fig. 6 (lectotype from Ter. Chubut, right tarsometatarsus, Mus. La Plata no. 62, designated by Ameghino, 1891, Rev. arg. Hist. nat., vol. 1, p. 447). Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 103, 162, pl. 1, fig. 3 (type from Trelew redescribed).

Palaeospheniscus interruptus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 104, 162, pl. 1, fig. 4 (type from Trelew, right tarsometatarsus, Mus. La Plata).

[?] *Palaeospheniscus planus* Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 109, 163, pl. 1, fig. 7; pl. 2, fig. 7 (type from Golfo de San Jorge, left tarsometatarsus, coll. Ameghino).

LOWER MIOCENE (Patagonia formation, Juliense member). ARGENTINA: Ter. Chubut: Trelew; Golfo de San Jorge.

22. *Palaeospheniscus rothi* Ameghino

Palaeospheniscus rothi Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 110, 163, pl. 2, fig. 8 (type from Trelew, left tarsometatarsus, La Plata Mus.).

Palaeospheniscus intermedius Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 113, 163, pl. 2, fig. 10 (type from Golfo de San Jorge, left tarsometatarsus, Ameghino coll.).

Palaeospheniscus affinis Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 114, 163, pl. 2, fig. 11 (type from Trelew, left tarsometatarsus, La Plata Mus.).

LOWER MIOCENE (Patagonia formation, Juliense member). ARGENTINA: Ter. Chubut: Trelew; Golfo de San Jorge.

Genus †*Perispheniscus* Ameghino

Perispheniscus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 117 (type by monotypy *Perispheniscus wimani* Ameghino).

Treleudytes Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 156 (type by monotypy *Treleudytes crassa* Ameghino).

23. *Perispheniscus robustus* (Ameghino)

Palaeospheniscus robustus Ameghino, 1895, Bol. Inst. geog. argentina, vol. 15, p. 588, fig. 1 (type from Trelew, left humerus, Brit. Mus.).

Perispheniscus wimani Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 117, 164, pl. 2, fig. 14; pl. 3, fig. 14-15 (type from "costas de Patagonia," left tarsometatarsus, La Plata Mus.; referred humerus, Ameghino coll.).

Treleudytes crassa Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 156, text-fig. 4 (type from Trelew, left tarsometatarsus, La Plata Mus.).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Chubut: Trelew.

Genus †*Paraspheniscus* Ameghino

Paraspheniscus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 115 (type by original designation *Palaeospheniscus bergi* Moreno and Mercerat).

24. *Paraspheniscus bergi* (Moreno and Mercerat)

Palaeospheniscus bergi Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 18, 34; 1891 (Aug. 5), pl. 1, fig. 2, 4, 18-20, 25-26; pl. 2, fig. 7-8 (lectotype from Trelew, left tarsometatarsus, La Plata Mus., selected by Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 447). *Paraspheniscus bergi* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 115, 163, pl. 2, fig. 12 (type redescribed).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Chubut: Trelew.

25. *Paraspheniscus nereius* (Ameghino)

Palaeospheniscus nereius Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (type from Golfo de San Jorge, left tarsometatarsus, Ameghino coll.).
Paraspheniscus nereius Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 116, 163, pl. 2, fig. 13 (type redescribed).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Chubut: Golfo de San Jorge.

Subfamily †PARAPTENODYTINAE Simpson

Paraptenodytinae Simpson, 1946 (Aug. 8), Bull. Amer. Mus. nat. Hist., vol. 87, p. 69 (type *Paraptenodytes* Ameghino).

Genus †*Paraptenodytes* Ameghino

Paraptenodytes Ameghino, 1891 (Dec. 1), Rev. argentina Hist. nat., vol. 1, p. 447 (type by monotypy *Palaeospheniscus antarcticus* Moreno and Mercerat).

Metancyclornis Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 129 (type by original designation *Paraptenodytes curtus* Ameghino).

26. *Paraptenodytes antarcticus* (Moreno and Mercerat)

Palaeospheniscus antarcticus Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 16, 30; 1891 (Aug. 5), pl. 2, fig. 1-2, 4 (lectotype from mouth of Río Santa Cruz, associated right femur, tibiotarsus, tarsometatarsus).

tarsus, La Plata Mus. nos. 2, 4, 6, designated by Ameghino, 1905, p. 139).—*Paraptenodytes antarcticus* [sic] Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 447 (lapsus).—*Paraptenodytes antarcticus* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 139, 166, pl. 5, fig. 32; pl. 6, fig. 33-34 (types restudied).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter Santa Cruz: mouth of Río Santa Cruz. Ter. Chubut: south side of Río Chubut opposite Gaiman (Simpson, 1946, Bull. Amer. Mus. nat. Hist., vol 87, p. 9).

27. *Paraptenodytes andrewsi* Ameghino

Paraptenodytes andrewsi Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (types from San Julián, associated right humerus, right coracoid, proximal part of right scapula, Ameghino coll., now perhaps in Buenos Aires Mus.).—*Arthrodytes andrewsi* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 146, 166, pl. 7, fig. 37; pl. 8, fig. 38-39 (types redescribed).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: San Julián.

28. *Paraptenodytes curtus* Ameghino

Paraptenodytes curtus Ameghino, 1901, An. Soc. cien. argentina, vol. 51, p. 81 (type from San Julián, right tarsometatarsus, Ameghino coll.).—*Metancyclornis curtus* Ameghino, 1905, An. Mus. nac. Buenos Aires, vol. 13, pp. 129, 165; pl. 4, fig. 25-26 (type redescribed).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: San Julián.

Genus †*Isotremornis* Ameghino

Isotremornis Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 134 (type by original designation *Isotremornis nordenskjöldi* Ameghino).

29. *Isotremornis nordenskjöldi* Ameghino

Isotremornis nordenskjöldi Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 134, 165, pl. 4, fig. 28 [fig. 28a is duplicated, the upper one representing this species]; pl. 5, fig. 29-31 (holotype from San Julián, proximal part of left tarsometatarsus, with associated right humerus, distal half of left humerus, distal half of left femur, Ameghino coll., now perhaps in Buenos Aires Mus.; the right humerus was designated as lectotype by Simpson, 1946, p. 33, but this action appears invalid in view of Ameghino's wording).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: San Julián.

Genus †*Pseudospheniscus* Ameghino

Pseudospheniscus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 123 (type by original designation *Pseudospheniscus interplanus* Ameghino).

30. *Pseudospheniscus interplanus* Ameghino

Pseudospheniscus interplanus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 123 (type distal part of left tarsometatarsus, from San Julián, Ameghino coll., now perhaps in Buenos Aires Mus.).

Pseudospheniscus planus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 164, pl. 3, fig. 19 (same type; as first reviser I select *P. interplanus*).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: San Julián.

31. *Pseudospheniscus concavus* Ameghino

?*Pseudospheniscus concavus* Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 124 (type from San Julián, distal half of right tarsometatarsus, Ameghino coll., now perhaps in Buenos Aires Mus.).

Pseudospheniscus convexus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 164, pl. 3, fig. 20 (same type; as first reviser I select *P. concavus*).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: San Julián.

Genus †*Neculus* Ameghino

Neculus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 127 (type by original designation *Neculus rothi* Ameghino).

32. *Neculus rothi* Ameghino

Neculus rothi Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 127, 165, pl. 4, fig. 23 (type from Trelew, distal part of left tarsometatarsus, La Plata Mus.).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Chubut: Trelew.

Subfamily SPHENISCINAE (Bonaparte)

Spheniscidae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 62 (type *Spheniscus* Brisson).

No extinct fossil species.

Neospecies of Spheniscinae from Pleistocene sites:

1. *Eudyptes crestatus* (J. F. Miller). NEW ZEALAND: Waikouaiti (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 196).

2. *Megadyptes antipodes* (Hombron and Jacquinot). NEW ZEALAND: Waikouaiti (Lydekker, 1891, p. 195).

3. *Eudyptula minor* (J. R. Forster). NEW ZEALAND: Waikouaiti (Lydekker, 1891, p. 197).

Order PROCELLARIIFORMES Fürbringer

Procellariiformes Fürbringer, 1888, *Untersuch. Morph. Syst. Vögel*, vol. 2, p. 1544 (intermediäre subordo; type *Procellaria* Linnaeus).

Family DIOMEDEIDAE (Gray)

Diomedinae Gray, 1840, *List Genera Birds*, ed. 1, p. 78 (subfamily; type *Diomedea* Linnaeus).

Genus †*Gigantornis* Andrews

Gigantornis Andrews, 1916, *Proc. zool. Soc. London*, p. 519 (type by monotypy *Gigantornis eaglesomei* Andrews). Position tentative.

1. *Gigantornis eaglesomei* Andrews

Gigantornis eaglesomei Andrews, 1916, *Proc. zool. Soc. London*, p. 519, fig. 1-2 (type sternum, *Brit. Mus.*).

MIDDLE EOCENE (Ameki formation). NIGERIA: Omobiialla district: Ameki, Port Harcourt Railway.

Genus †*Manu* Marples

Manu Marples, 1946, *Trans. Roy. Soc. N. Zealand*, vol. 76, pt. 2, p. 133 (type *Manu antiquus* Marples). Position tentative.

2. *Manu antiquus* Marples

Manu antiquus Marples, 1946, *Trans. Roy. Soc. N. Zealand*, vol. 76, pt. 2, p. 133, pl. 6, fig. 7-9.

LOWER OLIGOCENE (Maerewhenua greensand). NEW ZEALAND: South Island: near Duntroon in North Otago.

Genus *Diomedea* Linnaeus

Diomedea Linnaeus, 1758, *Syst. Nat.*, ed. 10, vol. 1, p. 132 (type *Diomedea exulans* Linnaeus).

3. *Diomedea californica* L. Miller

Diomedea californica L. Miller, 1962 (Nov. 28), *Condor*, vol. 64, no. 6, p. 471, fig. 1 (type left tarsometatarsus, *Univ. Calif. Mus. Paleo. no. 61392*).

MIDDLE MIOCENE (Temblor formation). CALIFORNIA: Kern County: Sharktooth Hill, 7 miles northeast of Bakersfield.

4. *Diomedea anglica* Lydekker

Diomedea anglica Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 189, fig. 42 (types from Red Crag at Foxhall, right tarsometatarsus, phalanx 1 of toe IV, Ipswich Mus.; casts Brit. Mus. no. A.87).

LOWER Pliocene (Bone Valley formation). FLORIDA: Polk County: Pierce (Wetmore, 1943, Proc. New England zool. Club, vol. 22, p. 66; identification uncertain, specimen not comparable to type).

UPPER Pliocene (Coralline Crag). ENGLAND: Suffolk: Foxhall (Lydekker, 1891, Ibis, p. 395; specimen not comparable with type).

LOWER Pleistocene (Red Crag). ENGLAND: Suffolk: Foxhall (Lydekker, 1891, Cat., p. 189).

Neospecies of Diomedidae recorded from Pleistocene and *pre-historic sites:

1. *Diomedea exulans* Linnaeus. ENGLAND: Ilford (Lambrecht, 1933, Handb. palaeoim., p. 732). CHATHAM ISLANDS (Lambrecht, 1933, p. 273).

2. *Diomedea albatrus* Pallas. JAPAN: *Iki Island (Kuroda, 1959, Bull. biogeog. Soc. Japan, vol. 21, p. 73). ALASKA: *St. Lawrence Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 87); *Amaknak Island and *Kodiak Island (Friedmann, 1934, op. cit., pp. 231, 234); *Dutch Harbor, *Little Kiska, *Atka Island, and *Attu Island (Friedmann, 1937, op. cit., vol. 27, pp. 432-437). OREGON: *Maxwell Point (Wetmore, 1928, Condor, vol. 30, p. 191). CALIFORNIA: Del Rey Hills (Howard, 1936, Condor, vol. 38, p. 212); Newport Bay and ?San Pedro (Howard, 1949, Condor, vol. 51, p. 23); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 332).

3. *Diomedea nigripes* Audubon. ALASKA: *Kodiak Island (Friedmann, 1935, Jour. Washington Acad. Sci., vol. 25, p. 46). CALIFORNIA: San Pedro? (L. Miller, 1914, Univ. Calif. Publ. Geol., vol. 8, p. 34).

4. *Diomedea chlororhynchos* Gmelin. NEW ZEALAND: Waikouaiti (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 189).

Family PROCELLARIIDAE (Boie)

Procellariidae Boie, 1826, Isis von Oken, vol. 19, col. 980 (type *Procellaria* Linnaeus).

Genus *Puffinus* Brisson

Puffinus Brisson, 1760, Ornithologia, vol. 1, p. 56 (type by tautonymy *Procellaria puffinus* Brunnich).

1. *Puffinus raemdonckii* (Van Beneden)

Larus raemdonckii Van Beneden, 1871, Bull. Acad. Sci. Belgique, ser. 2, vol. 32, no. 11, p. 258, fig. 1 (lectotype from Rupelmonde, distal part of left humerus, designated by Brodtkorb, 1962, Auk, vol. 79, p. 707).

MIDDLE Oligocene (Rupelian sand). BELGIUM: East Flanders: mouth of the Rupel. Prov. Antwerp: Edegheem (Van Beneden, 1871).

2. *Puffinus arvernensis* Milne-Edwards

Puffinus arvernensis Milne-Edwards, 1871, Ois. Foss. France, vol. 2, p. 572 (nomen nudum).—Milne-Edwards, in Shufeldt, Proc. Acad. nat. Sci. Philadelphia, p. 510, pl. 24, fig. 1-2 only (type from St.-Gérand-le-Puy, left tarsometatarsus, Paris Mus.).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Saint-Gérand-le-Puy. The record from the Tortonian at Grive-St.-Alban (Shufeldt, 1896) must represent some other species or a mixing of localities.

3. *Puffinus micraulax* Brodkorb

Puffinus micraulax Brodkorb, 1963 (in press), Quart. Jour. Florida Acad. Sci., vol. 26, no. 2, p. 000, fig. 0 (type from Gainesville, distal part of left humerus, Univ. Florida no. 4872).

LOWER MIOCENE (Hawthorne formation). FLORIDA: Alachua County: Gainesville.

4. *Puffinus aquitanicus* (Milne-Edwards)

Procellaria aquitanica Milne-Edwards, 1874, Bibl. École hautes Études Paris, sect. sci. nat., vol. 11, art. 3, p. 6, pl. 12, fig. 1 (type distal part of humerus).

MIDDLE MIOCENE (Burdigalian). FRANCE: Dept. Gironde: Faluns de Saucats.

5. *Puffinus antiquus* (Milne-Edwards)

Procellaria antiqua Milne-Edwards, 1874, Bibl. École hautes Études Paris, sect. sci. nat., vol. 11, art. 3, p. 7 (type proximal part of humerus).

MIDDLE MIOCENE (Burdigalian). FRANCE: Dept. Gironde: Faluns de Saucats.

6. *Puffinus conradi* Marsh

Puffinus conradi Marsh, 1870, Amer. Jour. Sci., ser. 2, vol. 49, no. 146, p. 212 (type distal part of left humerus, Acad. Nat. Sci. Phila. no. 13360; cast U. S. Nat. Mus.).—Shufeldt, 1915, Trans. Connecticut Acad. Arts Sci., vol. 19, p. 62, pl. 8, fig. 63-64 (type restudied).—Wetmore, 1926, Auk, vol. 43, p. 463 (type restudied).

MIDDLE MIOCENE (Calvert formation). MARYLAND: Calvert County.

7. *Puffinus inceptor* Wetmore

Puffinus inceptor Wetmore, 1930 (July 15), Proc. California Acad. Sci., ser. 4, vol. 19, no. 8, p. 86, fig. 1-3 (type from Sharktooth Hill, distal part of right humerus, Calif. Acad. Sci. no. 5223).

MIDDLE MIOCENE (Temblor formation). CALIFORNIA: Kern County: Sharktooth Hill, 7 miles northeast of Bakersfield.

8. *Puffinus priscus* L. Miller

Puffinus priscus L. Miller, 1961 (Oct. 3), Condor, vol. 63, no. 5, p. 399, fig. 1 center (type from Sharktooth Hill, distal third of left humerus, Univ. Calif. Mus. Paleo. no. 58185).

MIDDLE MIOCENE (Temblor formation). CALIFORNIA: Kern County: Sharktooth Hill.

9. *Puffinus mitchelli* L. Miller

Puffinus mitchelli L. Miller, 1961 (Oct. 3), Condor, vol. 63, no. 5, p. 400, fig. 1 right (type from Sharktooth Hill, distal half of right humerus, Univ. Calif. Mus. Paleo. no. 58184).

MIDDLE MIOCENE (Temblor formation). CALIFORNIA: Kern County: Sharktooth Hill.

10. *Puffinus diatomicus* L. Miller

Puffinus diatomicus L. Miller, 1925 (Aug.), Publ. Carnegie Inst. Washington, no. 349, p. 111, pl. 1-2, 7a (type from near Lompoc, skeleton impression, Univ. Calif. Mus. Paleo. no. 26541).

UPPER MIOCENE (Valmonte diatomite member of Monterey shale). CALIFORNIA: Los Angeles County: San Pedro breakwater (L. Miller, 1935, Univ. Calif. Los Angeles Publ. Biol. Sci., vol. 1, p. 74); Lomita (Howard, 1955, Los Angeles County Mus., sci. ser. no. 17, p. 14); Sherman Oaks (Howard, 1962, Condor, vol. 64, p. 512).

UPPER MIOCENE (basal 1000 feet of Sisquoc formation). CALIFORNIA: Santa Barbara County: Johns Mansville "Celite" mines, 3½ miles south of Lompoc (L. Miller, 1925).

11. *Puffinus felthami* Howard

Puffinus felthami Howard, 1949 (June 22), Publ. Carnegie Instn. Washington, no. 584, p. 194, pl. 2, fig. 4, 6 (type distal part of right humerus, Los Angeles Mus. no. 2037).

LOWER PLIOCENE (Repetto formation). CALIFORNIA: Orange County: 3 miles north of Corona del Mar.

12. *Puffinus kanakoffi* Howard

Puffinus kanakoffi Howard, 1949 (June 22), Publ. Carnegie Instn. Washington, no. 584, pp. 187, 195 note, pl. 2, fig. 3, 5 (type tarsometatarsus, Los Angeles Mus. no. 2122).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego.

Genus †*Argyrodypes* Ameghino

Argyrodypes Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, p. 121 (type by original designation *Argyrodypes microtarsus* Ameghino).

Argyrodypes Trouessart, 1906, Rev. crit. Paléozool., vol. 10, pp. 90, 251 (emendation).

13. *Argyrodypes microtarsus* Ameghino

Argyrodypes microtarsus Ameghino, 1905 (Nov. 30), An. Mus. nac. Buenos Aires, vol. 13, pp. 121, 164, pl. 3, fig. 17-18 (lectotype by present designation distal part of left tibiotarsus, Ameghino coll., with associated distal part of right femur, now perhaps in Buenos Aires Mus.).

LOWER MIOCENE (Patagonia formation, Juliense member).
ARGENTINA: Ter. Santa Cruz: Río Seco at San Julián.

Genus †*Plotornis* Milne-Edwards

Plotornis Milne-Edwards, 1878, Bibl. École hautes Études Paris, sect. sci. nat., vol. 11, art. 3, pp. 4-5 (type by monotypy *Plotornis delfortrii* Milne-Edwards).

14. *Plotornis delfortrii* Milne-Edwards

Plotornis delfortrii Milne-Edwards, 1878, Bibl. École hautes Études Paris, sect. sci. nat., vol. 11, art. 3, pp. 4-5, pl. 11 (types tarsometatarsus and distal part of humerus).

MIDDLE MIOCENE (Molasse de Léognan). FRANCE: Dept. Gironde: Léognan near Bordeaux.¹

Neospecies of Procellariidae from Pleistocene and *prehistoric sites:

1. *Macronectes giganteus* (Gmelin). NEW ZEALAND: Waingongoro (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 187).

2. *Fulmarus glacialis* (Linnaeus). NORWAY: Vardo (Lambrecht, 1933, Handb. Palaeorn., p. 732). ALASKA: *St. Lawrence Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, p. 87); *Kodiak Island (Friedmann, 1934, op. cit., p. 234); *Dutch Harbor and *Attu Island (Friedmann, 1937, op. cit., pp. 435, 438). CALIFORNIA: San Pedro (L. Miller, 1914, Univ. Calif. Publ. Geol., vol. 8, p. 35); Newport Bay (Howard, 1949, Condor, vol. 51, p. 21).

3. *Puffinus leucomelas* (Temminck). JAPAN: *Iki Island (Kuroda, 1959, Bull. biogeog. Soc. Japan, vol. 21, p. 73).

4. *Puffinus diomedea* (Scopoli). PORTUGAL: Grotte de Furinha (Lambrecht, 1933, Handb. Palaeorn., p. 732). GIBRALTAR: Devils Tower (Bate, 1928, Jour. Roy. anthrop. Inst., vol. 58, p. 104). SARDINIA: Grotto Pietro Tamponi on Tavò-

¹*Fulmarus*, sp. indet., recorded from Middle Miocene Calvert formation at Chesapeake Beach, Maryland (Wetmore, 1926, Auk, vol. 43, p. 464).

lara Island (*Puffinus eyermani* Shufeldt, 1896, Proc. Acad. nat. Sci. Philadelphia, p. 511, pl. 24, fig. 3-4, 8; types right tibiotarsus, right tarsometatarsus, now U. S. Nat. Mus. no. 2166).

5. *Puffinus gravis* (O'Reilly). NOVA SCOTIA: Reid site (Halifax Mus.).

6. *Puffinus griseus* (Gmelin). SARDINIA: Grotta Pietro Tamponi (Regalia, 1897, Avicula, vol. 1, p. 165); Monte Giovanni? (Lambrecht, 1933, Handb. Palaeorn., p. 732). ALASKA: *Dutch Harbor, *Little Kiska, and *Attu Island (Friedmann, 1937, Jour. Washington Acad. Sci., vol. 27, pp. 435-438).

7. *Puffinus tenuirostris* (Temminck). ALASKA: *St. Lawrence Island and *Amaknak Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, pp. 87, 231); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405).

8. *Puffinus puffinus* (Brünnich). DENMARK: *Ordrup Mose (*Oestrelata* sp., H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 92). GIBRALTAR: Devils Tower (Bate, 1928, Jour. Roy. anthrop. Inst., vol. 58, p. 104). SARDINIA: Grotta Pietro Tamponi? (Lambrecht, 1933, Handb. Palaeorn., p. 732). ITALY: Buca del Bersagliere (Lambrecht, 1933). BERMUDA: *caves (*Puffinus mcgalli* Shufeldt, Oct. 1916, Ibis, p. 630; type sternum; Brit. Mus.?). BAHAMAS: *Gordon Hills on Crooked Island (Wetmore, 1938, Auk, vol. 55, p. 51). FLORIDA: Melbourne (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 13). CALIFORNIA: San Pedro (L. Miller, 1914, Univ. Calif. Publ. Geol., vol. 8, p. 35); Del Rey Hills (Howard, 1936, Condor, vol. 38, p. 212); Newport Bay? (Howard, 1949, Condor, vol. 51, p. 21). Includes *Puffinus opisthomelas* Coues.

9. *Puffinus lherminieri* Lesson. BERMUDA: *caves (*Puffinus parvus* Shufeldt, Oct. 1916, Ibis, p. 632; types miscellaneous elements; Brit. Mus.?). Rail Cave, *Shearwater Cave, and *Castle Harbour Islands (Brodkorb coll.); *Cockroach Island (Wetmore, 1962, Smithsonian misc. Coll., vol. 145, no. 2, p. 15). BAHAMAS: *Gordon Hills on Crooked Island (Wetmore, 1938, Auk, vol. 55, p. 51). ST. THOMAS: *midden (Wetmore, 1918, Proc. U. S. nat. Mus., vol. 54, p. 514). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 6). BARBUDA: caves (Univ. Florida). ANTIGUA: *Mill Reef midden (Univ. Florida).

10. *Pterodroma cahow* (Nichols and Mowbray). BERMUDA: *caves (*Aestrelata vociferans* Shufeldt, Oct. 1916, Ibis, p. 633; practically a nomen nudum except for generic characters; types Brit. Mus.?). Wilkinson Quarry and *Cockroach Island (Wetmore, 1960, Smithsonian misc. Coll., vol. 145, no. 2, p. 16); Rail Cave, Crane Crevice, and Wilson's Cave (Brodkorb coll.). BAHAMAS: *Gordon Hills on Crooked Island (Wetmore, 1938, Auk, vol. 55, p. 51).

11. *Pterodroma hasitata* (Kuhl). MARTINIQUE: *Paquemar (Wetmore, 1952, Auk, vol. 69, p. 460).

Family OCEANITIDAE (Salvin)

Oceanitinae Salvin, 1896, Cat. Birds Brit. Mus., vol. 25, pp. xiv, 343, 358 (subfamily; type *Oceanites* Keyserling and Blasius).

Hydrobatidae Mathews, 1912, Birds Australia, vol. 2, p. 9 (type *Hydrobates* Boie). Family name preoccupied by *Hydrobatidae* Gray, 1869, Hand-list Gen. Sp. Birds, pt. 1, p. 266 (type *Hydrobata* Vieillot, 1816, a junior synonym of *Cinclus* Bechstein, 1802) and antedated by *Oceanitinae* Salvin.

Genus *Oceanodroma* Reichenbach

Oceanodroma, Reichenbach, 1852, *Avium systema naturale*, p. iv (type by original designation *Procellaria furcata* Gmelin).

1. *Oceanodroma hubbsi* L. Miller

Oceanodroma hubbsi L. Miller, 1951 (March 27), *Condor*, vol. 53, no. 2, p. 78, fig. 1 (type skull, vertebrae, pelvis, left leg, Univ. Calif. Mus. Paleo. no. 39979).

UPPER MIOCENE (Capistrano formation). CALIFORNIA: Orange County: 1 mile south of Capistrano Beach.

Neospecies of Oceanitidae from the Quarternary:

1. *Oceanodroma hornbyi* (Gray). CHILE: Tocopilla (Stresemann, 1924, *Ornith. Monatsber.*, p. 61).

Family PELECANOIDIDAE (Gray)

Halodrominae Bonaparte, 1856, *C. R. Acad. Sci. Paris*, vol. 37, no. 18, p. 643 (type *Halodroma* Illiger, 1811, a junior synonym of *Pelecanoides* Lacépède, 1800).

Pelecanoidinae Gray, 1871, *Hand-list Genera and Species of Birds*, pt. 3, pp. x, 102 (type *Pelecanoides* Lacépède).

Neospecies of Pelecanoididae from the Pleistocene.

1. *Pelecanoides gárnottii* (Lesson). PERU: Islas de Lobos de Afuera (Clarke, 1882, *Proc. philos. Soc. Glasgow*, vol. 13, p. 573).

Order PELECANIFORMES Sharpe

Pelecaniformes Sharpe, 1891, Review of Recent Attempts to Classify Birds, p. 76 (type *Pelecanus* Linnaeus).

Suborder SULAE Sharpe

Sulae Sharpe, 1891, Review of Recent Attempts to Classify Birds, p. 76 (type *Sula* Brisson).

Family †ELOPTERYGIDAE Lambrecht

Elopterygidae Lambrecht, 1933, Handbuch Palaeorn., p. 287 (type *Elopteryx* Andrews).

Genus †*Elopteryx* Andrews

Elopteryx Andrews, 1913 (May), Geol. Mag., n.s., decade 5, vol. 10, no. 5, p. 195 (type by monotypy *Elopteryx nopcsai* Andrews).

1. *Elopteryx nopcsai* Andrews

Elopteryx nopcsai Andrews, 1913 (May), Geol. Mag., n.s., decade 5, vol. 10, no. 5, p. 195, fig. 1-2 (type from Szentpéterfalva, proximal part of left femur, Brit. Mus.).

UPPER CRETACEOUS, MAESTRICHTIAN (Transylvanian freshwater limestone). RUMANIA: Transylvania: Szentpéterfalva near Hatszeg (= Hatég).

Genus †*Argillornis* Owen

Megalornis Seeley, 1866, Ann. Mag. nat. Hist., ser. 3, vol. 18, p. 110 (type by monotypy *Lithornis emuinus* Bowerbank). Preoccupied by *Megalornis* Gray, 1841, List. Gen. Birds, ed. 2, p. 85).

Argillornis Owen, 1878, Quart. Jour. geol. Soc. London, vol. 34, p. 124 (type *Argillornis longipennis* Owen).

2. *Argillornis emuinus* (Bowerbank)

Lithornis emuinus Bowerbank, 1854, Ann. Mag. nat. Hist., ser. 2, vol. 14, p. 263, fig. (type from Sheppey, "tibiotalarsus" = shaft of humerus, Brit. Mus. no. 38941).

Lithornis emuianus Seeley, 1866, Ann. Mag. nat. Hist., ser. 3, vol. 18, p. 110 (lapsus or emendation).

Argillornis longipennis Owen, 1878, Quart. Jour. geol. Soc. London, vol. 34, p. 124, pl. 6, fig. 1-3; 7-12, 16 (types from Sheppey, fragments of associated right and left humeri, Brit. Mus. nos. A.5-9).

Argillornis longipes "Sharpe," Lambrecht, 1933, Handb. Palaeorn., p. 282 (lapsus; spelled correctly in Sharpe, 1899, Hand-list, vol. 1, p. 240).

LOWER EOCENE (London clay). ENGLAND: Kent: Sheppey Isle at mouth of Thames (Bowerbank, 1854): Eastchurch (Seeley, 1866).

MIDDLE EOCENE (Bruxellian). BELGIUM: Etterbeek near Brussels (Dollo, 1909, *Ann. N. Y. Acad. Sci.*, vol. 19, no. 4, p. 111). Needs restudy.

Genus †*Eostega* Lambrecht

Eostega Lambrecht, 1929, C. R. X Congr. internat. Zool. Budapest 1927, p. 1272 (type by monotypy *Eostega lebedinskyi* Lambrecht).

3. *Eostega lebedinskyi* Lambrecht

Eostega lebedinskyi Lambrecht, 1929, C. R. X Congr. internat. Zool. Budapest 1927, p. 1272, fig. 12-13 (type from Kolozsmonostor, mandible, Wiener Naturhistorische Hofsmuseum).

MIDDLE EOCENE (Steinbruch Grobkalk). RUMANIA: Transylvania: Kolozsmonostor near Kolozsvár (Kluj), in the Siebenbürgen.

Family PHALACROCORACIDAE (Bonaparte)

Phalacrocoracidae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (type *Phalacrocorax* Brisson).

Phalacrocoracinae Bonaparte, 1854, *Ann. Sci. nat. (Paris)*, vol. 1, p. 38.

Subfamily †GRACULAVINAE Fürbringer

Graculavinae Fürbringer, 1888, *Untersuch. Morph. Syst. Vögel*, vol. 2, p. 1565 footnote (type *Graculavus* Marsh).

Genus †*Graculavus* Marsh

Graculavus Marsh, 1872, *Amer. Jour. Sci.*, ser. 3, vol. 3, p. 363 (type *Graculavus velox* Marsh, by gen. et sp. nov. convention, and by designation of Hay, 1902, *Bull. U. S. Geol. Surv.*, no. 179, p. 533).

Limosavis Shufeldt, 1915 (Feb.), *Trans. Connecticut Acad. Arts Sci.*, vol. 19, p. 19 (substitute name for *Graculavus* Marsh, considered inappropriate).

1. *Graculavus velox* Marsh

Graculavus velox Marsh, 1872, *Amer. Jour. Sci.*, ser. 3, vol. 3, p. 363 (type from Hornerstown, proximal end of left humerus, Yale Peabody Mus. no. 855).

UPPER PALEOCENE (Hornerstown marl). NEW JERSEY: Ocean County: Hornerstown.

2. *Graculavus pumilus* Marsh

Graculavus pumilus Marsh, 1872, *Am. Jour. Sci.*, ser. 3, vol. 3, p. 364 (lectotype from Hornerstown, "distal" [proximal] end of right humerus, Yale Peabody Mus. no. 1209, designated by Shufeldt, 1915, where said to be from Battle Creek, Kansas!).

UPPER PALEOCENE (Hornerstown marl). NEW JERSEY: Ocean County: Hornerstown.

Subfamily PHALACROCORACINAE Bonaparte

Phalacrocoracinae Bonaparte, 1854, Ann. Sci. nat. (Paris), vol. 1, p. 38 (type *Phalacrocorax* Brisson).

Genus †*Actiornis* Lydekker

Actiornis Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 56 (type by original designation *Actiornis anglicus* Lydekker).

3. *Actiornis anglicus* Lydekker

Actiornis anglicus Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 56, fig. 13 (type from Hordwell, proximal part of right ulna, Brit. Mus. no. 30328).

MIDDLE EOCENE (Hordwell beds). ENGLAND: Hampshire: Hordwell.

Genus *Phalacrocorax* Brisson

Phalacrocorax Brisson, 1760, Ornithologia, vol. 1, p. 60 (type *Pelecanus carbo* Linnaeus).

Oligocorax Lambrecht, 1933, Handb. Palaeorn., p. 290 (type *Graculus littoralis* Milne-Edwards, designated by Brodkorb, 1952, Condor, vol. 54, p. 175).

Miocorax Lambrecht, 1933, Handb. Palaeorn., p. 291 (type *Phalacrocorax femoralis* Miller, designated by Brodkorb, 1952).

Paracorax Lambrecht, 1933, Handb. Palaeorn., p. 292 (type *Phalacrocorax destefanii* Regàlia, designated by Brodkorb, 1952).

Australocorax Lambrecht, 1933, Handb. Palaeorn., p. 292 (type *Phalacrocorax vetustus* DeVis, designated by Brodkorb, 1952).

4. *Phalacrocorax mediterraneus* Shufeldt

Phalacrocorax mediterraneus Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 58, pl. 15, fig. 138 (type from Gerry's Ranch, proximal part of right carpometacarpus, Yale Peabody Mus. no. 943).

LOWER OR MIDDLE OLIGOCENE (White River formation). COLORADO: Weld County: Gerry's Ranch at Chalk Bluffs, Township 11 North, Range 64 West.

5. *Phalacrocorax littoralis* (Milne-Edwards)

Graculus littoralis Milne-Edwards, 1863 (after June 29), C. R. Acad. Sci. Paris, vol. 56, p. 1222 (type from Dept. Allier; almost a nomen nudum). —Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 33, p. 263, pl. 42, fig. 5-12; pl. 43, fig. 1-7; pl. 44, fig. 1-8 (types complete left coracoid from Saint-Pourçain in coll. Poirrier; complete right humerus from Billy in coll. Milne-Edwards; and from Dept. Allier in coll. Milne-Edwards proximal part of left metatarsus, proximal two-thirds of left ulna, proximal part of left femur, and distal end of left tibia; all figured but the last two not described).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Saint-Pourçain and Billy (Milne-Edwards, 1867); Vaumas and Langy (Paris, 1912, Rev. française Ornith., vol. 4, p. 289).

LOWER MIOCENE (Hydrobienkalk?). GERMANY: harbor construction at Frankfort am Main (Lambrecht, 1933, Handb. Palaeorn., p. 290).

6. *Phalacrocorax miocaenus* (Milne-Edwards)

Graculus miocaenus Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 32, p. 255, pl. 39, fig. 5-18; pl. 40-41; pl. 42, fig. 1-4 (types from Langy, left tarsometatarsus, left tibia, right femur, pelvis, sternum, upper fragment of furculum, left coracoid, several scapulae, right humerus, right ulna, radius, carpometacarpus, alar digits II-1 and III, coll. Milne-Edwards).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy (Milne-Edwards, 1867); Vaumas (Paris, 1912, Rev. Franç. Orn., vol. 4, p. 289); St.-Gerand-le-Puy and Montaigu (Lambrecht, 1933, Handb. Palaeorn., p. 290).

7. *Phalacrocorax subvolans* Brodkorb

Phalacrocorax subvolans Brodkorb, 1956 (Sept. 24), Condor, vol. 58, no. 5, p. 367, fig. 1 (type from Thomas Farm, proximal part of right humerus, Univ. Florida no. 4500).

LOWER MIOCENE (Thomas Farm local fauna, Hawthorne age). FLORIDA: Gilchrist County: Thomas Farm, 8 miles north of Bell.

8. *Phalacrocorax marinavis* Shufeldt

Phalacrocorax marinavis Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 56, pl. 14, fig. 114, 116-118, 122 (types from Willow Creek, distal parts of 2 humeri, distal part of left tarsometatarsus, proximal half of right ulna, Yale Peabody Mus. no. 936).

LOWER MIOCENE (John Day formation). OREGON: Malheur County: Willow Creek.

9. *Phalacrocorax intermedius* (Milne-Edwards)

Graculus intermedius Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 34, p. 266, pl. 43, fig. 8-11 (type from Orleanais, proximal part of right humerus, coll. Nouel, now apparently in Paris Mus.)

UPPER MIOCENE (Faluns de Touraine). France: prov. Orléanais.

10. *Phalacrocorax praearbo* Ammon

Phalacrocorax praearbo von Ammon, 1918, Abh. naturwiss. Ver. Regensburg, vol. 12, p. 28, fig. 3 (type from Mayer and Reinhard clayworks, upper end of left coracoid, Mus. Naturw. Vereins zu Regensburg).

UPPER MIOCENE (Braunkohlen der Oberpfalz). BAVARIA: clayworks of Mayer and Reinhard, between Dechbetten and Prüfening near Regensburg.

11. *Phalacrocorax femoralis* L. Miller

Phalacrocorax femoralis L. Miller, 1929 (July 15), Condor, vol. 31, no. 4, p. 167, fig. 58-59 (type from Poyer quarry, skeleton impression, Univ. Calif. at Los Angeles, reverse in coll. Dr. Frederick Kellogg, Los Angeles).

UPPER MIOCENE (Modelo formation). CALIFORNIA: Los Angeles County: quarry of Dan J. Poyer, in NW $\frac{1}{4}$ of section 18, Township 1 North, Range 17 West, near Calabasas.

12. *Phalacrocorax wetmorei* Brodkorb

Phalacrocorax wetmorei Brodkorb, 1955 (Nov. 30), Florida Geol. Surv. Rept. Invest., no. 14, p. 12, pl. 3, fig. 10-11 (type from Brewster, right coracoid, Brodkorb coll. no. PB-530).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster and Pierce (Brodkorb, 1955).

LOWER PLIOCENE (Alachua clay). FLORIDA: Alachua County: near Newberry (Brodkorb, 1963, Spec. Publ. Florida geol. Surv., no. 2, paper 4, p. 2).

13. *Phalacrocorax leptopus* Brodkorb

Phalacrocorax leptopus Brodkorb, 1961 (Nov. 7), Quart. Jour. Florida Acad. Sci., vol. 24, no. 3, p. 170, fig. 1 (type from Juntura, proximal half of left tarsometatarsus, Univ. Ore. Mus. Nat. Hist. no. F-7994).

LOWER and MIDDLE PLIOCENE (Juntura beds). OREGON: Malheur County: Juntura.

14. *Phalacrocorax kennelli* Howard

Phalacrocorax kennelli Howard, 1949 (June 22), Publ. Carnegie Instn. Washington, no. 584, p. 188, pl. 3, fig. 7-8 (type from locality 1080, upper half of left coracoid, Los Angeles Mus. no. 2127).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego, locality 1080 on Washington Boulevard freeway.

15. *Phalacrocorax destefani* Regalia

Phalacrocorax de stefani Regalia, 1902, Palaeontogr. ital., vol. 8, p. 225, pl. 27, fig. 4-14 (types from Orciano Pisano, cervical vertebra, furculum, coracoid, humerus, ulna, femur, tibiotalarsus, tarsometatarsus, Roberto Lawley coll., on deposit in Gabinetto di Geologia, Istituto di Studi Superiori at Florence).

MIDDLE PLIOCENE (argille marine): ITALY: Provincia di Pisa: Orciano Pisano near Valle di Fine.

16. *Phalacrocorax idahensis* (Marsh)

Graculus idahensis Marsh, 1870, Amer. Jour. Sci., ser. 2, vol. 49, p. 216 (type from Castle Creek, proximal half of left carpometacarpus, Yale Peabody Mus. no. 527).—*Phalacrocorax idahensis* Shufeldt, 1915, Trans. Connecticut Acad. Arts Sci., vol. 19, p. 68, pl. 6, fig. 44 (type restudied).

MIDDLE PLIOCENE (Chalk Hills formation). IDAHO: Owyhee County: Castle Creek, about 10 miles northwest of Grand View. Referred specimens from the Lower Pleistocene Glens Ferry formation in the Hagerman lake beds, Idaho (Wetmore, 1933, Smithsonian misc. Coll., vol. 87, no. 20, p. 5), and from the Lower Pliocene Bone Valley gravel at Brewster, Florida (Brodkorb, 1955, Florida geol. Surv. Rept. Invest., no. 14, p. 14), are not comparable to the type and probably represent other species.

17. *Phalacrocorax macer* Brodkorb

Phalacrocorax macer Brodkorb, 1958 (Oct. 31), Wilson Bull., vol. 70, no. 3, p. 237, fig. 1 (type from sec. 28, right carpometacarpus, Univ. Mich. Mus. Paleo. no. 33918).

LOWER PLEISTOCENE (Hagerman lake beds of Glens Ferry formation). IDAHO: Twin Falls County: section 28, Township 7 South, Range 18 East, opposite Hagerman.

18. *Phalacrocorax rogersi* Howard

Phalacrocorax rogersi Howard, 1932 (May 16), Condor, vol. 34, no. 3, p. 118, fig. 19 (type from Veronica Springs, left coracoid, Santa Barbara Mus. no. 32.1).

LOWER PLEISTOCENE (Santa Barbara formation): CALIFORNIA: Santa Barbara County: Veronica Springs stone quarry.

19. *Phalacrocorax macropus* (Cope)

Graculus macropus Cope, 1878, Bull. U. S. geol. geog. Surv. Terrs., vol. 4, no. 2, p. 386 (lectotype tarsometatarsus, Am. Mus. Nat. Hist. no. 3555, selected by Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, p. 153).

MIDDLE PLEISTOCENE (Fossil Lake formation). OREGON: Lake County: Fossil Lake. The specimen reported from the Lower Miocene Arikaree sandstone of Montana (Shufeldt, 1915, Auk, vol. 32, p. 485) is unidentifiable even to family (cf. Wetmore, 1955, Condor, vol. 57, p. 371).

20. *Phalacrocorax pampeanus* Moreno and Mercerat

Phalacrocorax pampeanus Moreno and Mercerat, 1891 (May), An. Mus. La Plata, Pal. arg., vol. 1, pp. 19, 35; 1891 (Aug. 5), pl. 18, fig. 8 (type from Lujan, proximal part of right humerus, La Plata Mus. no. 82).

UPPER PLEISTOCENE (Pampas formation). ARGENTINA: PROV. BUENOS AIRES: Lujan.

21. *Phalacrocorax gregorii* DeVis

Phalacrocorax gregorii DeVis, 1906, Ann. Queensland Mus., no. 6, p. 18, pl. 5, fig. 6; pl. 6, fig. 3-5; pl. 7, fig. 1-4; pl. 8, fig. 1-2 (types from various localities near Lake Eyre, premaxilla, fragments of 2 coracoids, 7 humeri, carpometacarpus, 7 femora, 4 tibiotarsi, 6 tarsometatarsi, 7 pelvis).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: Wankameminna; Malkuni; Kalamurina; Wurdumankula; Wurdulumankula; Mulcani, all on lower Cooper near Lake Eyre.

22. *Phalacrocorax vetustus* DeVis

Phalacrocorax vetustus DeVis, 1906, Ann. Queensland Mus., no. 6, p. 22, pl. 8, fig. 3-7; pl. 9, fig. 1-5; 7 (types from localities near Lake Eyre, fragments of 3 coracoids, 7 humeri, 2 ulnae, 4 carpometacarpi, 2 femora, 2 tibiae, 1 tarsometatarsus).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: Malkuni; Kalamurina; Wurdumankula; Wurdumulankula, all on lower Cooper near Lake Eyre.

Genus †*Pliocarbo* Tugarinov

Pliocarbo Tugarinov, 1940, Doklady Akad. Nauk S.S.S.R., vol. 26, no. 2, p. 197 (type *Pliocarbo longipes* Tugarinov).

23. *Pliocarbo longipes* Tugarinov

Pliocarbo longipes Tugarinov, Doklady Akad. Nauk S.S.S.R., vol. 26, no. 2, p. 197, fig. 1-2 (type from Slobodka, tarsometatarsus).

LOWER PLEISTOCENE (Meotian stage). UKRAINE: Slobodka near Odessa.

Neospecies of *Phalacrocoracidae* from Pleistocene and *prehistoric sites:

1. *Phalacrocorax auritus* (Lesson): OREGON: Dry Creek (L. Miller, 1944, Condor, vol. 46, p. 27); Fossil Lake? (Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, p. 156). CALIFORNIA: Santa Monica (L. Miller, 1925, Condor, vol. 27, p. 145); San Pedro (Howard, 1949, Condor, vol. 51, p. 23); Manix Lake? (Howard, 1955, U. S. geol. Surv. profess. Paper, no. 264-J, p. 202); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 312);

*Buena Vista Lake (DeMay, Condor, vol. 44, p. 228). NEVADA: Rattlesnake Hill? (Wetmore, 1940, Smithsonian misc. Coll., vol. 99, no. 4, p. 13); Crypt Cave (Howard, 1958, vol. 60, p. 412). IDHAO: Hagerman (Wetmore, 1933, Smithsonian misc. Coll., vol. 87, no. 20, p. 6); Twin Falls County (Brodkorb, 1958, Wilson Bull., vol. 70, p. 237). IOWA: *Mill Creek (Hamon, 1961, Plains Anthropologist, vol. 6, p. 209). NOVA SCOTIA: *Bear River (Halifax Mus.). FLORIDA: Seminole Field, Melbourne, Hog Creek near Sarasota, Itchtucknee River, Rock Spring, and Vero Beach (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 13); Bradenton (Wetmore, 1945, Auk, vol. 62, p. 459); Lake Monroe and Lake Washington (Brodkorb coll.); *Good's shellpit, *Lemon Bluff, and *Bluffton (Neill, Gut, and Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388); *South Indian Field (Weigel, 1959, Florida Anthropologist, vol. 12, p. 73); *Green Mound (Hamon, 1959, Auk, vol. 76, p. 533); *Castle Windy (Bullen and Sleight, 1959, Rept. Bryant Foundation Amer. Studies, no. 1, p. 20).

2. *Phalacrocorax olivaceus* (Humboldt). BRAZIL: Lapa da Escrivania and Lapa da Lagoa do Sumidouro (O. Winge, 1887, E Mus. Lund., vol. 1, no. 2, p. 5).

3. *Phalacrocorax carbo* (Linnaeus). NORWAY: Vardo (Lambrecht, 1933, Handb. Palaeorn., p. 733). DENMARK: Fannerup, Mejlgaard, Havnoe, Krabbe-sholm, Erteboelle, Gudumlund, Maglemose, Klintesoe, Soelager, *Erlang Vig, *Vejlby, *Borrebjerg, *Barsmark, *Noerre Broby, *Vimose, *Vangede Brogaards Mose, and *Ordstrup Mose (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 99). IRELAND: Newhall Cave (Lambrecht, 1933). SCOTLAND: Caithness (Lydekker, 1891, Ibis, p. 388); Cnoc-Sligeach Oransay (Lambrecht, 1933). ENGLAND: Grays (Milne-Edwards, 1867, Ois. Foss. France, pl. 42); West Runton (E. T. Newton, 1887, Geol. Mag., p. 147). GIBRALTAR: Devils Tower? (Bate, 1938, Jour. Roy. anthrop. Inst., vol. 58, p. 104). ITALY: Grotta Romanelli (Lambrecht, 1933). ALASKA: *Kodiak Island (Friedmann, 1933, Condor, vol. 35, p. 30). NOVA SCOTIA: *Port Jollie (Halifax Mus.).

4. *Phalacrocorax penicillatus* (Brandt). CALIFORNIA: Santa Barbara? (Howard, 1931, Condor, vol. 33, p. 30); Newport Bay, San Pedro, and Santa Monica (Howard, 1949, Condor, vol. 51, pp. 21-27); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 312).

5. *Phalacrocorax pelagicus* Pallas. ALASKA: *St. Lawrence Island, *Amaknak Island, and *Kodiak Island (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, pp. 88, 231-234); *Dutch Harbor, *Little Kiska, and *Attu Island (Friedmann, 1937, op. cit., vol. 27, pp. 432-438); *Cape Prince of Wales (Friedmann, 1941, op. cit., vol. 31, p. 405). CALIFORNIA: *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 312).

6. *Phalacrocorax capillatus* (Temminck and Schlegel). JAPAN: *Iki Island and *Doiga-hama? (Kuroda, 1959, Bull. biogeog. Soc. Japan, vol. 21, p. 73).

7. *Phalacrocorax urile* (Gmelin). ALASKA: *St. Lawrence Island and *Cape Denbeigh (Friedmann, 1934, Jour. Washington Acad. Sci., vol. 24, pp. 88, 237).

8. *Phalacrocorax aristotelis* (Linnaeus). NORWAY: Vardo (Lambrecht, 1933, Handb. Palaeorn., p. 733). SCOTLAND: Oransay, Caithness (Lydekker, 1891, Ibis, p. 388). GIBRALTAR: Devils Tower (Bate, 1928, Jour. Roy. anthr. Inst., vol. 58, p. 104). MONACO: Grotte de l'Observatoire (Lambrecht, 1933). PORTUGAL: Grotte de Fuminha (Lambrecht, 1933). ITALY: Grotta dei Colombi (Regalia,

1893, Arch. Antrop. Etnol., vol. 23, p. 262); Grotta Romanelli and Buca del Bersagliere (Lambrecht, 1933).

Family ANHINGIDAE Ridgway

Plotinae Bonaparte, 1831, Saggio di una distribuzione metodica, degli Animali Vertebrati, p. 61. (type *Plotus* Linnaeus, 1766, a junior synonym of *Anhinga* Brisson).

Anhingidae Ridgway, 1887, Manual N. Amer. Birds, p. 73 (type *Anhinga* Brisson).

Genus †*Protoplotus* Lambrecht

Protoplotus Lambrecht, 1930, Wet. Meded. Dienst Mijnb. E. Indies, no. 17, p. 15 (type *Protoplotus beauforti* Lambrecht).

1. *Protoplotus beauforti* Lambrecht

Protoplotus beauforti Lambrecht, 1930, Wet. Meded. Dienst Mijnb. E. Indies, no. 17, p. 15, text-fig. 1-4, pl. 2-3 (type from Sipang, skeleton impression, Mus. Mijnbouw Bureau van den Oporigsdienst der Nederl. Indischen Regiering, Bandoeng, Java; casts in Kgl. Ung. Geol. Anstalt, Budapest).

MIDDLE? EOCENE (freshwater fish beds). SUMATRA: Sipang.

Genus *Anhinga* Brisson

Anhinga Brisson, 1760, Ornithologia, vol. 1, p. 60; vol. 6, p. 476 (type *Plotus anhinga* Linnaeus).

2. *Anhinga pannonica* (Lambrecht)

Plotus pannonicus Lambrecht, 1916, Mitt. Jahrb. ungar. geol. Anst., vol. 24, p. 1, fig. 1, 3, 5, 7 (types from Tataros, carpometacarpus, cervical vertebra, Kgl. Ung. Geol. Anstalt, Budapest).

LOWER PLIOCENE (Pannonian beds). HUNGARY: Komitat Bihar: Tataros.

3. *Anhinga parva* (DeVis)

Plotus parvus DeVis, Proc. Linn. Soc. N. S. Wales, vol. 3, no. 2, p. 1286, pl. 35, fig. 10 (type from River Condamine, left humerus, Queensland Mus.?).

UPPER PLEISTOCENE (Darling Downs beds). QUEENSLAND: north bank of River Condamine, 3 miles from Chinchilla.

4. *Anhinga laticeps* (DeVis)

Plotus laticeps DeVis, 1906, Ann. Queensland Mus., no. 6, p. 17, pl. 6, fig. 1-2 (types from lower Cooper, cranium, pelvis, Queensland Mus.?).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: lower Cooper Creek, near Lake Eyre.

5. *Anhinga nana* (Newton and Gadow)

Plotus nanus E. T. Newton and Gadow, 1893, Trans. zool. Soc. London, vol. 13, p. 288, pl. 34, fig. 1-5 (types from Mare aux Songes, humerus, pelvis, tarsometatarsus, Cambridge Univ.).

QUATERNARY. MAURITIUS: Mare aux Songes (Newton and Gadow, 1893).

QUATERNARY. MADAGASCAR: Sirabé (Andrews, 1897, Ibis, p. 358).

Neospecies of Anhingidae from Pleistocene and *prehistoric sites:

1. *Anhinga anhinga* (Linnaeus). FLORIDA: Melbourne (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 14); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185); Itchtucknee River (McCoy, 1963, Auk, vol. 80, p. 000); Lake Monroe (Brodkorb coll.); *Lemon Bluff (Neill, Gut, and Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388).

Family SULIDAE (Reichenbach)

Sularinae Reichenbach, 1849, Avium systema naturale, p. 00 (type *Sula* Brisson).—*Sulinae* Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643:

Genus *Sula* Brisson

Sula Brisson, 1760, Ornithologia, vol. 1, p. 60 (type *Pelecanus piscator* Linnaeus).

1. *Sula ronzoni* Milne-Edwards

Mergus ronzoni Gervais, 1849 (1851?), Mém. Acad. Sci. Lett. Montpellier, sec. sci., vol. 1, p. 220 (nomen nudum).

Sula ronzoni Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 34, p. 271, pl. 44, fig. 9 (type from Ronzon, pelvis, Mus. Saint Pierre at Lyon).

LOWER OLIGOCENE (marnes calcaires de Ronzon). FRANCE: Prov. Auvergne: Ronzon near Puy-en-Velay.

2. *Sula arvernensis* Milne-Edwards

Sula arvernensis Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 34, p. 267, pl. 43, fig. 12 (type from Gannat, pelvis, coll. Milne-Edwards).

UPPER OLIGOCENE (calcaire de Gannat). FRANCE: Dept. Allier: Gannat.

3. *Sula universitatis* Brodkorb

Sula universitatis Brodkorb, 1963 (in press), Quart. Jour. Florida Acad. Sci., vol. 26, no. 2, p. 000, fig. 0 (type from Gainesville, proximal part of left carpometacarpus, Brodkorb coll. no. 8505).

LOWER MIOCENE (Hawthorne formation). FLORIDA: Alachua County: Gainesville.

4. *Sula pohli* Howard

Sula pohli Howard, 1958 (Aug. 15), Los Angeles County Mus. Contr. in Sci., no. 25, p. 4, fig. 1-2 (type from Studio City, wings, pectoral girdle, sternum, Los Angeles Mus. no. 2674; reverse Pohl Mus. no. PV68).

UPPER MIOCENE (Monterey shale, Valmonte diatomite member). CALIFORNIA: Los Angeles County: Studio City, Ventura Boulevard between Whitsett Avenue and Coldwater Canyon Road.

5. *Sula willetti* L. Miller

Sula willetti L. Miller, 1925 (Aug.), Publ. Carnegie Instn. Washington, no. 349, p. 112, pl. 3, 8 (type from Lompoc, skeleton impression, Univ. Calif. Mus. Paleo. no. 26542).

UPPER MIOCENE (Monterey shale, Valmonte diatomite member). CALIFORNIA: Los Angeles County: Lomita? (Howard, 1958, Los Angeles County Mus. Contr. Sci., no. 25, pp. 3, 10); Sherman Oaks (Howard, 1962, Condor, vol. 64, p. 512).

UPPER MIOCENE (Sisquoc formation). CALIFORNIA: Santa Barbara County: Johns Manville mines, 3½ miles south of Lompoc (L. Miller, 1925).

6. *Sula guano* Brodkorb

Sula guano Brodkorb, 1955 (Nov. 30), Florida Geol. Surv. Rept. Invest., no. 14, p. 9, pl. 1, fig. 2, 5; pl. 2, fig. 8 (type from Brewster, left coracoid, Brodkorb no. 301).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster.

7. *Sula phosphata* Brodkorb

Sula phosphata Brodkorb, 1955 (Nov. 30), Florida Geol. Surv. Rept. Invest., no. 14, p. 11, pl. 1, fig. 3, 6; pl. 2, fig. 9 (type from Brewster, right coracoid, Brodkorb no. 302).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster.

8. *Sula humeralis* L. Miller and Bowman

Sula humeralis L. Miller and Bowman, 1958 (March 6), Los Angeles County Mus. Contr. in Sci., no. 20, p. 9, fig. 2 (type from San Diego, distal end of right humerus, Univ. Calif. Mus. Paleo. no. 45889).

MIDDLE PLIOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego.

Genus †*Microsula* Wetmore

Microsula Wetmore, 1938 (Jan. 14), Proc. U. S. Nat. Mus., vol. 85, p. 25 (type by original designation *Sula avita* Wetmore; subgenus).

9. *Microsula pygmaea* (Milne-Edwards)

Sula pygmaea Milne-Edwards, 1874, Bibl. École hautes Études Paris, sect. sci. nat., vol. 11, art. 3, p. 8, pl. 12, fig. 2 (type from Léognan, left humerus, Delfortrie coll.).

MIDDLE MIOCENE (molasse de Léognan). FRANCE: Dept. Gironde: Léognan.

10. *Microsula avita* (Wetmore)

Sula avita Wetmore, 1938 (Jan. 14), Proc. U. S. Nat. Mus., vol. 85, p. 22, fig. 2-3 (type from Plumpoint, distal part of right humerus, U. S. Nat. Mus. no. 13854).

MIDDLE MIOCENE (Calvert formation, zone 10). MARYLAND: Calvert County: near Plumpoint.

Genus *Morus* Vieillot

Morus Vieillot, 1816, Analyse d'une nouvelle ornithologie élémentaire, p. 63 (type *Pelecanus bassanus* Linnaeus).

11. *Morus loxostyla* (Cope)

Sula loxostyla Cope, 1870 (Dec.), Trans. Amer. philos. Soc., n.s., vol. 14, p. 236, fig. 53 (type from Calvert Co., left coracoid, Cope coll.).
Sula atlantica Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 62, pl. 15, fig. 123 (type from New Jersey, left coracoid, Yale Peabody Mus. no. 937).—Wetmore, 1926, Auk, vol. 43, p. 465 (type restudied).

MIDDLE MIOCENE (Calvert formation). MARYLAND: Calvert County: Chesapeake Beach (Wetmore, 1926, Auk, vol. 43, p. 465).

MIDDLE MIOCENE (Kirkwood formation, *Ammoidon* beds; see Marsh, 1893, Am. Jour. Sci., p. 412). NEW JERSEY: apparently Farmingdale in Monmouth County.

12. *Morus vagabundus* (Wetmore)

Morus vagabundus Wetmore, 1930 (July 15), Proc. Calif. Acad. Sci., ser. 4, vol. 19, p. 89, fig. 4 (type from Sharktooth Hill, distal end of right humerus, Univ. Calif. Mus. Paleo. no. 31062).

MIDDLE MIOCENE (Temblor formation). CALIFORNIA: Kern County: Sharktooth Hill, in sec. 25, Township 28 South, Range 28 East, 7 miles northeast of Bakersfield (Wetmore, 1930); west branch of Granite

Creek, in sec. 28, Township 27 South, Range 28 East, 11 miles north of Bakersfield (Compton, 1936, Proc. Calif. Acad. Sci., ser. 4, vol. 23, p. 84).

13. *Morus lompocanus* (L. Miller)

Sula lompocana L. Miller, 1925 (Aug.), Publ. Carnegie Instn. Washington, no. 349, p. 114, pl. 4, fig. 7b, 9 (type from Lompoc, skeleton impression, Univ. Calif. Mus. Paleo. no. 26544).

UPPER MIOCENE (Sisquoc formation). CALIFORNIA: Santa Barbara County: Johns Manville mines, 3½ miles south of Lompoc.

14. *Morus peninsularis* Brodkorb

Morus peninsularis Brodkorb, 1955 (Nov. 30), Florida Geol. Surv. Rept. Invest., no. 14, p. 8, pl. 1, fig. 1, 4; pl. 2, fig. 7 (type from Brewster, left coracoid, Brodkorb no. 148).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster.

15. *Morus reyanus* (Howard)

Morus reyanus Howard, 1936 (Sept. 15), Condor, vol. 38, no. 5, p. 213 (type from Del Rey Hills, left coracoid, Los Angeles Mus. no. 991).

UPPER PLEISTOCENE (Palos verdes sand). CALIFORNIA: Los Angeles County: Del Rey Hills, 2 miles east-northeast of Playa del Rey (Howard, 1936). Orange County: Newport Bay (Howard, 1949, Condor, vol. 51, pp. 21-29).

Genus †*Palaeosula* Howard

Palaeosula Howard, 1958 (Aug. 15), Los Angeles County Mus. Contr. in Sci., no. 25, p. 12 (type by original designation *Sula stocktoni* Miller).

16. *Palaeosula stocktoni* (L. Miller)

Sula stocktoni L. Miller, 1935 (March 12), Univ. Calif. Los Angeles Publ. Biol. Sci., vol. 1, p. 75, fig. 2 (type from Lomita, wings, sternum, coracoid, Univ. Calif. Mus. Paleo. no. 32105).

UPPER MIOCENE (Monterey shale, Valmonte diatomite member). CALIFORNIA: Los Angeles County: near Lomita; El Sereno (Howard, 1958, Los Angeles County Mus. Contr. Sci., no. 25, pp. 3, 12).

Genus †*Miosula* L. Miller

Miosula L. Miller, 1925 (Aug.), Publ. Carnegie Instn. Washington, no. 349, p. 114 (type by monotypy *Miosula media* Miller).

17. *Miosula media* L. Miller

Miosula media L. Miller, 1925 (Aug.), Publ. Carnegie Instn. Washington, no. 349, p. 114, pl. 5 (type from Lompoc, skeleton impression, Univ. Calif. Mus. Paleo. no. 26543).

UPPER MIOCENE (Sisquoc formation). CALIFORNIA: Santa Barbara County: Johns Manville mines, 3½ miles south of Lompoc.

18. *Miosula recentior* Howard

Miosula recentior Howard, 1949 (June 22), Publ. Carnegie Instn. Washington, no. 584, p. 190, pl. 2, fig. 1-2 (type from San Diego, distal part of right tibio-tarsus, Los Angeles Mus. no. 2117).

MIDDLE PLEISTOCENE (San Diego formation). CALIFORNIA: San Diego County: San Diego.

Neospecies of Sulidae from Pleistocene and *prehistoric sites:

1. *Sula dactylatra* Lesson. ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 6).

2. *Sula sula* (Linnaeus). RODRIGUEZ: *superficial deposits (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 46). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 6).

3. *Sula leucogaster* (Boddaert). BAHAMAS: *Gordon Hills on Crooked Island (Wetmore, 1938, Auk, vol. 55, p. 52). ST. THOMAS: *midden (Wetmore, 1918, Proc. U. S. nat. Mus., vol. 54, p. 514). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico vol. 21, p. 6).

4. *Morus bassanus* (Linnaeus). NORWAY: Vardo (Lambrecht, 1933, Handb. Palaeorn., p. 733). DENMARK: Fannerup, Ertebølle, Hesseløe, *Børrebjerg, and *Ordrup Mose (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 100). SCOTLAND: *Caithness (Lydekker, 1891, Ibis, p. 388); *Colonsay, *Oransay, *Orkney, and *Androssan (Lambrecht, 1933). IRELAND: *Whitepeak Bay (Lambrecht, 1933). ENGLAND: *Whitburn (Lambrecht, 1933). NOVA SCOTIA: *Whynacht (Halifax Mus.). FLORIDA: Green Mound (Hamon, 1959, Auk, vol. 76, p. 533); *Castle Windy (Bullen and Sleight, 1959, Rept. Bryant Found. Amer. Studies, no. 1, p. 20); *Summer Haven (Brodkorb, 1960, Auk, vol. 77, p. 342).

Suborder PHAETHONTES Sharpe

Phaethontes Sharpe, 1891, Review Recent Attempts to Classify Birds, p. 76 (type *Phaethon* Linnaeus).

Family PHAETHONTIDAE (Bonaparte)

Phaetonidae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (type "*Phaeton*" Linnaeus).

Genus †*Prophaeton* Andrews

Prophaeton Andrews, 1899, Proc. zool. Soc. London, p. 776 (type by monotypy *Prophaeton shrubsolei* Andrews).

1. *Prophaeton shrubsolei* Andrews

Prophaeton shrubsolei Andrews, 1899, Proc. zool. Soc. London, p. 776, text-fig. 1-2, pl. 51, fig. 1-2 (type from Sheppey, skull, pelvis, femur, Brit. Mus.).

LOWER EOCENE (London clay). ENGLAND: Kent: Sheppey Isle at mouth of Thames.

Neospecies of Phaethontidae from *prehistoric sites:

1. *Phaethon lepturus* Daudin. RODRIGUEZ: *superficial deposits (Lambrecht, 1933, Handb. Palaeorn., p. 732). BERMUDA: *Cockroach Island (Wetmore, 1962, Smithsonian misc. Coll., vol. 145, no. 2, p. 17).

Suborder †ODONTOPTERYGIA Spulski

Odontopterygia Spulski, 1910 (Apr. 4), Zeitschr. deutsch. geol. Ges. Monatsber., Abh. 22, no. 7, p. 521 (Ordnung; type *Odontopteryx* Owen).—*Odontopteryges* Lambrecht, 1933, Handb. Palaeorn., p. 304 (subordo).—*Odontopterygiformes* Howard, 1957 (Feb. 1), Santa Barbara Mus. nat. Hist., Bull. Dept. Geol., no. 1, p. 21 (order).

Family †ODONTOPTERYGIDAE Lambrecht

Odontopterygidae Lambrecht, 1933, Handb. Palaeorn., pp. ix, 304 (type *Odontopteryx* Owen).

Genus †*Odontopteryx* Owen

Odontopteryx Owen, 1873 (read June 25), Quart. Jour. geol. Soc. London, vol. 29, pt. 1, p. 511 (type by monotypy *Odontopteryx toliapicus* Owen).
Odontornis Owen, 1873 (read June 25), Quart. Jour. geol. Soc. London, vol. 29, pt. 1, p. 521 footnote (equivalent to *Odontopteryx*: "I should have preferred the term *Odontornis* for my genus; but it is bespoke for Marsh's subclass.").

1. *Odontopteryx toliapica* Owen

Odontopteryx toliapicus Owen, 1873 (read June 25), Quart. Jour. geol. Soc. London, vol. 29, pt. 1, p. 511, pl. 16-17 (type from Sheppey, skull, Brit. Mus. no. 44096).

LOWER EOCENE (London clay). ENGLAND: Kent: Sheppey Isle.

Family †PSEUDODONTORNITHIDAE Lambrecht

Pseudodontornithidae Lambrecht, 1933, Handb. Palaeorn., pp. ix, 305 (type *Pseudodontornis* Lambrecht).

Genus †*Pseudodontornis* Lambrecht

Pseudodontornis Lambrecht, 1930 (Jan. 25), Geol. hungarica, ser. pal., fasc. 7, p. 1 (type by monotypy *Odontopteryx longirostris* Spulski).

1. *Pseudodontornis longirostris* (Spulski)

Odontopteryx longirostris Spulski, 1910 (Apr. 4), Zeitschr. deutsch. geol. Ges. Monatsber., Abh. 22, no. 7, p. 507, fig. 1-7 (type from unknown locality, skull, Albertus-Magnus Univ., Königsberg).—Lambrecht, 1930, Geol. hungarica, ser. pal., fasc. 7, p. 1, text-fig. 3, 6; pl. 1-2 (type restudied).

MIOCENE? BRAZIL OR GERMANY?

Genus †*Osteodontornis* Howard

Osteodontornis 1957 (Feb. 1), Santa Barbara Mus. nat. Hist., Bull. Dept. Geol., no. 1, p. 3 (type by original designation *Osteodontornis orri* Howard).

2. *Osteodontornis orri* Howard

Osteodontornis orri Howard, 1957 (Feb. 1), Santa Barbara Mus. nat. Hist., Bull. Dept. Geol., no. 1, p. 3, fig. 2-8 (type from Tepusquet Canyon, incomplete skeleton impression, Santa Barbara Mus. no. 309).

UPPER MIOCENE (Monterey shale, Valmonte diatomite member). CALIFORNIA: Santa Barbara County: west side of Tepusquet Creek, flagstone quarry of G. Antolini & Sons (Howard, 1957). Los Angeles County: Sherman Oaks (Howard and White, 1962, Los Angeles Co. Mus., Contr. Sci., no. 52, p. 3, fig. 2-5).

Family †PELAGORNITHIDAE (Fürbringer)

Pelagornithinae Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, p. 1565 footnote (subfamily; type *Pelagornis* Lartet).—*Pelagornithidae* Wetmore, 1930, Proc. U. S. nat. Mus., vol. 76, p. 2.

Genus †*Pelagornis* Lartet

Pelagornis Lartet, 1857 (read Apr. 6), C. R. Acad. Sci. Paris, vol. 44, no. 14, p. 740 (type by monotypy *Pelagornis miocaenus* Lartet).

1. *Pelagornis miocaenus* Lartet

Pelagornis miocaenus Lartet, 1857 (read Apr. 6), C. R. Acad. Sci. Paris, vol. 44, no. 14, p. 740 [separate includes a plate, fide Milne-Edwards] (type from Armagnac, left humerus, Paris Mus.).—Milne-Edwards, 1867, Ois. Foss. France, vol. 1, p. 273, pl. 45 (type restudied).

Pelagornis delfortrii Lambrecht, 1933, Handb. Palaeorn., p. 282 footnote (nomen nudum).

MIDDLE MIOCENE (molasse coquillière marine de l'Armagnac). FRANCE: Dept. Gers: Armagnac (Lartet, 1857).

MIDDLE MIOCENE (molasse de Léognan). FRANCE: Dept. Gironde: Léognan (Milne-Edwards, 1874, Bibl. École hautes Études, Paris, sec. sci. nat., vol. 11, art. 3, p. 1).

Suborder †CLADORNITHES Wetmore

Cladornithes Wetmore, 1960 (June 23), Smithsonian misc. Coll., vol. 139, no. 11, pp. 4, 25 (suborder; type *Cladornis* Ameghino).

Family †CLADORNITHIDAE (Ameghino)

Cladornithidae Ameghino, 1895 [separate apparently published 1894], Bol. Inst. geog. argentino, vol. 15, cahiers 11-12, p. 584 [85 of separate] (type *Cladornis* Ameghino).

Cladornithidae Wetmore, 1930, Proc. U. S. nat. Mus., vol. 76, no. 2821, p. 2.

Genus †*Cladornis* Ameghino

Cladornis Ameghino, 1895 [1894?], Bol. Inst. geog. argentino, vol. 15, cahiers 11-12, p. 585 [86 of separate] (type by monotypy *Cladornis pachypus* Ameghino).

1. *Cladornis pachypus* Ameghino

Cladornis pachypus Ameghino, 1895 [1894?], Bol. Inst. geog. argentino, vol. 15, cahiers 11-12, p. 585 [86 of separate], fig. 35 (type from *Pyrotherium* beds, distal part of right tarsometatarsus, now in Brit. Mus.).

LOWER OLIGOCENE (Deseado formation). ARGENTINA: Ter. Santa Cruz: Río Deseado.

Family †CYPHORNITHIDAE Wetmore

Cyphornithidae Wetmore, 1928 (March 15), Canad. Dept. Mines, Geol. Surv. Bull., no. 49, p. 4 (type *Cyphornis* Cope).

Genus †*Cyphornis* Cope

Cyphornis magnus Cope, 1894 (May 31), Jour. Acad. nat. Sci. Philadelphia, ser. 2, vol. 9, p. 449, (type by monotypy *Cyphornis magnus* Cope).

1. *Cyphornis magnus* Cope

Cyphornis magnus Cope, 1894 (May 31), Jour. Acad. nat. Sci. Philadelphia, ser. 2, vol. 9, p. 451, pl. 20, fig. 11-16 (type from Carmanah Point, proximal part of left metatarsus, Can. Geol. Surv. no. 6323).—Wetmore, 1928, Canad. Dept. Mines, Geol. Surv. Bull., no. 49, p. 1, fig. 1 (type restudied).

LOWER MIOCENE (Carmanah Point beds). BRITISH COLUMBIA: Vancouver Island: Carmanah Point.

Genus †*Palaeochenoides* Shufeldt

Palaeochenoides Shufeldt, 1916 (Aug.), Geol. Mag., n.s., decade 6, vol. 3, p. 347 (type by monotypy *Palaeochenoides mioceanus* Shufeldt).

2. *Palaeochenoides mioceanus* Shufeldt

Palaeochenoides mioceanus Shufeldt, 1916 (Aug.), Geol. Mag., n.s., decade 6, vol. 3, p. 347, pl. 15 (type from Stono River, distal part of left femur, U. S. nat. Mus.).—Wetmore, 1917, Jour. Geol., vol. 25, no. 6, p. 555, fig. 1 (type restudied).

LOWER MIOCENE (Hawthorne formation). SOUTH CAROLINA: Charleston County: near source of Stono River.

Suborder PELECANI Sharpe

Pelecani Sharpe, 1891, Review Recent Attempts to Classify Birds, p. 76 (type *Pelecanus* Linnaeus).

Family PELECANIDAE Vigors

Pelecanidae Vigors, 1825, Trans. Linn. Soc. London, vol. 14, pp. 498, 504 (type *Pelecanus* Linnaeus).

Genus *Pelecanus* Linnaeus

Pelecanus Linnaeus, 1758, Syst. Nat., ed. 10, p. 132 (type *Pelecanus onocrotalus* Linnaeus).

1. *Pelecanus gracilis* Milne-Edwards

Pelecanus gracilis Milne-Edwards, 1863, C. R. Acad. Sci. Paris, vol. 56, p. 1222 (nomen nudum).—Milne-Edwards, 1867, Ois. Foss. France, vol. 1, sheet 32, p. 350, pl. 38-39 (types from Labeur, furculum and upper part of tarsometatarsus, coll. Poirrier; also from Langy, upper end of humerus, complete femur, scapula, coll. Abbot Vandenhecke).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Labeur near Vaumas and Langy (Milne-Edwards, 1867); Saint-Cérand-le-Puy (Lambrecht, 1933, Handb. Palaeorn., p. 277). Dept. Puy-de-Dôme: Montaigut (Lambrecht, 1933).

2. *Pelecanus intermedius* Fraas

Pelecanus intermedius O. Fraas, 1870, Jahresh. Ver. Naturk. Württemberg, vol. 26, p. 281, pl. 13, fig. 3-4 (type from Hahnenberg, skull and mandible, Stuttgart Mus.).

UPPER MIOCENE (obere Süßwassermolasse). GERMANY: Württemberg: Hahnenberg (Fraas, 1870); Steinhaim (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 39).

3. *Pelecanus fraasi* Lydekker

Pelecanus fraasi Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 44, fig. 10A (type from Klein-Sorheim, cranium, Brit. Mus. no. 47862).

UPPER MIOCENE (obere Süßwassermolasse). BAVARIA: Klein-Sorheim. Württemberg: Lierheim near Hahnenberg (Lydekker, 1891).

4. *Pelecanus cautleyi* Davies

Pelecanus cautleyi Davies, 1880, Geol. Mag., decade 2, vol. 7, p. 26 (type from Siwalik Hills; distal end of left ulna, Brit. Mus. no. 39740).—*Pelecanus cautleyi* Lydekker, 1884, Pal. indica, ser. 10, vol. 3, pt. 4, p. 137, pl. 14, fig. 11 (type restudied).

LOWER PLIOCENE (Siwalik series). INDIA: United Provinces: Siwalik Hills.

5. *Pelecanus sivalensis* Davies

Pelecanus(?) *sivalensis* Davies, 1880, Geol. Mag., decade 2, vol. 7, p. 26 (type from Siwalik Hills, distal end of right ulna, Brit. Mus. no. 39745).—*Pelecanus sivalensis* Lydekker, 1890, Rec. geol. Surv. India, vol. 23, p. 235, fig. 2 (type restudied).

LOWER PLIOCENE (Siwalik series). INDIA: United Provinces: Siwalik Hills.

6. *Pelecanus odessanus* Lambrecht

Pelecanus odessanus fossilis Wildham, 1886, Schrift. Neuruss. Ges. Naturf. Odessa, vol. 10, Beilage, p. 4, pl. 5, fig. 1-4. (non-binomial).—*Pelecanus odessanus* Lambrecht, 1933, Handb. Palaeorn., p. 279 (types from Slobodka, coracoid, tarsometatarsus).

LOWER PLIOCENE (Meotian). UKRAINE: Slobodka near Odessa.

7. *Pelecanus halieus* Wetmore

Pelecanus halieus Wetmore, 1933 (Dec. 27), Smithsonian misc. Coll., vol. 87, no. 20, p. 3, fig. 1-2 (type from sec. 16, proximal part of right radius, U. S. Nat. Mus. no. 12233).

LOWER PLEISTOCENE (Glenns Ferry formation, Hagerman Lake beds). IDAHO: Gooding County: NW $\frac{1}{4}$ of section 16, Township 7 South, Range 13 East, 2 miles west of Hagerman.

8. *Pelecanus grandiceps* DeVis

Pelecanus grandiceps DeVis, 1906, Ann. Queensland Mus., no. 6, p. 16, pl. 5, fig. 1-3 (type from lower Cooper, left quadrate, left coracoid, distal part of left tarsometatarsus).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: lower Cooper Creek near Lake Eyre.

9. *Pelecanus proavus* DeVis

Pelecanus proavus DeVis, 1892, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. 6, p. 444, pl. 24, fig. 6 (type from Queensland, proximal part of carpometacarpus).

UPPER PLEISTOCENE (Darling Downs beds). QUEENSLAND (DeVis, 1892).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: lower Cooper Creek (DeVis, 1906, Ann. Queensland Mus., no. 6, p. 17, pl. 5, fig. 4-5).

Genus †*Liptornis* Ameghino

Liptornis Ameghino, 1895, Bol. inst. Geog. argentino, vol. 15, cahiers 11-12, p. 99 (type by monotypy *Liptornis hesternus* Ameghino).

10. *Liptornis hesternus* Ameghino

Liptornis hesternus Ameghino, 1895, Bol. Inst. geog. argentino, vol. 15, cahiers 11-12, p. 99 (type lower cervical vertebra, Brit. Mus.).

MIDDLE MIOCENE (Santa Cruz formation). ARGENTINA: Ter. Santa Cruz: Cueva.

Neospecies of Pelecanidae from Pleistocene and *prehistoric sites:

1. *Pelecanus onocrotalis* Linnaeus. ENGLAND: Norfolk (Lydekker, 1891, Ibis, p. 387). SWITZERLAND: *Neuenberger See (Lambrecht, 1933, Handb. Palaeorn., p. 732).

2. *Pelecanus crispus* Bruch. DENMARK: Havnoe (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 100). ENGLAND: Feltwell Fen (Newton, Proc. zool. Soc. London, p. 702); Burnt Fen near Littleport (Harmer, 1898, Geol. Mag., p. 418). AZERBAIJAN: Bingada near Baku (*Pelecanus crispus palaeocrispus* Serebrövsky, 1941, Doklady Akad. Nauk S.S.S.R., vol. 33, p. 472).

3. *Pelecanus erythrorhynchus* Gmelin. OREGON: Fossil Lake (Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, p. 153; Shufeldt's earlier records erroneous); Dry Creek? (L. Miller, 1944, Condor, vol. 46, p. 26). CALIFORNIA: Manix (Compton, 1934, Condor, vol. 36, p. 167); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 312); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). NEVADA: Rattlesnake Hill (Wetmore, 1940, Smithsonian misc. Coll., vol. 99, no. 4, p. 10). SOUTH DAKOTA: *Corson County (L. Miller, 1961, Bull. S. Calif. Acad. Sci., vol. 60, pt. 3, p. 125). KANSAS: Shorts Creek (Stettenheim, 1958, Wilson Bull., vol. 70, p. 197). OKLAHOMA: Beaver County (Mengel, 1952, Auk, vol. 69, p. 81). IOWA: *Mill Creek (Hamon, 1961, Plains Anthropologist, vol. 6, p. 209). ILLINOIS: *Snyder and *Cahokia (Parmalee, 1958, Auk, vol. 75, p. 170).

4. *Pelecanus occidentalis* Linnaeus. CALIFORNIA: Carpinteria (DeMay, 1941, Publ. Carnegie Instn. Washington, no. 530, p. 64); *Emeryville (Howard, 1929,

Univ. Calif. Publ. Zool., vol. 32, p. 312); *Buena Vista Lake (DeMay, Condor, vol. 44, p. 228). ILLINOIS: *Modoc (Parmalee; 1958, Auk, vol. 75, p. 170 [needs confirmation]). FLORIDA: *Castle Windy (Bullen and Sleight, 1959, Rept. Bryant Found. Amer. Studies, no. 1, p. 20). PUERTO RICO: *Barrio Canas (Wetmore, 1938, Auk, vol. 55, p. 53). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 6).

Suborder FREGATAE (Sharpe)

Fregati Sharpe, 1891, Review Recent Attempts to Classify Birds, p. 77 (suborder; type *Fregata* Lacépède).—Wetmore and W. D. Miller, 1926, Auk, vol. 43, no. 3, p. 341).

Family FREGATIDAE Garrod

Fregatidae Garrod, 1874 (read Feb. 3), Proc. zool. Soc. London, p. 117 (type *Fregata* Lacépède).

Neospecies of *Fregatidae* from *prehistoric sites:

1. *Fregata magnificens* Mathews. ST. THOMAS: *midden (Wetmore, 1918, Proc. U. S. nat. Mus., vol. 54, p. 515). ANTIGUA: *Mill Reef midden (Univ. Florida).

Order ARDEIFORMES (Wagler)

- Ardeae* Wagler, 1830, Natürliches System der Amphibien mit vorangehender Classification der Säugethiere und Vögel, p. 000 (ordo; type *Ardea* Linnaeus).
 Wäglar, 1831, Isis von Oken, Heft 4, p. 530.—*Ardeiformes* Gadow, 1892, Proc. zool. Soc. London, p. 240 (order).
Tantali Wagler, 1830, Nat. Syst. Amphib. Säugeth. Vögel, p. 000 (ordo; type *Tantalus* Linnaeus, 1758, a synonym of *Mycteria* Linnaeus, 1758).—Wagler, 1831, Isis von Oken, Heft 4, p. 530.
Herodiones Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 642 (ordo; type *Herodias* Boie, 1822, a junior synonym of *Egretta* Forster, 1817).
 —Bonaparte, 1854, Ann. Sci. nat. (Paris), p. 37.—*Herodii* Cope, 1889 (Oct.), Amer. Natural., vol. 23, no. 274, p. 871 (suborder).
Ciconiae Bonaparte, 1854, Ann. Sci. nat. (Paris), p. 37 ("tribus," i.e. suborder of *Herodiones*; type *Ciconia* Linnaeus).—*Ciconiiformes* Garrod, 1874, Proc. zool. Soc. London, pp. 117, 122 (order).

Suborder PHOENICOPTERI Fürbringer

- Phoenicopteri* Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, p. 1565 (gens; type *Phoenicopterus* Linnaeus).—*Phoenicoptériformes* Sharpe, 1891, Review Recent Attempts to Classify Birds, p. 76 (order).

Family †TOROTIGIDAE Brodkorb

- Torotigidae* Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000 (type *Torotix* Brodkorb).

Genus †*Gallornis* Lambrecht

- Gallornis* Lambrecht, 1931, Bull. Mus. Hist. nat. Belgique, vol. 7, no. 30, p. 1 (type by monotypy *Gallornis straeleni* Lambrecht). Position tentative.

1. *Gallornis straeleni* Lambrecht

- Gallornis straeleni* Lambrecht, 1931, Bull. Mus. Hist. nat. Belgique, vol. 7, no. 30, p. 1, fig. 1-3 (type from Auxerre, proximal end of femur, Brussels Mus.).

LOWER CRETACEOUS, NEOCOMIAN. FRANCE: Dept. Yonne: Auxerre.

Genus †*Parascaniornis* Lambrecht

- Parascaniornis* Lambrecht, 1933, Handb. Palaeorn., p. 335 (type by monotypy *Parascaniornis stensioi* Lambrecht). Position tentative.

2. *Parascaniornis stensioi* Lambrecht

- Parascaniornis stensioi* Lambrecht, 1933, Handb. Palaeorn., p. 335, fig. 116 (type from Ivö, vertebra, Mineralogical-Geological Museum, Copenhagen).

UPPER CRETACEOUS, CAMPANIAN (Shell fragment limestone).
 SWEDEN: IVÖ.

Genus †*Torotix* Brodkorb

Torotix Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000 (type by original designation *Torotix clemensi* Brodkorb).

3. *Torotix clemensi* Brodkorb

Torotix clemensi Brodkorb, 1963 (in press), Proc. XIII internat. ornith. Congr. Ithaca, p. 000, fig. 4-5 (type distal part of right humerus, Univ. Calif. Mus. Paleo. no. 53958).

UPPER CRETACEOUS, MAËSTRICHTIAN (Lance formation). WYOMING: Niobrara County: Lance Creek.

Family †SCANIORNITHIDAE Lambrecht

Scaniornithidae Lambrecht, 1933, Handb. Palaeorn., p. 334 (type *Scaniornis Dames*).

Genus †*Scaniornis* Dames

Scaniornis Dames, 1890 (read Jan. 8), Bihang svenska Vet.-Akad. Handl., vol. 16, pt. 4, no. 1, p. 4 (type by monotypy *Scaniornis lundgreni* Dames).

1. *Scaniornis lundgreni* Dames

Scaniornis lundgreni Dames, 1890 (read Jan. 8), Bihang svenska Vet.-Akad. Handl., vol. 16, pt. 4, no. 1, p. 4, pl. (types from Annetorp quarry, right humerus, coracoid, scapula, Univ. Lund).

LOWER PALEOCENE (Saltholmskalk). SWEDEN: Annetorp quarry near Limhamn.

Family †TELMABATIDAE Howard

Telmabatidae Howard, 1955 (March 11), Amer. Mus. Novit., no. 1710, p. 23 (type *Telmabates* Howard).

Genus †*Telmabates* Howard

Telmabates Howard, 1955 (March 11), Amer. Mus. Novit., no. 1710, p. 3 (type by original designation *Telmabates antiquus* Howard).

1. *Telmabates antiquus* Howard

Telmabates antiquus Howard, 1955 (March 11), Amer. Mus. Novit., no. 1710, p. 3, fig. 1-8 (type from Cañadón Hondo, postcranial skeleton, Am. Mus. Nat. Hist. no. 3170).

LOWER EOCENE (Casamayor formation). ARGENTINA: Ter. Chubut: Cañadón Hondo near Paso Niemann, south of Río Chico del Chubut.

Family †AGNOPTERIDAE Lambrecht

Agnopteridae Lambrecht, 1933, Handb. Palaeorn., p. 333 (type *Agnopterus Milne-Edwards*).

Genus †*Agnopterus* Milne-Edwards

Ptenornis Seeley, 1866, Ann. Mag. nat. Hist., ser. 3, vol. 18, p. 109 (inadequate description and no specific name).

Agnopterus. Milne-Edwards, 1868, Ois. Foss. France, vol. 2, pl. 89, fig. 10-15 (type by monotypy *Agnopterus laurillardi* Milne-Edwards).—Milne-Edwards, 1870, op. cit., vol. 2, sheet 11, p. 83.

1. *Agnopterus hantoniensis* Lydekker

Agnopterus(?) *hantoniensis* Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 96, fig. 23 (type from Hordwell, right coracoid, Brit. Mus. no. 30325).

UPPER EOCENE (Hordwell beds). ENGLAND: Hampshire: Hordwell (Lydekker, 1891). Isle of Wight: Hempstead? (Seeley, 1866, Ann. Mag. nat. Hist., p. 109).

2. *Agnopterus laurillardi* Milne-Edwards

Agnopterus laurillardi Milne-Edwards, 1868, Ois. Foss. France, vol. 2, pl. 89, fig. 10-15; 1870, vol. 2, sheet 11, p. 83 (type from environs de Paris, distal part of tibiotarsus, Paris Mus.).

UPPER EOCENE (gypse de Montmartre). FRANCE: Dept. Seine: Montmartre.

3. *Agnopterus turgaiensis* Tugarinov

Agnopterus turgaiensis Tugarinov, 1940, Doklady Akad. Nauk S.S.S.R., vol. 26, no. 3, p. 308, fig. 2 (type from Lake Chelkar-Teniz).—*Agnopterus turgaiensis* Belyaeva, 1962, Cat. Tertiary Fossil Sites of Land Mammals in U.S.S.R., p. 8).

UPPER OLIGOCENE (*Indricotherium* beds). KAZAKSTAN: Lake Chelkar-Teniz.

Family PHOENICOPTERIDAE Bonaparte

Phoenicopteridae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 59 (type *Phoenicopterus* Linnaeus).

Genus †*Elornis* Aymard

Elornis Aymard, 1856, Congr. sci. France, vol. 1, p. 234 (type *Elornis littoralis* Aymard, designated by Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 80). *Helornis* Lydekker, 1891, Ibis, ser. 6, vol. 3, p. 396 (emendation).

1. *Elornis anglicus* Lydekker

Elornis(?) *anglicus* Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 80, fig. 22 (type from Hordwell, left humerus, Brit. Mus. no. 36792).

UPPER EOCENE (Hordwell beds). ENGLAND: Hampshire: Hordwell.

2. *Elornis littoralis* Aymard

Elornis littoralis Aymard, 1856, Congr. sci. France, vol. 1, pp. 234, 267 (lectotype from Ronzon, humerus, suggested by Lydekker, 1891, Cat., p. 80).

Elornis antiquus Aymard, 1856, Congr. sci. France, vol. 1, p. 234 (types from Ronzon, proximal part of tarsometatarsus, humerus).

LOWER OLIGOCENE (marnes calcaires de Ronzon). FRANCE: Dept. Haut Loire: Ronzon near Puy-en-Velay.

3. *Elornis grandis* Aymard

Elornis grandis Aymard, 1856, Congr. sci. France, vol. 1, pp. 234, 267 (type from Ronzon, proximal part of humerus).

LOWER OLIGOCENE (marnes calcaires de Ronzon). FRANCE: Dept. Haut Loire: Ronzon near Puy-en-Velay.

Genus †*Tiliornis* Ameghino

Tiliornis Ameghino, 1899 (July), Sinopsis geológico-paleontológica, Suplemento, p. 9 (type by monotypy *Tiliornis senex* Ameghino).

4. *Tiliornis senex* Ameghino

Tiliornis senex Ameghino, 1899 (July), Sinopsis geológico-paleontológica, Suplemento, p. 9 (type from "Guaranítico de Patagonia," coracoid).

LOWER OLIGOCENE (Deseado formation). ARGENTINA: Patagonia.

Genus *Phoenicopterus* Linnaeus

Phoenicopterus Linnaeus, 1758, Syst. Nat., ed. 10, vol. 1, p. 139 (type *Phoenicopterus ruber* Linnaeus).

5. *Phoenicopterus croizeti* Gervais

Phoenicopterus croizeti Gervais, 1849, Mem. Acad. Sci. Lett. Montpellier, sec. sci., vol. 1, p. 220 (nomen nudum; based on "Flamant semblable au *Ph. ruber*, P. Gerv., Ois. foss., p. 21").—Gervais, 1852, Zool. et Pal. Françaises, ed. 1, p. 233, pl. 2, fig. 4-5 (types tarsometatarsus from Gergovie and skull from Clermont-Ferrand).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Puy-en-Dôme: Clermont-Ferrand and Gergovie (Gervais, 1852); Chaptuzat and Cournon (Milne-Edwards, 1869, Ois. Foss. France, vol. 2, p. 572); Perignat and Sauvetat (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 78). Dept. Allier: Chavroches, Gannat, Allets, and Langy (Milne-Edwards); Saint-Gérand-le-Puy (Lydekker). Dept. Somme: Créchy (Lambrecht, 1933, Handb. Palaeorn., p. 344).

LOWER MIOCENE (Hydrobienschichten). GERMANY: Prov. Rheinhessen: Budenheim near Mainz (Lambrecht).

6. *Phoenicopterus floridanus* Brodkorb

Phoenicopterus floridanus Brodkorb, 1953 (June 9), Nat. Hist. Misc., no. 124, p. 1, fig. 1-2 (type from Brewster, distal part of right tibiotarsus, Brodkorb no. 147).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster.

7. *Phoenicopterus stocki* L. Miller

Phoenicopterus stocki L. Miller, 1944 (June), Wilson Bull., vol. 56, no. 2, p. 77, fig. 1-2 (type from Rincón, distal end of tibiotarsus, Los Angeles Co. Mus. no. C.I.T. 3245).

MIDDLE PLIOCENE (Chihuahua formation). MEXICO: Chihuahua: Rincón de la Concha, near Yepomera, valley of Río Papigochic.

8. *Phoenicopterus copei* Shufeldt

Phoenicopterus copei Shufeldt, 1891 (Sept.), Amer. Natural., vol. 25, no. 297, p. 820.—Shufeldt, 1892, Jour. Acad. nat. Sci. Philadelphia, vol. 9, p. 410, pl. 15, fig. 11, 13; pl. 17, fig. 28-29, 38 (types from Fossil Lake, distal end of left tarsometatarsus and wing phalanx, Am. Mus. no. 3485).

MIDDLE PLEISTOCENE (Fossil Lake formation). OREGON: Lake County: Fossil Lake (Shufeldt, 1891).

UPPER PLEISTOCENE (Manix lake beds). CALIFORNIA: San Bernardino County: Manix? (Howard, 1955, U. S. geol. Surv. profess. Paper, no. 264-J, p. 202).

9. *Phoenicopterus minutus* Howard

Phoenicopterus minutus Howard, 1955 (June 8), U. S. geol. Surv. profess. Paper, No. 264-J, p. 202, pl. 50, fig. 1-7 (type from Manix, right tibiotarsus and associated proximal part of tarsometatarsus, Los Angeles Mus. no. 2445).

UPPER PLEISTOCENE (Manix lake beds). CALIFORNIA: San Bernardino County: Manix.

Neospecies of Phoenicopteridae from Pleistocene and *prehistoric sites:

1. *Phoenicopterus ruber* Linnaeus. PUERTO RICO: *Barrió Canas (Wetmore, 1938, vol. 55, p. 53). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 7). ANTIGUA: *Mill Reef midden (Univ. Florida).

2. *Phoenicopterus chilensis* Molina. ARGENTINA: Luján (Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 445).

Family †PALAELODIDAE (Stejneger)

Palaeodontidae Stejneger, 1885, Stand. nat. Hist., vol. 4, p. 154 (type *Palaeodus* Milne-Edwards).

Palaelodidae Fürbringer, 1888, Untersuch. Morph. Syst. Vögel, vol. 2, p. 1565.

Paloelodidae Howard, 1955, Amer. Mus. Novit., no. 1710, p. 22.

Genus †*Palaelodus* Milne-Edwards

Palaelodus Milne-Edwards, 1863 (read June 29), C. R. Acad. Sci. Paris, vol. 56, p. 1220 (type *Palaelodus ambiguus* Milne-Edwards, designated by Milne-Edwards, 1869, Ois. Foss. France, vol. 2, p. 59).

Paloelodus Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 82-89; 1869, vol. 2, sheet 8, p. 58 (typographical error for *Palaelodus*?).—O. Fraas, 1870, Jahresh. Ver. Naturk. Württemberg, vol. 26, p. 285 (emendation).

1. *Palaelodus goliath* Milne-Edwards

Palaelodus goliath Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 87; pl. 88, fig. 1-3; 1870, vol. 2, p. 79 (lectotype from Langy, tarsometatarsus, selected by Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 95).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy (Milne-Edwards, 1871, vol. 2, p. 572); Saint-Gérand-le-Puy (Lambrecht, 1933, Handb. Palaeorn., p. 341). Dept. Somme: Créchy (Lambrecht, 1933).

LOWER MIOCENE (Hydrobienkalk). GERMANY: HESSEN: Budenheim, Kastel Bruch, River Hessler between Wiesbaden and Mainz, and Neuer Bruch (Lambrecht, 1933).

2. *Palaelodus crassipes* Milne-Edwards

Palaelodus crassipes Milne-Edwards, 1863 (read June 29), C. R. Acad. Sci. Paris, vol. 56, p. 1221 (almost a nomen nudum; type from dept. Allier, element not specified).—*Paloelodus crassipes* Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 88, fig. 4-11; pl. 89, fig. 1-5.—Milne-Edwards, 1870, Ois. Foss. France, vol. 2, sheet 10, p. 77.

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy and Gannat (Milne-Edwards, 1871, vol. 2, p. 572); Saint-Gérand-le-Puy [not Ciernat?] (Lambrecht, 1933, Handb. Palaeorn., pp. 341, 884). Dept. Puy-de-Dôme: Montaigut le Blin (Lambrecht, p. 341).

3. *Palaelodus ambiguus* Milne-Edwards

Palaelodus ambiguus Milne-Edwards, 1863 (read June 29), C. R. Acad. Sci. Paris, vol. 56, p. 1221 (descr. type from dept. Allier).—*Paloelodus ambiguus* Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 82-84, pl. 85, fig. 1-11; 1869, vol. 2, sheet 8, p. 60 (types redescribed).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Gannat, Billy, Langy, Vaumas, and Saint-Gérand-le-Puy? (Milne-Edwards). Dept. Puy-de-Dôme: Cournon and Chaptuzat (Milne-Edwards); Pont-du-Château and Perignat (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 83). Dept. Somme: Créchy (Lambrecht, 1933, Handb. Palaeorn., p. 341).

LOWER MIOCENE (Hydrobienkalk). GERMANY: Hesse: Weisenau (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 83); River Hessler between Wiesbaden and Mainz, "Dickkopf" near Monsheim, Budenheim, and Kasteler Bruch (Lambrecht, pp. 340, 670).

4. *Palaelodus minutus* Milne-Edwards

Palaelodus minutus Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 86, fig. 17-20; 1870, vol. 2, sheet 10, p. 75 (lectotype from Allier, tarsometatarsus, coll. Milne-Edwards, selected by Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 92).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy (Milne-Edwards, 1871, Ois. Foss. France, vol. 2, p. 572); Saint-Gérand-le-Puy (Paris, 1912, Rev. française Ornith., vol. 4, p. 291); Chavrochès (Lambrecht, 1933, Handb. Palaeorn., p. 342). Dept. Somme: Créchy (Lambrecht, p. 667).

LOWER MIOCENE (Hydrobienkalk). GERMANY: Hesse: Kastel Bruch and Budenheim (Lambrecht).

5. *Palaelodus gracilipes* Milne-Edwards

Palaelodus gracilipes Milne-Edwards, 1863 (read June 29), C. R. Acad. Sci. Paris, vol. 56, p. 1221 (almost a nomen nudum; type from Allier).—*Palaelodus gracilipes* Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 85, fig. 12-16; pl. 86, fig. 1-16; 1870, vol. 2, sheet 10, p. 73 (types redescribed).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy, Gannat, Vaumas, and Saint-Gérand-le-Puy (Milne-Edwards, 1871, vol. 2, p. 572).

6. *Palaelodus steinheimensis* Fraas

Palaelodus steinheimensis O. Fraas, 1870, Jahresh. Ver. Vaterl. Naturk. Württemberg, vol. 26, p. 285, pl. 7, fig. 13 (type from Steinheim, distal end of left tibiotarsus, Stuttgart Mus.).

UPPER MIOCENE (obere Süßwassermolasse). GERMANY: Württemberg: Steinheim (Fraas). Records of *P. goliath* from Goldberg (Lambrecht, p. 670) and *P. ambiguus* from Goldberg, Spitzberg, Steinheim, and Hahnenberg (Lambrecht, pp. 339, 678) may be referable

to this large species, whereas the records of *P. gracilipes* from Steinheim (Fraas, p. 286) and *P. minutus* from Goldberg (Lambrecht, pp. 342, 670) suggest the presence of an undescribed small species in the Upper Miocene.

Genus †*Megapaloelodus* A. H. Miller

Megapaloelodus A. H. Miller, 1944 (June 22), Univ. Calif. Publ. geol. Sci., vol. 27, no. 4, p. 86 (type by monotypy *Megapaloelodus connectens* A. H. Miller).

Megapalaelodus Wetmore, 1951, Proc. X. internat. ornith. Congr., pp. 58, 66 (emendation).

7. *Megapaloelodus connectens* A. H. Miller

Megapaloelodus connectens A. H. Miller, 1944 (June 22), Univ. Calif. Publ. geol. Sci., vol. 27, no. 4, p. 86, fig. 1-2 (type from Flint Hill, distal end of right tarsometatarsus; Univ. Calif. Mus. Paleo. no. 37367).

LOWER MIOCENE (Rosebud formation). SOUTH DAKOTA: Bennett County: Flint Hill, 9 miles WSW of Martin (A. H. Miller, 1944).

UPPER MIOCENE (Barstow formation). CALIFORNIA: San Bernardino County: Barstow (L. Miller, 1950, Condor, vol. 52, p. 69; 1952, Condor, vol. 54, p. 296); elements not comparable to type and may represent another species.

8. *Megapaloelodus opsigonus* Brodkorb

Megapaloelodus opsigonus Brodkorb, 1961 (Nov. 7), Quart. Jour. Florida Acad. Sci., vol. 24, no. 3, p. 173, fig. 2 (type from Juntura, proximal end of left tarsometatarsus, Univ. Ore. Mus. Nat. Hist., no. F-5459).

LOWER PLIOCENE (Juntura beds). OREGON: Malheur County: Juntura.

Suborder PLATALEAE Newton

Plataleae A. Newton, 1884, Encyclop. brit., ed. 9, vol. 18, p. 47 (type *Platalea* Linnaeus).

Ibides Coues, 1884 (April or later), Key N. Amer. Birds, ed. 2, pp. ix, 648 (type *Ibis* Cuvier, a synonym of *Threskiornis* Gray).

Family †PLEGADORNITHIDAE (Wetmore)

Pelagodornithidae [sic] Wetmore, 1962 (June 26), Smithsonian misc. Coll., vol. 145, no. 2, p. 3 (type *Plegadornis* Wetmore,).—*Pelagodornithoidea* [sic] Wetmore, 1962, op. cit., p. 3 (superfamily).

Genus †*Plegadornis* Wetmore

Plegadornis Wetmore, 1962 (June 26), Smithsonian misc. Coll., vol. 145, no. 2, p. 1 (type by original designation *Plegadornis antecessor* Wetmore).

1. *Plegadornis antecessor* Wetmore

Plegadornis antecessor Wetmore, 1962 (June 26), Smithsonian misc. Coll., vol. 145, no. 2, p. 1, fig. 1 (type from Hewletts farm, distal part of left humerus, U. S. Nat. Mus. no. 22820).

UPPER CRETACEOUS, SANTONIAN (Mooreville tongue of Selma chalk). ALABAMA: Greene County: Hewletts farm, 3 miles northeast of Boligee.

Family PLATALEIDAE Bonaparte

Plataleinae Bonaparte, 1838, Geographical and comparative list of the birds of Europe and North America, p. 48 (subfamilia; type *Platalea* Linnaeus).—*Plataleidae* Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (familia).

Ibinae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (subfamilia; type "*Ibis*, Savig. Cuv. (*Threskiornis* Wagl.)", see Bonaparte, 1854, Ann. Sci. nat. (Paris), p. 38; *Ibis* in this sense is preoccupied by *Ibis* Lacépède, 1799).—*Ibididae* Coues, 1884 (April or later.), Key N. Amer. Birds, ed. 2, pp. ix, 648.

Plegadidae Mathews, 1913 (Jan.), Auk, vol. 30, no. 1, pp. 93, 95 (type *Plegadis* Kaup).

Threskiornithidae Richmond, 1917 (Aug. 16), Proc. U. S. nat. Mus., vol. 53, no. 2221, pp. 580, 636 (type *Threskiornis* Gray).

Subfamily THRESKIORNITHINAE (Richmond)

Ibinae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (type *Ibis* Savigny, Cuvier, not *Ibis* Lacépède).

Eudociminae Bonaparte, 1854, Ann. Sci. nat. (Paris), p. 38 (type *Eudocimus* Wagler).

Threskiornithidae Richmond, 1917 (Aug. 16), Proc. U. S. nat. Mus., vol. 53, no. 2221, pp. 580, 636 (family; type *Threskiornis* Gray).—*Threskiornithinae* Wetmore and W. D. Miller, 1926, Auk, vol. 43, p. 341).

Genus †*Ibidopsis* Lydekker

Ibidopsis Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 74 (type by original designation *Ibidopsis hordwelliensis* Lydekker).

1. *Ibidopsis hordwelliensis* Lydekker

Ibidopsis hordwelliensis Lydekker, 1891 (Apr. 25); Cat. Foss. Birds Brit. Mus., p. 74, fig. 20 (type from Hordwell, distal part of right tibiotarsus, Brit. Mus. no. 36793).

UPPER EOCENE (Hordwell beds). ENGLAND: Hampshire: Hordwell.

Genus †*Ibidopodia* Milne-Edwards

Ibidopodia Milne-Edwards, 1868, Ois. Foss. France, vol. 1, sheet 59, p. 465 (type by monotypy *Ibidopodia palustris* Milne-Edwards).

2. *Ibidopodia palustris* Milne-Edwards

Ibidopodia palustris Milne-Edwards, 1868, Ois. Foss. France, vol. 1, sheet 59, 465, pl. 71, fig. 17-21 (lectotype cranium from Langy, selected by Lydekker, 1891, p. 74).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy.

Genus *Eudocimus* Wagler

Eudocimus Wagler, 1832, Isis von Oken, p. 1232 (type *Scolopax rubra* Linnaeus).

3. *Eudocimus paganus* (Milne-Edwards)

Ibis pagana Milne-Edwards, 1868, Ois. Foss. France, vol. 1, sheet 57, p. 450, pl. 69-70, pl. 71, fig. 1-12 (types numerous elements from Langy and Saint-Gérand-le-Puy).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy and Saint-Gérand-le-Puy (Milne-Edwards). Dept. Puy-de-Dôme: Montaignut (Lambrecht, 1933, Handb. Palaeorn., p. 331).¹

Genus †*Protibis* Ameghino

Protibis Ameghino, 1891 (Dec. 1), Rev. argentina Hist. nat., vol. 1, p. 445 (type by monotypy *Protibis cnemialis* Ameghino).

4. *Protibis cnemialis* Ameghino

Protibis cnemialis Ameghino, 1891 (Dec. 1), Rev. argentina Hist. nat., vol. 1, p. 445 (type from Monte Observación, distal part of tibiotarsus, now in Brit. Mus.).—Ameghino, 1895, Ból. Inst. geog. argentino, vol. 15, p. 98, fig. 42 (type redescribed).

MIDDLE MIOCENE (Santa Cruz formation). ARGENTINA: Ter. Santa Cruz: Monte Observación.

Genus *Plegadis* Kaup

Plegadis Kaup, 1829, Skizz. Ent.-Gesch. Eur. Thierw., p. 82 (type *Tantalus falcinellus* Linnaeus).

5. *Plegadis gracilis* A. H. Miller and Bowman

Plegadis gracilis A. H. Miller and Bowman, 1956 (March 5), Wilson Bull., vol. 68, no. 1, p. 38, fig. 1 d-e (type from Cita Canyon, proximal part of left tarsometatarsus, Univ. Calif. Mus. Paleo. no. 45088).

¹A similar species occurs in the Upper Miocene at Steinheim (Fraas, 1870, Jahresh. Ver. Naturk. Württemberg, vol. 26, p. 284) and Lierheim (Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 73).

LOWER PLEISTOCENE (Cita Canyon beds). TEXAS: Randall County: Cita Canyon, at Newton Harrell-Edd Ranch.

Genus *Carphibis* Reichenbach

Carphibis Reichenbach, 1853, *Avium systema naturale*, p. xiv (type *Ibis spinicollis* Jameson).

6. *Carphibis condita* (DeVis)

Ibis(?) *conditus* DeVis, 1906, *Ann. Queensland Mus.*, no. 6, p. 10, pl. 2, fig. 2 (type from Wurdulumanġula, femur).

UPPER PLEISTOCENE (Malkuni fauna, Katipiri sands). SOUTH AUSTRALIA: Wurdulumanġula near Lake Eyre.

Subfamily PLATALEINAE Bonaparte

Plataleinae Bonaparte, 1838, *Geogr. comp. List Birds Eur. N. Amer.*, p. 48 (type *Platalea* Linnaeus).

Genus *Platalea* Linnaeus

Platalea Linnaeus, 1758, *Syst. Nat.*, ed. 10, vol. 1, p. 139 (type *Platalea leucorodia* Linnaeus).

7. *Platalea subtenuis* DeVis

Platalea subtenuis DeVis, 1892, *Proc. Linn. Soc. N. S. Wales*, ser. 2, vol. 6, p. 443, pl. 24, fig. 5 (types from Queensland, fragmentary femur and tibiotarsus).

UPPER PLEISTOCENE (Darling Downs beds). QUEENSLAND.

Neospecies of Plataleidae from Pleistocene and *prehistoric sites:

1. *Nipponia nippon* (Temminck). JAPAN: *Iki Island? (Kuroda, 1959, *Bull. biogeog. Soc. Japan*, vol. 21, p. 68, pl. 1, fig. D-E).
2. *Theristicus caudatus* (Boddaert). BRAZIL: Lapa da Escrivania? (Winge, 1887, *E. Mus. Lund.*, vol. 1, no. 2, p. 29).
3. *Eudocimus albus* (Linnaeus). FLORIDA: Seminole Field (Wetmore, 1931, *Smithsonian misc. Coll.*, vol. 85, no. 2, p. 18); Haile (Brodkorb, 1953, *Wilson Bull.*, vol. 65, p. 49); Itchtucknee River (McCoy, 1963, *Auk*, vol. 80, p. 000). BAHAMAS: *Cordon Hills on Crooked Island (Wetmore, 1938, *Auk*, vol. 55, p. 52). PUERTO RICO: *Barrio Canas (Wetmore, 1938, *Auk*, vol. 55, p. 53).
4. *Eudocimus ruber* (Linnaeus). VENEZUELA: *Hacienda Tocoron? (Wetmore, 1935, *Auk*, vol. 52, p. 329).
5. *Plegadis falcinellus* (Linnaeus). PUERTO RICO: *Barrio Canas (Wetmore, 1938, *Auk*, vol. 55, p. 53).
6. *Plegadis chihi* (Vieillot). CALIFORNIA: Rancho La Brea (L. Miller, 1925, *Publ. Carnegie Instn. Washington*, no. 349, p. 73); *Emeryville (Howard, 1929, *Univ. Calif. Publ. Zool.*, vol. 32, p. 312); *Buena Vista Lake (DeMay, 1942, *Condor*, vol. 44, p. 229).

7. *Platalea alba* Scopoli. MADAGASCAR: *Sirabé (Andrews, 1897, Ibis, p. 358).

8. *Ajaja ajaja* (Linnaeus). CALIFORNIA: Rancho La Brea? (Howard, 1930, Condor, vol. 32, p. 84). FLORIDA: Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185).

Suborder ARDEAE Wagler

Ardeae Wagler, 1831, Isis von Oken, p. 530 (ordo; type *Ardea* Linnaeus).

Family ARDEIDAE Vigors

Ardeidae "Leach," Vigors, 1825, Trans. Linn. Soc. London, vol. 14, pp. 488-490 (type *Ardea* Linnaeus).

Genus †*Proherodius* Lydekker

Proherodius Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 60 (type by original designation *Proherodius oweni* Lydekker).

1. *Proherodius oweni* Lydekker

Proherodius oweni Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., pp. 60, 363, fig. 75 (type from Primrose Hill, fragmentary sternum, Brit. Mus. no. 43164).

LOWER EOCENE (London clay). ENGLAND: Middlesex: Primrose Hill and St. James' Park (Lydekker.)

Genus †*Eoceornis* Shufeldt

Eoceornis Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 39 (type by monotypy *Eoceornis ardetta* Shufeldt).

2. *Eoceornis ardetta* Shufeldt

Eoceornis ardetta Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 39, pl. 13, fig. 102 (type from Henrys Fork, fragmentary sternum, Yale Peabody Mus. no. 891).

MIDDLE EOCENE (Bridger formation). WYOMING: Uinta County: Henrys Fork.

Genus †*Botauroides* Shufeldt

Botauroides Shufeldt 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 33 (type by monotypy *Botauroides parvus* Shufeldt).

3. *Botauroides parvus* Shufeldt

Botauroides parvus Shufeldt, 1915 (Feb.), Trans. Connecticut Acad. Arts Sci., vol. 19, p. 33 (type from Spanish John's Meadow, distal part of left tarso-metatarsus, Yale Peabody Mus. no. 1030).

MIDDLE EOCENE (Bridger formation). WYOMING: Sweetwater County: Spanish John's Meadow.

Genus †*Proardea* Lambrecht

Proardea Lambrecht, 1933, Handb. Palaeorn., p. 311 (type by monotypy *Ardea amissa* Milne-Edwards).

4. *Proardea amissa* (Milne-Edwards)

Ardea amissa Milne-Edwards, 1892, C. R. 2. Congr. internat. ornith. Budapest, p. 73 (type from phosphate de Chaux, tarsometatarsus, Paris Mus.).

Ardea amissa Paris, 1912, Rev. française Ornith., vol. 4, p. 291 (lapsus).

UPPER EOCENE OR LOWER OLIGOCENE (phosphorites du Quercy). FRANCE: Dept. Tarn-et-Garonne: Chaux.

Genus †*Goliathia* Lambrecht

Goliathia Lambrecht, 1930 (Jan. 25), Geol. hungarica, ser. pal., fasc. 7, p. 30 (type by monotypy *Goliathia andrewsi* Lambrecht).

5. *Goliathia andrewsi* Lambrecht

Goliathia andrewsi Lambrecht, 1930 (Jan. 25), Geol. hungarica, ser. pal., fasc. 7, p. 30, fig. 7 (type ulna, Brit. Mus. no. A.883).

UPPER EOCENE OR LOWER OLIGOCENE (Fayum series). EGYPT: Fayum (exact locality unknown).

Genus †*Ardeacites* Haushalter

Ardeacites Haushalter, 1855, Merkwürdige fossile Tierüberreste aus der Allgäuer Molasse, p. 11 (type by monotypy *Ardeacites molassicus* Haushalter).

6. *Ardeacites molassicus* Haushalter

Ardeacites molassicus Haushalter, 1855, Merkwürdige fossile Tierüberreste aus der Allgäuer Molasse, p. 11, pl. 2, fig. 1 (type from Allgäu, humerus, Munich Mus., now lost).

UPPER MIOCENE (obere Meeresmolasse). BAVARIA: Allgäu near Harbartshofen.

Genus †*Botaurites* Ammon

Botaurites von Ammon, 1918, Abh. Naturw. Ver. Regensburg, vol. 12, p. 31 (type by monotypy *Botaurites avitus* von Ammon).

7. *Botaurites avitus* Ammon

Botaurites avitus von Ammon, 1918, Abh. Naturw. Ver. Regensburg, vol. 12, p. 31, fig. 5-6 (type from clay works, 7th or 8th cervical vertebra, Naturw. Verein zu Regensburg.)

UPPER MIOCENE (Braunkohlen der Oberpfalz). GERMANY: Württemberg: clay works of Mayer and Reinhard, between Dechbetten and Prüfening.

8. *Botaurites similis* (Fraas)

Ardea similis O. Fraas, 1870, Jahresh. Ver. Naturk. Württemberg, vol. 26, p. 284, pl. 7, fig. 14 (type from Steinheim, distal end of right tibiotarsus, Stuttgart Mus.).

UPPER MIOCENE (obere Süßwassermolasse). GERMANY: Württemberg: Steinheim.

Genus *Ardea* Linnaeus

Ardea Linnaeus, 1758, Syst. Nat., ed. 10, vol. 1, p. 141 (type *Ardea cinerea* Linnaeus).

9. *Ardea aurelianensis* Milne-Edwards

Ardea aurelianensis Milne-Edwards, 1871, Ois. Foss. France, vol. 2, sheet 74, p. 585 (type from Suèvres, humerus).

UPPER MIOCENE (faluns de Touraine). FRANCE: Dept. Indre-et-Loire: Suèvres northeast of Tours.

10. *Ardea perplexa* Milne-Edwards

Ardea perplexa Milne-Edwards, 1868, Ois. Foss. France, vol. 1, pl. 96, fig. 1-3; 1869, vol. 2, sheet 14, p. 108 (type from Sansan, distal part of right humerus).

UPPER MIOCENE (gisement lacustre de Sansan). FRANCE: Dept. Gers: Sansan.

11. *Ardea brunhuberi* von Ammon

Ardea brunhuberi von Ammon, 1918, Abh. Naturw. Ver. Regensburg, vol. 12, p. 30, fig. 4 (type from clay works, proximal end of left metacarpus, Naturw. Verein zu Regensburg).

UPPER MIOCENE (Braunkohlen der Oberpfalz). GERMANY: Württemberg: clay works of Mayer and Reinhard, between Dechbetten and Prüfening.

12. *Ardea polkensis* Brodkorb

Ardea polkensis Brodkorb, 1955 (Nov. 30), Florida Geol. Surv. Rept. Invest., no. 14, p. 17, pl. 4, fig. 13-15 (type from Brewster, proximal part of right tarsometatarsus, Brodkorb no. 308).

LOWER PLIOCENE (Bone Valley gravel). FLORIDA: Polk County: Brewster.

13. *Ardea lignitum* Giebel

Ardea lignitum Giebel, 1860 (Sept.), Zeitschr. Naturwiss., vol. 16, no. 9, p. 152, pl. 1, fig. 3 (type from Rippersroda, distal part of left femur).

UPPER PLIOCENE (Braunkohle von Rippersroda). GERMANY: Thuringia: Rippersroda.

Genus *Nycticorax* Forster

Nycticorax Forster, 1817, Syn. Cat. Brit. Birds, p. 59 (type *Ardea nycticorax* Linnaeus).

14. *Nycticorax fidens* Brodkorb

Nycticorax fidens Brodkorb, 1963 (Feb. 8), Florida Geol. Surv. Spec. Publ., no. 2, paper 4, p. 3, pl. 1 (type from McGehee farm, left femur, Univ. Florida no. 3285).

LOWER PLIOCENE (Alachua clay). FLORIDA: Alachua County: C. C. McGehee farm, section 22, Township 9 South, Range 17 East, 3.6 miles north of Newberry.

15. *Nycticorax megacephalus* (Milne-Edwards)

Ardea megacephala Milne-Edwards, 1873, Bibl. École hautes Études Paris, sec. sci. nat., vol. 9, art. 3, p. 8, pl. 14, fig. 1-14 (types from Rodriguez).

QUATERNARY. RODRIGUEZ ISLAND.

Genus †*Palaeophoyx* McCoy

Palaeophoyx McCoy 1963 (in press), Auk, vol. 80, no. 3, p. 000 (type by original designation *Palaeophoyx columbiana* McCoy).

16. *Palaeophoyx columbiana* McCoy

Palaeophoyx columbiana McCoy, 1963 (in press) Auk, vol. 80, no. 3, p. 000 fig. 1 (type from Itchtucknee River, right coracoid, Brodkorb no. 32).

UPPER PLEISTOCENE (Itchtucknee River beds). FLORIDA: Columbia County: Itchtucknee River.

Genus *Butorides* Blyth

Butorides Blyth, 1852, Cat. Birds Mus. Asiatic Soc., p. 281 (type *Ardea javanica* Horsfield).

17. *Butorides mauritianus* Günther and E. Newton

Butorides mauritianus Günther and E. Newton, 1879, Philos. Trans. Roy. Soc. London, vol. 168, extra vol., p. 424, pl. 41, fig. a-f (types from Mare aux Songes, Cambridge Univ., casts in Brit. Mus.).

QUATERNARY. MAURITIUS ISLAND: Mare aux Songes.

Neospecies of Ardeidae from Pleistocene and *prehistoric sites:

1. *Ardea cinerea* Linnaeus. DENMARK: Erteboelle, Maglemose, *Vejleby, and *Barsmark (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 99). IRELAND: Ballycotton, Edenvale, and Newhall caves (Lambrecht, 1933, Handb. Palaeorn., p. 734). ENGLAND: Clevedon Cave and *Glastonbury (Lambrecht, 1933); *Colchester (Bate, 1934, Ibis, p. 391). FRANCE: Essone near Corbeil (Milne-Edwards, 1871, Ois. Foss. France, vol. 2, p. 601). ITALY: *Castello nel Trentino (Lambrecht, 1933). SWITZERLAND: *Moosseedorf and *Robenhäusen (Lambrecht, 1933). GERMANY: Hohlefels near Schelkingen (Lambrecht, 1933). CZECHOSLOVAKIA: Certova dira (Capek, 1910, Ber. V internat. ornith. Kongr. Berlin, p. 941). HUNGARY: Puskaporos (Lambrecht, 1912, Aquila, vol. 19, pp. 297, 305). FINLAND: Ladogasee (Lambrecht, 1933)

2. *Ardea herodias* Linnaeus. OREGON: Fossil Lake (Shufeldt, 1913, Bull. Amer. Mus. nat. Hist., vol. 32, pp. 153, 157). CALIFORNIA: Rancho La Brea (L. Miller, 1909, Univ. Calif. Publ. Geol., vol. 5, p. 306); McKittrick (L. Miller, 1925, Univ. Calif. Publ. Geol., vol. 15, p. 317); *Emeryville (Howard, 1929, Univ. Calif. Publ. Zool., vol. 32, p. 312); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). FLORIDA: Seminole Field, Itchtucknee River, Melbourne, Bradenton, and *Vero Beach stratum 3 (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 14); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185); *Good's shellpit and *Lemon Bluff (Neill, Gut, Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388); *South Indian Field (Weigel, 1959, Florida Anthropologist, vol. 12, p. 73); *Castle Windy (Bullen and Sleight, 1959, Rept. Bryant Found. Amer. Studies, no. 1, p. 20). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 7).

3. *Ardea cocoi* Linnaeus. VENEZUELA: *Los Tamarindos (Wetmore, 1935, Auk, vol. 52, p. 329). ARGENTINA: Luján (Ameghino, 1891, Rev. argentina Hist. nat., vol. 1, p. 445).

4. *Ardea purpurea* Linnaeus. ITALY: Grotta Romanelli and Buca del Bersagliere? (Lambrecht, 1933, Handb. Palaeorn., p. 734).

5. *Butorides virescens* (Linnaeus). CALIFORNIA: Rancho La Brea (Howard, 1936, Condor, vol. 38, p. 34); McKittrick (DeMay, 1941, Publ. Carnegie Instn. Washington, no. 530, p. 35); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). FLORIDA: Seminole Field (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 16); Itchtucknee River (McCoy, 1963, Auk, vol. 80, p. 000); *Vero Beach stratum 3 (Weigel, 1963, Spec. Publ. Florida geol. Surv., no. 10, p. 25).

6. *Casmerodius albus* (Linnaeus). CALIFORNIA: Rancho La Brea (Howard, 1936, Condor, vol. 38, p. 34); McKittrick (DeMay, 1941, Publ. Carnegie Instn. Washington, no. 530, p. 35); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). FLORIDA: Seminole Field, Venice, and Melbourne (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 15); Itchtucknee River, (McCoy, 1963, Auk, vol. 80, p. 000); *Hialeah (Laxson, 1953, Florida Anthropologist, vol. 6, p. 98); *Good's shellpit and *Lemon Bluff (Neill, Gut, and Brodkorb, 1956, Amer. Antiquity, vol. 21, p. 388); *South Indian Field (Weigel, 1959, Florida Anthropologist, vol. 12, p. 73); *Vero Beach stratum 3 (Weigel, 1963, Spec. Publ. Florida geol. Surv., no. 10, p. 25). CUBA: Baños de Ciego Montero (Wet-

more, 1928, Amer. Mus. Novit., no. 301, p. 1). VENEZUELA: *Los Tamarindos (Wetmore, 1935, Auk, vol. 52, p. 329).

7. *Ardeola ralloides* (Scopoli). ITALY: Buca del Bersagliere (Lambrecht, 1933, Handb. Palaeorn., p. 734).

8. *Florida caerulea* (Linnaeus). CALIFORNIA: McKittrick (DeMay, 1941, Publ. Carnegie Instn. Washington, no. 530, p. 35); Rancho La Brea (Howard, 1962, Los Angeles County Mus. Contr. Sci., no. 58, p. 20). FLORIDA: Seminole Field (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 16); Itchtucknee River (McCoy, 1963, Auk, vol. 80, p. 000).

9. *Florida thula* (Molina). FLORIDA: Bradenton (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 15); *Vero Beach stratum 3 (Weigel, 1963, Spec. Publ. Florida geol. Surv., no. 10, p. 25). Tentative record from Rancho La Brea, California (Howard, 1936, Condor, vol. 38, p. 35), withdrawn (Howard, 1962, Los Angeles County Mus. Contr. Sci., no. 58, p. 20).

10. *Egretta garzetta* (Linnaeus). ITALY: Bersagliere (Lambrecht, 1933, Handb. Palaeorn., p. 734).

11. *Mesophoyx intermedia* (Wagler). MADAGASCAR: *Sirabé (Andrews, 1897, Ibis, p. 358).

12. *Hydranassa tricolor* (Müller). FLORIDA: Seminole Field (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 15).

13. *Nyctanassa violacea* (Linnaeus). FLORIDA: Seminole Field (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 16); *Vero Beach stratum 3 (*Larus vero* Shufeldt, 1917, Jour. Geol., p. 18, type left carpometacarpus, formerly Florida Geol. Surv. no. V320, now in U. S. Nat. Mus., cast coll. Brodkorb; see Wetmore, 1931). ST. CROIX: *Concordia (Wetmore, 1937, Jour. Agr. Univ. Puerto Rico, vol. 21, p. 7). ST. THOMAS: *midden (Wetmore, 1918, Proc. U. S. nat. Mus., vol. 54, p. 515). ANTIGUA: *Mill Reef midden (Univ. Florida).

14. *Nycticorax nycticorax* (Linnaeus). CALIFORNIA: Rancho La Brea (Howard, 1929, Condor, vol. 31, p. 252); McKittrick (L. Miller, 1935, Condor, vol. 37, p. 75); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). FLORIDA: Bradenton and Itchtucknee River (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 16); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185). NUEVO LEON: San Josecito cave (L. Miller, 1943, Univ. Calif. Publ. Zool., vol. 47, p. 150).

15. *Ixobrychus minutus* (Linnaeus). ITALY: Buca del Bersagliere? (Lambrecht, 1933, Handb. Palaeorn., p. 734).

16. *Ixobrychus exilis* (Gmelin). CALIFORNIA: *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). CUBA: Baños de Ciego Montero (Wetmore, 1928, Amer. Mus. Novit., no. 301, p. 2). BRAZIL: Lapa da Escrivania (O. Wingé, 1887, E Mus. Lund., vol. 1, no. 2, p. 30).

17. *Botaurus stellaris* (Linnaeus). DENMARK: Maglemøse and *Bodals Mose (H. Wingé, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 99). ENGLAND: Cambridgeshire (Milne-Edwards, 1868, Ibis, p. 364); Burwell fens, Reach fens, and *Glastonbury (Lambrecht, 1933, Handb. Palaeorn., p. 734). FRANCE: tourbières (Milne-Edwards, 1871, Ois. Foss. France, vol. 2, p. 601).

18. *Botaurus lentiginosus* (Rackett). OREGON: Fossil Lake (includes *Ardea palloccidentalis* Shufeldt, 1892, Jour. Acad. nat. Sci. Philadelphia, vol. 9, p. 411, pl. 17, fig. 31, type distal part of right tarsometatarsus, Amer. Mus. Nat. Hist.

no. 3483; see Howard, 1946, Publ. Carnegie Instn. Washington, no. 551, p. 156). CALIFORNIA: Rancho La Brea (L. Miller, 1921, Condor, vol. 23, p. 129); *Buena Vista Lake (DeMay, 1942, Condor, vol. 44, p. 228). NORTH DAKOTA: *Morton County (L. Miller, 1961, Bull. S. Calif. Acad. Sci., vol. 60, pt. 3, p. 125). IOWA: *Mill Creek (Hamon, 1961, Plains Anthropologist, vol. 6, p. 209). FLORIDA: Seminole Field and Hog Creek at Sarasota (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 17); Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185); Veró Beach (Weigel, 1963, Spec. Publ. Florida geol. Surv., no. 10, p. 26).

Family COCHLEARIIDAE Ridgway

Cancromidae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (type *Cancroma* Linnaeus, 1766, a junior synonym of *Cochlearius* Brisson, 1760).

Cochleariidae Ridgway, 1887, Manual N. Amer. Birds, p. 122 (type *Cochlearius* Brisson).

No fossil record.

Family SCOPIDAE (Bonaparte)

Scopinae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (sous-famille; type *Scopus* Brisson).

No fossil record.

Family BALAENICIPITIDAE (Bonaparte)

Balaenicipinae Bonaparte, 1853, C. R. Acad. Sci. Paris, vol. 37, no. 18, p. 643 (sous-famille; type *Balaeniceps* Gould).

No fossil record.

Suborder CICONIAE Bonaparte

Tantali Wagler, 1831, Isis von Oken, p. 530 (ordo; type *Tantalus* Linnaeus, 1758, a synonym of *Mycteria* Linnaeus, 1758).

Ciconiae Bonaparte, 1854, Ann. Sci. nat. (Paris), p. 37 ("tribus," i.e. suborder; type *Ciconia* Linnaeus).

Family CICONIIDAE (Gray)

Tantalidae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 57 (type *Tantalus* Linnaeus, a synonym of *Mycteria* Linnaeus).

Ciconiinae Gray, 1840, List Genera Birds, p. 000 (type *Ciconia* Brisson).

Mycteriinae American Ornithologists' Union, 1908, Auk, vol. 25, no. 3, p. 363 (type *Mycteria* Linnaeus).

Subfamily CICONIINAE Gray

Ciconiinae Gray, 1840, List Genera Birds, p. 000 (type *Ciconia* Brisson).

Genus †*Pelargopappus* Stejneger

Pelargopsis Milne-Edwards, 1868 (after April), Ois. Foss. France, vol. 1, sheet 58, p. 460 (type by original designation *Pelargopsis magnus* Milne-Edwards). Preoccupied by *Pelargopsis* Gloger, 1841.

Pelargopappus Stejneger, 1885, Stand. nat. Hist., vol. 4, p. 163 (new name for *Pelargopsis* Milne-Edwards).

Pelargoides Lydekker, 1891, Nature, vol. 45, p. 71 (new name for *Pelargopsis* Milne-Edwards).

Pelargodes Lydekker, 1892 (Apr. 1), Proc. zool. Soc. London for 1891, p. 477 (emendation of *Pelargoides* Lydekker).

Pelargocrex Milne-Edwards, 1893 (July 4), Bull. Brit. ornith. Club, vol. 1, p. 54 (new name for *Pelargopsis* Milne-Edwards).

1. *Pelargopappus stehlini* (Gaillard)

Pelargopsis stehlini Gaillard, 1908, Ann. Univ. Lyon, n.s., vol. 1, fasc. 23, p. 82, text-fig. 21, pl. 4, fig. 5-8 (type from Quercy, distal end of right tarsometatarsus, Basel Mus. no. QH.146).

UPPER EOCENE OR LOWER OLIGOCENE (phosphorites du Quercy).
FRANCE: plateau of Quercy.

2. *Pelargopappus trouessarti* (Gaillard)

Pelargopsis trouessarti Gaillard, 1908, Ann. Univ. Lyon, n.s., vol. 1, fasc. 23, p. 84, text-fig. 22, pl. 4, fig. 9-12 (type from Quercy, distal end of left tarsometatarsus, Basel Mus. no. QH.147).

UPPER EOCENE OR LOWER OLIGOCENE (phosphorites du Quercy).
FRANCE: plateau of Quercy.

3. *Pelargopappus magnus* (Milne-Edwards)

Pelargopsis magnus Milne-Edwards, 1868 (after April), Ois. Foss. France, vol. 1, sheet 58, p. 460, pl. 72, fig. 1-19 (lectotype from Langy, distal part of tarsometatarsus, Paris Mus., designated by Lydekker, 1891, Cat. Foss. Birds Brit. Mus., pp. 67-68).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Langy and Saint-Gérand-le-Puy (Milne-Edwards, 1868). Dept. Puy-de-Dôme (Lydekker, 1891).

Genus †*Propelargus* Lydekker

Propelargus Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 65 (type by original designation *Propelargus cayluxensis* Lydekker).

4. *Propelargus cayluxensis* Lydekker

Propelargus cayluxensis Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 66, fig. 16 (type from Bach, distal part of right tarsometatarsus, Brit. Mus. no. A.109).

UPPER EOCENE OR LOWER OLIGOCENE (phosphorites de Bach).
FRANCE: Dept. Lot: Bach.

5. *Propelargus edwardsi* Lydekker

Propelargus edwardsi Lydekker, 1891 (Nov. 3), Proc. zool. Soc. London, p. 479, fig. 3 (types from Saint-Gérand-le-Puy, right coracoid, left metacarpus, Brit. Mus.).

LOWER MIOCENE (Aquitanian). FRANCE: Dept. Allier: Saint-Gérand-le-Puy.

6. *Propelargus olseni* Brodkorb

Propelargus olseni Brodkorb, 1963 (in press), Quart. Jour. Florida Acad. Sci., vol. 26, no. 2, p. 000, fig. 00 (type from Tallahassee, left tarsometatarsus, Brodkorb no. 8504).

LOWER MIOCENE (Hawthorne formation). FLORIDA: Leon County: Tallahassee, Switchyard B, Seaboard Airline Railroad Company.

Genus †*Palaeohippiorhynchus* Lambrecht

Palaeohippiorhynchus Lambrecht, 1930 (Jan. 25), Geol. hungarica, ser. pal., fasc. 7, p. 18 (type by monotypy *Palaeohippiorhynchus dietrichi* Lambrecht).

7. *Palaeohippiorhynchus dietrichi* Lambrecht

Palaeohippiorhynchus dietrichi Lambrecht, 1930 (Jan. 25), Geol. hungarica, ser. pal., fasc. 7, p. 18, pl. 3, fig. 1-4 (type from Qasr-el-Qurun, skull, mandible, Naturaliensammlung, Stuttgart).

LOWER OLIGOCENE (Fayum series, fluviomarine beds). EGYPT: Fayum: Qasr-el-Qurun.

Genus †*Ciconiopsis* Ameghino

Ciconiopsis Ameghino, 1899 (July), Sinopsis geológico-paleontológica, Suplemento, p. 8 (type by monotypy *Ciconiopsis antarctica* Ameghino).

8. *Ciconiopsis antarctica* Ameghino

Ciconiopsis antarctica Ameghino, 1899 (July), Sinopsis geológico-paleontológica, Suplemento, p. 8 (type from "formación guaranítica," metacarpus).

LOWER OLIGOCENE (Deseado formation). ARGENTINA: Patagonia.

Genus †*Amhipelargus* Lydekker

Amhipelargus Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 68 (type by original designation *Amhipelargus majori* Lydekker).

9. *Amphipelargus majori* Lydekker

Amphipelargus majori Lydekker, 1891 (Apr. 25), Cat. Foss. Birds Brit. Mus., p. 69, fig. 18 (type from Samos, distal end of left tibiotarsus, Brit. Mus. no. A.123).

LOWER PLIOCENE (Samos beds). GREECE: Samos Island.

Genus *Leptoptilos* Lesson

Leptoptilos Lesson, 1831, Traité d'Ornithologie, livr. 8, p. 583 (type *Ardea dubia* Gmelin).

10. *Leptoptilos falconeri* (Davies)

Argala falconeri Milne-Edwards, 1868, Ois. Foss. France, vol. 1, sheet 56, p. 449 footnote (nomen nudum).—Davies, 1880, Geol. Mag., decade 2, vol. 7, p. 24, pl. 2, fig. 4 (lectotype from Siwalik Hills, distal part of right tibiotarsus, Brit. Mus. no. 39753, designated by Lydekker, 1884, Mem. geol. Surv. India, Palaeontologia indica, ser. 10, vol. 3, pt. 4, p. 139).

LOWER PLIOCENE (Siwalik series). INDIA: United Provinces: Siwalik Hills (Davies, 1880). Punjab (Lydekker, 1884).

11. *Leptoptilos titan* Wetmore

Leptoptilos titan Wetmore, 1940 (Sept.), Jour. Paleont., vol. 14, no. 5, p. 447, fig. 1-5 (type from Watoealang, left tarsometatarsus, Mining and Geological Survey, Dept. Netherlands Indies, no. 3313).

UPPER PLEISTOCENE (Solo River beds). JAVA: Watoealang, near Solo River.

Genus *Ciconia* Brisson

Ciconia Brisson, 1760, Ornithologia, vol. 1, p. 48; vol. 5, p. 361 (type *Ardea ciconia* Linnaeus).

12. *Ciconia gaudryi* Lambrecht

Ciconia gaudryi Lambrecht, 1933, Handb. Palaeorn., p. 323 (type from Pikermi, humerus, Paris Mus.).

LOWER PLIOCENE (Pikermi red clay). GREECE: Attica: Pikermi.

13. *Ciconia maltha* L. Miller

Ciconia maltha L. Miller, 1910 (Aug. 5), Univ. Calif. Publ. Geol., vol. 5, no. 30, p. 440, fig. 1-7 (type from Rancho La Brea, left tarsometatarsus, Univ. Calif. Mus. Paleo. no. 11202).

Jabiru? weilli Sellards, 1916, Eighth Ann. Rept., Florida geol. Surv., p. 146, text-fig. 15c, pl. 26, fig. 1-4 (type from Vero Beach, right humerus, formerly Fla. Geol. Surv. no. 5961, now in U. S. Nat. Mus., cast coll. Brodkorb).

MIDDLE PLEISTOCENE (Bruneau formation). IDAHO: Owyhee County: Barbour Ranch, 3.8 miles east of Bruneau-Mountain Home bridge (L. Miller, 1944, Condor, vol. 46, p. 27).

UPPER PLEISTOCENE (American Falls lake beds.). IDAHO: Power County: American Falls (Howard, 1942, Publ. Carnegie Instn. Washington, no. 530, p. 189).

UPPER PLEISTOCENE (tar pits). CALIFORNIA: Los Angeles County: Rancho La Brea (L. Miller, 1910). Santa Barbara County: Carpinteria (L. Miller, 1931, Univ. Calif. Publ. geol. Sci., vol. 20, p. 366). Kern County: McKittrick (L. Miller, 1935, Condor, vol. 37, p. 75).

UPPER PLEISTOCENE (Manix lake beds). CALIFORNIA: San Bernardino County: Manix (Howard, 1955, U. S. geol. Surv., profess. Paper, no. 264-J, p. 202).

UPPER PLEISTOCENE (Itchtucknee River beds). FLORIDA: Columbia County: Itchtucknee River (Wetmore, 1931, Smithsonian misc. Coll., vol. 85, no. 2, p. 17).

UPPER PLEISTOCENE (Pamlico formation). FLORIDA: Flagler County: Bon Terra Farm, 6½ miles south of Marineland (Howard, 1942). Orange County: Rock Spring (Woolfenden, 1959, Wilson Bull., vol. 71, p. 185). Brevard County: Melbourne (Wetmore, 1931). Indian River County: Winter Beach (Brodkorb coll.); Vero Beach (Sellards, 1916). Pinellas County: "Seminole Field" in St. Petersburg (Wetmore, 1931). Sarasota County: Venice (Wetmore, 1931); Warm Mineral Springs (Brodkorb coll.).

UPPER PLEISTOCENE (springs deposits). CUBA: Prov. Santa Clara: Baños de Ciego Montrero (Wetmore, 1928, Amer. Mus. Novit., no. 301, p. 2).

Genus †*Pelargosteon* Kretzoi

Pelargosteon Kretzoi, 1962 (Feb.), *Aquila*, vol. 67-68, p. 169 (type by monotypy *Pelargosteon tothi* Kretzoi).

14. *Pelargosteon tothi* Kretzoi

Pelargosteon tothi Kretzoi, 1962 (Feb.), *Aquila*, vol. 67-68, p. 169 (type from Betfia no. 5, fragmentary sternum, Oradea Mus. no. 1899/1).

UPPER LOWER PLEISTOCENE (Biharian fauna). RUMANIA: Betfia.

Genus †*Prociconia* Ameghino

Prociconia Ameghino, 1891 (Dec. 1), *Rev. argentina Hist. nat.*, vol. 1, p. 445 (type by monotypy *Prociconia lydekkeri* Ameghino).

15. *Prociconia lydekkeri* Ameghino

Prociconia lydekkeri Ameghino, 1891 (Dec. 1), Rev. argentina Hist. nat., vol. 1, p. 445 (new name for "*Palaeociconia australis*, Moreno," Lydekker, 1891, Cat. Foss. Birds Brit. Mus., p. 65, fig. 15; types from Lagoa Santa, distal ends of right and left tarsometatarsi, Brit. Mus. nos. 18878, 18879).

UPPER PLEISTOCENE (cavern deposits). BRAZIL: Minas Geraes: cave near Lagoa Santa.¹

Genus †*Palaeopelargus* DeVis

Palaeopelargus DeVis, 1892, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. 6, p. 441 (type by monotypy *Palaeopelargus nobilis* DeVis).

16. *Palaeopelargus nobilis* DeVis

Palaeopelargus nobilis DeVis, 1892, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. 6, p. 441, pl. 20, fig. 4 (type from Queensland, distal part of carpometacarpus).

UPPER PLEISTOCENE (Darling Downs beds). QUEENSLAND.

Genus †*Xenorhynchopsis* DeVis

Xenorhynchopsis DeVis, 1906, Ann. Queensland Mus., no. 6, p. 9 (type by present designation *Xenorhynchopsis tibialis* DeVis).

17. *Xenorhynchopsis tibialis* DeVis

Xenorhynchopsis tibialis DeVis, 1906, Ann. Queensland Mus., no. 6, p. 10, pl. 1, fig. 6 (types from Lower Cooper, distal ends of right and left tibiotarsi).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: lower Cooper Creek, east of Lake Eyre.

18. *Xenorhynchopsis minor* DeVis

Xenorhynchopsis minor DeVis, 1906, Ann. Queensland Mus., no. 6, p. 10, pl. 2, fig. 1 (lectotype by present designation, from Unduwampa, distal end of right tibiotarsus).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: Unduwampa and Wurdulumankula (DeVis, 1906).

Genus *Xenorhynchus* Bonaparte

Xenorhynchus Bonaparte, 1855, Conspectus generum avium, vol. 2, p. 106 (type *Mycteria australis* Shaw).

¹Referred without supporting evidence to genus *Jabiru* Hellmayr by Patterson and Kraglievich (1960, Publ. Mus. Mar del Plata, vol. 1, p. 8, footnote). If Lydekker's figure is accurate, such action is unwarranted. *Ciconia maltha* Miller needs comparison with this species.

19. *Xenorhynchus nanus* DeVis

Xenorhynchus nanus DeVis, 1888, Proc. Linn. Soc. N. S. Wales, vol. 3, p. 1287, pl. 35, fig. 11 (lectotype by present designation, from Darling Downs, distal part of right tibiotarsus).

UPPER PLEISTOCENE (Darling Downs beds). QUEENSLAND: north bank of River Condamine, 3 miles from Chinchilla (DeVis, 1888).

UPPER PLEISTOCENE (Katipiri sands, Malkuni fauna). SOUTH AUSTRALIA: Wurdulumankula (DeVis, 1906, Anni. Queensland Mus., no. 6, p. 9).

Subfamily MYCTERIINAE American Ornithologists' Union

Tantalidae Bonaparte, 1831, Saggio di una distribuzione metodica degli Animali Vertebrati, p. 57 (family; type *Tantalus* Linnaeus, a synonym of *Mycteria* Linnaeus).

Mycteriinae American Ornithologists' Union, 1908, Auk, vol. 25, no. 3, p. 363 (type *Mycteria* Linnaeus).

Genus *Ibis* Lacépède

Ibis Lacépède, 1799, Tableau Oiseaux, p. 18 (type *Tantalus ibis* Linnaeus).

20. *Ibis milne-edwardsi* (Shufeldt)

Tantalus milne-edwardsi Shufeldt, 1896, Proc. Acad. nat. Sci. Philadelphia p. 513, fig. 1 (type from Grive-St.-Alban, proximal part of right tibiotarsus, U. S. Nat. Mus. no. 2168).

UPPER MIOCENE (Tortonian). FRANCE: Dept. Isère: Grive-St.-Alban.

Genus *Mycteria* Linnaeus

Mycteria Linnaeus, 1758, Syst. Nat., ed. 10, vol. 1, p. 140 (type by monotypy *Mycteria americana* Linnaeus).

21. *Mycteria wetmorei* Howard

Mycteria wetmorei Howard, 1935 (Sept.), Condor, vol. 37, no. 5, p. 253, fig. 47 (type from Rancho La Brea, lower mandible, Los Angeles Mus. no. K3527).

UPPER PLEISTOCENE (tar pits). CALIFORNIA: Los Angeles County; Rancho La Brea in Los Angeles.

Neospecies of Ciconiidae from Pleistocene and *prehistoric sites:

1. *Ciconia ciconia* (Linnaeus). ENGLAND: *Silchester (Lambrecht, 1933, Handb. Palaeorn., p. 735). FRANCE: Grotte de Lunel-Vieil (Milne-Edwards, 1871, Ois. Foss. France, vol. 2, p. 000). SWITZERLAND: Salève, *Moosseedorf, and *Robenhäusen (Lambrecht, 1933). CZECHOSLOVAKIA: Holubic (Lambrecht, 1933).

2. *Ciconia nigra* (Linnaeus). DENMARK: Vester Ælslev (H. Winge, 1903, Vidensk. Meddel. naturhist. Foren. Copenhagen, vol. 6, p. 99).

3. *Euxenura galeata* (Molina). ARGENTINA: *Llajta-Maica and *Las Represas in Santiago del Estero (Kraglievich and Rusconi, 1931, *Physis*, vol. 10, p. 240).

4. *Ibis ibis* (Linnaeus). SARDINIA: bone breccia (*Tantalus brescienensis* Giebel, 1847, *Fauna der Vorwelt*, vol. 1, pt. 2, pp. 28, 40: type ulna; a nomen nudum here, possibly previously described by de la Marmora or Keferstein).

5. *Ibis leucocephalus* (Pennant). INDIA: Karnul district in Madras (Lydekker, 1891, *Cat. Foss. Birds Brit. Mus.*, p. 70, fig. 19).

6. *Mycteria americana* Linnaeus. FLORIDA: Itchtucknee River (McCoy, 1963, *Auk*, vol. 80, p. 000); *Castle Windy (Bullen and Sleight, 1959, *Rept. Bryant Found. Amer. Studies*, no. 1, p. 20). VENEZUELA: *Los Tamarindos (Wetmore, 1935, *Auk*, vol. 52, p. 329).

Contributions to the BULLETIN OF THE FLORIDA STATE MUSEUM may be in any field of biology. Manuscripts dealing with natural history or systematic problems involving the southeastern United States or the Caribbean area are solicited especially.

Manuscripts should be of medium length—50 to 200 pages. Examination for suitability is made by an Editorial Board.

The BULLETIN is distributed worldwide through institutional subscriptions and exchanges only. It is considered the responsibility of the author to distribute his paper to all interested individuals. To aid in this, fifty copies are furnished the author without cost.

PREPARATION OF MANUSCRIPT

Highly recommended as a guide is the volume:

Conference of Biological Editors, Committee on Form and Style.
1960. Style manual for biological journals.
Amer. Inst. Biol. Sci., Washington. 92 p.

Manuscripts should be typewritten with double spacing throughout, with ample margins, and on only one side of the paper. The author should keep a copy; the original and a carbon must be submitted. Tables and legends of figures should be typed on sheets separate from the text. Several legends or tables may be placed on a single sheet.

Illustrations, including maps and photographs, should be referred to as "figures." All illustrations are reduced to a maximum of 4-1/4 by 7-1/8 inches. Size scales, wherever they are necessary, should be incorporated into the figure.

References to literature should conform with the bibliographic style used in recent numbers of the BULLETIN. Spell out in full the titles of non-English serials and places of publication.

Footnote material should be kept to a minimum. However, provide copy for a footnote detailing the title, affiliations, and address of the author (see recent numbers of the BULLETIN).

Manuscripts must be accompanied by a synopsis—a brief and factual summary (not a mere description) of the contents and conclusions, which points out the presence of any new information and indicates its relevance. In it list all new organisms described and give their ranges; indicate all taxonomic changes proposed. The synopsis, written in full sentences, should be concise, but completely intelligible in itself without references to the paper, thereby enabling the busy reader to decide more surely than he can from the title alone whether the paper merits his reading. The synopsis will be published with the paper. It does not replace the usual conclusions or summary sections. It may also serve as copy for the abstracting services.

Manuscripts and all editorial matters should be addressed to:

Editor of the BULLETIN
Florida State Museum
Seagle Building
Gainesville, Florida