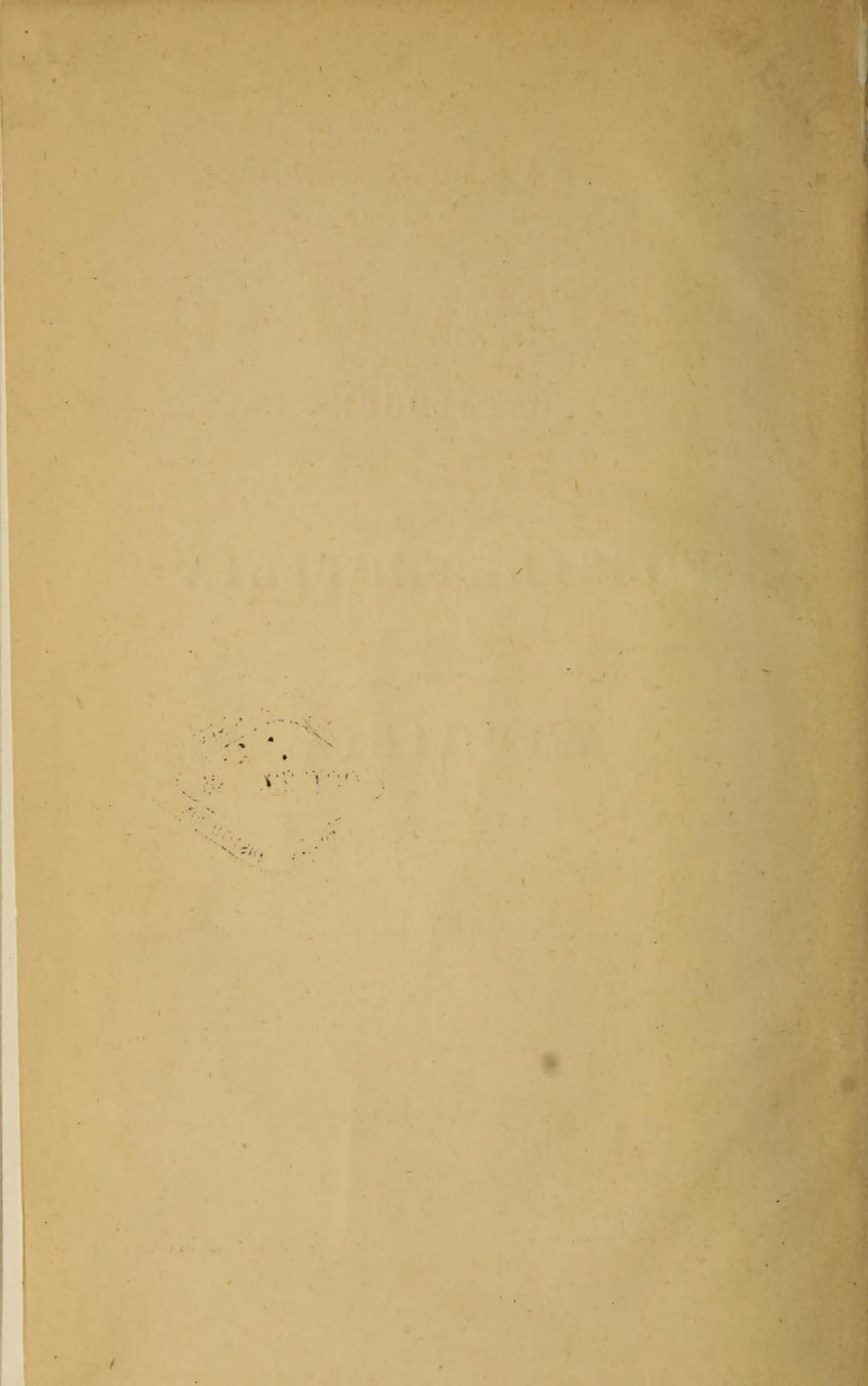


CATALOGUE  
OF  
FOSSIL REPTILIA  
AND  
AMPHIBIA.

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PART I.

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P. Vert. Paleon.

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CATALOGUE  
OF THE  
FOSSIL REPTILIA  
AND  
AMPHIBIA  
IN THE  
BRITISH MUSEUM  
(NATURAL HISTORY),

CROMWELL ROAD, S.W.

PART I.

CONTAINING

THE ORDERS ORNITHOSAURIA, CROCODILIA, DINOSAURIA,  
SQUAMATA, RHYNCHOCEPHALIA, AND  
PROTEROSAURIA.

BY

RICHARD LYDEKKER, B.A., F.G.S., ETC.

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## PREFACE.

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IN presenting Part I. of Mr. Lydekker's Catalogue of the Fossil Reptilia preserved in the Geological Department, it may be desirable to state that although the British Museum does not possess such complete remains of individuals of the order Dinosauria as are now to be seen in the Royal Museum of Brussels, or in that of Yale College, New Haven, U. S., yet there is probably no other Museum which contains so large a number of the original "type-specimens" figured and described by Buckland, Mantell, Meyer, Owen, Huxley, Hulke, Seeley, and many others during the past seventy years.

These "types" must always be of the highest importance to all students of Comparative Anatomy, and this Catalogue will furnish them with exact information as to the nature of the remains upon which the various genera and species were originally established. Such knowledge becomes all the more needful as so many genera and species of Dinosaurs and other Reptilia have been proposed based upon fossil remains referable to entirely different parts of the skeletons of individuals, thus rendering their correlation a matter of extreme difficulty, if not an altogether impossible task.

The present volume only records those species represented in the Collection which belong to the orders Ornithosauria, Crocodilia, Dinosauria, Squamata, Rhynchocephalia, and Proterosauria.

Part II. will contain the Chelonia, the Sauropterygia, and the Ichthyopterygia.

Part III. the Anomodontia and other forms of South-African fossil Reptilia, together with the Amphibia and the so-called "Ichnites."

HENRY WOODWARD.

Department of Geology,  
June 1, 1888.

## INTRODUCTION.

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THE present Catalogue, like that of the Fossil Mammalia, is exclusively confined to species and genera represented in the Collection of the Museum ; although in a few instances the names of certain larger groups, which are at present desiderata, have been introduced in order to render the general scheme of classification less imperfect than would otherwise be the case. Unlike, however, the earlier parts of the ‘ Catalogue of Fossil Mammalia,’ the present work is descriptive throughout—this addition to its bulk being almost imperative in order to justify the specific and generic reference of many of the individual specimens.

In order to avoid adding one more to the numerous schemes of classification which have been proposed for the Reptilia, it has been thought advisable to take one of those already published, and to adhere in the main to the arrangement thus adopted. The classification selected as a guide was recently published by Dr. George Baur<sup>1</sup>, of Yale College, and is a modification of a scheme previously proposed by Prof. E. D. Cope<sup>2</sup>, of Philadelphia. In this arrangement the orders of the Reptilia are divided into several groups or branches, for which the names proposed by Prof. Cope have been retained ; although it has been thought better to use them in an adjectival form rather than to make them into definite subclasses. Dr. Baur’s scheme differs from that of Prof. Cope by the removal of the Anomodontia (*Theromorpha*) from the branch which includes the Dinosauria, Crocodilia, and Ornithosauria ; and the transference of the Rhynchocephalia from the neighbourhood of the Chelonia and Sauropterygia to that of the true Lizards—the latter change being in harmony with the views recently expressed by Prof. Huxley<sup>3</sup>. The Ichthyopterygia, moreover, instead of being placed as a group totally distinct from all other Reptiles, are regarded by Dr. Baur as closely related to the Lizards and Rhynchocephalians—a view which

<sup>1</sup> Sitz. ges. Morph. München, vol. iii. pp. 46–74 (1887) ; also Journ. Morphol. vol. i. pp. 93–104 (1887) ; and Biol. Centralblatt, vol. vii. pp. 481–493 (1887).

<sup>2</sup> Amer. Nat. vol. xix. pp. 245, 246 (1885).

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xlvi. pp. 691, 692 (1887).

accords with the conclusions arrived at many years ago by Sir Richard Owen. In the Dinosauria the classification of Prof. O. C. Marsh has been adopted with some slight simplifications, such as the union of the Stegosauria with the Ornithopoda.

In the present work a few alterations have been introduced into Dr. Baur's scheme. Thus, in order to make the value of the divisions used among the Lacertilia and their allies more nearly equivalent to those employed in the Dinosauria, it has been considered advisable to group the true Lacertilia, the Rhiptoglossa, Ophidia, and Pythonomorpha in a single ordinal group under the name of Squamata—an association which was suggested by Prof. Cope on page 308 of his work entitled 'The Origin of the Fittest'.

In deference, moreover, to the views of Prof. Seeley, the Proterosauria have been provisionally allowed an ordinal rank; although the writer is not by any means assured that this view will eventually be maintained. Following also the views of the same writer, the order Proganosauria of Baur is not retained, since the genus on which it is founded appears to be clearly allied to the Triassic Sauopterygia.

In regard to the association of the Ornithosauria, Dinosauria, and Crocodilia into a single branch there can be no question whatever; but some divergence of view may be legitimately entertained as to the mutual association of some of the other orders. On the latter grounds, coupled with the circumstance that when we trace back the different branches in which the orders are here arranged into the Trias and Permian we find all of them showing more or less intimate relationships with one another, it has been considered inadvisable, as already observed, to rank these branches as subclasses.

The study of Fossil Reptiles, when contrasted with that of Fossil Mammals, is found to suffer from the want of a common standard of comparison, like that afforded by the teeth and jaws, on the evidence of which by far the greater number of fossil mammalian genera and species have been founded. In Reptiles, on the other hand, genera and species, even in the same groups, have been founded upon totally different parts of the skeleton, which do not admit of comparison with one another. This renders it in many groups almost or quite impossible to say how many genera or species are really entitled to distinction; and consequently entails the introduction into a work like the present of a considerable number of names which may prove to be only synonyms. It has, moreover, been thought advisable to retain such doubtful genera and species in

many cases where there is even a considerable probability of these being synonyms ; since it appears to the author that it is almost as great an evil to abolish a well-known name without being almost absolutely certain of the necessity of the step, as it is to introduce new names. The aid of asterisks has, however, been called in to point out some of these doubtful names. Whether many of the generic terms which have been applied to Dinosaurians and other Reptiles from the strata of North America, which are evidently closely allied to European forms, are really entitled to stand, remains to be proved ; but since in most cases the names applied to the European forms have the priority, the question does not affect the majority of those employed in the present work.

In many instances, however, such American generic names have been taken as the foundation for family names ; but since there is a possibility of some of these being eventually relegated to the rank of synonyms, the earlier European names have generally been substituted as the foundation for family names<sup>1</sup>. In some cases also, families have been admitted which it may eventually be found advisable to fuse with others. A word is also desirable in regard to the supercession of generic and specific names, of which the type specimens have never been figured. The writer is not one of those who think that a name should never be recognized until the type has been figured<sup>2</sup> ; but in cases where the original description is altogether unsatisfactory and difficult to recognize, and no figure of the type has been subsequently given, he considers that if, after a reasonable interval, other specimens have been described and figured under a new name, that name is entitled to supersede the old one. If, however, an author having the original type of an unfigured but described species before him, ignores the old name, even if insufficiently characterized, to impose a new one, then there appears good reason for reviving the older name. The former course has been followed in the instance of the species of the genus

<sup>1</sup> Many writers maintain that family names are entitled to rank by priority like generic and specific ones. It is, however, merely, so to speak, by accident that the earlier generic names were not made types of families ; and the writer thinks that when this has been omitted the fair course would be to take such names as the foundation for families, rather than to elevate some newly made term to this rank. That family names should stand when the genera on which they were based have been reduced to the rank of synonyms is practically an absurdity. Thus, should it be found eventually advisable to include the genus *Stegosaurus* in *Omosaurus*, it would be absurd to speak of the *Stegosauridæ*, or *Stegosaurus*-like reptiles, when no such reptile as *Stegosaurus* existed.

<sup>2</sup> As proposed at the Berlin Geological Congress.

*Cetiosaurus* in the present volume; and the latter in the case of the names *Platychoerops* and *Miolophus* in the 5th part of the 'Catalogue of Fossil Mammalia.' In this, as in other analogous instances, it is, however, almost impossible to draw any absolutely hard-and-fast rule which shall hold good in all cases.

Among the Dinosauria, the writer has been guided in the association of certain remains by the memoirs of Prof. O. C. Marsh; and it is of course obvious that in such cases the association must stand or fall by the correctness or otherwise of those memoirs. So far, however, as English specimens are naturally associated, they appear in all cases to support the restorations and associations given by the American palaeontologist<sup>1</sup>.

The following list furnishes a few particulars relating to the history of some of the more important series of specimens collected by private individuals, and subsequently acquired by the Museum:—

*Beckles Collection*.—Purchased in 1876 from Mr. S. H. Beckles, F.R.S., of Hastings; and comprises specimens from the Wealden and Purbeck.

*Bowerbank Collection*.—This collection comprises an extensive series of specimens from the English Cretaceous, and was purchased in 1865 from the late Dr. J. S. Bowerbank, F.R.S., of Highbury.

*Bravard Collection*.—The reptilian remains belonging to this collection were obtained from the French Tertiaries, and were purchased in 1852 from the late M. Bravard.

*Cautley Collection*.—Comprises specimens from the Indian Siwaliks, presented by Col. Sir Proby T. Cautley, K.C.B., in 1840. [In the Mammal Catalogue it is stated, on the authority of Mr. W. Davies, that the presentation was made in 1842; a recent perusal by that gentleman of original documents preserved in the Museum has, however, shown that the earlier date is the correct one.]

*Claussen Collection*.—A series of specimens from the Pleistocene of South America, purchased in 1845 from the late Herr Claussen.

*Croizet Collection*.—Purchased in 1848 from the late Abbé Croizet; and includes specimens from the French Tertiaries, more especially from the district of the Auvergne.

*Cunnington Collection*.—This collection was purchased in 1875 from the late Mr. W. Cunnington, of Devizes.

*Dawson Collection*.—An important series of mainly Dinosaurian

<sup>1</sup> The absence of the inner trochanter in the femur referred to *Stegosaurus* (p. 177) by Prof. Marsh, and its presence in that of *Omosaurus*, suggests that the former reference may be incorrect.

remains from the Wealden of the neighbourhood of Hastings, purchased from Mr. T. Dawson, F.G.S., of St. Leonards. The first portion was purchased in 1884, since which date additions have been continually made to the series.

*Dixon Collection.*—A series of specimens, mainly from the Tertiaries and Chalk of the South of England, purchased in 1851 from the late Mr. F. Dixon, F.G.S., of Worthing.

*Egerton Collection.*—Purchased in 1882 from the executors of the late Sir Philip de Malpas Grey Egerton, Bart., F.R.S., formerly a Trustee of the Museum.

*Fox Collection.*—An exceedingly important collection, acquired in 1882 by purchase from the executors of the late Rev. W. Fox, of Brightstone, Isle of Wight.

*Häberlein Collection.*—A number of specimens from the Solenhofen limestones, purchased in 1862 from Dr. Carl Häberlein, of Pappenheim, Bavaria.

*Hastings Collection.*—Purchased in 1855 from the late Marquess of Hastings. Includes specimens from the Tertiaries and Cretaceous of the South of England.

*Mansel-Pleydell Collection.*—A valuable series of reptilian remains, mainly from the Kimeridge Clay of Dorsetshire, presented on different occasions by J. C. Mansel-Pleydell (formerly Mansel), Esq., F.G.S., of Watcombe, Dorsetshire.

*Mantell Collection.*—A large and important collection, mainly comprising specimens from the Cretaceous of the South of England, acquired in two portions. The first portion was purchased in 1838 from the late Dr. Gideon A. Mantell, F.R.S., and the second from his executors in 1853. [In the Catalogue of Mammalia the date of the purchase of the first portion was given as 1836, but Mr. Davies has subsequently found that it was really in 1838.]

*Morris Collection.*—Purchased in 1867 from the late Professor John Morris, F.R.S.

*Pomel Collection.*—A series of specimens, mainly from the French Tertiaries, purchased in 1851 from the late Monsieur J. Pomel, formerly of Clermont-Ferrand.

*Saul Collection.*—Acquired by purchase in 1863 from the Directors of the Metropolitan Institute, to whom it had been presented by the late Mr. W. D. Saul, of Bishopsgate Street, London.

*Sharp Collection.*—A series of remains mainly from the Jurassics of Northamptonshire, purchased in 1876 from Mr. S. Sharp, of Dallington Hall, Northamptonshire.

*Shrubsole Collection.*—Acquired by purchase in 1880 from Mr.

W. Shrubsole, of Sheppeney, and mainly consisting of specimens from the London Clay.

*Sommerring Collection*.—Purchased in 1827 from the late Prof. S. T. Sommerring of Munich.

*Tesson Collection*. A valuable series of specimens from the Lias and Jurassics of Normandy; acquired by purchase in 1857 from the late Monsieur Tesson, of Caen.

*Toulmin-Smith Collection*.—Purchased in 1869 from the widow of the late Mr. J. Toulmin-Smith, of Highgate.

*Van Breda Collection*.—A large collection, chiefly from the Cretaceous of Maastricht and the Solenhofen limestones, purchased in 1871 from the executors of the late Professor Van Breda, of Haarlem.

*Wetherell Collection*.—Purchased, through the late Mr. J. Tennant, from Mr. N. T. Wetherell, of Highgate, in 1871.

In all cases the references to generic and specific names have been verified after they were in type, so that they may be considered thoroughly reliable. Mr. William Davies, F.G.S., has been good enough to come to the Museum for the express purpose of checking each individual entry with the specimen to which it refers; and it is solely due to his intimate acquaintance with the Collection that it has been possible to give the correct history of many of the specimens which have been long in the Museum.

The author is indebted to Prof. O. C. Marsh, of Yale College, for the loan of many excellent woodcuts of North-American Dinosaurian remains with which this volume is illustrated. Thanks are also due to the Council of the Geological Society, and to Mr. J. W. Hulke, F.R.S., Prof. H. G. Seeley, F.R.S., and Sir Richard Owen, K.C.B., F.R.S., for the use of woodcuts from the Geological Society's 'Journal.' Prof. H. Alleyne Nicholson and Messrs. Blackwood have also been good enough to allow the reproduction of woodcuts from the 'Manual of Palaeontology.' And the author is also indebted for similar favours to the Director of the Geological Survey of India, and to M. L. Dollo, of the Royal Museum of Natural History, Brussels.

Finally, it may be mentioned that since the notice of *Scaphognathus crassirostris* (p. 28) was in type, a second species of that genus has been described from the Upper Lias of Whitby by Mr. E. T. Newton, in the 'Proc. Roy. Soc.' vol. xlivi. p. 436 (1888).

RICHARD LYDEKKER.

Harpden,  
June 1st, 1888.

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## ABBREVIATIONS OF SERIALS QUOTED IN THIS VOLUME.

[Where not otherwise stated, the works are in 8vo.]

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*Abh. k.-bay Ak. Wiss.*—Abhandlungen der mathematisch-physikalischen Classe der königlich-bayerischen Akademie der Wissenschaften zu München. *Munich.*

*Acta Ac. Theod.-palat.*—Acta physica et historica Academæ electoralis scientiarum. . . . Theodoro-palatinæ. *Mannheim.*

*Amer. Journ.*—The American Journal of Arts and Sciences. *Newhaven (U.S.A.).*

*Amer. Nat.*—American Naturalist. *Salem, Mass. (U.S.A.).*

*Ann. du Muséum.*—Annales du Muséum d'Histoire Naturelle à Paris. 4to. *Paris.*

*Ann. Gén. Sci. Phys. Brussels.*—Annales générales des Sciences physiques. *Brussels.*

*Ann. Mag. Nat. Hist.*—Annals and Magazine of Natural History. *London.*

*Ann. Sci. Géol.*—Annales des Sciences Géologiques. *Paris.*

*Ann. Soc. R. Sci. Orléans.*—Annales de la Société Royale d'Orléans.

*Ann. Soc. Sci. Bruxelles.*—Annales de la Société Scientifique de Bruxelles.—*Brussels.*

*Anzeig. k. Ak. Wiss. Wien.*—Anzeiger der kaiserlichen Akademie der Wissenschaften zu Wien; mathematisch-naturwissenschaftliche Classe. *Vienna.*

*Arch. Mus. Teyler.*—Archives Musée Teyler. *Haarlem.*

*Arch. Sci. Phys. Nat.*—Bibliothèque Universelle et Revue Suisse;—Archives des Sciences Physiques et Naturelles. *Geneva.*

*Archiv f. Nat.*—Archiv für die gesammte Naturlehre (Kastner). *Nuremberg.*

*Asiatic Researches.*—*Calcutta.*

- Ber. Senckenb. Nat. Ges.*—Bericht über die Senckenbergische Naturforschende Gesellschaft. *Frankfort.*
- Biol. Centralblatt.*—Biologisches Centralblatt. *Rosenthal; Erlangen.*
- Bull. Ac. R. Belg.*—Bulletin de l'Académie Royale des Sciences . . . de Belgique. *Brussels.*
- Bull. Mus. R. Hist. Nat. Belg.*—Bulletin du Musée Royal d'Histoire Naturelle de Belgique. *Brussels.*
- Bull. Soc. Géol. France.*—Bulletin de la Société Géologique de la France. *Paris.*
- Bull. Soc. Linn. Normandie.*—Bulletin de la Société Linnéenne de Normandie. *Caen.*
- Charlesworth's London Geological Journal.*—*London.*
- Comptes Rendus.*—Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences. 4to. *Paris.*
- Corrblatt. nat. Ver. Regensberg.*—Correspondenz-Blatt des naturwissenschaftlichen Vereins in Regensberg. *Ratisbon.*
- Denkschr. k. Ak. München.*—Denkschriften der königlichen Akademie der Wissenschaften zu München. 4to. *Munich.*
- Denkschr. k. Ak. Wiss. Wien.*—Denkschriften der kaiserlichen Akademie der Wissenschaften ; mathematisch-naturwissenschaftliche Classe. 4to. *Vienna.*
- Geol. Mag.*—Geological Magazine. *London.*
- Jahrb. k. preuss. geol. Landesanst.*—Jahrbuch der königlichen preussischen geologischen Landesanstalt und Bergakademie. *Berlin.*
- Jahresh. Ver. Nat. Württ.*—Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg. *Stuttgart.*
- Journ. As. Soc. Beng.*—Journal of the Asiatic Society of Bengal. *Calcutta.*
- Journ. Linn. Soc.*—Journal of the Linnean Society : Zoology. 4to. *London.*
- Journ. Morphol.*—Journal of Morphology. *Boston, U.S.*
- London & Edinb. Philos. Mag.*—London and Edinburgh Philosophical Magazine. *London and Edinburgh.*
- Mem. Ac. R. Linc.*—Atti della Reale Accademia dei Lincei ; Memorie. 4to. *Rome.*
- Mém. du Muséum.*—Mémoires du Muséum d'Histoire Naturelle à Paris. 4to. *Paris.*
- Mem. Geol. Surv. Eng.*—Memoirs of the Geological Survey of Great Britain. Pls., 4to. *London.*
- Mém. Soc. Géol. France.*—Mémoires de la Société Géologique de la France. 4to. *Paris.*
- Mém. Soc. Linn. Normandie.*—Mémoires de la Société Linnéenne de Normandie. 4to. *Caen.*

*Mon. Pal. Soc.*—Monographs of the Palæontographical Society.  
*London.*

*Museum Senckenberg.*—Museum Senckenbergianum: Abhandlungen aus dem Gebiete der beschreibenden Naturgeschichte. 4to.  
*Frankfort.*

*Neues Jahrb.*—Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. *Stuttgart.*

*Notiz. Gebiet. Nat. Heilk.*—Notizen aus dem Gebiete der Natur- und Heilkunde. *Erfurt.*

*Nouv. Archiv. d. Muséum.*—Nouvelles Archives du Muséum d'Histoire Naturelle à Paris. 4to. *Paris.*

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*Dresden.*

*Pal. Abhandl.*—Palæontologische Abhandlungen. 4to. *Berlin.*

*Palæontographica.*—Palæontographica: Beiträge zur Naturgeschichte der Vorwelt. 4to. *Cassel.*

*Palæontologia Indica.*—Memoirs of the Geological Survey of India: Palæontologia Indica. 4to. *Calcutta.*

*Phil. Trans.*—Philosophical Transactions of the Royal Society. 4to.  
*London.*

*Proc. Ac. Nat. Sci. Philad.*—Proceedings of the Academy of Natural Sciences of Philadelphia. *Philadelphia.*

*Proc. Amer. Assoc.*—Proceedings of the American Association for the Advancement of Science. *Salem.*

*Proc. Amer. Phil. Soc.*—Proceedings of the American Philosophical Society. *Philadelphia.*

*Proc. Boston Soc. Nat. Hist.*—Proceedings of the Boston Society of Natural History. *Boston, U.S.*

*Proc. Dorset Nat. Hist. Club.*—Proceedings of the Dorset Natural-History and Antiquarian Field Club. *Sherborne.*

*Proc. Geol. Assoc.*—Proceedings of the Geologists' Association. *London.*

*Proc. Geol. Soc.*—Proceedings of the Geological Society. *London.*

*Proc. R. Soc.*—Proceedings of the Royal Society. *London.*

*Proc. Zool. Soc.*—Proceedings of the Scientific Meetings of the Zoological Society of London. *London.*

*Quart. Journ. Geol. Soc.*—The Quarterly Journal of the Geological Society of London. *London.*

*Rec. Geol. Surv. Ind.*—Records of the Geological Survey of India. *Calcutta.*

*Rep. Brit. Assoc.*—Report of the British Association for the Advancement of Science. *London.*

*Rev. Quest. Sci.*.—*Revue des Questions scientifiques. Brussels.*

*Revue Encyclopédique*.—*Revue Encyclopédique, etc. Paris.*

*Sitz. Ges. Morph. München*.—*Sitzungsberichte der Gesellschaft für Morphologie und Physiologie in München. Munich.*

*Sitz. k.-bay. Ak. Wiss.*.—*Sitzungsberichte der mathematisch-physikalischen Classe der k.-bayerischen Akademie der Wissenschaften zu München. Munich.*

*Sitz. k. böhm. Ges. Wiss.*.—*Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften. Prague.*

*Smiths. Contrib. Knowl.*.—*Contributions to Knowledge by the Smithsonian Institution. 4to. Washington.*

*Trans. Amer. Phil. Soc.*.—*Transactions of the American Philosophical Society. 4to. Philadelphia.*

*Trans. Camb. Phil. Soc.*.—*Transactions of the Cambridge Philosophical Society. 4to. Cambridge.*

*Trans. Geol. Soc.*.—*Transactions of the Geological Society of London. 4to. London.*

*Trans. N. Zealand Inst.*.—*Transactions and Proceedings of the New Zealand Institute. Wellington.*

*Ver. schw. nat. Ges.*.—*Verhandlungen der schweizerische naturforschende Gesellschaft. Various Swiss Towns.*

*Vid. Med. Nat. Foren. Kjöbenhavn.*.—*Videnskabelige Meddelelser fra den Naturhistorisk Forening i Kjöbenhavn. Copenhagen.*

*Wiegmann's Archiv*.—*Archiv für Naturgeschichte.... Herausg. von A. F. A. Wiegmann. Berlin.*

*Zool. Anzeig.*.—*Zoologischer Anzeiger. Leipsic.*

CATALOGUE  
OF  
FOSSIL REPTILIA  
AND  
AMPHIBIA.

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Class REPTILIA.

ARCHOSAURIAN BRANCH.

THE three Orders included in this branch present the following characters in common.

Teeth usually set in distinct sockets, never ankylosed to the jaws, and confined to premaxilla, maxilla, and dentary. No parietal foramen; two temporal arcades; infratemporal fossa not roofed over by bone; quadrate immovably fixed; frequently no columella (epipterygoid). Anterior ribs double-headed<sup>1</sup>; dorsal vertebræ with long transverse processes, which may be placed entirely on the arch; frequently more than two sacral vertebræ. No T-shaped interclavicle or precoracoid. Pectoral and pelvic limbs present; humerus without distal foramen, but occasionally with ectepi-

<sup>1</sup> Zittel ('Palaeontographica,' vol. xxix. pp. 63, 64) suggests that all the ribs of *Pterouactylus* are single-headed; and Marsh thinks that the same structure may obtain in *Cœlurus*.

condylar groove; proximal row of tarsus consisting of astragalus and calcaneum. Abdominal ribs generally present. In the limbs the number of phalangeals is liable to variation, although approximating, more or less, to the arrangement obtaining in the Squamata (*infra*). There may be a lateral vacuity in the mandible.

## Order ORNITHOSAURIA.

Pectoral limb adapted to support a patagium; body probably naked. Vertebræ procœlous, without persistent neuro-central suture; cervicals longer than dorsals; precaudals not numerous; from three to six in sacrum<sup>1</sup>; cervical ribs, at least in *Rhamphorhynchus*, crocodilian<sup>2</sup>. Skull large, more or less bird-like in contour, with the bones ankylosed in the adult; jaws elongated, the greater portion of upper one formed by premaxilla; mandibular symphysis ankylosed; occipital condyle situated on base of cranium. Orbita large, usually with sclerotic ossifications<sup>3</sup>; narial aperture approximated to orbit, but separated by preorbital vacuity, with which it may be confluent. Teeth simple and pointed. Scapula and coracoid long and slender, latter without fontanelle; no clavicle; sternum broad, and keeled superiorly. Carpus with a proximal and distal bone; four functional digits in manus; phalangeals of ulnar digit<sup>4</sup> of manus much elongated, and terminal one not clawed. Pelvis weak; ilium generally extended on both sides of acetabulum; pubis directed forwards; ischium short and wide; pelvic limb short; fibula, and sometimes astragalus, united with tibia. Bones hollow, and frequently with pneumatic foramina. Habits volant. The brain seems to have been bird-like.

<sup>1</sup> Seeley ('Ornithosauria, pp. 110, 111) states that there are but two ankylosed vertebræ in the sacrum of *Scaphognathus* (*Pachyrhampus*), and none in that of *Dimorphodon*.

<sup>2</sup> See Baur, 'Amer. Nat.' 1886, p. 980.

<sup>3</sup> Perhaps wanting in Pteranodontia.

<sup>4</sup> Regarded by Owen, Marsh, and Zittel ('Palæontographica,' vol. xxix. p. 54) as the fifth of the typical series; the styliform ossification on the radial side of the carpus (fig. 3) representing the pollex.

Suborder *PTERANODONTIA*.

Teeth absent; cranium (fig. 1) with a long, backwardly-produced supraoccipital crest, and nares completely confluent with

Fig. 1.



*Pteranodon longiceps*, Marsh.—Left lateral view of skull; from the Cretaceous of North America.  $\frac{1}{2}$ . a, preorbital vacuity; b, orbit; c, supraoccipital crest; d, angle of mandible; q, quadrate; s, symphysis. (After Marsh.)

preorbital vacuity. Scapula generally articulating with spines of dorsal vertebræ, which are ankylosed together.

This Suborder is at present unrepresented in the Collection.

Suborder *PTEROSAURIA*.

Teeth in both jaws; cranium without backwardly-projecting supraoccipital crest, and with the nares usually more or less completely separated from the preorbital vacuity. Scapula (at least usually) not ankylosed to spines of dorsal vertebræ, which are distinct from one another; four phalangeals in ulnar digit of manus.

Family *PTERODACTYLIDÆ*.

Tail short; skull bird-like, either long or short; jaws toothed to their anterior extremity; nares usually large, and imperfectly separated from preorbital vacuity; length of metacarpus considerably exceeding half that of ulna; proximal half of tarsus distinct from tibia.

Genus **PTENODRACON**<sup>1</sup>, Lydekker.

Skull very short, and the muzzle not produced into a rostrum; teeth confined to anterior extremity of jaws; nares and preorbital

<sup>1</sup> Seeley ('Ornithosauria,' p. 111) proposed to use *Ornithocephalus* in this sense, an application which has been shown by Zittel ('Palaeontographica,' vol. xxix, p. 80) to be inadmissible.

vacuity apparently not separated ; cervical vertebræ comparatively short.

**Ptenodracon brevirostris** (Sömmerring<sup>1</sup>).

Syn. *Ornithocephalus brevirostris*, Sömmerring<sup>2</sup>.

*Pterodactylus meyeri*, Münster<sup>3</sup>.

*Ornithocephalus meyeri*, Wagner<sup>4</sup>.

Zittel ('Palaeontographica,' vol. xxix. p. 79) suggests that the so-called *P. meyeri* is not distinct from the present species, which is fully confirmed by a comparison of the type specimens of the latter with his figure. The species is the only known example of the genus, and is about the size of a sparrow ; the length of the cranium being 0,028.

*Hab.* Europe (Germany).

**42736.** A slab of lithographic limestone, containing the greater (Fig.) part of the skeleton ; from the Kimeridgian of Kelheim, Bavaria. Figured by von Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schief.' pl. iv. fig. 2, as *Pterodactylus meyeri*, of which it is the type.

*Van Breda Collection.* Purchased, 1871.

**39352.** Cast of the preceding specimen. Purchased, 1865.

Genus **PTERODACTYLUS**, Cuvier<sup>5</sup>.

Syn. *Onithocephalus*, Sömmerring<sup>6</sup>.

*Macrotrachelus*, Giebel<sup>7</sup>.

*Diopecephalus*, Seeley<sup>8</sup>.

Skull slender and elongated into a narrow rostrum, of which the alveolar margins are straight ; teeth placed vertically, and none extending behind the middle of the narial aperture ; cervical vertebræ frequently much elongated ; scapula and coracoid separate ; pubis<sup>9</sup> short and rounded, without bony symphysis ; pes with four functional digits, and frequently an aborted fifth digit with only one phalangeal<sup>10</sup>. None of the species attain a very large size.

<sup>1</sup> Denkschr. k. Ak. München, vol. vi. p. 89 (1820).—*Ornithocephalus*. (Read 1816.) <sup>2</sup> Loc. cit.

<sup>3</sup> Neues Jahrb. 1842, p. 35.

<sup>4</sup> Abh. k.-bay. Ak. Wiss. vol. vi. pt. i. p. 167 (1851).

<sup>5</sup> Ann. d. Muséum, vol. xiii. p. 424 (1809).—*Pterodactyle*.

<sup>6</sup> Denkschr. k. Ak. München, vol. iii. p. 126 (1812).

<sup>7</sup> Allgemeine Paläontologie, p. 231 (1852).

<sup>8</sup> Ann. Mag. Nat. Hist. ser. 4, vol. vii. p. 35 (1871).

<sup>9</sup> Prepubis, or epipubis of some writers.

<sup>10</sup> Zittel, 'Palæontographica,' vol. xxix. p. 62 (1882).

**Pterodactylus antiquus** (Sömmerring<sup>1</sup>).

Syn. *Ornithocephalus antiquus*, Sömmerring<sup>2</sup>.

*Pterodactylus longirostris*, Cuvier<sup>3</sup>.

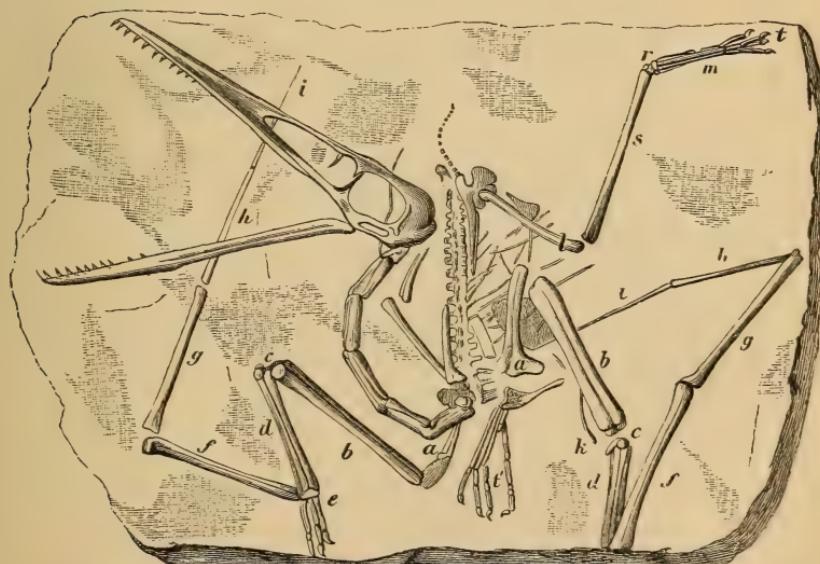
*Ornithocephalus longirostris*, Wagler<sup>4</sup>.

*Macrotrachelus longirostris*, Giebel<sup>5</sup>.

This is the type species, and is of medium size; the length of the cranium in the type specimen is 0,107, and that of the entire skeleton about 0,300. Typically the neck and rostrum are much elongated, and the teeth do not extend backwards to the narial aperture; but there are said to be transitions in this respect towards the next form<sup>6</sup>. The preorbital vacuity is partially separated from the narial aperture.

Hab. Europe (Germany).

Fig. 2.



*Pterodactylus antiquus*.—Skeleton; from the Kimeridgian of Bavaria. About  $\frac{1}{2}$ . *a*, humerus; *b*, radius and ulna; *c*, carpus; *d*, metacarpus; *r*, clawed digits; *f*, *g*, *h*, *i*, phalangeals of ulnar digit; *k*, rib; *l*, femur; *s*, tibia; *t*, tarsus; *m*, metatarsals; *t*, phalangeals of pes.

<sup>1</sup> Denkschr. k. Ak. München, vol. iii. p. 126 (1812).—*Ornithocephalus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Ossemens Fossiles, 2nd ed. vol. v. pt. 2, p. 359 (1824).

<sup>4</sup> Syst. Amphib. p. 61 (1830).

<sup>5</sup> Allgemeine Paläontologie, p. 231 (1852).

<sup>6</sup> Vide Zittel, 'Palæontographica,' vol. xxix. p. 71 (1882).

**R. 336.** Cast of a slab of lithographic limestone, containing the nearly entire skeleton. The original (fig. 2) was obtained from the Kimeridgian of Eichstädt, Bavaria ; and is preserved in the Museum at Munich. It is the type of the genus and species, and is figured by Collini in the *Acta Ac. Theod. Palat.* vol. v. pl. v. (1784), without name ; by Cuvier in the ‘*Ann. du Muséum*,’ vol. xiii. pl. xxxi., without specific name ; by Sömmerring in the ‘*Denkschr. k. Ak. München*,’ vol. iii. pl. v. ; by Cuvier in the ‘*Ossemens Fossiles*,’ 2nd ed. vol. v. pt. 2, pl. xxiii., as *P. longirostris* ; by Buckland in his *Geology and Mineralogy (Bridgewater Treatise)*, pl. xxi. ; and by Meyer in the ‘*Fauna der Vorwelt—Rept. Lith. Schiefer*,’ pl. ii. fig. 1.

*Purchased*, 1883.

**R. 388.** A split block of lithographic limestone, containing the entire skeleton, but wanting the mandible and the anterior half of the cranium ; from Eichstädt. This specimen is slightly smaller than the preceding, but otherwise agrees exactly.

*Purchased*, 1884.

### ***Pterodactylus kochi* (Wagner<sup>1</sup>).**

Syn. *Ornithocephalus kochi*, Wagner<sup>2</sup>.

*Pterodactylus scolopaciceps*, Meyer<sup>3</sup>.

*Diopecephalus kochi*, Seeley<sup>4</sup>.

Allied to the preceding, but typically of rather smaller size, with a shorter neck and rostrum, and the teeth extending back to the narial aperture. The length of the cranium varies from 0,066 to 0,080.

The identity of *P. scolopaciceps* with this form is given on the authority of Zittel<sup>5</sup> ; by whom it is suggested that the species may be only a variety of *P. antiquus*.

*Hab.* Europe (Germany).

**37360.** Casts of a split slab of lithographic limestone, showing a considerable portion of the skeleton. The original is from the Kimeridgian of Eichstädt, Bavaria ; and is preserved in the Museum at Munich ; it is figured by Meyer in the

<sup>1</sup> *Abh. k.-bay. Ak. Wiss.* vol. ii. p. 168 (1837).—*Ornithocephalus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Fauna der Vorwelt—Rept. Lith. Schiefer*, p. 33 (1860).

<sup>4</sup> *Ann. Mag. Nat. Hist. ser. 4*, vol. vii. p. 35 (1871).

<sup>5</sup> *Palaeontographica*, vol. xxix. p. 71 (1882).

'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. iii. fig. 2; and also by Zittel, in the 'Palæontographica,' vol. xxix. pl. xiii. fig. 1. *Purchased*, 1863.

- 37359.** Cast of a slab of lithographic limestone, containing the entire skeleton. The history of the original is the same as that of the last specimen; and it is figured by Meyer, *op. cit.* pl. i. fig. 2, under the name of *P. scolopaciceps*, of which it is the type. *Purchased*, 1863.

**Pterodactylus pulchellus**, Meyer<sup>1</sup>.

Zittel<sup>2</sup> identifies with this species the somewhat smaller *P. elegans*, Wagner<sup>3</sup>; in the type specimen of the present form the length of the cranium is 0,0465; the rostrum is as much elongated as in the preceding species; but the teeth are confined to the extremities of the jaws. In some specimens of the so-called *P. elegans* the preorbital vacuity is separated from the narial aperture.

*Hab.* Europe (Germany).

- 42735.** A slab of lithographic limestone, containing the impression (*Fig.*) of the nearly entire skeleton, and a few fragments of bone; from the Kimeridgian of Eichstädt, Bavaria. Counterfeit of the specimen figured by Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. i. fig. 1, under the name of *P. longirostris*; but subsequently made the type of the present species (see 'Palæontographica,' vol. x. p. 9).

*Van Breda Collection. Purchased*, 1871.

- 39351.** Partially restored cast of the preceding specimen.

*Purchased*, 1865.

**Pterodactylus spectabilis**, Meyer<sup>4</sup>.

This is a small species, apparently allied to *P. pulchellus*, but regarded by its describer as having a larger skull, and different proportions in some of the limb-bones. Its right to specific distinction may be doubtful<sup>5</sup>.

*Hab.* Europe (Germany).

<sup>1</sup> Neues Jahrb. 1861, p. 470.

<sup>2</sup> 'Palæontographica,' vol. xxix. p. 77 (1882).

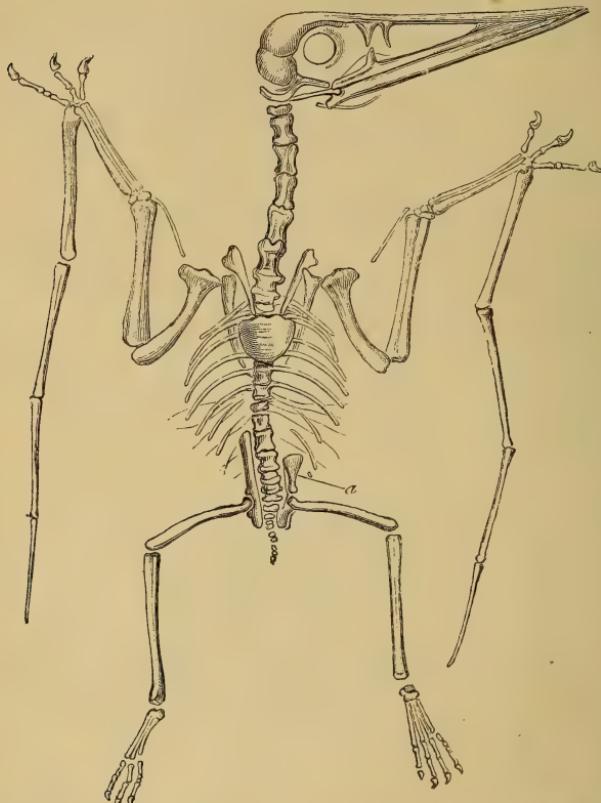
<sup>3</sup> Sitz. k.-bay. Ak. Wiss. 1861, vol. i. p. 363.

<sup>4</sup> Neues Jahrb. 1861, p. 467.

<sup>5</sup> See Zittel, 'Palæontographica,' vol. xxix. p. 77 (1882).

38150. Casts of a split block of lithographic limestone, containing the nearly entire skeleton. The original (fig. 3) was

Fig. 3.



*Pterodactylus spectabilis*.—The nearly entire skeleton, viewed from the ventral aspect; from the Kimeridgian of Bavaria. On the left side the pubis (prepubis) is shown at *a*, while on the right the ilium is exposed. ‡.

obtained from the Kimeridgian of Eichstädt, Bavaria, and is the type; it is figured by Meyer in the 'Palaeontographica,' vol. x. pl. i. (1861). *Purchased, 1864.*

#### **Pterodactylus rhamphastinus** (Wagner<sup>1</sup>).

Syn. *Ornithocephalus rhamphastinus*, Wagner<sup>2</sup>.

*Diopecephalus rhamphastinus*, Seeley<sup>3</sup>.

<sup>1</sup> Abh. k.-bay. Ak. Wiss. vol. vi. pt. i. p. 132 (1851).—*Ornithocephalus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Ann. Mag. Nat. Hist. ser. 4, vol. vii. p. 35 (1871).

A large species, with the narial aperture and preorbital vacuity entirely confluent; the length of the cranium is 0.215; the teeth are short and stout, and extend unusually far back, reaching in the upper jaw nearly to the middle of the narial aperture; the cervical vertebræ are comparatively thick.

*Hab.* Europe (Germany).

- 37363-4.** Two casts of a split slab of lithographic limestone, showing the greater portion of the skeleton. The original was obtained from the Kimeridgian of Daiting, Bavaria, and is the type of the species; it is figured by Wagner in the ‘*Abh. k.-bay. Ak. Wiss.*’ vol. vi. pt. i. pl. v.

*Purchased*, 1863.

**Pterodactylus longicollum**, Meyer<sup>1</sup>.

Syn. *Diopecephalus longicollum*, Seeley<sup>2</sup>.

A species of large size, but smaller than the preceding, with the narial aperture and preorbital vacuity entirely confluent; the length of the cranium is 0.145; the teeth are slender, and those of the upper jaw do not extend posteriorly to within a considerable distance of the narial aperture.

*Hab.* Europe (Germany).

- 37990.** Cast of a slab of lithographic limestone, showing a considerable portion of the skeleton. The original is from the Kimeridgian of Eichstädt, Bavaria; and is figured by Meyer in the ‘*Fauna der Vorwelt—Rept. Lith. Schiefer*,’ pl. vii. figs. 1-3.

*Purchased*, 1862.

- 37990 a.** Two casts of a split slab of lithographic limestone, showing some of the bones of the fore limb and pes of a Pterodactyle referred by Meyer to the present species. The original is from the Kimeridgian of Bavaria; and is figured by Meyer, *op. cit.* pl. vii. fig. 4.

*Purchased*, 1862.

Genus **CYCNORHAMPHUS**, Seeley<sup>3</sup>.

Rostrum elongated and expanded into a broad, swan-like beak, with the teeth confined to its extremity; neck long; and (according to Seeley) the pubis of either side meeting in a bony symphysis. As mentioned by Zittel, the characters of the nares as given by Seeley require modification.

<sup>1</sup> *Neues Jahrb.* 1854, p. 52.

<sup>2</sup> *Ann. Mag. Nat. Hist.* ser. 4, vol. vii. p. 35 (1871).

<sup>3</sup> ‘*Ornithosauria*,’ p. 111 (1870).

**Cycnorhamphus suevicus** (Quenstedt<sup>1</sup>).Syn. *Pterodactylus suevicus*, Quenstedt<sup>2</sup>.*Pterodactylus wurtembergicus*, Quenstedt<sup>3</sup>.*Pterodactylus eurychirus*, Wagner<sup>4</sup>.*Ornithocephalus eurychirus*, Wagner<sup>5</sup>.

This is the only known species of the genus, and is of comparatively large size; the length of the cranium being 0,158.

*Hab.* Europe (Germany).

**37370 x.** Cast of a slab of lithographic limestone, showing the nearly entire skeleton. The original was obtained from the Kimeridgian of Nurplingen, Würtemberg; and is the type of the species; it is described and figured by Quenstedt in the memoir cited. *Purchased*, 1863.

*Family Uncertain.*

Tail apparently long; jaws toothed to their anterior extremity; relative lengths of metacarpus and ulna unknown; skull long or short; astragalus, at least in some instances, united to tibia.

It is uncertain whether the members of this group should be included in the *Rhamphorhynchidae*, or should form a distinct family.

**Genus ORNITHOCHIRUS**, Seeley<sup>6</sup>.

Including *Palaeornis*, Mantell<sup>7</sup>, *Cimoliornis*, Owen<sup>8</sup>, *Coloborhynchus*, Owen<sup>9</sup>, *Criorhynchus*, Owen<sup>10</sup>, *Doratorhynchus*, Seeley<sup>11</sup>, *Cretornis*, Fritsch<sup>12</sup>.

All the species are known by such fragmentary remains that no accurate diagnosis can be given. In the upper jaw the anterior teeth frequently curve in advance of the muzzle; the teeth may be rounded or compressed, and are frequently inclined forwards; there

<sup>1</sup> Ueber *Pterodactylus suevicus* (Tübingen, 1855).—*Pterodactylus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Neues Jahrb. 1854, p. 570.—Subsequently withdrawn.

<sup>4</sup> Abh. k.-bay. Ak. Wiss. vol. viii. pt. ii. p. 444 (1858).

<sup>5</sup> *Ibid.* p. 448.

<sup>6</sup> *Ornithosauria*, p. 112 (1870).—Amended. Also mentioned in ‘Index to Aves, &c., in Cambridge Museum,’ p. xvi (1869); *Ptenodactylus* of the latter page was withdrawn, on account of being preoccupied.

<sup>7</sup> Medals of Creation, 1st ed. vol. ii. p. 806 (1844).—Preoccupied and inappropriate.

<sup>8</sup> Brit. Foss. Mamm. and Birds, p. 545 (1846).—Inappropriate.

<sup>9</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 6 (1874).

<sup>10</sup> *Ibid.* p. 7.

<sup>11</sup> Quart. Journ. Geol. Soc. vol. xxxi. p. 465 (1875).

<sup>12</sup> Sitz. k. böhm. Ges. Wiss. for 1880, p. 276 (1881).

is a median longitudinal ridge on the palate, and a corresponding groove in the mandibular symphysis; the scapula and coracoid are frequently ankylosed. The skull may be either short, or with a long rostrum. Seeley<sup>1</sup> considers that there are only three digits in the manus of some species; and there appears to have been a long tail<sup>2</sup> in at least some forms.

This genus includes the largest known members of the Suborder; if less imperfect specimens were forthcoming it might probably be subdivided into groups or genera, but at present the only safe course seems to arrange the species according to the geological horizons from which the type examples were obtained. Many of the species are probably invalid.

A. *Species typically from the Chalk.*

**Ornithochirus compressirostris** (Owen<sup>3</sup>).

Syn. *Pterodactylus compressirostris*, Owen<sup>4</sup>.

Referred to this genus by Seeley ('Ornithosauria,' p. 92). The species is of very large size, and has the skull produced into a very long and narrow rostrum, with numerous small teeth. Owen estimates the length of the entire skull at about 0,450.

Hab. Europe (England).

- 39410.** Two fragments of the cranial rostrum; from the Lower (Fig.) Chalk of Burham, Kent. These specimens are the type, and are figured by Owen in his 'Cretaceous Reptilia,' pl. xxviii. figs. 8–10, a restoration of the skull being given in pl. xxvii. fig. 1.

*Bowerbank Collection. Purchased, 1865.*

- 39416.** Fragment of a rostrum probably belonging to this species; from the Chalk of Kent. *Same history.*

*The following specimens are referred to this species by Owen.*

- 49004.** The imperfect radius and ulna; from the Chalk of Burham. (Fig.) Figured by Owen, *op. cit.* pl. xxx. figs. 5, 5 a.  
*Toulmin-Smith Collection. Purchased, 1869.*

<sup>1</sup> *Vide Geol. Mag. dec. 2, vol. viii. p. 17 (1881).*

<sup>2</sup> It has been suggested by Seeley (Quart. Journ. Geol. Soc. vol. xxxi. p. 466) that the vertebrae originally described by him as caudal may be cervical, but from the analogy of *Rhamphorhynchus* the writer is inclined to adhere to the original view.

<sup>3</sup> Cretaceous Reptilia (Mon. Pal. Soc.), p. 95 (1851).—*Pterodactylus.*

<sup>4</sup> *Loc. cit.*

**39411.** An imperfect wing-bone (? first phalangeal of the ulnar (Fig.) digit); from Burham. Figured by Owen, *op. cit.* pl. xxx. fig. 4. *Bowerbank Collection. Purchased*, 1865.

**49003.** The imperfect proximal extremity of a bone, apparently (Fig.) homologous with the preceding; from Burham. Figured by Owen, *op. cit.* pl. xxxii. fig. 2. *Toulmin-Smith Collection. Purchased*, 1869.

**Ornithochirus cuvieri** (Bowerbank<sup>1</sup>).

Syn. *Pterodactylus cuvieri*, Bowerbank<sup>2</sup>.

*Coloborhynchus cuvieri*, Owen<sup>3</sup>.

Referred to this genus by Seeley ('Ornithosauria,' p. 113), by whom it is provisionally recorded from the Cambridge Greensand. Fully equal in size to the preceding species, but with the rostrum shorter and thicker, and the teeth larger and less numerous, and characterized by a marked lateral compression. The limb-bones referred by Owen to this species are regarded as indicating an expanse of wing of not less than 18 feet.

*Hab.* Europe (England).

**39409.** The greater portion of the cranial rostrum, showing the (Fig.) dental alveoli (some with tooth-germs) and two detached teeth; from the Lower Chalk of Burham, Kent. This specimen is the type, and is figured by Bowerbank in the 'Proc. Zool. Soc.' 1851, pl. iv. (lettered *longirostris*), and also by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pl. xxviii. figs. 1-7.

*Bowerbank Collection. Purchased*, 1865.

*The following specimens are provisionally referred to this species.*

**37982.** An imperfect tooth of very large size; from the Lower Chalk of Halling, Kent. *Purchased*, 1864.

**41637.** An imperfect bone of the wing; from the Lower Chalk of (Fig.) Burham, Kent. Figured by Owen, *op. cit.* pl. xxx. figs. 1-3. (? First phalangeal of ulnar digit.)

*Toulmin-Smith Collection. Purchased*, 1869.

**Ornithochirus (?) giganteus** (Bowerbank<sup>4</sup>).

Syn. *Pterodactylus giganteus*, Bowerbank<sup>5</sup>.

*Pterodactylus conirostris*, Owen<sup>6</sup>.

<sup>1</sup> Proc. Zool. Soc. 1851, p. 15.—*Pterodactylus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 6 (1874).

<sup>4</sup> Quart. Journ. Geol. Soc. vol. ii. p. 8 (1846).—*Pterodactylus*.

<sup>5</sup> *Loc. cit.*

<sup>6</sup> In Dixon's 'Geology of Sussex,' p. 401 (1850).

Smaller than the preceding, with the skull not produced into a distinct rostrum, and with the teeth short, rounded, and not projecting in advance of the muzzle; scapula and coracoid ankylosed. The form of the muzzle approximates to that of *Scaphognathus crassirostris*, but the teeth do not extend so far back. The calculated length of the cranium on the proportions of that of the latter would be 0,255.

*Hab.* Europe (England).

- 39412.** The associated anterior extremities of the upper and lower (*Fig.*) jaws, pectoral girdle, and fragments of bones; from the Lower Chalk of Burham, Kent. These specimens may be regarded as the types; and are figured by Bowerbank in the 'Quart. Journ. Geol. Soc.' vol. ii. pl. i. fig. 1; in Dixon's 'Geology of Sussex,' pl. xxxviii. figs. 4, 5 (as *P. conirostris*); and in Owen's 'Cretaceous Reptilia,' pl. xxxi. figs. 1-6. *Bowerbank Collection. Purchased, 1865.*

*The following specimens from the same locality are referred by Owen to this species; all belong to the Bowerbank Collection.*

- 39413.** An imperfect bone (? part of sternum). Figured by Owen, (*Fig.*) *op. cit. pl. xxxi. fig. 9.*

- 39415 a.** Termination of a long-bone. Figured by Bowerbank, (*Fig.*) *op. cit. pl. i. fig. 5*, and by Owen, *op. cit. pl. xxxi. fig. 10.*

- 39417.** Shaft of a bone of the wing. Figured by Bowerbank, *op. cit. pl. i. fig. 6*; by Dixon, *op. cit. pl. xxxviii. fig. 7* (as *P. conirostris*); and by Owen, *op. cit. pl. xxxi. fig. 11.*

- 39414.** Part of the shaft of a long-bone (? tibia). Figured by (*Fig.*) Bowerbank, *op. cit. pl. i. fig. 3*; and by Owen, *op. cit. pl. xxxi. fig. 12.*

- 39415 b.** Two portions of long-bones, and portion of a rib. Figured (*Fig.*) by Bowerbank, *op. cit. pl. i. fig. 4*; and by Owen, *op. cit. pl. xxxi. fig. 13.*

- 39413.** Fragment of a long-bone. Figured by Bowerbank, *op. cit. pl. i. fig. 7*, and by Owen, *op. cit. pl. xxxi. fig. 14.*

\*\* **Ornithochirus diomedius** (Owen<sup>1</sup>, *ex* Gervais).

Syn. *Cimoliornis diomedius*, Owen<sup>2</sup>.

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<sup>1</sup> Brit. Foss. Mamm. and Birds, p 545 (1846).—*Cimoliornis.*   <sup>2</sup> *Loc. cit.*

It is probable that this form is identical with one of the preceding species.

*Hab.* Europe (England).

- 39418.** The distal extremity of the ulnar metacarpal; from the (*Fig.*) Middle Chalk of Kent. This specimen is the type, and is figured by Owen in the 'Trans. Geol. Soc.' ser. 2, vol. vi. pl. xxxix. fig. 2 (as a bird-bone); in his 'British Fossil Mammals and Birds,' p. 545, fig. 230 (as *Cimoliornis*); and in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pl. xxxii. fig. 4.      *Bowerbank Collection. Purchased, 1865.*

\*\* ***Ornithochirus hlavatschi*** (Fritsch<sup>1</sup>).

Syn. *Cretornis hlavatschi*, Fritsch<sup>2</sup>.

The type of *Cretornis*. Of medium size; known by the humerus; may be identical with one of the preceding.

*Hab.* Europe (Bohemia).

- R. 1031.** Cast of the left humerus and some imperfect metacarpals and phalangeals of the wing. The originals, which are the types, were obtained from the Upper Chalk (Ierschichten) of Zarecka Lhota, near Chotzen, Bohemia; and are described by Fritsch in the 'Sitz. k. böhm. Ges. Wiss.' for 1880, pp. 275-6, as belonging to a Bird. The humerus (described by Fritsch as a coracoid) has a length of 0,074; and, though somewhat smaller, closely resembles the Wealden specimen No. 2353.

*Presented by Dr. Anton Fritsch, 1887.*

*Specifically undetermined specimens from the Chalk.*

- 41638.** The distal extremity of the ulnar metacarpal; from the (*Fig.*) Middle Chalk of Kent. Figured in the 'Quart. Journ. Geol. Soc.' vol. iv. pl. ii. figs. 4, 5; and in Owen's 'Cretaceous Reptilia' (Mon. Pal. Soc.) pl. xxxii. fig. 5.

*Toulmin-Smith Collection. Purchased, 1869.*

- 39417.** An homologous fragment; from the same horizon.

*Bowerbank Collection. Purchased, 1865.*

- 49005.** Part of shaft of a long-bone (?femur); from the Lower (*Fig.*) Chalk of Burham, Kent. Figured by Owen, *op. cit.* pl. xxxii. fig. 3.      *Smith Collection. Purchased, 1878.*

<sup>1</sup> Sitz. k. böhm. Ges. Wiss. for 1880, p. 276 (1881).—*Cretornis.*    <sup>2</sup> *Loc. cit.*

- R. 39. Four imperfect long-bones ; from the Chalk of Snodland, Kent. *Shrubsole Collection. Purchased, 1880.*

B. *Species typically from the Cambridge Greensand.*

**Ornithochirus sedgwicki** (Owen<sup>1</sup>).

Syn. *Pterodactylus sedgwicki*, Owen<sup>2</sup>.  
*Coloborhynchus sedgwicki*, Owen<sup>3</sup>.

Apparently allied to *O. cuvieri*, but with the anterior dental alveoli relatively larger, a corresponding increase in the depth of the muzzle, and a larger total number of alveoli in a corresponding space.

*Hab.* Europe (England).

35213. Fragment of the premaxillary rostrum, showing three pairs of dental alveoli ; from the Cambridge Greensand.  
*Purchased, 1859.*

35220. A smaller fragment of the premaxillary rostrum, showing two pairs of dental alveoli ; from the same formation.  
*Purchased, 1859.*

35376. Anterior extremity of the mandibular symphysis ; from the same formation. This specimen was determined by Sir R. Owen, and agrees generally with the type mandible figured in his Cretaceous Reptilia (Mon. Pal. Soc.), 1st Suppl. p. 2 (1859), pl. i. fig. 2, although of somewhat greater depth.  
*Purchased, 1859.*

- 35412 a. Greater portion of a smaller mandibular symphysis agreeing in general characters with the preceding specimen, and perhaps belonging to this species ; from the same formation. Closely resembles the specimen figured by Owen, *op. cit.* pl. i. fig. 7.  
*Purchased, 1859.*

39105. Part of a similar mandibular symphysis ; from the same formation. *Bowerbank Collection. Purchased, 1865.*

**Ornithochirus fittoni** (Owen<sup>4</sup>).

Syn. *Pterodactylus fittoni*, Owen<sup>5</sup>.

Referred to this genus by Seeley ('Ornithosauria,' p. 118). The

<sup>1</sup> Rep. Brit. Assoc. for 1858, Trans. of Sections, p. 98 (1859).—*Pterodactylus.*

<sup>2</sup> *Loc. cit.*                   <sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 6 (1874).

<sup>4</sup> Cretaceous Reptilia (Mon. Pal. Soc.), 1st Suppl. p. 4 (1859).—*Pterodactylus.*

<sup>5</sup> *Loc. cit.*

premaxillary rostrum is much less deep than in the preceding species ; and the dental alveoli are relatively larger, and separated from one another by longer intervals.

*Hab.* Europe (England).

**R. 540.** The extremity of a mandibular symphysis, showing three pairs of dental alveoli, which agree in relative size and position with those of the type premaxillary rostrum figured by Owen, *op. cit.* pl. i. fig. 3. *Purchased*, 1885.

### **Ornithochirus (?) simus (Owen<sup>1</sup>).**

Syn. *Pterodactylus simus*, Owen<sup>2</sup>.

*Criorhynchus simus*, Owen<sup>3</sup>.

(?) *Pterodactylus woodwardi*, Owen<sup>4</sup>.

Of very large size, and characterized by the great depth and bluntness of the muzzle. If, as is very probable, this species should prove generically distinct from the preceding forms, the name *Criorhynchus* might be retained for it<sup>5</sup>.

*Hab.* Europe (England).

**35412.** Fragment of the muzzle ; from the Cambridge Greensand. This specimen, although rather smaller, agrees with the type example figured by Owen in his 'Cretaceous Reptilia,' 3rd Suppl. pl. i. figs. 1, 2, as belonging to the upper jaw, but is referred by Seeley ('Ornithosauria,' p. 127) to the mandible. *Purchased*, 1859.

**R. 546.** Fragment of the extremity of the premaxillæ, not improbably belonging to a larger individual of the present species ; from Cambridgeshire. This specimen, which apparently agrees in character with the one figured by Owen, *op. cit.* pl. ii. fig. 3, under the name of *Pterodactylus woodwardi*, if rightly determined, would indicate the correctness of Seeley's view as to the position of the type specimen, and also that *P. woodwardi* may be a synonym of this form. *Purchased*, 1885.

<sup>1</sup> Cretaceous Reptilia (Mon. Pal. Soc.), 3rd Suppl. p. 2 (1860).—*Pterodactylus*.

<sup>2</sup> *Loc. cit.*                   <sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 7 (1874).

<sup>4</sup> Cretaceous Reptilia, *op. cit.* p. 4.

<sup>5</sup> In the preliminary publication of the name *Ornithochirus* (Seeley, Index to Aves &c. in Camb. Mus. p. xvi [1869]) it was applied to this species ; but in the later memoir ('Ornithosauria,' p. 127) the forms with spear-shaped jaws were taken as the types. See also Geol. Mag. 1881, pp. 15, 16. It would apparently only lead to worse confusion to revert to the original application of the name.

**35418.** An imperfect upper tooth, agreeing with the second tooth (*Fig.*) in the preceding specimen; from Cambridgeshire. Figured by Owen, *op. cit. pl. iv. fig. 4*, and referred to the present species. *Purchased*, 1859.

**35418 a.** A very similar specimen; from Cambridgeshire. *Same history.*

*Specifically undetermined specimens from the Cambridge Greensand. (Some of these bones may perhaps belong to the Pteranodontia<sup>1</sup>.)*

**35435.** Fragment apparently belonging to the premaxillary rostrum, containing one broken tooth. *Purchased*, 1859.

**41787.** Hinder portion of an Ornithosaurian or Avian cranium. *Purchased*, 1869.

**44173.** Model of a natural cast of the brain-cavity. The original is preserved in the Geological Museum, Cambridge, and is described and figured by Seeley in his 'Ornithosauria,' p. 87, pl. xi. figs. 10–12. *Presented by Mr. H. Keeping.*

**35436.** Fragment of a rostrum, with three pairs of dental alveoli. *Purchased*, 1859.

**R. 485.** The extremity of a mandibular symphysis, showing three pairs of dental alveoli, one of which contains a broken tooth. *Presented by Sir R. Owen, K.C.B.*

**35241.** A large broken tooth (? *O. simus*). *Purchased*, 1859.

**R. 474.** Seven teeth, mostly imperfect. *Presented by Sir R. Owen, K.C.B.*

**35241 a, 35419, 35427.** Sixteen more or less imperfect teeth. *Purchased*, 1859.

**35411.** The axis vertebra of a large species. *Purchased*, 1859.

**R. 547.** The conjoint atlas and axis vertebræ of a considerably smaller form. *Purchased*, 1885.

**R. 548.** The conjoint atlas and axis vertebræ of a rather smaller individual. *Same history.*

<sup>1</sup> The toothless *Ornithostoma* has been described from these beds; *vide* Seeley, Ann. Mag. Nat. Hist. ser. 4, vol. vii. p. 35, note (1871).

- 35410.** The conjoint atlas and axis vertebræ, in which the centrum of the latter is rather shorter than in the preceding specimen. *Purchased*, 1859.
- 35410 a.** A very similar specimen. *Purchased*, 1859.
- 35242.** Another similar specimen, wanting the greater portion of the neural spine. *Purchased*, 1859.
- 35829.** The axis vertebra of a form in which the centrum is shorter than in the preceding. *Purchased*, 1859.
- 43982.** A very similar specimen. *Purchased*, 1872.
- 43982 a.** The axis vertebra of a smaller form. *Purchased*, 1872.
- 46370.** Four imperfect cervical<sup>1</sup> vertebræ of a large species. *Purchased*, 1875.
- 35215, 35223-4, 35423-4.** Five imperfect cervical vertebræ of large size. *Purchased*, 1859.
- 35215 a.** A large imperfect cervical vertebra. *Purchased*, 1859.
- 35245.** An imperfect cervical vertebra of a large species. *Purchased*, 1859.
- R. 475.** A large imperfect cervical vertebra. *Presented by Sir R. Owen, K.C.B.*
- R. 56.** Two large imperfect cervical vertebræ. *Purchased*, 1881.
- R. 549.** Five imperfect cervical vertebræ belonging to individuals of different sizes. *Purchased*, 1885.
- 43983.** An imperfect cervical vertebra of a species of medium size. *Purchased*, 1872.
- 43983 a.** An imperfect cervical vertebra of a smaller form. *Purchased*, 1872.
- 41786.** Part of a cervical vertebra of a still smaller form. *Purchased*, 1869.
- 35243.** Two imperfect vertebræ provisionally referred to the cervical region. *Purchased*, 1859.

<sup>1</sup> In assigning these vertebræ to the cervical region the writer follows Owen, *op. cit.* 1st Suppl. pl. ii.; *vide suprà*, note 2, p. 11.

- R. 475.** A dorsal vertebra. Very similar to the specimen figured by Seeley, *op. cit.* pl. x. figs. 2–4.

*Presented by Sir R. Owen, K.C.B.*

- 35425.** A very similar dorsal vertebra. *Purchased, 1859.*

- 35244.** An imperfect dorsal vertebra of similar type.

*Purchased, 1859.*

- 35244 a.** The centrum of a small trunk vertebra.

*Purchased, 1859.*

- 35377.** A lumbar vertebra. *Purchased, 1860.*

- 35246.** An imperfect anterior sacral vertebra. *Purchased, 1859.*

- R. 459.** A caudal vertebra of a large species. Somewhat smaller than the specimen figured by Seeley, *op. cit.* pl. x. figs. 13, 14.

*Presented by Sir R. Owen, K.C.B.*

- 35248.** Four caudal vertebræ of rather smaller size.

*Purchased, 1859.*

- 35247.** A smaller imperfect caudal vertebra. *Purchased, 1859.*

- 35249.** An imperfect caudal vertebra of still smaller size.

*Purchased, 1859.*

- 35421.** Cast of the anterior portion of the sternum of a large species.

The original is preserved in the Geological Museum at Cambridge, and is figured by Owen, *op. cit.* 3rd Suppl. pl. ii. figs. 7–9, and also by Seeley, *op. cit.* pl. i. fig. 1.

*Purchased, 1859.*

- R. 541.** The imperfect anterior portion of a rather smaller sternum.

*Purchased, 1885.*

- 41782.** The anterior portion of a sternum, agreeing in size with the preceding. *Purchased, 1869.*

- 35405.** The anterior portion of a smaller sternum. Figured by (*Fig.*) Owen, *op. cit.* 3rd Suppl. pl. ii. figs. 10–12.

*Purchased, 1859.*

- 35409.** The glenoidal extremity of the ankylosed right scapula and coracoid of a large species. Very similar to the specimen figured in Owen's 'Cretaceous Reptilia,' 1st Suppl. pl. i. figs. 1–3.

*Purchased, 1860.*

35226. A more imperfect, but otherwise very similar, specimen belonging to the opposite side. *Purchased*, 1859.
- R. 553. The glenoidal extremity of the ankylosed scapula and coracoid of a smaller form. *Purchased*, 1885.
- R. 552. The glenoidal extremity of a smaller ankylosed scapula and coracoid. *Same history*.
- R. 551. The glenoidal extremity of the ankylosed right scapula and coracoid of a small species. *Same history*.
41780. The glenoidal extremity of the right scapula. *Purchased*, 1869.
- R. 554. The proximal extremity of the right scapula. *Purchased*, 1885.
35231. Two specimens of the glenoidal extremity of the coracoid. *Purchased*, 1859.
35232. The glenoidal half of a coracoid. *Purchased*, 1859.
35378. The proximal extremity of the right humerus of a large species. *Purchased*, 1860.
35214. The proximal extremity of the right humerus of an equally large form. *Purchased*, 1859.
35225. The proximal extremity of a rather smaller left humerus. *Purchased*, 1859.
35408. The proximal extremity of a nearly similar left humerus. *Purchased*, 1860.
35830. The proximal extremity of a rather smaller right humerus. *Purchased*, 1860.
41779. The proximal extremity of a considerably smaller left humerus. *Purchased*, 1869.
35413. The slightly imperfect right humerus of a small form. Very similar to the specimen figured by Seeley, 'Ornithosauria,' pl. iv. fig. 1. *Purchased*, 1860.
- R. 1032. Cast of the distal extremity of the left humerus of a large species. The original is preserved in the Geological Museum at Cambridge, and is figured by Seeley, *op. cit.* pl. iv. fig. 13. *Presented by Mr. H. Keeping*.

41778. The proximal extremity of the ulna of a large species.  
*Purchased*, 1869.
35229. The proximal extremity of the ulna of a small species.  
*Purchased*, 1859.
41777. The distal extremity of the ulna of a very large species.  
*Purchased*, 1869.
35324. The distal extremity of a rather smaller ulna.  
*Purchased*, 1859.
- R. 555. A specimen which is apparently the distal portion of the  
ulna of a small species.  
*Purchased*, 1885.
41781. The distal portion of the radius of a small species.  
*Purchased*, 1869.
37954. The right proximal carpal of a large species. Very similar  
to the specimen figured by Seeley, *op. cit. pl. v. fig. 1.*  
*Presented by Sir R. Owen, K.C.B.*, 1863.
43987. The right proximal carpal, of equal size with the preceding.  
*Purchased*, 1872.
35235. The left proximal carpal of a specifically distinct form.  
*Purchased*, 1859.
35330. The left proximal carpal.  
*Purchased*, 1859.
35422. A rather smaller left proximal carpal.  
*Purchased*, 1859.
- R. 543. The left distal carpal of a very large species.  
*Purchased*, 1885.
36156. The right distal carpal of a rather smaller form.  
*Purchased*, 1861.
35407. The imperfect left distal carpal of an apparently similar  
form.  
*Purchased*, 1860.
35237. A slightly smaller right distal carpal.  
*Purchased*, 1859.
- R. 544. A very similar imperfect right distal carpal.  
*Purchased*, 1885.
35405. A nearly similar imperfect left distal carpal.  
*Purchased*, 1860.

**35420.** The right distal carpal of a rather smaller form. Figured (*Fig.*) by Owen in his 'Cretaceous Reptilia,' 3rd Suppl. pl. iv. figs. 7, 10. *Purchased*, 1859.

**R. 1032 a.** Cast of a similar right distal carpal. The original is in the Geological Museum, Cambridge, and is said to be the one figured by Seeley in his 'Ornithosauria,' pl. v. figs. 7–10.

*Presented by Mr. H. Keeping.*

**R. 550.** An imperfect right distal carpal, agreeing in size with the preceding specimen. *Purchased*, 1885.

**R. 542.** The distal extremity of the ulnar metacarpal of a large species. Very similar to the specimen figured by Owen, *op. cit.* 1st Suppl. pl. iv. figs. 9–11. *Same history.*

**39108.** A rather larger specimen of a corresponding fragment of the opposite side, showing none of the shaft.

*Bowerbank Collection. Purchased*, 1865.

**39107.** A rather smaller specimen of a corresponding fragment, with a portion of the shaft. *Same history.*

**43984.** A similar specimen, without any of the shaft.

*Purchased*, 1872.

**43985.** Four specimens of the distal extremity of the homologous bone, two of which show portions of the shaft.

*Purchased*, 1872.

**35239.** The imperfect proximal extremity of the first phalangeal of the ulnar digit of the manus of a very large species.

*Purchased*, 1859.

**39106.** The proximal extremity of the homologous bone of a smaller form. This bone agrees closely with the less imperfect one figured by Seeley, *op. cit.* pl. vii. fig. 1.

*Bowerbank Collection. Purchased*, 1865.

**35227.** A very similar specimen.

*Purchased*, 1859.

**41783.** The imperfect proximal portion of an homologous bone, apparently agreeing very closely with the preceding.

*Purchased*, 1869.

**35325.** The distal extremity of the first phalangeal of the ulnar digit of the manus of a large species. *Purchased*, 1859.

**35325 a.** A similar fragment, of rather smaller size.

**35216.** Fragment of the shaft of a wing-bone of a large species.

*Purchased*, 1859.

**35228, -328-9.** Five fragments of shafts of smaller wing-bones.

*Purchased*, 1859-60.

**R. 487.** The imperfect terminal phalangeal of one of the clawed digits of the manus. Very similar to the specimen figured by Seeley, *op. cit.* pl. viii. fig. 16.

*Presented by Sir R. Owen, K.C.B.*

**41784.** Termination of a bone said to belong to the second phalangeal of the ulnar digit of the manus.

*Purchased*, 1869.

**43988.** The proximal portion of the femur of a small species. Agrees closely with the entire bone figured by Seeley, *op. cit.* pl. viii. figs. 5, 6.

*Purchased*, 1872.

**35230.** The distal half of the left femur of a form agreeing closely in size with the preceding.

*Purchased*, 1859.

**R. 478.** The distal portion of a rather smaller left femur.

*Presented by Sir R. Owen, K.C.B.*

**35230 a.** The proximal portion of a tibia. Slightly smaller than the specimen figured by Seeley, *op. cit.* pl. viii. figs. 13, 14.

*Purchased*, 1859.

### C. Species typically from the Gault.

#### **Ornithochirus daviesi** (Owen<sup>1</sup>).

Syn. *Pterodactylus daviesi*, Owen<sup>2</sup>.

A species agreeing approximately in size with *O. fittoni*, but with smaller and more numerous teeth; it appears highly probable that this form is really identical with *O. denticulatus*, Seeley<sup>3</sup>, from the Cambridge Greensand.

*Hab.* Europe (England).

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 2 (1874).—*Pterodactylus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> 'Ornithosauria,' p. 122, pl. xii. figs. 8, 9 (1870).

- 43074.** The extremity of the mandibular rostrum ; from the Gault (*Fig.*) of Folkestone. This specimen is the type, and is figured by Owen, *op. cit. pl. i. figs. 5, 6.* There are five dental alveoli in a space equal to that which contains three in the mandible referred to *O. fittoni.* *Purchased, 1871.*

*Specifically undetermined specimens from the Gault of Folkestone.*

- R. 47.** Four imperfect bones belonging to the wing.

*Purchased, 1881.*

- 37238.** Two imperfect wing-bones.

*Purchased, 1863.*

- 40096.** Two imperfect wing-bones.

*Purchased, 1866.*

- 47212.** The nearly entire tibia, of which the total length is 0,220.

As in *Dimorphodon*, this bone has a distal trochlea, looking as though the astragalus were ankylosed to it.

*Purchased, 1876.*

**D. Species typically from the Wealden.**

**\*\* *Ornithochirus nobilis* (Owen<sup>1</sup>).**

Syn. *Pterodactylus nobilis*, Owen<sup>2</sup>.

This species is of large size, but is too imperfectly known to admit of its distinctive characters being given.

*Hab.* Europe (England).

- 36552.** Part of the second (?) phalangeal of the ulnar digit of the (*Fig.*) manus ; from the Wealden of the Isle of Wight. This specimen is figured by Owen in his 'Liassic Reptilia,' pt. ii. pl. xix. fig. 10, and is the type.

*Mantell Collection. Purchased, 1853.*

- 36552 a.** Fragments of bones associated with the preceding.

*Same history.*

- R. 176.** Considerable portion of the skeleton of a large Ornithosaurian not improbably belonging to this species ; from the Wealden of Brook, Isle of Wight. The skeleton is

<sup>1</sup> Liassic Reptilia (Mon. Pal. Soc.), pt. ii. pl. xix. fig. 10 (1870).

<sup>2</sup> *Loc. cit.*

fragmentary, and much crushed; the hinder part of the cranium is preserved, as well as parts of the vertebral column and numerous portions of the wing-bones; the anterior part of the sacrum is well shown. The portion of the cranium has been bisected in order to show the brain-cavity; but the contour of the latter is not very clear.

*Fox Collection. Purchased, 1882.*

\*\* **Ornithochirus (?) clifti** (Mantell<sup>1</sup>).

Syn. *Palaeornis clifti*, Mantell<sup>2</sup>.  
*Pterodactylus clifti*, Bronn<sup>3</sup>.

The following specimens indicate a form considerably smaller than the preceding, which is provisionally referred to the present genus.

*Hab.* Europe (England).

- 2353.** The proximal extremity of the left humerus; from the (Fig.) Wealden of Cuckfield, Sussex. This specimen is figured by Mantell in his 'Fossils of Tilgate Forest,' pl. viii. fig. 11 (1827), and also in the 'Trans. Geol. Soc.' ser. 2, vol. v. pl. xiii. fig. 3, as the bone of a bird; but was refigured by Owen in the 'Quart. Journ. Geol. Soc.' vol. ii. pp. 99–100, figs. 5, 7, and referred to the Ornithosauria.

*Mantell Collection. Purchased, 1836.*

- 2353 a.** The imperfect distal part of apparently the same left (Fig.) humerus. Figured by Mantell, *op. cit.* pl. viii. fig. 15, and pl. xiii. figs. 1, 1 $\alpha$  (as a bird-bone), and in his 'Medals of Creation,' 1st ed. vol. i. p. 806, fig. 149 (as *Palaeornis*); also by Owen, *op. cit.* p. 97, figs. 1, 2, 3. This specimen is the type.

*Same history.*

**Ornithochirus (?)**, sp.

Distinguished from the preceding by a considerable difference in the contour of the head of the humerus.

*Hab.* Europe (England).

- R. 558.** The imperfect proximal extremity of the left humerus; from the Wealden of Brook, Isle of Wight.

*Purchased, 1885.*

<sup>1</sup> 'Medals of Creation,' 1st ed. vol. ii. p. 806 (1844).—*Palaeornis*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> 'Index Palaeontologicus,' p. 895 (1848).

\*\* **Ornithochirus (?) curtus** (Owen<sup>1</sup>).

Syn. *Pterodactylus curtus*, Owen<sup>2</sup>.

A comparatively small form, definitely known only by the following specimen.

*Hab.* Europe (England).

**R. 1440.** The distal extremity of the tibia; from the Wealden of (Fig.) Sussex. Figured by Owen, *loc. cit.* In the ankylosis of the proximal portion of the tarsus to its distal extremity, this bone agrees with the tibia from the Gault (No. 47212).

*Mantell Collection. Purchased, 1838.*

*Specifically undetermined specimens from the Wealden.*

**2458.** Shaft of a long-bone; from the Wealden of Cuckfield, Sussex. (Fig.) Figured by Mantell, in the 'Trans. Geol. Soc.' ser. 2, vol. v. pl. xiii. fig. 6, as a bird's bone. *Same history.*

**2470.** Shaft of a long-bone; from the same locality. Figured by (Fig.) Mantell, *op. cit.* pl. xiii. fig. 5. *Same history.*

**2455.** Three imperfect long-bones; from the same locality.

*Same history.*

E. *Species typically from the Purbeck.*

**Ornithochirus validus** (Owen<sup>3</sup>).

Syn. *Pterodactylus validus*, Owen<sup>4</sup>.

? *Pterodactylus macrurus*, Seeley<sup>5</sup>.

*Doratorhynchus validus*, Seeley<sup>6</sup>.

The lower jaw, originally described by Seeley as *P. macrurus*, but subsequently provisionally identified with this species, has the symphysial groove characteristic of *Ornithochirus*. The species is of comparatively large size.

*Hab.* Europe (England).

<sup>1</sup> Liassic Reptilia (Mon. Pal. Soc.), pt. ii. pl. xix. figs. 8-9 (1870).  
—*Pterodactylus.*

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Ibid.* pl. xix. fig. 7.

<sup>4</sup> *Loc. cit.*

<sup>5</sup> 'Index to Aves &c., in Camb. Mus.', p. 89 (1869).

<sup>6</sup> Quart. Journ. Geol. Soc. vol. xxxi. p. 465 (1875).

- 40653.** The second phalangeal of the ulnar digit of the manus ; (Fig.) from the Middle Purbeck beds of Swanage, Dorsetshire. This specimen is the type, and is figured (without description) by Owen in his 'Liassic Reptilia,' pt. ii. pl. xix. fig. 7. *Purchased*, 1867.

*The following specimen may perhaps belong to the present genus.*

- 2462.** A phalangeal of the ulnar digit of the manus, embedded in a slab of the Purbeck Limestone of Swanage. Length 0,103. *Mantell Collection. Purchased*, 1838.

### Family RHAMPHORHYNCHIDÆ.

Tail (at least usually) long; skull less bird-like than in the *Pterodactylidæ*, and often comparatively short and stout; jaws not always toothed to their anterior extremity; nares frequently small and separated by a complete bar from the preorbital vacuity; metacarpus much shorter than half the length of the ulna; proximal half of tarsus sometimes ankylosed to tibia.

#### Genus **SCAPHOGNATHUS**, Wagner<sup>1</sup>.

Syn. *Pachyrhamphus*, Fitzinger<sup>2</sup>.

*Brachytrachelus*, Giebel<sup>3</sup>.

In the type species, skull massive, without a distinct rostrum; nares small, and separated by a broad bar from preorbital vacuity; teeth subequal, nearly vertical, and extending anteriorly to the extremities of the jaws, and backwards to the hinder part of the preorbital vacuity; alveolar border of jaws and inferior border of mandible nearly straight; neck short and thick; tail unknown; other characters as in *Rhamphorhynchus*. Zittel<sup>4</sup> would include both this genus and *Ornithochirus* in the latter.

<sup>1</sup> Sitz. k.-bay. Ak. Wiss. 1861, vol. i. p. 519.

<sup>2</sup> Syst. Rept. p. 35 (1843).—Preoccupied by a genus of Birds (Gray, 1840).

<sup>3</sup> 'Allgemeine Paläontologie,' p. 231 (1852).—Preoccupied by a genus of Coleoptera (Schönh., 1847).

<sup>4</sup> *Palaeontographica*, vol. xxix. p. 64 (1882).

**Scaphognathus crassirostris** (Goldfuss<sup>1</sup>).

Syn. *Pterodactylus crassirostris*, Goldfuss<sup>2</sup>.

*Pachyrhamphus crassirostris*, Fitzinger<sup>3</sup>.

*Ornithocephalus crassirostris*, Wagner<sup>4</sup>.

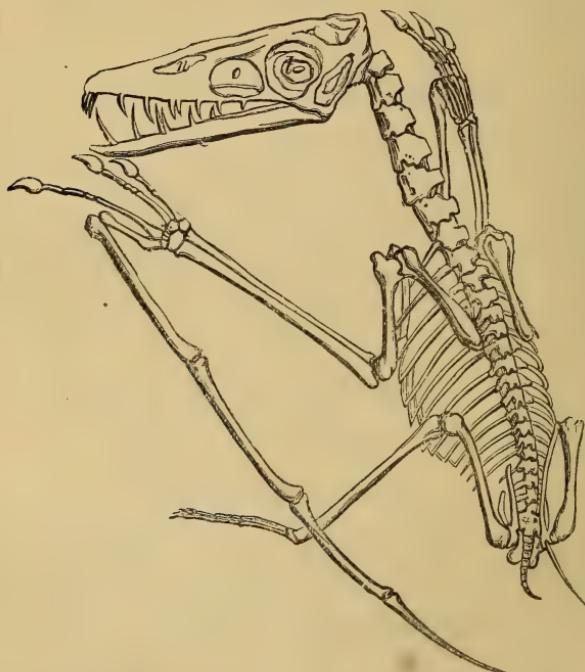
*Brachytrachelus crassirostris*, Giebel<sup>5</sup>.

*Rhamphorhynchus crassirostris*, Wagner<sup>6</sup>.

The type species; the length of the skull is 0,120. Zittel<sup>7</sup> concludes that the tail was long.

Hab. Europe (Germany).

Fig. 4.



*Scaphognathus crassirostris*; from the Kimeridgian of Bavaria.  $\frac{1}{3}$ . n, nares; o, preorbital vacuity; t, orbit. The restoration of the tail is incorrect.

**43468.** Casts of a split slab of lithographic limestone, showing the greater portion of the skeleton. The original (woodcut,

<sup>1</sup> *Nova Acta Ac. Cæs. Leop.-Car.* vol. xv. pt. i. p. 63 (1832).—*Pterodactylus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Syst. Rept.* p. 35 (1843).

<sup>4</sup> *Abh. k.-bay. Ak. Wiss.* vol. vi. pt. i. p. 189 (1851).

<sup>5</sup> ‘*Allgemeine Paläontologie*,’ p. 231 (1852).

<sup>6</sup> *Op. cit.* vol. viii. pt. ii. p. 505 (1858).

<sup>7</sup> *Palæontographica*, vol. xxix. p. 64 (1882).

fig. 4) was obtained from the Kimeridgian of Bavaria, and is preserved in the Museum at Bonn. It is figured by Goldfuss in the ‘Nova Acta Ac. Cæs. Leop.-Car.’ vol. xv. pt. i. pls. 7–9; by Buckland in his Mineralogy and Geology (Bridgewater Treatise), pl. xxii.; by Meyer in the ‘Fauna der Vorwelt—Rept. Lith. Schiefer,’ pl. v. figs. 1, 2; and by Owen in his ‘Cretaceous Reptilia’ (Mon. Pal. Soc.), pl. xxvii. *Presented by K. Murchison, Esq., 1872.*

- 43437.** Cast showing the left side of the skull of the preceding specimen. Figured by Meyer, *op. cit.* pl. v. fig. 3. The symphysis of the mandible shows a median descending ridge on the ventral surface. *Same history.*

### Genus **RHAMPHORHYNCHUS**, Meyer<sup>1</sup>.

Teeth usually not extending to the extremities of the jaws; those of the mandible subequal in size, and all inclined forwards; nares moderate, and separated by a broad bar from preorbital vacuity; alveolar border of premaxilla concave, and of mandible convex, and inferior border of latter concave; scapula and coracoid separate or ankylosed; neck thick, and of moderate length; proximal tarsals usually distinct, but ankylosed to the tibia in *R. grandis*; either four or five functional digits in pes, the fifth digit having two phalangeals. Pubis narrow, elongated, and bent, and uniting in a bony symphysis; ischium ankylosed to ilium; sacrum with from three to five vertebrae. Hind limb usually comparatively weak; and the long tail with a terminal membranous expansion (fig. 5), and the vertebrae bound together by ossified tendons.

#### **Rhamphorhynchus longicauda**(Münster<sup>2</sup>).

Syn. *Pterodactylus longicaudus*, Münster<sup>3</sup>.

*Ornithocephalus longicaudatus*, Wagner<sup>4</sup>.

*Rhamphorhynchus longicaudatus*, Ammon<sup>5</sup>.

The type species. Of small size, and perhaps without an edentulous interval at the extremity of the upper jaw. The length of the cranium is 0,043; and the scapula and coracoid are distinct, and approximate in structure to those of *Pterodactylus*.

*Hab.* Europe (Germany).

<sup>1</sup> Neues Jahrb. 1846, p. 463.

<sup>2</sup> Ibid. 1839, p. 677.—*Pterodactylus*.

<sup>3</sup> Loc. cit.

<sup>4</sup> Abh. k.-bay. Ak. Wiss. vol. vi. pt. i. p. 190 (1851).

<sup>5</sup> Corr.-blatt. Nat. Ver. Regensburg, vol. xxxviii. p. 155 (1884).

**37361.** Cast of a slab of lithographic limestone, showing the nearly entire skeleton. The original is preserved in the Museum at Leucktenberg, and was obtained in 1846 from the Kimeridgian of Eichstädt, Bavaria; it is one of the types, and is figured by Von Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. ix. fig. 5. Another skeleton wanting the skull is figured by Zittel in the 'Palaeontographica,' vol. xxix. pl. xi.

*Purchased*, 1863.

**Rhamphorhynchus muensteri** (Goldfuss<sup>1</sup>).

Syn. *Ornithocephalus muensteri*, Goldfuss<sup>2</sup>.

*Pterodactylus muensteri*, Meyer<sup>3</sup>.

*Ramphorhynchus phyllurus*, Marsh<sup>4</sup>.

Regarded by Zittel<sup>5</sup> as closely allied to the following form, but with the scapula and coracoid frequently ankylosed, with a fifth digit in the pes, and with the patagium rather wider. The same writer identifies the so-called *R. phyllurus* with this species. If the next form be also specifically identical, the present name should stand.

*Hab.* Europe (Germany).

**43004.** A slab of lithographic limestone, containing the imperfect skeleton, of which the cranium and mandible are entire; from the Kimeridgian of Eichstädt, Bavaria. The length of the cranium is 0,080.

*Van Breda Collection. Purchased*, 1871.

**42738.** A slab of lithographic limestone containing an imperfect skeleton (without the skull), provisionally referred to this species; from Eichstädt. Figured by Von Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. x. fig. 3, under the name of *R. gemmingi*. It agrees in size with the present form.

*Van Breda Collection. Purchased*, 1871.

**39353.** Cast of the preceding specimen. *Purchased*, 1865.

**R. 300.** Cast of a slab of lithographic limestone, showing the nearly entire skeleton and the impression of the patagium. The original, which was obtained from Eichstädt in 1873, is

<sup>1</sup> Nova Acta Ac. Cœs. Leop.-Car. vol. xv. pt. i. p. 112 (1831).—*Ornithocephalus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Palæologica, p. 116 (1832).

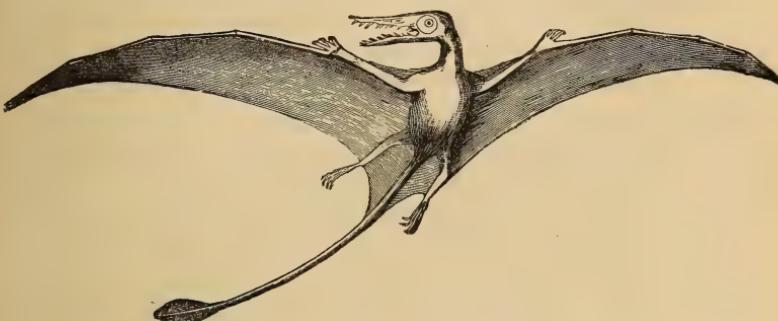
<sup>4</sup> Amer. Journ. ser. 3, vol. xxiii. p. 256 (1882).

<sup>5</sup> Palæontographica, vol. xxix. pp. 62–63 (1882).

preserved in the Museum at Yale College, Connecticut, U.S.A., and is figured by Marsh in the 'Amer. Journ.' ser. 3, vol. xxiii. pl. iii., under the name of *R. phyllurus*, of which it is the type. The length of the cranium is about 0,091. A restoration is given in woodcut fig. 5.

*Presented by Prof. O. C. Marsh, 1883.*

Fig. 5.



Restoration of *Rhamphorhynchus muensteri*. ½. (After Marsh.)

### **Rhamphorhynchus gemmingi**, Meyer<sup>1</sup>.

Syn. *Pterodactylus (Rhamphorhynchus) gemmingi*, Meyer<sup>2</sup>.

*Ornithocephalus gemmingi*, Wagner<sup>3</sup>.

*Rhamphorhynchus longimanus*, Wagner<sup>4</sup>.

*Rhamphorhynchus meyeri*, Owen<sup>5</sup>.

Of medium size, the length of the cranium being usually about 0,125; the extremity of the mandible not upwardly recurved; the scapula and coracoid separate; and apparently either four or five digits in the pes.

*Hab.* Europe (Germany).

**R. 231.** Cast of a slab of lithographic limestone, showing the cranium and detached mandible. The original, which is the type, was obtained from the Kimeridgian of Steinbrüche, near Solenhofen, Bavaria, and is preserved in the Museum at Munich. It is figured by Goldfuss in the 'Nova Acta Ac. Cæs. Leop.-Car.' vol. xv. pt. i. pl. xi.

<sup>1</sup> *Palaeontographica*, vol. i. p. 1 (1846). <sup>2</sup> *Loc. cit.*

<sup>3</sup> *Abh. k.-bay. Ak. Wiss.* vol. vi. p. 190 (1851).

<sup>4</sup> *Ibid.* vol. viii. pt. ii. p. 494 (1858).

<sup>5</sup> *Liassic Reptilia* (*Mon. Pal. Soc.*), pt. ii. p. 80 (1870).

fig. 1 ; by Wagner in the 'Abh. k.-bay. Ak. Wiss.' vol. ii. pt. i. pl. vi. ; and by Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. iii. fig. 4 (as *R. gemmingi*). The length of the cranium is 0,095.

*Egerton Collection. Purchased, 1882.*

- 49151.** Cast of a slab of lithographic limestone, showing the nearly entire skeleton. The original is from the Kimeridgian of Bavaria, and is figured by Wagner in the 'Abh. k.-bay. Ak. Wiss.' vol. viii. pt. ii. pl. xvi. fig. 1, under the name of *R. longimanus*, of which it is one of the types. The length of the cranium is 1,080. *Purchased, 1877.*

- 37362.** Cast of a slab of lithographic limestone, showing a considerable portion of the skeleton; from the Kimeridgian of Solenhofen, Bavaria. The original is figured by Wagner, *op. cit. pl. xvii.*, under the name of *R. longimanus*.

*Purchased, 1863.*

- 37003.** A slab of lithographic limestone, showing the mandible (*Fig.*) and a large part of the rest of the skeleton; from Solenhofen. Figured by Owen in his 'Liassic Reptilia' (Mon. Pal. Soc.), pt. ii. pl. xix. figs. 5, 6, under the name of *R. meyeri*, of which it is the type. In the presence of five digits to the pes (one of the so-called specific characters) it agrees with the specimen figured by Zittel in the 'Palaeontographica,' vol. xix. pl. xii. fig. 2.

*Haberlein Collection. Purchased, 1862.*

- 37787.** A split slab of lithographic limestone, containing the greater part of a skeleton, without the skull, provisionally referred to a large individual of this species; from Solenhofen. The bones are somewhat longer than those of figured examples; the length of the four phalangeals of the ulnar digit of the manus being respectively (1) 0,148, (2) 0,118, (3) 0,110, (4) 0,110. *Same history.*

### **Rhamphorhynchus grandis** (Cuvier<sup>1</sup>).

Syn. *Pterodactylus grandis*, Cuvier<sup>2</sup>.

*Ornithocephalus grandis*, Wagner<sup>3</sup>.

This species is of much larger size than the preceding, the length of the second phalangeal of the wing-digit in the type-specimen

<sup>1</sup> Oss. Foss. 2nd ed. vol. v. pt. ii. p. 382 (1824).—*Pterodactylus*.

<sup>2</sup> Loc. cit.                   <sup>3</sup> Abh. k.-bay. Ak. Wiss. vol. vi. pt. i. p. 190 (1851).

being 0,194. It was founded upon bones of the manus and pes, which were referred both by Wagner and Meyer to *Pterodactylus*; but the relative shortness of the metacarpals in the figure given by Wagner in the 'Abh. k.-bay. Ak. Wiss.' vol. vi. pt. iii. pl. xix., shows that it belongs to the Rhamphorhynchine type. The proximal portion of the tarsus is ankylosed to the tibia, and the hind limb was probably stronger than in the other species. The following specimen, which is only provisionally referred to this species, indicates a smaller individual than the type; the extremity of the mandible is strongly recurved upwards, and the length of the skull is about 0,200.

*Hab.* Europe (Germany).

**37002.** A slab of lithographic limestone containing the greater part of a skeleton, provisionally referred to the present species; from the Kimeridgian of Eichstädt, Bavaria. The length of the second phalangeal of the wing-digit is 0,165, that of the third 0,140, and that of the fourth 0,136. The teeth are markedly compressed laterally; the tibia and tarsus are not visible. *Haberlein Collection. Purchased*, 1862.

**42737.** A split slab of lithographic limestone showing the conjoint tibia and fibula and pes of a large Ornithosaurian, which may belong either to the present or an allied form; from Eichstädt. In the ankylosis of the proximal portion of the tarsus to the tibia this specimen agrees with the imperfect pelvic limb of *R. grandis* figured by Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. vii. fig. 7. The length of the tibia in the present specimen is 0,141, against 0,198 in the latter, and thus agrees in relative size with No. 37002.

*Van Breda Collection. Purchased*, 1871.

#### Genus **RHAMPHOCEPHALUS**, Seeley<sup>1</sup>.

Distinguished from *Rhamphorhynchus* by the anterior mandibular teeth being taller than the posterior, which are directed nearly vertically, and by the great constriction of the cranium between the orbits. The scapula and coracoid were united<sup>2</sup>.

The apparent generic distinctness from *Rhamphorhynchus* of the forms included in this group was first pointed out by Huxley in the memoir cited under the head of *R. depressirostris*.

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxxvi. p. 27 (1880).

<sup>2</sup> See Huxley, Quart. Journ. Geol. Soc. vol. xv. pl. xxiv. fig. 6.

**Rhamphocephalus bucklandi** (Meyer<sup>1</sup>).Syn. *Pterodactylus bucklandi*, Meyer<sup>2</sup>.*Rhamphorhynchus bucklandi*, Huxley<sup>3</sup>.Including:—*Pterodactylus duncani*, Owen<sup>4</sup>.*Pterodactylus kiddi*, Owen<sup>5</sup>.

The mandible figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xv. pl. xxiv. fig. 2, may be regarded as the type.

This species is larger than *Rhamphorhynchus grandis*, and has more than five lower teeth, with the inferior border of the mandibular ramus highly concave<sup>6</sup>.

Since no characters have been adduced by which the specimens named *Pterodactylus duncani* and *P. kiddi* can be distinguished from the present species, they are provisionally included under this heading, although one or other of them may be distinct. *R. prestwichi*, Seeley<sup>7</sup>, may apparently be identical either with the present or following species.

*Hab.* Europe (England).

*The following specimens are from the Lower Jurassic of Stonesfield, Oxfordshire. Some doubtless belong to the present species, but others may be specifically distinct; in the latter event one of the names proposed by Owen might perhaps be adopted.*

40126. An imperfect humerus. Slightly smaller than the specimen figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xv. pl. xxiv. fig. 7. *Purchased.*

38016. A bone, which is probably the radius. Length 0,132. *Purchased*, 1862.

R. 1030. Cast of the first phalangeal of the ulnar digit of the manus. The original is in the Oxford Museum, and is probably the specimen noticed in Phillips's 'Geology of Oxford,' p. 224. Length 0,135. *Purchased.*

R. 1029. Cast of the proximal extremity of a similar bone. Original in the Oxford Museum. *Purchased.*

40126 b. The first phalangeal of the ulnar digit of the manus. This (Fig.) specimen is figured by Owen in his 'Mesozoic Reptilia'

<sup>1</sup> Palaeologica, p. 117 (1832).—*Pterodactylus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xv. p. 658 (1859).

<sup>5</sup> Loc. cit.

<sup>4</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 11 (1874).

<sup>6</sup> See p. 666 of the memoir by Huxley above cited.

Quart. Journ. Geol. Soc. vol. xxxvi. p. 27 (1880).

(Mon. Pal. Soc.), pt. i. pl. i. fig. 18, under the name of *Pterodactylus duncani*, of which it is the type. The length (exclusive of the proximal projection) is 0,137, and the specimen cannot be distinguished from No. R. 1030.

*Purchased*, 1866.

- 40126 a. The homologous bone of a smaller individual. This bone (*Fig.*) is figured by Owen, *op. cit.* pl. i. fig. 17, under the name of *Pterodactylus kiddi*, of which it is the type. Its length (exclusive of the proximal projection) is 0,123; and there is no reason why it should not have belonged to an immature individual of the same species as the preceding specimen. *Same history.*

38019. The proximal half of a similar bone. *Purchased*, 1862.

38020. The proximal extremity of a similar bone. *Same history.*

- 40126 g. A considerably smaller homologous bone belonging to the same side as No. 40126 b. Length (exclusive of proximal process) 0,100. *Purchased*, 1866.

- 40126 d. The second phalangeal of the ulnar digit of the manus. (*Fig.*) Figured by Owen, *op. cit.* pl. i. fig. 28. Length 0,160. *Same history.*

38014. The second or third phalangeal of the same digit. Length 0,142. *Purchased*, 1862.

38015. A similar bone. *Same history.*

38025. An imperfect homologous bone, with impression of the entire shaft. *Same history.*

- 40126 f. A similar bone; imperfect. *Purchased*, 1866.

- R. 1028. Cast of a bone which is probably a second or third phalangeal of the wing-digit. Original in Oxford Museum. *Purchased*.

- 40126 e. Two vertebrae in a crushed condition. *Purchased*, 1866.

- 40126 i. A rib. *Purchased*.

37765. A rib. *Purchased*.

28610. A rib. *Purchased*.

- 47999 a. A crushed bone not improbably belonging to the pectoral girdle. *Presented by the Hon. R. Marsham*, 1877.

- 28610 a. An undetermined imperfect bone. *Purchased.*  
 40126 n. An undetermined imperfect bone. *Purchased.*
- \* *Numerous other imperfect bones in the Collection are not catalogued.*

*The following specimens may indicate young individuals:—*

- 40126 p. Four terminal phalangeals of the ulnar digit of the manus.  
 Length of smallest 0,023. *Purchased.*
- 28610 b. An homologous bone. *Purchased.*
- 28610 c. A humerus. Length 0,019. *Purchased.*

**Rhamphocephalus depressirostris** (Huxley<sup>1</sup>).

Syn. *Rhamphorhynchus depressirostris*, Huxley<sup>2</sup>.  
 (?) *Pterodactylus acclandi*, Owen<sup>3</sup>.

Characterized by the presence of only five lower teeth, and by the slight concavity of the inferior border of the mandibular ramus. The following specimen indicates a large form agreeing in characters with this species, and from its size is probably the same as Owen's *P. acclandi*; if these specimens should be specifically distinct from this species, the latter name might be retained.

*Hab.* Europe (England).

47991. Part of the right ramus of a mandible, provisionally referred to this species, and showing the four posterior teeth and the alveolus of the first tooth; from the Lower Jurassic of Stonesfield, Oxford. This specimen is larger than the type mandible of the present species, but is otherwise similar.

*Presented by the Hon. R. Marsham, 1877.*

*The following specimens from the same locality agree in relative size with the preceding mandible.*

- 40126 j. The ulna. Length (excluding olecranon) 0,157. The distal extremity agrees very closely with that of the corresponding bone (No. 35324) of *Ornithochirus* from the Cambridge Greensand. *Purchased, 1866.*
- 40126 c. The first phalangeal of the ulnar digit of the manus. (*Fig.*) Figured by Owen in his 'Mesozoic Reptilia' (Mon. Pal.

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xv. p. 663 (1859).—*Rhamphorhynchus*.  
*Loc. cit.*

<sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 11 (1874).

Soc.), pt. i. pl. i. fig. 19, under the name of *Pterodactylus aclandi*, of which it is the type. Length (exclusive of proximal projection) 0,145. *Purchased*, 1866.

- 40126 k. A second or third phalangeal of the homologous digit.  
Length 0,210. *Same history.*
- 40126 l. An imperfect corresponding bone. *Same history.*
- 40126 m. A terminal phalangeal of the ulnar digit of the manus.  
Length 0,186. *Same history.*
- 40126 n. A similar bone. *Same history.*
- 40126 o. The proximal portion of a similar bone. *Same history.*

Genus **DIMORPHODON**, Owen<sup>1</sup>.

Jaws toothed to their extremities; anterior teeth in both jaws large, but posterior mandibular ones very small; nares large, and separated by a narrow bar from preorbital vacuity; coracoid and scapula united; proximal tarsals united to tibia; five digits in pes. According to Owen's restoration<sup>2</sup>, the pubis and ischium form an expanded sheet of bone at right angles to the narrow ilium, which is extended to an equal length on either side of the acetabulum.

**Dimorphodon macronyx** (Buckland<sup>3</sup>).

Syn. *Pterodactylus macronyx*, Buckland<sup>4</sup>:

(?) *Pterodactylus marderi*, Owen<sup>5</sup>.

The type species. Length of the cranium usually about 0,220. *Ornithocephalus banthensis*, Theodori<sup>6</sup> (*Dimorphodon banthensis*, Owen<sup>7</sup>), was identified with it by Meyer; but the anterior extremity of the jaws is edentulous, as in *Rhamphocephalus*, and the species is the type of *Dorygnathus*, Wagner<sup>8</sup>. The specimen on which *P. marderi* is founded does not appear to be specifically distinct from the present form.

*Hab.* Europe (England).

<sup>1</sup> Rep. Brit. Assoc. for 1858, Transactions of Sections, p. 97 (1859).

<sup>2</sup> Liassic Reptilia (Mon. Pal. Soc.), pl. xx. Zittel ('Palaeontographica,' vol. xxix. p. 64) doubts the correctness of this restoration.

<sup>3</sup> Proc. Geol. Soc. vol. i. p. 127 (1829).—*Pterodactylus*.

<sup>4</sup> Loc. cit.

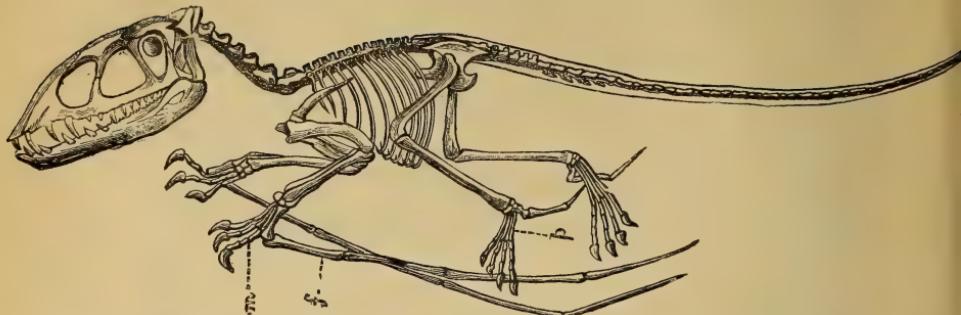
<sup>5</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 12 (1874).

<sup>6</sup> Notiz. Nat. Heilk. vol. xxix. p. 103 (1830).—This name has the priority.

<sup>7</sup> Palaeontology, 2nd edit. p. 275 (1861).

<sup>8</sup> Sitz. k.-bay. Ak. Wiss. 1861, p. 520.

Fig. 6.



*Dimorphodon macronyx*.—Restored skeleton; from the Lower Lias. †. *f.*, proximal phalangeal of the ulnar digit of the manus; *m*, corresponding phalangeal of adjacent digit; *p*, metatarsus. (After Owen.)

R. 1034. Slab containing a considerable portion of the skeleton; (Fig.) from the Lower Lias of Lyme-Regis, Dorsetshire. The type. Figured by Buckland in the 'Trans. Geol. Soc.' ser. 2, vol. iii. pl. xxvii. (1835). The skull and most of the vertebrae are wanting. Purchased.

R. 1035. The skull and fragments of the rest of the skeleton; (Fig.) from Lyme-Regis. Figured by Owen in his 'Liassic Reptilia,' pt. ii. pl. xvii. Purchased. About 1858.

41212-13. The skull and greater portion of the rest of the skeleton; (Fig.) from Lyme-Regis. Figured by Owen, *op. cit.* pl. xviii. Purchased, 1868.

43486-7. Two imperfect mandibular rami; from Lyme-Regis. Presented by the Earl of Enniskillen, 1874.

41346. The entire tail; from Lyme-Regis. Figured by Owen, (Fig.) *op. cit.* pl. xix. fig. 4. Purchased, 1869.

R. 590. Part of the right side of the cranium, showing part of the nasal and preorbital vacuities. Purchased, 1885.

The following specimens from the Lower Lias of Lyme-Regis are all provisionally included under this specific heading, but some may be distinct.

42016. The distal extremity of the right humerus. Figured by (Fig.) Owen in his 'Mesozoic Reptilia' (Mon. Pal. Soc.), pt. i. pl. i. figs. 13, 14. Purchased, 1870.

43974. The left humerus. The length of this specimen is 0,076; the length of the corresponding bone in No. 41212 being 0,092; both have a similar curved shaft. Purchased, 1872.

- 41348.** The right humerus, wanting the distal extremity. This (Fig.) specimen is figured by Owen, *op. cit.* pl. i. figs. 7–9, under the name of *Pterodactylus marderi*, of which it is the type; it agrees in size with the last specimen, and presents no characters which can be regarded as of specific value.

*Purchased*, 1869.

- R. 591.** The right humerus, imperfect proximally, of a rather smaller individual.

*Purchased*, 1885.

- R. 1036.** The imperfect left humerus of an individual agreeing approximately in size with the preceding.

*Purchased*. *About* 1858.

- R. 35.** The imperfect metacarpus, belonging to a larger individual than the one from which Owen's restoration is made.

*Purchased*, 1880.

- 41347.** Three phalangeals of the ulnar digit of the manus.

*Purchased*, 1869.

- 42016 a.** A phalangeal of the ulnar digit of the manus.

*Purchased*, 1870.

- 43053.** A phalangeal of the ulnar digit of the manus.

*Purchased*, 1871.

- 43052.** A bone, probably belonging to the manus.

*Purchased*, 1871.

- 41347 a.** An imperfect bone, which is probably the femur.

*Purchased*, 1869.

- 43973.** The slightly imperfect tibia and fibula. This specimen agrees closely with the corresponding element in Owen's restoration, the length being 0,125. The distal extremity evidently consists of the proximal portion of the tarsus.

*Purchased*, 1872.

- 43051.** The tibia and fibula of a smaller individual. Length 0,104.

*Purchased*, 1871.

- 41347 b.** A similar tibia and fibula, imperfect proximally.

*Purchased*, 1869.

- 47464.** The tibia and fibula of a very young individual.

*Purchased*, 1876.

- 41347 c.** An undetermined long-bone.

*Purchased*, 1869.

- R. 223.** An apparently homologous bone, belonging to a smaller individual.

*Purchased*, 1882.

## ORNITHOSAURS OF UNCERTAIN GENERIC POSITION.

There is no evidence as to the genus (or genera) to which the following forms (which are from the typical horizon of *Pterodactylus* and *Rhamphorhynchus*) should be referred. The distal portion of the ulnar metacarpal is remarkable for having a bony plate suturally attached to one of its lateral surfaces, which doubtless aided in supporting the patagium.

SPECIES *a.**Pterodactylus manseli*, Owen<sup>1</sup>.

This species is only known by the following bones, which agree approximately in size with those of *Dimorphodon*.

*Hab.* Europe (England).

**41970.** The distal portion of the left humerus; from the Kimeridge (*Fig.*) Clay of Weymouth, Dorsetshire. This specimen is the type, and is figured by Owen, *op. cit. pl. i. figs. 10–12.*

*Purchased*, 1870.

**43035.** The proximal extremity of the first phalangeal of the ulnar (*Fig.*) digit of the manus; from Weymouth. This specimen is referred to the present species by Owen, and figured by him, *op. cit. pl. i. figs. 20, 21.* *Purchased*, 1871.

**44182.** Seven specimens of the same extremity of the homologous bone; from Weymouth. *Purchased*, 1873.

**R. 559.** A similar specimen; from Weymouth. *Purchased*, 1886.

**45918.** A similar specimen, showing more of the shaft. *Purchased*, 1874.

*The following specimens from the Kimeridge of Weymouth may probably be referred either to the present or the next form.*

**R. 563.** An extremity of (apparently) one of the bones of the forearm. *Purchased*, 1886.

**41404.** A similar specimen. *Purchased*, 1869.

**41232.** An homologous specimen of a smaller individual. *Purchased*, 1868.

**42376.** Two proximal carpals. Figured by Owen, *op. cit. pl. i. (Fig.) figs. 24–27.* *Purchased*, 1870.

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 8 (1874).

- 42376 a.** A similar bone. *Purchased*, 1870.  
**R. 562.** A similar bone. *Purchased*, 1886.  
**41886.** A similar bone. *Purchased*, 1869.  
**41887.** A similar bone, imperfect. *Same history*.  
**43034.** The distal extremity of the ulnar metacarpal. *Purchased*, 1871.  
**44183.** The distal portion of an homologous bone. The accessory lateral ossification is well shown. *Purchased*, 1873.  
**R. 561.** The distal extremity of a smaller example of the homologous bone. *Purchased*, 1886.  
**43571.** Three fragments of phalangeals of the ulnar digit of the manus. *Purchased*, 1872.  
**43571 a.** An imperfect undetermined long-bone. *Same history*.

## SPECIES b.

*Pterodactylus pleydelli*, Owen<sup>1</sup>.

Said to be distinguished from the preceding form by its somewhat inferior dimensions.

*Hab.* Europe (England).

- 42378.** The distal portion of the left humerus; from the Kimeridge (Fig.) Clay of Weymouth, Dorsetshire. This specimen is the type, and is figured by Owen, *op. cit.* pl. i. figs. 15, 16. *Purchased*, 1870.

- 42374.** The proximal extremity of the first phalangeal of the ulnar (Fig.) digit of the manus; from Weymouth. Figured by Owen, *op. cit.* pl. i. figs. 22, 23, and provisionally referred to this species. *Same history*.

- 41404, 41884, 41885, 41971, 42374, 44182.** Six apparently similar specimens; from Weymouth. *Purchased*.

## SPECIES c.

Of considerably larger size than either of the preceding forms.

*Hab.* Europe (England).

- 41179.** The distal extremity of the ulnar metacarpal; from the Kimeridge Clay of Weymouth, Dorsetshire. The diameter across the condyles is 0,016, against 0,008 in No. 44183 (Species a). *Purchased*, 1868.

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. i. p. 9 (1874).

## ORDINAL POSITION UNCERTAIN.

Genus **ORNITHODESMUS**, Seeley<sup>1</sup>.

The specimen on which this genus is founded is regarded by its describer as probably Avian, although presenting certain indications of affinity with Dinosauria. The impossibility of its belonging to the present Order does not, however, appear to be proved.

***Ornithodesmus cluniculus***, Seeley<sup>2</sup>.

*Hab.* Europe (England).

R. 187. The imperfect sacrum ; from the Wealden of Brook, Isle of (Fig.) Wight. The type ; figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xlili. pl. xii. figs. 1-6.

*Fox Collection. Purchased, 1884.*

Order CROCODILIA<sup>3</sup>.

Limbs and body lacertiform ; the former short ; the latter with a dorsal armour of pitted, imbricated, dermal scutes. Vertebræ either pro- or amphicœlous, with persistent neuro-central suture ; rib-facet in middle dorsal vertebrae forming a "step" on the transverse process ; cervical ribs with long antero-posterior processes ; dorsal ribs usually with uncinate processes ; two vertebrae in sacrum ; chevrons generally open superiorly. Cranium relatively large, with component bones firmly united, and some of them usually sculptured ; palatines and pterygoids uniting in middle line, and latter joined to base of cranium and giving off processes to unite anteriorly with vomers ; quadrate wedged in among adjacent bones ; tympanum with three eustachian canals ; usually no columella ; mandibular symphysis uniting by suture ; no ossifications in sclerotic. Teeth pointed and subconical or compressed ; inserted in distinct sockets. Sternum cartilaginous ; an interclavicle ; usually no clavicle. Limb-bones solid. Coracoid long or short, with fontanelle ; humerus with head imperfectly differentiated from tuberosities and transversely extended, with the deltoid crest terminating abruptly. Ilium (fig. 7) without distinct pubic or preacetabular processes ;

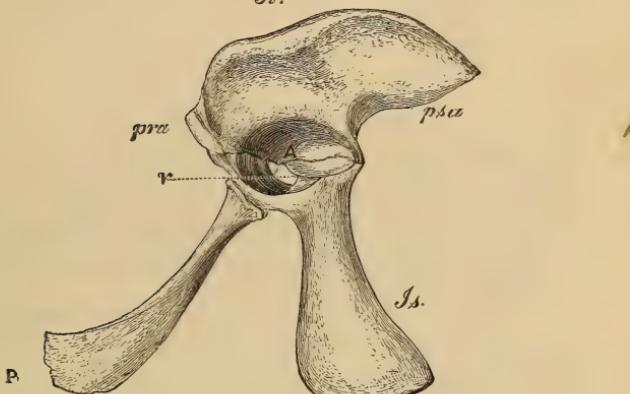
<sup>1</sup> Quart. Journ. Geol. Soc. vol. xlili. p. 206 (1887).

<sup>2</sup> Loc. cit.

<sup>3</sup> Some of the following characters may not be applicable to the Aëtosauria, which are included by Baur (*Sitz. ges. Morph. Münch.* vol. iii. p. 55, 1887) in this Order.

pubis<sup>1</sup> directed forwards, with cartilaginous symphysis, and frequently excluded from acetabulum; ischium short and thick, without obturator process; femur with curved shaft, head oblique to condyles, and not differentiated from tuberosities, and no inner trochanter; tibia without enemial crest; astragalus not flattened, and distinct from tibia. A ventral dermal armour may be present; and the mandible nearly always has a lateral vacuity. Habits quadrupedal and subaquatic; feet plantigrade.

Fig. 7.

*Il.*

*Crocodilus vulgaris*.—Left side of pelvis.  $\frac{1}{2}$ . *Il.*, ilium; *pra*, *psa*, pre- and post-acetabular processes of ditto; *Is*, ischium; *P.*, pubis; *v*, acetabulum. (From the 'Quart. Journ. Geol. Soc.')

## Suborder EUSUCHIA.

Premaxillæ, maxillæ, and palatines with palatal plates uniting in the median line to separate the narial and oral passages; no columella; anterior nares terminal and usually undivided; vomers generally invisible on palate; no distinct postfrontal<sup>2</sup>; middle eustachian canal bony; and premaxilla with not more than 4 or 5 teeth. No clavicle; coracoid elongated, with small fontanelle; humerus without ectepicondylar groove. Pubis<sup>3</sup> excluded from acetabulum (fig. 7); five digits in manus and four in pes, of which three have claws. Vertebræ pro- or amphicœlous. Dorsal scutes

<sup>1</sup> Seeley (Proc. R. Soc. vol. xlivi. p. 235 [1887]) regards the bone usually termed pubis in the Eusuchia as a prepubis.

<sup>2</sup> See Baur, Zool. Anzeiger, No. 240 (1886).—The bone commonly termed postfrontal is really the postorbital.

<sup>3</sup> See note 1.

keeled or keelless, and arranged in two or more rows; ventrals (when present) in eight or more rows.

This group includes the Mesosuchia of Huxley<sup>1</sup>.

### A. PROCŒLIAN SERIES.

Vertebrae, except atlas, axis, sacral, and first caudal, procœlous<sup>2</sup>. Pterygoids developing palatal plates to prolong narial passage; lateral eustachian passages bony. Dorsal scutes keeled, in more than two rows; ventral buckler (when present) single, with more than eight longitudinal rows of imbricating scutes, each scute consisting of an anterior and posterior element united by suture. Acetabular margin of pubis deeply notched.

### Family CROCODYLIDÆ.

The orbit communicating with the infratemporal fossa, and generally larger than or equal to the supratemporal fossa; on the palate the posterior border of the premaxillæ either slightly concave posteriorly, straight, or projecting into the maxillæ. Usually no preorbital vacuity.

#### BREVIROSTRINE SECTION.

The cranium short or moderately elongated, with its alveolar border festooned; the nasals reaching the premaxillæ, and frequently the nares; the orbits larger than the supratemporal fossæ; the premaxillary fissure either heart-shaped or slit-like; the mandibular symphysis more or less short, and without a splenial element. The teeth more or less differentiated; usually the 3rd and 9th upper, and the 4th and frequently the 1st and 11th lower, enlarged. Dorsal scutes strongly keeled and usually comparatively narrow. Ventral armour present or absent.

#### Genus **ALLIGATOR**, Cuvier<sup>3</sup>.

Including *Caiman* and *Jacare*.

Cranium short and broad, with the palatal aspect of the premaxillæ short, and their posterior border straight or concave poste-

<sup>1</sup> In order to avoid confusion the writer, who at one time proposed the name Crocodilia Vera for this suborder, subsequently came to the conclusion that it was better to retain the earlier name in a wider sense.

<sup>2</sup> It is of course possible that a form may be found having the pterygoids with palatal plates, but still retaining amphicelous vertebrae.

<sup>3</sup> Ann. d. Muséum, vol. x. p. 25 (1807).—As a subgenus.

riorly; supratemporal fossæ very small or obliterated; premaxillary fissure heart-shaped; upper teeth equal to or less numerous than lower, and the smaller lateral ones biting externally to them; both 1st and 4th lower teeth received into pits in the cranium; 3rd lower tooth much smaller than 4th; mandibular vacuity large. Frequently a dermal ventral armour.

### Alligator, sp.

The following specimen probably belongs to one of the existing Brazilian species like *A. latirostris*, *A. multiscutatus*, and *A. punctatus*.

*Hab.* S. America (Brazil).

**18880.** A caudal vertebra of a small individual; from a cave in Minas Geraes, Brazil.

*Claussen Collection. Purchased, 1845.*

### Genus DIPLOCYNODON, Pomel<sup>1</sup>.

Syn. *Orthosaurus*, Geoffroy<sup>2</sup>; *Pleurodon*, Meyer<sup>3</sup>.

The generic identity of the forms to which the three above-mentioned names were applied is indicated by Meyer in the 'Neues Jahrb.' 1857, p. 538. Pomel's name is adopted as being the one first well defined.

Cranium short and broad, with the palatal aspect of the premaxillæ short, and their posterior border straight; upper teeth more numerous than lower, and the smaller lateral ones biting externally to them; 1st lower tooth received into a pit, and 4th (normally) into a notch in the cranium; 3rd lower tooth nearly as large as 4th; supratemporal fossa of medium size; premaxillary fissure heart-shaped; mandibular vacuity large. A dermal ventral armour.

### Diplocynodon hantoniensis (Wood<sup>4</sup>).

Syn. *Alligator hantoniensis*, Wood<sup>5</sup>.

*Crocodilus hastingsiæ*, Owen<sup>6</sup>.

<sup>1</sup> Bull. Soc. Géol. France, sér. 2, voi. iv. p. 383 (1847).

<sup>2</sup> Revue Encyclopédique, vol. lix. p. 91 (1833).—Insufficiently described.

<sup>3</sup> Neues Jahrb. 1839, p. 77 (errorim, *Plerodon*).

<sup>4</sup> Charlesworth's London Geological Journal, pt. i. p. 6 (1846).—*Alligator*.

<sup>5</sup> Loc. cit.      <sup>6</sup> Rep. Brit. Assoc. for 1847, Trans. of Sections, p. 66 (1848).

Cranium very broad and blunt, with the premaxillæ uniting superiorly and excluding the nasals from the nares. Teeth (usually)  $\frac{22}{20}$ .

The type specimen of *Alligator hantoniensis* was referred by Pomel<sup>1</sup> to this genus, and the specific identity of *Crocodilus hastingsiae* with the former was suggested by Owen<sup>2</sup> and confirmed by Huxley<sup>3</sup>. The so-called *Alligator darwini*, Ludwig<sup>4</sup>, from the Lower Miocene (Upper Oligocene) of the Mayence basin (Weissenau, &c.), agrees in the characters of the cranium with the present species, to which it was evidently very closely allied. Ludwig includes in this species *Crocodilus rathi*, *C. bruchi*, *C. medius*, and *C. brauni*, Meyer, all of which were obtained from the same formation; and the first of which was identified by Meyer<sup>5</sup> with *D. rateli*, Pomel<sup>6</sup> (*Crocodilus elaverensis*, Bravard<sup>7</sup>), from the equivalent beds of St. Gérand-le-Puy, which was founded upon a mandible differing, according to Vaillant, from that of *D. gracilis*. Meyer regarded all these forms as closely allied to *D. hantoniensis*, but some of them probably belong to *D. gracilis*. The higher horizon of the Mayence form allied to the present species may perhaps indicate its specific distinctness, in which case it would be advisable that it should be known as *Diplocynodon darwini*, since the other names were not sufficiently defined<sup>8</sup>.

*Hab.* Europe.

All the following specimens are from the Upper Eocene (Lower Oligocene) of Hordwell, Hampshire.

25166. The anterior portion of the cranium. This specimen is the (*Fig.*) type, and is described and figured by Searles Wood in Charlesworth's 'London Geological Journal,' pt. i. pp. 6, 6, 122, pl. i. figs. 1-3; and also by Owen and Bell in their 'Reptilia of the London Clay, &c.,' pt. ii. p. 42, pl. viii. fig. 2. It presents the peculiarity of having the notch for the 4th mandibular tooth converted into a pit, as in *Alligator*. *Presented by S. V. Wood, Esq.*, 1850.

<sup>1</sup> Catalogue Méthodique, p. 124 (1853).

<sup>2</sup> Rep. Brit. Assoc. for 1847, Trans. of Sections, p. 66 (1848).

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xv. p. 680 (1859).

<sup>4</sup> Palaeontographica, suppl. vol. iii. pt. iv. p. 4 (1877).

<sup>5</sup> Neues Jahrb. 1857, p. 538.

<sup>6</sup> Bull. Soc. Géol. France, sér. 2, vol. iii. p. 372 (1846).—*Crocodilus*.

<sup>7</sup> Mamm. du Puy-de-Dôme (1844), *teste* Gervais.

<sup>8</sup> See Lydekker, Geol. Mag. dec. 3, vol. iv. p. 307 (1887).

- 30393.** The skull. Described and figured by Owen, *op. cit.* p. 37, (*Fig.*) pl. vi. and pl. vii. fig. 1, under the name of *C. hastingsiae*, of which it is one of the types; and also noticed by the writer in the 'Geol. Mag.' dec. 3, vol. iv. p. 309. The enlargement of the 3rd lower tooth is well shown.

*Hastings Collection. Purchased, 1855.*

- 30392.** The cranium. Described and figured by Owen, *op. cit.* (*Fig.*) p. 37, pl. vii. fig. 2, and pl. viii. fig. 1. *Same history.*

- 29694.** A subadult cranium, in a very imperfect condition.

*Same history.*

- R. 1041.** An imperfect immature cranium. *Same history.*

- R. 1042.** The imperfect skull of a young individual. *Same history.*

- 25167.** The hinder portion of the cranium of a young individual. (*Fig.*) Described and figured by Owen, *op. cit.* p. 42, pl. ii. fig. 3.

*Presented by S. V. Wood, Esq., 1850.*

- 25168.** The left maxillo-palatine region of a young individual. *Same history.*

- 25169.** The corresponding region of a smaller individual. *Same history.*

- 25170.** Two fragments of the palate of a young individual. *Same history.*

- 25170 a.** The imperfect cranium of a very young individual, showing the upper surface. *Same history.*

- 25260.** Fragment of the maxilla of a young individual, showing two teeth. *Hastings Collection.*

- 25188.** The quadrato-jugal arch. *Presented by S. V. Wood, Esq., 1850.*

- 25186.** The basisphenoid. *Same history.*

- 25216, 7.** Three specimens of the pterygoid. *Same history.*

- 30369–70.** Two specimens of the premaxilla, belonging to opposite sides of the skull. *Hastings Collection.*

- 30372.** Two specimens of the quadrate. *Same history.*

- 30394.** The mandible. *Hastings Collection.*
- 30396.** The mandible. *Same history.*
- 30397.** The left ramus of the mandible. *Same history.*
- R. 1043.** The mandible and scutes of an immature individual, probably associated with the cranium No. R. 1041. *Same history.*
- R. 1044.** The right ramus of the mandible of an immature individual. *Hastings Collection. Purchased, 1855.*
- 30307-8.** Two specimens of the right angular element of the mandible. *Same history.*
- 30363.** The left articular element of the same. *Same history.*
- 30274.** The homologous bone of the right side. *Same history.*
- 30283-4.** Two smaller examples of the homologous bone. *Same history.*
- 30363 a.** A similar specimen of the right side. *Same history.*
- R. 1045.** The hinder part of the left ramus of the mandible of an immature individual, together with several associated vertebrae. *Same history.*
- 25176-7.** Three cervical vertebrae. Two are figured by Owen, *op. (Fig.) cit. pl. ix. figs. 1-4.* *Presented by S. V. Wood, Esq., 1850.*
- 25201.** A cervical vertebra. *Same history.*
- R. 1046.** Numerous cervical vertebrae. *Hastings Collection.*
- 30402.** An associated series of cervical and dorsal vertebrae of a small individual. *Same history.*
- 30414.** Several cervical ribs. *Same history.*
- 25213-4.** Two early dorsal vertebrae. *Presented by S. V. Wood, Esq., 1850.*
- 25222.** An early dorsal vertebra. *Same history.*
- R. 1047.** A number of early dorsal vertebrae. *Hastings Collection.*
- R. 1048.** Numerous late dorsal vertebrae. *Same history.*
- 25182.** Three associated late dorsal vertebrae. *Presented by S. V. Wood, Esq., 1850.*
- 25248.** Five ribs. *Same history.*
- 25207.** The last lumbar vertebra. *Same history.*

- R. 1049.** Three associated lumbar vertebrae. *No history.*
- 25179.** A sacral vertebra. Described and figured by Owen, *op. (Fig.) cit. p. 44, pl. ix. fig. 6.*
- Presented by S. V. Wood, Esq., 1850.*
- R. 1050.** Six sacral vertebrae. *Hastings Collection.*
- 25175.** The first caudal vertebra. Described and figured by Owen, *(Fig.) op. cit. p. 44, pl. ix. fig. 7.*
- Presented by S. V. Wood, Esq., 1850.*
- R. 1051.** A smaller first caudal vertebra. *Hastings Collection.*
- R. 1052.** Numerous caudal vertebrae. *Same history.*
- 30414.** Two imperfect specimens of the scapula. *Same history.*
- 30247.** The imperfect left scapula. *Same history.*
- 25245.** The left coracoid. *Presented by S. V. Wood, Esq., 1850.*
- 30359.** The left coracoid. *Hastings Collection.*
- 30206.** The right humerus. *Hastings Collection.*
- 30206 a.** A smaller right humerus. *Same history.*
- 30236-7.** Two specimens of the ulna. *Same history.*
- 30242.** A smaller ulna. *Same history.*
- 30389.** A similar specimen. *Same history.*
- 30401.** A radius. *Same history.*
- 25242-52.** Two metapodials. *Presented by S. V. Wood, Esq., 1850.*
- 30239, 30243.** Two metapodials. *Same history.*
- R. 2053.** Several phalangeals. *Same history.*
- 25252-3.** Two specimens of the ilium.
- Presented by S. V. Wood, Esq., 1850.*
- 30362.** An ilium. *Hastings Collection.*
- 30354.** Two specimens of the ischium. *Same history.*
- 30210-11-12-13.** Four specimens of the femur. *Same history.*
- 30215-17.** Three specimens of the tibia. *Same history.*
- 30233, 30234, 30235, 30241.** Four specimens of the fibula.
- Same history.*
- 25244.** A fibula. *Presented by S. V. Wood, Esq., 1850.*

- 30366-67.** Several dermal scutes. *Hastings Collection.*
- 30318.** Two dermal scutes. *Same history.*
- R. 1068.** Slab with five dorsal vertebræ and dermal scutes. *Same history.*
- 46434.** An imperfect dermal scute; from the Bembridge Beds of Hordwell, Hampshire. *Cunnington Collection. Purchased, 1875.*

\* *The Museum also possesses a large series of duplicate specimens which have not been catalogued.*

### **Diplocynodon, sp.**

There is no evidence to show whether either of the forms from the Hempstead and Barton beds are distinct from the preceding.  
*Hab.* Europe (England).

*The following specimens are from the Lower Miocene (Middle Oligocene) of Hempstead, Isle of Wight.*

- 40215.** Fragment of jaw with two teeth. *Purchased, 1867.*
- R. 980.** The right premaxilla, the dentary part of the right ramus of the mandible, numerous vertebral centra, and a dermal scute of a small form. *Presented by the Government-Grant Committee of the Royal Society, per Messrs. Gardner and Keeling, 1887.*
- R. 980 a.** A tooth of a larger form. *Same history.*

*The following are from the Upper Eocene Barton Beds of Lymington, Hampshire.*

- R. 1037.** The conjoint frontals. *Purchased, 1887.*
- R. 1037 a.** The left quadrate. *Same history.*

### **Diplocynodon gracilis, Vaillant<sup>1</sup>.**

Cranium somewhat pointed, and the nasals reaching the nares. Teeth <sup>(20-21)</sup><sub>(18-19)</sub>.

The so-called *Crocodilus ebertsi*, Ludwig<sup>2</sup>, from the Lower Miocene (Upper Oligocene) of the Mayence basin, which evidently

<sup>1</sup> Ann. Sci. Géol. vol. iii. art. 1, p. 18 (1872).

<sup>2</sup> Palaeontographica, suppl. vol. iii. pt. iv. p. 31 (1877).

belongs to the present genus, agrees in the relations of the nasals with the present species, and the difference in the contour of the figured skulls of the two forms does not appear greater than that obtaining between old and young skulls of a single species. *D. rateli*, from the same beds as the present species, has been noticed under the head of *D. hantoniensis*.

*Hab.* Europe.

- R. 789.** A slab of limestone, showing the dorsal aspect of the cranium and numerous scutes and bones of a small individual; from the Lower Miocene (Upper Oligocene) of St. Gérand-le-Puy (Allier), France. The cranium closely accords with the typical example figured by Vaillant in the 'Ann. Sci. Géol.' vol. iii. art. 1, figs. 8, 12.

*Bravard Collection. Purchased, 1852.*

- 26841.** The hinder portion of a cranium, agreeing in size with the preceding, and probably belonging to the same species; from the same locality.

*Pomel Collection. Purchased, 1851.*

*Of the following specimens some belong to the present species, while others may not improbably be referable to D. darwini (suprà, p. 46).*

- 26748.** The imperfect hinder portion of a large cranium; from the same locality. *Same history.*

- 27751.** The crushed cranium (oral surface shown) of a small individual; from the Lower Miocene of Antoign (Puy-de-Dôme), France. *Croizet Collection. Purchased, 1848.*

- 27719.** The hinder portion of a small cranium; from the same locality. *Same history.*

- 26841.** The left maxilla of a small individual; from St. Gérand-le-Puy. *Pomel Collection.*

- 26845.** A very similar right maxilla; from the same locality. *Same history.*

- 26846.** A tooth of a large individual; from the same locality. *Same history.*

- 30959.** Two small teeth; from the same locality

*Bravard Collection. Purchased, 1852.*

**30949, 30945-6.** Three fragments of skull ; from the same locality.  
*Same history.*

**26841 a -46.** Two fragments of skull ; from the same locality.  
*Pomel Collection.*

**26840.** The nearly entire left ramus of the mandible of an adult individual, with the fourth tooth remaining ; from the same locality.  
*Same history.*

**26842.** Part of the left ramus of the mandible of a young individual, showing one tooth ; from the same locality.  
*Same history.*

**41089.** A split layer of lignite containing the impression of the cranium of a small Crocodile, perhaps belonging to this species ; from the Lower Miocene of Rott, near Bonn.  
*Purchased, 1868.*

**R. 381.** The anterior part of the right ramus of the mandible of a very small individual ; from the Phosphorites of Caylux (Tarn-et-Garonne), France<sup>1</sup>.  
*Purchased, 1884.*

**26842.** The articular portion of the left ramus of the mandible of an adult ; from St. Gérand-le-Puy.  
*Pomel Collection.*

**26846.** An early dorsal vertebra ; from the same locality.  
*Same history.*

**48471.** The right humerus of an adult ; from the same locality.  
*Presented by C. Falconer, Esq., 1867.*

**30963.** The left humerus of a small individual ; from the same locality.  
*Bravard Collection.*

**26846.** Two specimens of smaller left humeri, one imperfect ; from the same locality.  
*Pomel Collection.*

**26846 a.** The left ilium and pubis ; from the same locality.  
*Same history.*

**27676.** Slab of rock containing an imperfect humerus, rib, vertebra, and other bones ; from the Lower Miocene of Cournon (Puy-de-Dôme), France.  
*Croizet Collection.*

**30965.** Eight dermal scutes of the dorsal buckler ; from St. Gérand-le-Puy.  
*Bravard Collection.*

<sup>1</sup> See Filhol, Ann. Sci. Géol. vol. viii. art. 1, p. 264 (1877).

*The following specimens probably also belong either to one or other of the two above-mentioned species.*

- R. 429. A tooth ; from the Phosphorites of Caylux (Tarn-et-Garonne), France. *Purchased, 1884.*
- R. 488. An imperfect early dorsal vertebra ; from the same deposits. *Same history.*
- R. 382. A right humerus ; from the same deposits. *Same history.*

**Diplocynodon plenidens** (Meyer<sup>1</sup>).

Syn. *Crocodilus plenidens*, Meyer<sup>2</sup>.  
*Pleurodon crocodiloides*, Meyer<sup>3</sup>.

A very large form, originally described from teeth obtained from the Middle (?) Miocene of Stein (Shaffhausen), Switzerland ; the skull is unknown.

*Hab.* Europe.

43634. The imperfect crowns of three teeth ; from the Middle (?) Miocene of Allstadt, near Mösskirch, Baden.

*Purchased, 1859.*

Genus **CROCODILUS**, Linn.<sup>4</sup>

Cranium either short and broad, or moderately elongated and narrow, with the mandibular symphysis in proportion ; upper teeth more numerous than lower, and the smaller lateral ones of both series interlocking ; 1st lower tooth received into a pit or perforation, and the 4th into a lateral notch in the cranium ; the 3rd lower tooth small ; supra-temporal fossa larger than in *Alligator* ; premaxillary fissure either heart-shaped or slit-like ; mandibular vacuity small. No dermal armour on the ventral aspect of the body.

Group a.—*Cranium short and broad ; mandibular symphysis short ; palatal aspect of the premaxilla short, with its posterior border nearly straight, or slightly convex posteriorly ; teeth strongly differentiated.*

<sup>1</sup> Neues Jahrb. 1838, p. 667.—*Crocodilus*.

<sup>2</sup> Loc. cit. <sup>3</sup> Ibid. 1839, p. 79.—*Errorim, Plerodon*.

<sup>4</sup> Syst. Nat. ed. 12, vol. i. p. 359 (1766).—As a subgenus.

*Crocodilus palustris*, Lesson<sup>1</sup>.

Syn. *Crocodilus bombifrons*, Gray<sup>2</sup>.

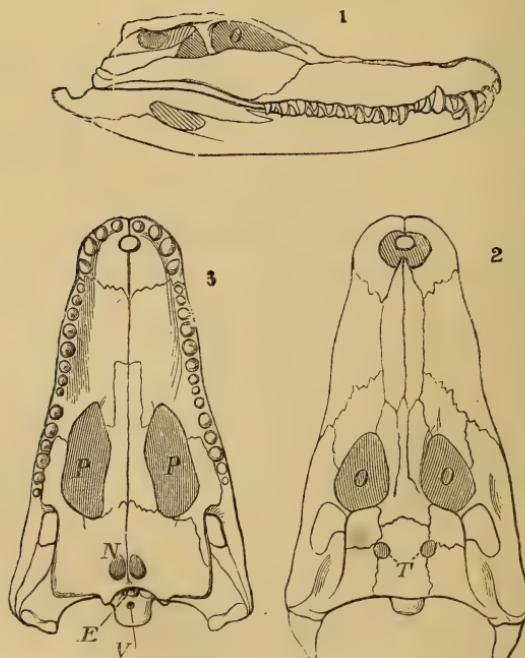
The facial sculpture strongly marked and deep, rugose nodules in advance of orbit, interorbital bar narrow and deeply concave, maxillo-premaxillary suture on palate usually not extending behind hinder border of 5th alveolus, premaxillary fissure heart-shaped, superior surface of premaxilla shorter than nares, facial profile concave.

Hab. India and Burma.

R. 1038. Several teeth provisionally referred to this species, as being the commonest Crocodile of Western India; from the Pleistocene of the Narbada Valley, India.

*Presented by C. Fraser, Esq., 1849.*

Fig. 8.



*Crocodilus palustris*.—1, 2, lateral and upper views of skull; 3, palatal view of cranium; *E*, aperture of median eustachian canal; *N*, posterior nares; *O*, orbit; *P*, palato-pterygoid vacuity; *T*, supratemporal fossa; *V*, basiscapital. Much reduced. (From the 'Quart. Journ. Geol. Soc.')

<sup>1</sup> In Belanger's Voyage Ind. Orient.; Zool. Rept. p. 305 (1834).

<sup>2</sup> Cat. Tortoises, &c., in Brit. Mus. p. 59 (1844).

**Crocodilus sivalensis**, Lydekker<sup>1</sup>.

This species is probably the ancestor of *C. palustris*, from which it is distinguished by the wider interorbital bar, the longer facial surface of the premaxilla, the greater posterior convexity of the maxillo-premaxillary suture on the palate, the greater rugosity of the facial sculpture, the smaller development of the preorbital nodules, and the wider nasals.

*Hab.* India and Burma.

*All the following specimens are from the Pliocene of the Siwalik Hills, and, unless it is otherwise stated, belong to the Cautley Collection. Presented, 1840.*

- 39795.** The cranium of a half-grown individual. This specimen (*Fig.*) is one of the types, and is described and figured in 'Falconer's Palæontological Memoirs,' vol. i. p. 355, pl. xxviii. figs. 2, 3 (as *C. bombifrons*), and by the present writer in the 'Palæontologia Indica,' ser. 10, vol. iii. p. 214, pl. xxviii. figs. 1, 1a.
- 39796.** The anterior portion of the cranium and mandible of a similar individual. Noticed by the writer, *op. cit.* p. 214.
- 39797.** The entire skull of a half-grown individual. Described and (*Fig.*) figured by the writer, *op. cit.* p. 214, pl. xxviii. fig. 3 (as No. 39798). *Presented by Dr. Hugh Falconer.*
- 39798.** The entire skull of a very similar individual. Figured in (*Fig.*) 'Falconer's Palæontological Memoirs,' vol. i. pl. xxviii. fig. 1 (as *C. bombifrons*), and noticed by the writer *op. cit.* p. 214 (as No. 39797).
- 39799.** The hinder half of a subadult skull, together with the (*Fig.*) nuchal scutes and the humerus.
- 39800.** The anterior portion of the cranium of an adult individual, (*Fig.*) with the alveolar region cut and polished. Described and figured by the writer, *op. cit.* p. 215, pl. xxix. figs. 2, 2a.
- 39801.** The anterior portion of an adult cranium. Figured by (*Fig.*) Cautley in the 'Asiatic Researches,' vol. xix. pl. ii. figs. 2, 4 (as *C. biporcatus*<sup>2</sup>), and noticed by the writer, *op. cit.* p. 215 (as No. 39081).

<sup>1</sup> *Palæontologia Indica* (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. p. 213 (1886).

<sup>2</sup> *C. biporcatus* of Cautley is *C. palustris*, and not *C. porosus*; see 'Palæontologia Indica,' ser. 10, vol. iii. p. 213.

- R. 1039. The anterior extremity of an adult cranium. Figured by (Fig.) Cautley, *op. cit.* pl. ii. fig. 5.
- R. 678. The anterior part of the cranium of a nearly adult individual.
- R. 769. The anterior portion of a cranium provisionally referred to this species.
- R. 325. The hinder part of the cranium of a nearly adult individual.
40823. The entire skull of a very young individual, measuring 0,010 in length. Noticed by the writer, *op. cit.* p. 215.
- R. 767. The right maxilla of a somewhat older individual. Noticed by the writer, *op. cit.* p. 215.
- R. 767 a. Part of the left maxilla of an adult, with the ninth tooth in position.
- R. 767 b. Part of a right premaxilla apparently belonging to the same individual as the preceding.
- R. 770. The associated left quadrate, quadratojugal, and articular portion of the mandible of an adult.
- R. 767 c. The articular region of the left ramus of the mandible, together with the condyle of the quadrate.
- R. 771. The anterior part of the left ramus of the mandible.
- R. 773. The hinder part of the left ramus of the mandible.
- R. 767 d. The anterior part of the right ramus of the mandible of a comparatively young individual.
- R. 767 e. A considerable series of teeth, some of which are probably the larger teeth of the present species, while others may belong to *Rhamphosuchus*.
- R. 615. Several similar teeth; from the Siwaliks of the Punjab, India.

*Presented by the Director of the Geological Survey of  
India, 1887.*

- R. 767 f. Two of the unenlarged teeth.

*Some of the following specimens may belong to the Longirostrine Section.*

16668. An imperfect cervical vertebra.

16668 a. A cervical vertebra.

16668 b. An imperfect cervical vertebra.

R. 1054. A larger cervical vertebra.

*Transferred from the old Indian Museum, 1880.*

16668 c. An imperfect cervical vertebra.

16668 d. Three associated cervical vertebræ of small size.

16668 e. Two early dorsal vertebræ (associated), of which one is imperfect.

16668 f. An early dorsal vertebra.

R. 1055. Two middle dorsal vertebræ, apparently belonging to a single individual.

16668 g. A large late dorsal or lumbar vertebra.

16668 h. A very similar specimen.

R. 777. Several similar specimens.

R. 777 a. A smaller late dorsal or early lumbar vertebra.

R. 325. A large late dorsal or early lumbar vertebra.

16668 i. A sacral vertebra.

16668 j. An imperfect sacral vertebra.

16668 k. An imperfect sacral vertebra.

R. 782. An imperfect sacral vertebra of larger size.

R. 778. A similar specimen.

R. 779. A perfect sacral vertebra agreeing in size with the preceding.

R. 780. The centrum of a large first caudal vertebra.

R. 325 a. A very similar specimen.

R. 325 b. Another very similar specimen.

16668 m. A smaller imperfect first caudal vertebra.

16668 l. An early caudal vertebra of a larger form.

**R. 765.** A large imperfect middle caudal vertebra.

**16606.** Several dermal scutes.

**38802.** A dermal scute.

*Purchased, 1865.*

**39817.** Three dermal scutes.

**R. 781.** A dermal scute.

**17066.** A larger dermal scute.

**R. 1056.** An imperfect dermal scute.

*Transferred from the old Indian Museum, 1880.*

**R. 788.** The distal portion of the left femur.

**16588.** The distal portion of a small right femur.

**R. 1057.** The distal portion of the left femur of a young individual.

**R. 1058.** Part of the pes and vertebral caudal region of a young individual.

### **Crocodilus palæindicus, Falconer<sup>1</sup>.**

Mainly distinguished from the preceding species by its convex facial profile.

*Hab.* India (western coast).

*All the following specimens are from the Pliocene Siwaliks of Perim Island, Gulf of Cambay.*

**R. 743.** The anterior portion of the cranium and mandible. Noticed by the writer in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. iii, p. 218.

*Transferred from the old Indian Museum, 1880.*

**R. 744.** The anterior portion of the cranium. Noticed by the writer, *op. cit.* *Transferred from the old Indian Museum, to which it had been presented by A. Bettington, Esq., in 1847.*

**R. 745.** Part of the right maxilla.

*Same history.*

*Some of the following specimens may belong to Garialis.*

**R. 746.** An imperfect late dorsal or lumbar vertebra.

*Same history.*

**R. 222.** Four imperfect vertebræ.

*Purchased, 1882.*

<sup>1</sup> Cat. Foss. Vert. in Mus. As. Soc. Bengal, p. 200 (1859).

**R. 1059.** A slightly imperfect late dorsal or early lumbar vertebra.  
*Presented by R. Lydekker, Esq., 1887.*

Group b.—*Cranium moderately broad and short, with mandibular symphysis in proportion; palatal aspect of premaxillæ elongated, with its posterior border projecting into maxillæ; teeth strongly differentiated, usually about  $\frac{18}{17}$ .*

This group includes the majority of existing species.

***Crocodilus porosus*, Schneider<sup>1</sup>.**

Syn. *Crocodilus biporcatus*, Cuvier<sup>2</sup>.

Facial sculpture slight; an elongated longitudinal sinuous ridge in advance of orbit; interorbital bar wide and slightly concave; premaxillary fissure a comparatively narrow slit.

*Hab.* India, N. Australia (Recent), and Queensland (Pleistocene).

**43047.** Part of the right maxilla, showing the split alveoli of the first five teeth; from the Pleistocene of Clifton Plains, Darling Downs, Queensland.

*Presented by Prof. Harkness, 1871.*

**43047 a.** The right premaxilla and anterior extremity of the right dentary of a smaller individual; from Clifton.

*Same history.*

**43213.** Two imperfect teeth; from the Pleistocene of Queensland.

*Presented by Sir R. Daintree, 1871.*

**43343.** The crown of a tooth; from the Pleistocene of Gowrie, Queensland. *Presented by Dr. George Bennett, 1872.*

**36079.** Three imperfect dermal scutes; from the Pleistocene of the lower part of the Condamine River, Queensland.

*Presented by T. H. Hood, Esq., 1861.*

**43221.** Four associated caudal vertebrae; from Queensland.

*Presented by Sir R. Daintree, 1871.*

Group c.—*Cranium somewhat elongated and narrow; mandibular symphysis long; palatal aspect of premaxillæ elongated, with its posterior border projecting into maxillæ; differentiation of teeth slight.*

The existing African *C. cataphractus* and N.-American *C. intermedius* belong to this group.

<sup>1</sup> Hist. Amphib. pt. ii. p. 159 (1801).

<sup>2</sup> Ossemens Fossiles, 2nd ed. vol. v. pt. ii. p. 65 (1824).

**Crocodilus spenceri**, Buckland<sup>1</sup>.

Syn. *Crocodilus toliapicus*, Owen<sup>2</sup>.  
*Crocodilus champsoides*, Owen<sup>3</sup>.  
*Crocodilus arduini*, Zigno<sup>4</sup>.

Teeth  $\frac{21-22}{19-20}$ ; the nasals reaching the nares<sup>5</sup>.

It has been shown by the writer in the 'Geol. Mag.' dec. 3, vol. iv. p. 310, that *C. toliapicus* and *C. champsoides* are apparently founded upon old and young individuals of a single species, the greater breadth of the facial part of the skull in the adult being precisely analogous to that obtaining in the existing *C. intermedius*<sup>6</sup>. The so-called *C. arduini* from the Nummulities of Verona is indistinguishable from the English form.

*Hab.* Europe (England and Italy).

*All the following specimens are from the London Clay of the Isle of Sheppey, Kent.*

**19633.** The hinder part of the cranium of an immature individual. (*Fig.*) This specimen is the type, and is figured by Buckland in his 'Geology and Mineralogy,' pl. xxv. fig. 1; and also by Owen in his 'Reptilia of the London Clay,' pt. ii. pl. ii. fig. 2 (as *C. champsoides*). *Purchased.*

**38975.** The cranium of an immature individual. Figured by Owen, (*Fig.*) *op. cit.* pl. iii., under the name of *C. champsoides*, of which it is the type. A restored figure is given in woodcut, fig. 9. *Bowerbank Collection.* *Purchased, 1865.*

**37717.** The hinder part of the cranium of an immature individual. *Purchased, 1863.*

**R. 41.** The imperfect hinder portion of the cranium of an immature individual. *Shrubsole Collection.* *Purchased, 1880.*

**38990-1.** The two angular and articular portions of the mandible. *Bowerbank Collection.*

<sup>1</sup> Geology and Mineralogy (Bridgewater Treatise), 1st ed. pl. xxv. fig. 1 (1837).

<sup>2</sup> Reptilia of London Clay (Mon. Pal. Soc.), pt. ii. p. 29 (1850).

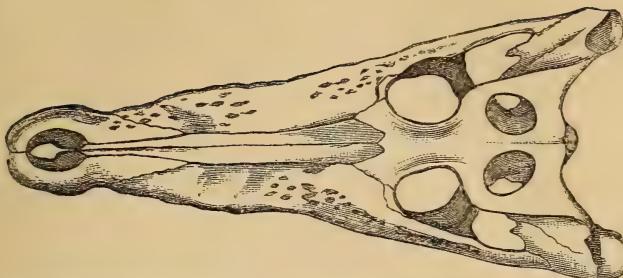
<sup>3</sup> *Ibid.* p. 31.

<sup>4</sup> Mem. Ac. R. Linc. ser. 3, vol. v. p. 67 (1880).

<sup>5</sup> In both *C. cataphractus* (see 'Falconer's Palaeontological Memoirs,' vol. ii. pl. xxxviii. fig. 1) and *C. intermedius* (see Lütken, 'Vid. Medd. Nat. Foren. Kjöbenhavn,' 1884, pl. v.) the nasals do not reach the nares.

<sup>6</sup> Compare the three crania figured by Lütken, *loc. cit.*

Fig. 9.



*Crocodilus spenceri*.—Restored cranium; from the London Clay of Sheppey.  
About  $\frac{1}{4}$ .

- 38988.** Part of the maxillary region of the cranium.

*Same history.*

*The following vertebræ were referred by Owen to C. champsoïdes ;  
they all belong to the Bowerbank Collection.*

**38979.** The third cervical vertebra. Figured by Owen, *op. cit.* (Fig.) pl. v. figs. 7, 8.

**38978.** The first dorsal vertebra. Figured by Owen, *op. cit.* pl. v. (Fig.) fig. 4.

**38980.** A late dorsal vertebra. Figured by Owen, *op. cit.* pl. v. (Fig.) fig. 9.

**38981.** The first caudal vertebra. Figured by Owen, *op. cit.* fig. 10.

*The following vertebræ and other bones (from the same collection)  
were referred by Owen to C. toliapicus, but do not appear speci-  
fically distinct from the preceding.*

**38975.** The fourth cervical vertebra. Figured by Owen, *op. cit.* (Fig.) pl. v. figs. 1, 2.

**38977.** The sixth cervical vertebra. Figured by Owen, *op. cit.* (Fig.) pl. v. fig. 3.

**38982.** The centrum of a cervical vertebra.

**38983.** The centrum of an early dorsal vertebra.

**38984.** The centrum of a late dorsal or lumbar vertebra.

**38976.** The first sacral vertebra. Figured by Owen, *op. cit.* pl. v. (*Fig.*) fig. 6.

**38986.** The distal extremity of the left humerus.

**38985.** A sacral rib.

**38987.** An undetermined bone.

*The following specimens may probably be referred to this form.*

**35691.** An imperfect vertebra, of very large size. *Purchased*, 1859.

**43195.** An imperfect dorsal or lumbar vertebra.

*Wetherell Collection.* *Purchased*, 1871.

**38989.** The distal half of the right femur. *Bowerbank Collection.*

**38993.** Five dermal scutes. *Same history.*

**28507.** A mass of matrix, containing numerous vertebræ and imperfect limb-bones of a small individual.

*Dixon Collection.* *Purchased*, 1847.

#### LONGIROSTRINE SECTION.

The cranium with the facial portion elongated into a rostrum, and its alveolar borders straight; the nasals never reaching the nares, and frequently separated from the premaxillæ; the supratemporal fossæ larger than in the Brevirostrine Section, and sometimes larger than the orbits; the premaxillary fissure slit-like; on the palate the posterior border of the premaxillæ projecting into the maxillæ; the mandibular symphysis very long, and embracing part of the splenial. The teeth numerous, and but slightly differentiated, but the 3rd upper and 4th lower generally enlarged. No ventral armour in recent forms; dorsal scutes very wide, with slight keels. Frequently an additional upper tooth between the proper first and second.

Genus **TOMISTOMA**, S. Müller<sup>1</sup>.

Syn. *Rhynchosuchus*, Huxley<sup>2</sup>.

Including *Melitosaurus*, Owen<sup>3</sup>.

*Gavialosuchus*, Toula and Kail<sup>4</sup>.

The premaxillæ articulating with the nasals; both the 1st and

<sup>1</sup> Archiv f. Nat. 1846, vol. i. p. 122.

<sup>2</sup> Journ. Linn. Soc. [Zool.] vol. iv. p. 16 (1859).

<sup>3</sup> Hulke, Quart. Journ. Geol. Soc. vol. xxvii. p. 31 (1871).

<sup>4</sup> Anzeig. k. Ak. Wiss. Wien, 1885, p. 109.

4th lower teeth received into notches in the cranium; the upper and lower teeth interlocking; the supra-temporal fossa smaller than orbit; and the facial profile concave. There are small interdental pits in the cranial rostrum for the summits of the unenlarged mandibular teeth.

In the typical *T. schlegeli* the anterior border of the orbit is not everted; there are  $\frac{20}{20}$  teeth; the mandibular symphysis extends to the 15th tooth; there are only four premaxillary teeth; and the premaxillæ are not expanded.

**Tomistoma eggenburgense** (Toula and Kail<sup>1</sup>).

Syn. *Gavialosuchus eggenburgensis*, Toula and Kail<sup>2</sup>.

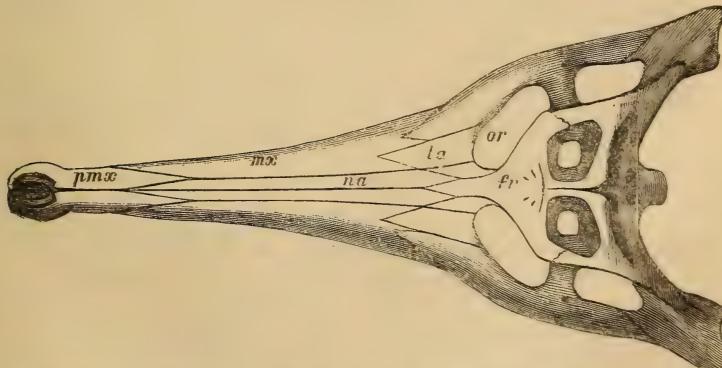
Referred to this genus by the present writer in the 'Quart. Journ. Geol. Soc.' vol. xlii. p. 21.

Rather larger than *T. schlegeli*, with five premaxillary teeth, the anterior border of the orbit slightly everted, and a slight expansion of the premaxillæ. Teeth  $\frac{20}{p}$ .

Hab. Europe (Austria).

R. 797. Cast of the cranium (fig. 10). The original, which is the type, was obtained from a Tertiary (?) Miocene deposit near Eggenburg, Lower Austria; and is figured by Toula and Kail in the 'Denkschr. k. Ak. Wiss. Wien,' vol. l. pls. i.-iii. (1885). *Presented by Prof. Toula, 1886.*

Fig. 10.



*Tomistoma eggenburgense*.—Cranium; from the Miocene (?) of Austria. <sup>1</sup> *Anzeig. k. Ak. Wiss. Wien*, 1885, p. 109.—*Gavialosuchus*. <sup>2</sup> *Loc. cit.*

<sup>1</sup> *Anzeig. k. Ak. Wiss. Wien*, 1885, p. 109.—*Gavialosuchus*.

<sup>2</sup> *Loc. cit.*

**Tomistoma champsoïdes** (Owen<sup>1</sup>).

Syn. *Melitosaurus champsoïdes*, Owen<sup>2</sup>.

Larger than the preceding, with the same number of premaxillary teeth, but with no expansion of the premaxillæ; orbit unknown.

*Hab.* Europe (Malta).

**41151.** The anterior portion of the cranium and mandible, together (*Fig.*) with a detached fragment of the mandible; from the Miocene of Malta. This specimen is the type, and is described and figured by the writer in the 'Quart. Journ. Geol. Soc.' vol. xlvi. p. 21, pl. ii. (1886).

*Presented by Captain Strickland, 1868.*

**41152.** Three imperfect vertebræ associated with the preceding.

*Same history.*

**Tomistoma (?) macrorhynchus** (Blainville<sup>3</sup>).

Syn. *Crocodilus macrorhynchus*, Blainville<sup>4</sup>:

*Crocodilus isorhynchus*, Pomel<sup>5</sup>.

*Garialis macrorhynchus*, Gervais<sup>6</sup>.

*Thoracosaurus macrorhynchus*, Leidy<sup>7</sup>.

According to the figure given by Gervais<sup>8</sup> the premaxillæ reach the nasals, but do not interlock with them as in the three preceding species; and since the supratemporal fossæ are relatively larger than in *T. eggenburgense*, this species would seem to connect the latter with *Garialis*.

*Hab.* Europe (France).

**28296.** Several teeth; from the Upper Cretaceous Pisolite of Mont Aimé (Marne), France. *Purchased, 1851.*

**28296 a.** Several vertebral centra; from the same locality.

*Same history.*

**28296 b.** Three specimens of the distal extremity of the femur; from the same locality. *Same history.*

<sup>1</sup> Hulke, Quart. Journ. Geol. Soc. vol. xxvii. p. 31 (1871).—*Melitosaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Ostéographie—Genus *Crocodilus*, pl. vi. (before 1848).—*Crocodilus*.

<sup>4</sup> *Loc. cit.*

<sup>5</sup> Arch. Sci. Phys. Nat. vol. v. p. 303 (1847).

<sup>6</sup> Zool. et Pal. Françaises, 1st ed. p. 252 (1848–52).

<sup>7</sup> Smiths. Contrib. Knowl. vol. xiv. art. 6, p. 11 (1865).

<sup>8</sup> *Op. cit.* pl. lix.

Genus **GARIALIS**, Geoffroy<sup>1</sup>.Syn. *Leptorhynchus*, Clift<sup>2</sup>.

The premaxillæ widely separated from the nasals; both the 1st and 4th lower teeth received into notches in the cranium; the upper and lower teeth interlocking; the supratemporal fossa nearly or quite as large as the orbit; and the facial profile concave. There may or may not be interdental pits in the cranial rostrum.

Group a.—*No pits in the cranial rostrum for the summits of the smaller mandibular teeth.*

***Garialis gangeticus* (Gmelin<sup>3</sup>).**Syn. *Lacerta gangetica*, Gmelin<sup>4</sup>.*Crocodilus longirostris*, Schneider<sup>5</sup>.*Crocodilus gangeticus*, Cuvier<sup>6</sup>.*Crocodilus tenuirostris*, Cuvier<sup>7</sup>.*Leptorhynchus clifti*, Meyer<sup>8</sup>.*Leptorhynchus gangeticus*, auct.

The type species. Teeth  $\frac{(27-28)}{(25-26)}$ . Anterior border of orbit everted, premaxillæ expanded at their termination, orbits widely separated, bar between supratemporal fossæ narrow, rostrum straight.

Recent examples attain a length of 20 feet, but fossil crania indicate larger individuals.

*Hab.* India and Burma.

*Unless otherwise stated, the following specimens were obtained from the Pliocene of the Siwalik Hills, India, and belong to the Cautley Collection. Presented, 1840.*

**39809.** The hinder portion of the cranium. Figured in ‘Falconer’s (*Fig.*) Palæontological Memoirs,’ vol. i. pl. xxviii. figs. 4, 5; and by the writer in the ‘Palæontologia Indica,’ ser. 10, vol. iii. pl. xxx. fig. 2 (1886).

<sup>1</sup> Mém. du Muséum, vol. xii. p. 97 (1825).—Amended.

<sup>2</sup> Trans. Geol. Soc. ser. 2, vol. ii. pt. 3, p. 375 (1828).

<sup>3</sup> Syst. Nat. vol. i. pt. 3, p. 1057 (1789).—*Lacerta.*

<sup>4</sup> *Loc. cit.*

<sup>5</sup> Hist. Amphib. pt. ii. p. 160 (1801).

<sup>6</sup> Ann. du Muséum, vol. x. p. 66 (1807).

<sup>7</sup> *Loc. cit.*

<sup>8</sup> Palæologica, p. 108 (1832).

- 36726.** The hinder portion of the skull.
- R. 784.** The occipito-parietal region of a very large individual.
- R. 784 a.** The interorbital region of an equally large individual.
- R. 785.** The hinder portion of the cranium.
- R. 786.** The hinder part of the cranium of an immature individual.
- R. 787.** The hinder portion of the cranium.
- R. 791.** The hinder part of the cranium.
- 36727.** The hinder part of the cranium of a half-grown individual, with a portion of the mandible attached. Noticed by the writer, *op. cit.* p. 221.
- 40206.** The hinder part of a young cranium. Figured by Cautley (*Fig.*) in the 'Asiatic Researches,' vol. xix. pl. iii. figs. 3, 5.
- R. 772.** The hinder part of a young cranium; from the Siwaliks of Perim Island, Gulf of Cambay. Noticed by the writer, *op. cit.* p. 228.  
*Transferred from the Old Indian Museum, to which it was presented by A. Bettington, Esq., 1847.*
- 40695.** The hinder part of the cranium; from Perim Island. Noticed by the writer, *op. cit.* p. 221. *Purchased, 1867.*
- R. 775.** The imperfect hinder portion of the cranium.
- 39810.** The hinder portion of the cranium of a young individual.
- R. 774.** The imperfect hinder portion of the cranium of a still younger individual.
- R. 222.** The parietal region of a young cranium; from Perim Island. *No history.*
- 39811 a.** The anterior portion of the cranial and mandibular rostrum. (*Fig.*) Figured in 'Falconer's Palaeontological Memoirs,' vol. i. pl. xxix. fig. 5, and also by the present writer, *op. cit.* pl. xxx. fig. 1.
- 39811.** The anterior portion of the cranial rostrum of an immature individual. Figured by the writer, *op. cit.* pl. xxx. figs. 3, 3a.
- 48461.** The anterior extremity of the premaxillæ of a very large individual. *Presented by C. Falconer, Esq., 1867.*

R. 783 a. The anterior part of the mandibular symphysis.

*Transferred from the Old Indian Museum, 1880.*

39812. The anterior part of the right half of the mandibular symphysis. Figured by the writer, *op. cit. pl. xxx. fig. 5.*

*Some of the following specimens may belong to the next species.*

R. 615. Several teeth; from the Siwaliks of the Punjab, India.

*Presented by the Director of the Geological Survey of India, 1886.*

R. 783 d. A tooth.

R. 746 a. Several dorsal vertebræ, with the overlying dermal scutes of the right side; from Perim Island.

*Transferred from the Old Indian Museum, 1880.*

R. 783 b. The palatal plates of the pterygoids and part of the pala-tines.

R. 783 c. The imperfect hinder portion of the right ramus of the mandible of a very large individual.

*The following specimens probably belong to this genus.*

39813. A mass of dorsal vertebræ, together with the dermal scutes in an obscure condition.

39814. A mass of matrix, showing the ventral aspect of a number of associated dorsal scutes, belonging to the same form as the preceding. This and the last specimen were referred by Falconer to *G. gangeticus*, and are too small to have belonged to *Rhamphosuchus*; they may have belonged to *G. leptodus*.

### **Garialis hysudricus, Lydekker<sup>1</sup>.**

Distinguished from *G. gangeticus* by the more marked concavity of the rostrum in advance of the orbits, and probably by the upward curvature of the extremity of the rostrum. The cranium, provisionally referred to this species, has the orbits more approximated, smaller supratemporal fossæ, with a wider parietal bar between them, and a greater lateral expansion of the jugal and quadrato-jugal region, than in the existing species. The extremity of the rostrum may have been without expansion.

*Hab.* India.

<sup>1</sup> *Palaeontologia Indica* (*Mem. Geol. Surv. Ind.*), ser. 10, vol. iii. p. 222 (1886).

*The following specimens are from the Pliocene of the Siwalik Hills, and belong to the Cautley Collection. Presented, 1840.*

- 39805.** The greater portion of the cranial and mandibular rostrum, (*Fig.*) wanting the narial extremity. This specimen is the type; it is figured in ‘Falconer’s Palæontological Memoirs,’ vol. i. pl. xxix. fig. 3, where it is referred to *G. leptodus*; and the cranial portion by the writer in the ‘Palæontologia Indica,’ ser. 10, vol. iii. pl. xxxii. figs. 1, 1 a, 1 b, 1 c.

- R. 325.** The hinder portion of the mandibular symphysis. Noticed by the writer, *op. cit.* p. 222.

*Transferred from the Old Indian Museum, 1880.*

- 39808.** The hinder portion of an adult cranium, provisionally (*Fig.*) referred to this species. Figured by the writer, *op. cit.* pl. xxxi. fig. 3.

- R. 326.** The hinder portion of an immature cranium, agreeing in general characters with the preceding specimen.

*Transferred from the Old Indian Museum, 1880.*

Group b.—*Pits in the cranial rostrum for the reception of the summits of the majority of the mandibular teeth.*

**Garialis leptodus** (Falconer and Cautley<sup>1</sup>).

Syn. *Crocodilus (Leptorhynchus) leptodus*, Falconer and Cautley<sup>2</sup>.

Slightly larger than *G. gangeticus*, with a wider and flatter rostrum, and proportionately smaller teeth.

*Hab.* India.

- 39806.** Portion of the mandibular symphysis; from the Pliocene of (*Fig.*) the Siwalik Hills. This specimen is the type, and is figured in ‘Falconer’s Palæontological Memoirs,’ vol. i. pl. xxix. fig. 4; and by the present writer in the ‘Palæontologia Indica’ (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. pl. xxxii. figs. 2, 2 a.

*Cautley Collection. Presented, 1840.*

<sup>1</sup> In ‘Falconer’s Palæontological Memoirs,’ vol. i. p. 355 (1868).—*Crocodilus (Leptorhynchus)*.

<sup>2</sup> *Loc. cit.*

***Garialis pachyrhynchus*, Lydekker<sup>1</sup>.**

Probably from two and a half to three times the size of *G. gangeticus*. The extremity of the premaxillæ expanded; the teeth stout, closely approximated, and the notch in the cranium for the first mandibular tooth roofed over; the rostrum was probably relatively short.

*Hab.* India (Sind).

**R. 602.** Cast of the extremity of the cranial rostrum. The original, which is the type, was obtained from the Lower Siwaliks of Sind, North-western India, and is preserved in the Indian Museum, Calcutta; it is figured by the writer in the 'Palaeontologia Indica,' ser. 10, vol. iii. pl. xxxiii. figs. 1, 2. *Made in the Museum, 1886.*

**R. 615 a.** The crown of a tooth, probably belonging to this species; from Sind. Similar to the specimen figured by the writer, *op. cit.* pl. xxxiii. fig. 4.

*Presented by the Director of the Geological Survey of India, 1886.*

**32504.** Fragment of one half of a mandibular symphysis, probably belonging to a young individual of this species; from Sind. *Presented by Col. Sykes.*

**32504 a.** Four imperfect dorsal scutes, probably belonging to this species; from Sind. *Same history.*

**32504 b.** The imperfect centrum of a late dorsal vertebra, associated with the preceding. *Same history.*

***Garialis (?) dixoni*, Owen<sup>2</sup>.**

Provisionally referred to the present group, but the cranium unknown. Of small size, with the teeth relatively larger, placed farther apart, and less compressed than in *G. gangeticus*; and interdental pits present in the hinder part of the mandible.

*Hab.* Europe (England).

*The following specimens are the types, and were obtained from the Middle Eocene of Bracklesham, Sussex; they belong to the Dixon Collection. Purchased, 1851.*

<sup>1</sup> *Palaeontologia Indica* (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. p. 227 (1886).

<sup>2</sup> *Reptilia of the London Clay* (Mon. Pal. Soc.), pt. ii. p. 46 (1850).

- 26125.** Part of the mandibular symphysis. Figured by Owen in (*Fig.*) his 'Reptilia of the London Clay,' pt. ii. pl. x. fig. 1.
- 26126.** Fragment of a mandibular ramus. Figured by Owen, (*Fig.*) *op. cit.* pl. x. fig. 2.
- 26128.** The slightly imperfect femur. Figured by Owen, *op. cit.* (*Fig.*) pl. x. fig. 9.
- 26129.** The centrum of a cervical vertebra. Figured by Owen, (*Fig.*) *op. cit.* pl. x. fig. 8.

Genus **THORACOSAURUS**, Leidy<sup>1</sup>.

Nasals not reaching premaxillæ; a preorbital vacuity in the cranium between the lachrymal and prefrontal; the supratemporal fossæ larger than the orbits; and the facial profile straight.

**Thoracosaurus neocesariensis** (De Kay<sup>2</sup>).

Syn. *Gavialis neocesariensis*, De Kay<sup>3</sup>.

*Crocodilus clavirostris*, Morton<sup>4</sup>.

*Crocodilus basifissus*, Owen<sup>5</sup> (*teste* Leidy).

*Thoracosaurus grandis*, Leidy<sup>6</sup>.

The type species. Fully as large as *Garialis gangeticus*, with the rostrum relatively wider, and no eversion of the orbit.

Hab. North America.

- 41842.** Cast of the cranium. The original, which is the type, was obtained from the Cretaceous near Vincenttown, Burlington County, New Jersey, and is preserved in the Museum of the Academy of Sciences at Philadelphia; it is figured by Leidy in the 'Smiths. Contrib. Knowl.' vol. xiv. art. 6, pl. i. figs. 1, 2, pl. ii. fig. 1 (1865).

*Purchased*, 1869.

<sup>1</sup> Proc. Ac. Nat. Sci. Philad. vol. vi. p. 35 (1852—vol. dated 1854).

<sup>2</sup> Zool. New York, pt. iii. p. 28 (1842).—*Gavialis*.

<sup>3</sup> *Loc. cit.*

<sup>4</sup> Proc. Ac. Nat. Sci. Philad. vol. ii. p. 82 (1844—vol. dated 1846).

<sup>5</sup> Quart. Journ. Geol. Soc. vol. v. p. 381 (1849).

<sup>6</sup> *Loc. cit.*

Genus **RHAMPHOSUCHUS**, Lydekker<sup>1</sup>.

Premaxillæ apparently separated from the nasals; 1st lower tooth received into a notch, and 4th into a pit in the cranium; upper teeth biting externally to the lower; and the facial profile straight; supratemporal fossa and entire orbit unknown.

**Rhamphosuchus crassidens** (Falconer and Cautley<sup>2</sup>).

Syn. *Crocodilus (Leptorhynchus) crassidens*, Falconer and Cautley<sup>3</sup>.  
*Garialis crassidens*, Lydekker<sup>4</sup>.

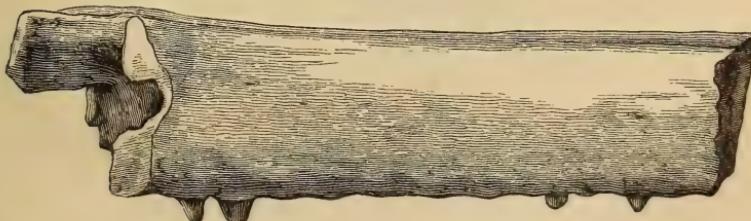
This is the only known species. The premaxillæ are not expanded, and there are pits in the cranial rostrum for the summits of the majority of the lower teeth, of which the 4th is enlarged. Total length probably between 50 and 60 feet.

*All the following specimens are from the Pliocene of the Siwalik Hills; and, unless it is otherwise stated, belong to the Cautley Collection. Presented, 1840.*

**39802.** The greater portion of the rostrum, showing the upper and (Fig.) lower jaws in apposition. This specimen is the type, and is figured in 'Falconer's Palæontological Memoirs,' vol. i. pl. xxix. fig. 1, and by the present writer in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. pl. xxxiv.

**39804.** The middle portion of the cranium. This specimen (wood-cut, fig. 11) is figured by the writer, *op. cit.* p. 232, fig. 1. *Presented by G. H. Smith, Esq., 1843.*

Fig. 11.



*Rhamphosuchus crassidens*.—Right lateral aspect of middle of cranium; from the Pliocene of the Siwalik Hills.  $\frac{1}{2}$ . (From the 'Palæontologia Indica'.)

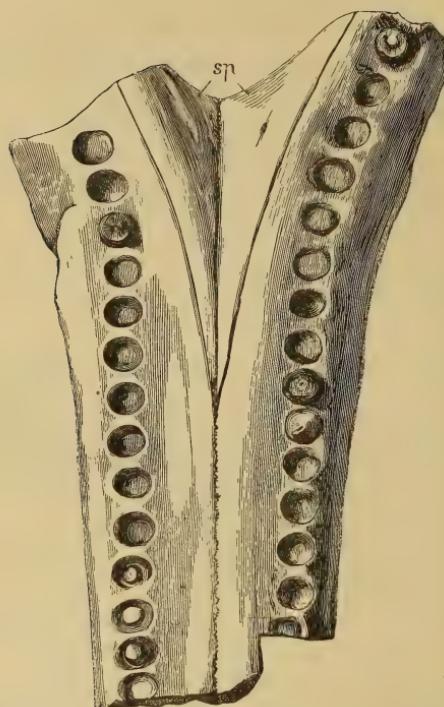
<sup>1</sup> *Palæontologia Indica* (Mem. Geol. Surv. Ind.), ser. 10, vol. iii. p. 229 (1886).

<sup>2</sup> *Trans. Geol. Soc.* ser. 2, vol. v. p. 503, note (1840).—*Crocodilus (Leptorhynchus)*. <sup>3</sup> *Loc. cit.*

<sup>4</sup> *Journ. As. Soc. Beng.* vol. xlix. pt. 2, p. 33 (1880).

**39803.** The hinder portion of the mandibular symphysis of the (*Fig.*) same individual. Figured in 'Falconer's Palæontological Memoirs,' vol. i. pl. xxix. fig. 2 (as part of the cranium),

Fig. 12.



*Rhamphosuchus crassidens*.—Hinder part of mandibular symphysis; from the Pliocene of the Siwalik Hills.  $\frac{1}{6}$ . sp, splenial. (From the 'Palæontologia Indica'.)

and by the writer, *op. cit.* p. 233, the latter figure being reproduced in fig. 12. One of the teeth has been cut, and is noticed by Owen in the 'Quart. Journ. Geol. Soc.' vol. xxxv. p. 196. *Presented by G. H. Smith, Esq., 1843.*

**R. 760.** The imperfect quadrate and quadrato-jugal. Noticed by the writer, *op. cit.* p. 232.

**16218.** The anterior extremity of the left half of the mandibular symphysis, with three dental alveoli.

- R. 776. A slightly imperfect cervical vertebra.
- R. 776 a. A slightly imperfect early dorsal vertebra.
- R. 759. An imperfect early (? 5th) dorsal vertebra. Noticed by the writer, *op. cit.* p. 234. The vertical diameter of the anterior articular cup is 0,112, and the transverse 0,098.
- R. 761. A slightly imperfect early dorsal vertebra.
- R. 761 a. An imperfect early dorsal vertebra.
- R. 762. An imperfect dorsal vertebra.
- R. 763. A very similar specimen.
- R. 763 a. A late dorsal or lumbar vertebra, somewhat imperfect.
- R. 764. A very similar specimen.
- R. 766 a. The left ilium. The longer transverse diameter measures 0,178.
- R. 766 b. A smaller left ilium, agreeing in contour with the preceding specimen.
18460. The right fibula, wanting the proximal extremity. The diameter of the distal extremity is 0,065.
- R. 766. An imperfect large scute, probably belonging to the nuchal region of the present form.  
*Transferred from the Old Indian Museum, 1880.*
17066. A dorsal scute. Noticed by the writer, *op. cit.* p. 234. Transverse diameter 0,181; antero-posterior do., 0,107.
39817. An imperfect dorsal scute of very large size.
- R. 783. A dorsal scute.
39815. A smaller dorsal scute, belonging either to this species or to *Garialis*.
39816. A similar specimen.
39818. An undetermined bone, perhaps belonging to this genus.

*Some of the following smaller specimens may belong to immature individuals of this species.*

- R. 777. A somewhat imperfect middle dorsal vertebra.
- R. 777 a. A late dorsal or lumbar vertebra.
- R. 777 b. A vertebra from the same region.
- R. 777 c. Another vertebra from the same region.
- R. 777 d. A third specimen from the same region.

*Serial Position Uncertain.*

Genus **PRISTICHAMPSA**, Gervais<sup>1</sup>.

Known only by the teeth, which are remarkable for their extreme compression and sharp cutting-edges.

**Pristichampsa rollinati** (Gray<sup>2</sup>).

Syn. *Crocodilus rollinati*, Gray<sup>3</sup>.

This is the type and only known species, and is of small size.

Hab. Europe (France).

- 26657. The crowns of two teeth; from the Middle Eocene of Argenton (Indre), France.

*Pomel Collection. Purchased, 1851.*

Genus **HETEROSUCHUS**, Seeley<sup>4</sup>.

This genus is founded on the first of the following specimens, and is only provisionally included in the present series. The centra of the vertebræ are laterally compressed, and the neuro-central suture is obliterated; while other features are stated to suggest Dinosaurian affinities. The genus may possibly prove identical with *Hylaeochamps* (*infra*, p. 76).

**Heterosuchus valdensis**, Seeley<sup>5</sup>.

Hab. Europe (England).

<sup>1</sup> Comptes Rendus, vol. xxxvi. p. 376 (1853).—Amended from *Pristichampsus*.

<sup>2</sup> Synopsis Reptilium, p. 61 (1831).—*Crocodilus*.

<sup>3</sup> *Loc. cit.*

<sup>4</sup> Quart. Journ. Geol. Soc. vol. xlivi. p. 212 (1887).

<sup>5</sup> *Loc. cit.*

- 36555.** A nodule of ironstone containing about a dozen vertebræ, (*Fig.*) and what may possibly be part of a cranium ; from the Hastings Sand (Wealden) of Hastings, Sussex. The type. Figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xlivi. pl. xii. fig. 7. It is suggested that the supposed cranium may possibly belong to a different animal.

*Mantell Collection. Purchased, 1853.*

- 36527.** An imperfect vertebra ; from the Wealden of Cuckfield, Sussex. Noticed by Seeley, *op. cit.* p. 215. *Same history.*

- 36528.** A trunk vertebra, somewhat broken, and with the posterior convexity of the centrum abraded ; from Cuckfield.

*Same history.*

- 36525.** An imperfect caudal vertebra ; from Brook. Noticed by Seeley, *op. cit.* p. 214. *Same history.*

- 36526.** Three imperfect caudal vertebrae ; from Cuckfield. Noticed by Seeley, *op. cit.* pp. 214–215. *Same history.*

#### GENUS *non det.*

In the following specimens the centra have not the marked lateral compression characteristic of *Heterosuchus*.

- 36524.** A slightly imperfect trunk vertebra of a small Crocodilian ; from the Wealden of the Isle of Wight. Noticed by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xlivi. p. 215.

*Mantell Collection. Purchased, 1853.*

- 48244.** A crushed cervical vertebra, partly imbedded in matrix ; from the Middle Purbeck Group of Durdlestone Bay, Swanage, Dorsetshire. Noticed by Seeley, *op. cit.* p. 215.

*Beckles Collection. Purchased, 1876.*

- R. 188.** A mass of vertebræ and imperfect limb-bones of a somewhat larger Crocodilian ; from the Hastings Sand (Wealden) of Brook, Isle of Wight. *Fox Collection. Purchased, 1882.*

[*Crocodilus cantabrigiensis*, Seeley<sup>1</sup>.]

- 41795.** An imperfect posterior dorsal vertebra ; from the Cambridge Greensand. Described by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxx. p. 694. *Purchased, 1869.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxx. p. 693 (1874).

### B. AMPHICŒLIAN SERIES.

Vertebræ usually amphicœlous<sup>1</sup>. Pterygoids without palatal plates; lateral eustachian passages not bony. Dorsal scutes keelless, and usually arranged in two rows; ventral buckler, which is usually divided but may be single, with not more than eight or ten longitudinal rows of scutes, each scute consisting of a single element. Acetabular margin of pubis slightly notched.

#### Family GONIOPHOLIDIDÆ.

Orbit communicating with infratemporal fossa, and either larger or only slightly smaller than supratemporal fossa; no preorbital vacuity; in palate posterior border of premaxillæ interpenetrated by maxillæ. Dorsal scutes rectangular, and arranged in two or more rows; ventral buckler either single or divided, with the scutes imbricating anteriorly, and either imbricating or articulating by suture posteriorly. Freshwater.

#### Subfamily BERNISSARTIINÆ.

Posterior nares placed very far back. Typically the dorsal scutes without peg-and-socket articulation, and arranged in more than two rows; ventral buckler undivided, with the scutes imbricating throughout.

In the type genus *Bernissartia*, Dollo<sup>2</sup>, the vertebræ are amphicœlous; the orbit is larger than the supratemporal fossa; the nasals reach the nares; the splenial enters into the mandibular symphysis; and the pectoral limb is much shorter than the pelvic.

#### Genus HYLÆOCHAMPSA, Owen<sup>3</sup>.

Imperfectly known: orbits considerably larger than supratemporal fossæ; cranium of moderate length. Possibly the procoelous vertebræ, to which the name *Heterosuchus* (p. 74) has been applied, may prove to belong to the present genus, in which case there will be no doubt as to the distinctness of *Bernissartia*<sup>4</sup>.

<sup>1</sup> As mentioned above, *Heterosuchus* may belong to this series; and the same may be the case with the procoelous vertebræ described from the Greensand of Cambridge and Austria under the names of *Crocodilus cantabrigiensis* (p. 75) and *C. proavus*.

<sup>2</sup> Bull. Mus. R. Hist. Nat. Belg. vol. ii. p. 321 (1883).

<sup>3</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. vi. p. 1 (1874).

<sup>4</sup> See Geol. Mag. dec. 3, vol. iv. pp. 310, 392 (1887).

***Hylæochamps*** *vectiana*, Owen<sup>1</sup>.

The type species; probably about 2 metres in total length; orbits subcircular, with a slightly outward direction; cranial sculpture radiate; posterior nares rounded and placed close to condyle; palato-pterygoid vacuities narrow and elongate.

*Hab.* Europe (England).

- R. 177. The hinder portion of the cranium; from the Wealden of (Fig.) Brook, Isle of Wight. This specimen is the type, and is figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. v. pl. ii. figs. 23–25.

*Fox Collection. Purchased, 1882.*

GENUS *non. det.*

The following specimen is too imperfect to admit of generic identification, but it may be identical with *Bernissartia*. The scutes have no peg-and-socket articulation.

37712. A split slab containing fragments of the exo- and endo-(Fig.) skeleton of a small Crocodilian; from the Wealden of Hastings, Sussex. Figured by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pl. xv. (1851), and referred to by A. Smith Woodward in 'Proc. Geol. Assoc.' vol. ix. p. 328, as *Crocodilus sauli*, Owen.

*Saul Collection. Purchased, 1863.*

## Subfamily GONIOPHOLIDINÆ.

Posterior nares placed more anteriorly than in preceding subfamily; two rows of dorsal scutes; ventral buckler divided, with the transverse rows of scutes articulating in the posterior part by suture.

## a. BREVIROSTRINE SECTION.

Cranium more or less short, with its alveolar borders festooned; nasals reaching premaxillæ, and frequently the nares; mandibular symphysis short, without or with small splenial element. Teeth not numerous, and more or less differentiated. Dorsal scutes with peg-and-socket articulation.

Genus **THERIOSUCHUS**, Owen<sup>2</sup>.

Cranium very short; nasals reaching and partly dividing nares; orbit slightly larger than supratemporal fossa; no vacuity in

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. vi. p. 1 (1874).

<sup>2</sup> Ibid. suppl. ix. p. 10 (1879).

mandible; teeth extremely differentiated; fore limb much shorter than hinder.

**Theriosuchus pusillus**, Owen<sup>1</sup>.

The type species. Length of cranium 0,087.

Hab. Europe (England).

*The following specimens include the types, and were obtained from the Middle Purbeck of Durdlestone Bay, Swanage, Dorsetshire. All belong to the Beckles Collection. Purchased, 1876.*

- 48330. The cranium. Figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ix. pl. iii. figs. 3-6, and also (restored) in the 'Quart. Journ. Geol. Soc.' vol. xxxv. pl. ix. figs. 1-3, 6 (1879).
- 48218. The imperfect skull. Figured in the 'Wealden Reptilia,' tom. (Fig.) cit. pl. iii. fig. 7, and the left maxilla in the 'Quart. Journ. Geol. Soc.' tom. cit. pl. ix. fig. 4.
- 48227. The imperfect anterior portion of the cranium. The right (Fig.) maxilla is figured in the 'Wealden Reptilia,' tom. cit. pl. iii. fig. 10.
- 48282. The left maxilla of a young individual. Figured, *op. cit.* (Fig.) pl. iii. fig. 12.
- 48228. The left maxilla of an immature individual. Figured, *op. cit.* (Fig.) pl. iii. fig. 13.
- 48240 a. The left maxilla. Figured, *op. cit.* pl. iii. fig. 11, and also in (Fig.) the 'Quart. Journ. Geol. Soc.' tom. cit. pl. ix. fig. 5 (wrongly described).
- 48240 b. A slab containing the imperfect upper and lower jaws. (Fig.) Figured in the 'Wealden Reptilia,' tom. cit. pl. iii. figs. 9, 14, 17.
- 48216. A slab containing the greater portion of both the endo- and (Fig.) exo-skeleton. Figured, *op. cit.* pl. iv. figs. 1, 2.
- 48279. Slab with part of mandible and detached scutes. Figured, (Fig.) *op. cit.* pl. iii. fig. 16 (mandible), and pl. iv. figs. 3, 4 (scutes); the mandible is also figured in the 'Quart. Journ. Geol. Soc.' tom. cit. pl. ix. fig. 7.
- 48244. The symphysis and greater part of the left ramus of the mandible.

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. ix. p. 10 (1879).

- 48218 a.** The mandible, imperfect posteriorly. Figured in the (*Fig.*) 'Wealden Reptilia,' *tom. cit.* pl. iii. fig. 15.
- 48382 a.** Extremity of a mandibular ramus. Figured, *op. cit.* pl. iii. (*Fig.*) fig. 18.
- 48302.** Slab with the two rami of the mandible.
- 48224.** The pterygoidal region of the cranium.
- 48262.** Slab with the right ramus of the mandible and detached scutes.
- 48240.** Slab with fragments of the skull.
- 48260.** Slab with the left half of the palate, vertebræ, limb-bones, and scutes.
- 48244.** Slab with part of maxilla and scutes.
- 48329.** Slab with bones and scutes.
- 48329 a.** Ditto.
- 48273.** Ditto.
- 48274.** Ditto.
- 48275.** Ditto.
- 48333.** A femur, provisionally referred to this species.

Genus **GONIOPHOLIS**, Owen<sup>1</sup>.

Cranium moderately elongated; the nasals not reaching the nares; orbits slightly smaller than the supratemporal fossæ; teeth moderately differentiated, stout, rounded, slightly curved, with the enamel ridged and grooved, and well-marked carinæ placed in a plane coincident with that of the curvature of the crown; the splenial entering slightly into the mandibular symphysis; the pectoral limb at least as long as the pelvic. Number of teeth usually  $\frac{23}{23}$ .

**Goniopholis crassidens**, Owen<sup>2</sup>.

The type species; characterized by the stoutness of the teeth and the tapering form of the cranium, of which the length in one specimen is 0,600, although other specimens indicate considerably larger individuals.

*Hab.* Europe (England).

- 3798.** A slab of stone containing the left mandibular ramus, scutes, (*Fig.*) vertebræ, &c. from the Purbeck of Swanage, Dorsetshire.

<sup>1</sup> Rep. Brit. Assoc. for 1841, p. 69 (1842).

<sup>2</sup> *Loc. cit.*

This specimen is the type, and is figured by Mantell in his 'Wonders of Geology,' 3rd ed. pl. i. (1839), and described by Owen in the 'Rep. Brit. Assoc.' 1841, p. 69, and in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. viii. p. 2 (1878). *Mantell Collection. Purchased, 1838.*

- 48340.** The middle part of the left maxillary region with teeth; from the Middle Purbeck of Durdlestone Bay, Swanage, Dorsetshire. *Beckles Collection. Purchased, 1876.*

*Specimens, of which a considerable number belong to the present or next species.*

Among the following the teeth and scutes belong to large species of the present genus; and many of the limb-bones and vertebræ doubtless also belong to the same<sup>1</sup>, although some of the latter may be generically distinct, and are, perhaps, referable to *Suchosaurus*.

- 37972.** The nearly entire right ramus of the mandible, containing several broken teeth of the type of *G. crassidens*; from the Wealden of Cuckfield. *Purchased, 1863.*

- R. 606.** The anterior part of the left ramus of the mandible; from the Wealden of Ecclesbourne, near Hastings, Sussex. The entrance of the splenial into the symphysis is well shown.  
*Dawson Collection. Purchased, 1884.*

- R. 726.** Fragment of a mandibular ramus, with dental alveoli; from the Wealden of Sussex. *Purchased, 1886.*

- R. 974.** The anterior portion of the left ramus of the mandible of a young individual, showing thirteen dental alveoli, with two perfect teeth *in situ*; from the Wealden of Cuckfield.  
*Presented by Major Sergison, 1887.*

- 2512.** A tooth; from the Wealden of Cuckfield. Figured in (*Fig.*) Mantell's 'Fossils of Tilgate Forest,' pl. v. fig. 10.  
*Mantell Collection. Purchased, 1838.*

- 2350, 2352, 2354.** Three teeth; from the Wealden of Cuckfield.  
*Mantell Collection. Purchased, 1838.*

<sup>1</sup> In addition to the species mentioned here, Koken ('Pal. Abhandl.' vol. iii. pt. 5, pp. 327-32 [1887]) has applied the names *G. pugnax* and *G. minor* to vertebræ from the German Wealden, while Owen ('British Fossil Reptilia,' Crocodilia, pl. xiv.) has figured vertebræ from the English Wealden as *G. carinatus*; and Moussaye (Bull. Soc. Géol. France, sér. 3, vol. iii. p. 53 [1885]) has made the species *G. undidens* upon the evidence of a tooth from the Upper Jurassic of France. The vertebræ upon which *G. carinatus* is founded are keeled, like those referred by Owen to *Suchosaurus*.

- 3301, 3302, 3303, 3304.** Four teeth; from Cuckfield.  
*Mantell Collection. Purchased, 1838.*
- 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3256, 3258, 3259, 3263,**  
**3265, 3271, 3272, 3275, 3280, 3281, 3282, 3284, 3288,**  
**3290, 3292, 3294.** Numerous teeth; from Cuckfield.  
*Same history.*
- 10834.** A tooth; from Cuckfield.  
*Mantell Collection. Purchased, 1853.*
- 33122.** A tooth; from Cuckfield.  
*Same history.*
- 36533.** Several teeth; from Cuckfield.  
*Same history.*
- R. 638, 642.** Two small teeth in matrix; from the Wealden (Tilgate Grit) of Battle, Sussex.  
*Presented by J. E. Lee, Esq., 1885.*
- R. 742.** A tooth in matrix; from the Wealden of Brook, Isle of Wight.  
*Purchased, 1886.*
- R. 607.** Several teeth; from the Wealden of Ecclesbourne.  
*Dawson Collection. Purchased, 1884.*
- R. 726 a.** An imperfect tooth; from the Wealden of Horsham, Sussex.  
*Purchased, 1886.*
- R. 968.** Two teeth, of which one is of very large size; from the Wealden, near Hastings.  
*Dawson Collection. Purchased, 1887.*
- R. 758.** Two teeth; from the Wealden; locality unknown.  
*Presented by J. S. Gardner, Esq., 1886.*
- R. 976.** A large tooth; from the Wealden of Cuckfield.  
*Presented by Major Sergison, 1887.*
- 48366.** A tooth in matrix; from the Middle Purbeck of Durdlestone Bay, Swanage. This is a typical specimen of *G. crassidens.*  
*Beckles Collection. Purchased, 1876.*
- R. 605.** A number of imperfect cervical, dorsal, and caudal vertebrae, the left coracoid, several imperfect limb-bones, and a broken dermal scute, apparently belonging to a single individual; from the Wealden near Ecclesbourne.  
*Dawson Collection. Purchased, 1886.*
- 2510.** The imperfect centrum of a cervical vertebra; from the Wealden of Sussex.  
*Mantell Collection. Purchased, 1838.*

- 26007.** An imperfect cervical or anterior dorsal vertebra; from Sussex. *Dixon Collection. Purchased, 1851.*
- 40455.** An imperfect dorsal vertebra, not improbably belonging to this group; from the Lower Greensand (? derived) of Polton, Bedfordshire. Although smaller, closely resembles the dorsal centra of No. R. 605. This specimen may be Teleosaurian. *Purchased, 1869.*
- 2312.** An imperfect sacral vertebra, provisionally referred to this group; from Cuckfield. The rib of the right side is wanting. *Mantell Collection. Purchased, 1838.*
- 43598.** The right coracoid; from the Purbeck of Swanage. Although smaller than the corresponding bone of No. R. 605, this specimen presents no distinctive features. *No history.*
- 40661.** The imperfect left humerus; from the Purbeck of Swanage. *Purchased, 1860.*
- 2480.** The right ischium of a large individual, slightly imperfect at its acetabular extremity; from the Wealden of Cuckfield. *Mantell Collection. Purchased, 1838.*
- 48310.** The left ischium of a smaller individual; from the Middle Purbeck of Durdlestone Bay, Swanage. *Beckles Collection. Purchased, 1876.*
- 23624.** The proximal half of the right femur of a very large individual; from the Wealden of Perch Hill, Sussex. *Presented by the Rev. J. Gould, 1849.*
- 35572.** The right femur of a smaller individual; from the Purbeck of Swanage. *Purchased, 1860.*
- 35570.** The right femur; from Swanage. *Purchased, 1859.*
- 2483.** The left femur of a very small individual; from the Wealden of Sussex. *Mantell Collection. Purchased, 1838.*
- R. 969.** A metapodial; from the Wealden near Hastings. *Dawson Collection.*
- 36534.** A dorsal scute; from the Wealden of Sussex. *Mantell Collection. Purchased, 1853.*
- 44818.** A dorsal scute; from the Purbeck of Swanage. *Presented by B. Bright, Esq., 1873.*
- 44818 a.** A slab showing impression of the outer surface of a dorsal scute; from the Purbeck of Swanage. *Same history.*

**3804.** An imperfect dorsal scute ; from the Wealden of Cuckfield.  
*Mantell Collection. Purchased, 1838.*

**3804 a.** Two imperfect dorsal scutes ; from Cuckfield. *Same history.*

**3805.** An imperfect dorsal scute ; from Cuckfield. Figured in  
*(Fig.)* Mantell's 'Fossils of Tilgate Forest,' pl. vi. fig. 8, as the  
bone of a *Trionyx*. *Same history.*

**36534 a.** An imperfect dorsal scute ; from Cuckfield.  
*Mantell Collection. Purchased, 1853.*

**R. 604.** An imperfect ventral scute ; from the Wealden near Hastings.  
*Dawson Collection.*

**Goniopholis simus, Owen<sup>1</sup>.**

The teeth are more slender and the cranium is wider than in the type species.

*Hab.* Europe (England and Belgium).

**41098.** The cranium ; from the Middle Purbeck beds of Swanage,  
*(Fig.)* Dorsetshire. This specimen is the type, and is figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. viii. pl. v.; and also by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxiv. pl. xv. figs. 3, 4 (1878), without specific name, *Purchased, 1868.*

**41098 a.** The impression of the upper surface of the preceding specimen. *Same history.*

**Goniopholis tenuidens, Owen<sup>2</sup>.**

Founded on an imperfect mandible of smaller size than that of either of the preceding species, but of which the distinctive specific characters are not indicated.

*Hab.* Europe (England).

**48300.** The anterior portion of the mandible ; from the Middle *(Fig.)* Purbeck of Durdlestone Bay, Swanage, Dorsetshire. The type specimen ; figured by Owen in his 'Wealden and Purbeck Reptilia'<sup>3</sup>, suppl. ix. pl. i. fig. 1.  
*Beckles Collection. Purchased, 1876.*

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. viii. p. 7 (1878).

<sup>2</sup> *Ibid.* suppl. ix. p. 2 (1879).

<sup>3</sup> *Loc. cit.*

Genus **NANNOSUCHUS**, Owen<sup>1</sup>.

Cranium agreeing in general structure with that of *Goniopholis*, but the teeth slender, recurved, smooth, and but slightly differentiated.

***Nannosuchus gracilidens*, Owen<sup>2</sup>.**

The type species; length of cranium about 0,115.

Hab. Europe (England).

*The following specimens are from the Middle Purbeck of Durdlestone Bay, Dorsetshire, and include the types. They belong to the Beckles Collection. Purchased, 1876.*

**48217.** The nearly entire cranium. Figured by Owen in his (*Fig.*) Wealden and Purbeck Reptilia,' suppl. ix. pl. iii. fig. 1.

**48303.** Slab containing the mandible, vertebræ, and scutes. Fig- (*Fig.*) ured by Owen, *op. cit.* pl. ii. figs. 1-5.

**48301.** Slab containing the dentary portion of the mandible, de- (*Fig.*) tached teeth, and scutes. Figured, *op. cit.* pl. ii. figs. 6 (mandible) and 7 (tooth).

**48328.** Slab containing the anterior part of the mandible, and (apparently) the tibia and fibula.

**48328 a.** The nearly entire right ramus of the mandible. Figured, (*Fig.*) *op. cit.* pl. ii. fig. 8.

**48328 c.** Slab containing the left dentary portion of the mandible, the humerus, and fragmentary scutes.

**48329.** Slab with the dentary portion of the mandible, the humerus, (*Fig.*) and vertebræ. Figured, *op. cit.* pl. ii. figs. 9 (mandible) and 10 (humerus).

**48244.** Slab with portion of cranium, mandible, vertebræ, and scutes.

Genus **OWENIASUCHUS**, A. Smith Woodward<sup>3</sup>.

Syn. *Brachydectes*, Owen<sup>4</sup>.

Described from the mandible, in which there is no vacuity and the teeth are confined to the anterior third.

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. ix. p. 6 (1879).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Geol. Mag. dec. 3, vol. ii. p. 506 (1885).

<sup>4</sup> *Op. cit.* p. 3. Preoccupied by Cope (1868) for a genus of Labyrinthodontia.

**Oweniasuchus major** (Owen<sup>1</sup>).

Syn. *Brachydectes major*, Owen<sup>2</sup>.

Of considerable size, the length of the mandibular ramus being 0,235.

*Hab.* Europe (England).

*The following specimens were obtained from the Middle Purbeck of Durdlestone Bay, Swanage, Dorsetshire, and belong to the Beckles Collection. Purchased, 1876.*

- 48304. The left ramus of the mandible. The type specimen ; figured (Fig.) by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. ix. pl. i. fig. 2.
- 48287. Slab showing anterior part of a mandibular ramus, vertebræ, imperfect limb-bones, and scutes.
- 48313. Slab with the right dentary portion of the mandible, detached teeth, imperfect limb-bones, and scutes.
- 48284. A large slab containing a considerable part of a skeleton apparently belonging to this species. The mandibular symphysis and part of the cranium proper are shown.

*The following specimens are provisionally referred to the present form.*

48315. Slab containing limb-bones, vertebræ, and scutes.

48291. Slab with scutes and broken bones.

**Oweniasuchus minor** (Owen<sup>3</sup>).

Syn. *Brachydectes minor*, Owen<sup>4</sup>.

Founded upon a mandibular ramus of much smaller size than the type of the preceding species, and showing characters which are regarded by its describer as of specific value.

*Hab.* Europe (England).

- 48328. The left ramus of the mandible ; from the Middle Purbeck (Fig.) of Durdlestone Bay, Swanage, Dorsetshire. The type specimen ; figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ix. pl. i. fig. 3.

*Beckles Collection. Purchased, 1876.*

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. ix. (1879).—  
<sup>2</sup> *Brachydectes.* <sup>3</sup> *Loc. cit.*

<sup>3</sup> *Loc. cit.* p. 5.—*Brachydectes,*

<sup>4</sup> *Loc. cit.*

- 48335 a.** A slab with four imperfect trunk vertebræ, provisionally (*Fig.*) referred by Owen to the present species; from Durdle-stone Bay. Figured, *op. cit.* pl. i. fig. 13. *Same history.*

GENERICALLY UNDETERMINED SPECIMENS.

*The following were obtained from the Middle Purbeck of Durdlestone Bay, and belong to the Beckles Collection. Purchased, 1876.*

- 48298.** Slab containing dorsal vertebræ, ribs, and scutes. Figured (*Fig.*) by Owen, in his 'Wealden and Purbeck Reptilia,' suppl. ix. pl. i. figs. 5, 6. These specimens probably belong either to *Oweniasuchus major* or *Goniopholis tenuidens*.

- 48335.** The fourth (?) dorsal vertebra, showing the intersection of the costal facet by the neuro-central suture.

- 48335 b.** An anterior dorsal vertebra. Figured by Owen, *op. cit.* (*Fig.*) pl. i. fig. 4.

- 48335 d.** A late dorsal or lumbar vertebra. Figured by Owen, *op. cit.* (*Fig.*) pl. i. fig. 8.

- 48335 c.** A sacral vertebra. Figured by Owen, *op. cit.* pl. i. fig. 9. (*Fig.*)

- 48335 e.** A caudal vertebra and chevron. Figured by Owen, *op. cit.* (*Fig.*) pl. i. fig. 10.

- 48335 f.** A slab with a tooth and imperfect vertebræ.

- 48335 g.** Slab with two caudal vertebræ.

- 48244 a.** Left half of the maxillo-premaxillary region, seen from the palatal aspect.

- 48337.** Slab containing a scapula and rib.

- 48287.** Slab with part of a mandibular ramus, vertebræ, imperfect limb-bones, and scutes.

- 48313.** Slab with right dentary part of the mandible, teeth, imperfect limb-bones, and scutes.

- 48315.** Slab with vertebræ, limb-bones, and scutes.

- 48291.** Slab containing broken limb-bones and scutes.

*The following specimens may not improbably be referable to the present group.*

- R. 898.** A slightly imperfect sacral vertebra; from the Wealden of Brook, Isle of Wight. *Fox Collection. Purchased, 1882.*

- R. 608.** Several imperfect vertebræ and the nearly entire left femur ; from the Wealden of Ecclesbourne, Sussex.  
*Dawson Collection. Purchased, 1884.*

*The following specimen indicates a larger form, which may belong to the next section.*

- R. 1090.** The imperfect right scapula and coracoid ; from the Wealden, locality unknown. The coracoid differs from that of *Goniopholis* (No. 43598, p. 82) by the flattening of its posterior surface below the glenoid cavity. *No history.*

#### b. LONGIROSTRINE SECTION.

Cranium elongated into a rostrum, with its alveolar borders straight and nasals not reaching the nares ; mandibular symphysis long, with a large splenial element. Teeth numerous, and but slightly differentiated. Dorsal scutes without peg-and-socket articulation.

#### Genus **PHOLIDOSAURUS**, Meyer<sup>1</sup>.

Syn. *Macrorhynchus*, Dunker<sup>2</sup>.

Orbit apparently slightly smaller than supratemporal fossa ; nasals reaching premaxillæ ; vomer appearing on the palate. For the identity of *Macrorhynchus* with this genus see Koken, ‘Pal. Abhandl.’ vol. iii. pt. 5 (1887).

#### **Pholidosaurus schaumburgensis**, Meyer<sup>3</sup>.

Syn. *Macrorhynchus schaumburgensis*, Koken<sup>4</sup>.

The type species. Fully as large as *Garialis gangeticus*, with the bar dividing the supratemporal fossæ flattened.

*Hab.* Europe (Germany).

- 40643.** Casts of the impressions of the dorsal scutes and vertebræ. The originals, which are the types, were obtained from the Wealden (Hastings Sand) of Harrels, Bückeburg, Schaumburg-Lippe, Germany, and are preserved in the

<sup>1</sup> Neues Jahrb. 1841, p. 443.

<sup>2</sup> Program. höch. Gewerbeschule in Cassel, p. 44 (1844). Preoccupied by Lacépède (1800) for a genus of Pisces. <sup>3</sup> Loc. cit.

<sup>4</sup> Pal. Abhandl. vol. iii. pt. 5, p. 335 (1887).

museum at Bückeburg. They are figured by Meyer in Dunker's 'Monographie d. norddeutschen Wealdenbildung,' pls. xvii.-xix. (1846). *Purchased, 1867.*

**Pholidosaurus meyeri** (Dunker<sup>1</sup>).

Syn. *Macrorhynchus meyeri*, Dunker<sup>2</sup>.

This form is regarded by Koken as distinguished from the preceding by the form of the cranium, the structure of the internal ear, and apparently by the rounding of the bar dividing the supratemporal fossæ, and the form of the posterior nares.

*Hab.* Europe (Germany and ? England).

**28966.** The imperfect hinder portion of a skull with attached cervical vertebræ and scutes, apparently belonging to this species; from the Wealden of Brook, Isle of Wight. This specimen is described by the present writer in the 'Geol. Mag.' dec. 3, vol. iv. p. 311 (1887); it apparently agrees precisely with the figure of the upper surface of the type skull given by Meyer in Dunker's 'Monographie der norddeutschen Wealdenbildung,' pl. xx. (1846), and differs from that of *P. schaumburgensis*, given by Koken in the 'Pal. Abhandl.' vol. iii. pls. xxii., xxiii., by the rounding of the bar dividing the supratemporal fossæ, and the contour of the posterior nares. The communication of the orbit with the supratemporal fossæ is well shown, and the few hinder teeth still remaining are small and slender.

*Hastings Collection. Purchased, 1855.*

*The following specimens may belong either to this or the preceding species.*

**36537.** The crown of a tooth; from the Wealden of Brook.

*Mantell Collection. Purchased, 1853.*

**46777-8.** Two imperfect dorsal vertebræ not improbably belonging to the present genus; from Brook. The centra have no trace of a hæmal keel. *Purchased, 1875.*

Subfamily PETROSAUCHINÆ.

Posterior nares placed near middle of cranium; scutes not improbably without peg-and-socket articulation, and of a Teleosauroid type.

<sup>1</sup> Program. höch. Gewerbschule in Cassel, p. 44 (1844).—*Macrorhynchus*.

<sup>2</sup> *Loc. cit.*

**Genus PETROSUCHUS, Owen<sup>1</sup>.**

Cranium apparently of a brevirostrine type, but somewhat more elongated than in *Goniopholis*; orbit considerably smaller than supratemporal fossa; mandibular teeth moderately differentiated; a vacuity in the mandible.

**Petrosuchus laevidens, Owen<sup>2</sup>.**

The type species; length of cranium probably about one foot.

*Hab.* Europe (England).

- 28432.** The cranium, imperfect anteriorly; from the Purbeck of (Fig.) Swanage, Dorsetshire. The type specimen; figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. viii. pl. vi. figs. 1, 2. *Purchased, 1853.*

- 41099.** The greater portion of the right ramus of the mandible; (Fig.) from Swanage. Figured by Owen, *op. cit.* pl. vi. fig. 3. *Purchased, 1868.*

- 43598 a.** A slab of Purbeck Limestone containing the hinder part of the right ramus of a mandible, three scutes, a late caudal vertebra, and an imperfect long bone, which may not improbably belong to the present species. The scutes, which are seen from their inner surface, have no peg-and-socket articulation. *No history.*

*Family Position Uncertain.*

*GENUS non det.*

- 48362.** The imperfect dentary element of the right ramus of the mandible of a longirostrine Crocodilian probably belonging to the *Goniopholididae*; from the Purbeck of Swanage, Dorsetshire. The teeth are small and widely separated.

*Beckles Collection. Purchased, 1876.*

**Genus SUCHOSAURUS, Owen<sup>3</sup>.**

Founded upon detached teeth, which are slightly curved, much compressed, with the enamel thrown into strong ridges and grooves, and with two carinæ placed in a plane at right angles to that of the

<sup>1</sup> Wealden and Purbeck Reptilia (*Mon. Pal. Soc.*), suppl. viii. p. 10 (1878).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Rep. Brit. Assoc. for 1841, p. 67 (1842).

curvature of the crown. *Hypsaurus* would seem to suggest that these teeth are referable to *Goniopholis*, but all the known jaws of that genus have the whole series of teeth conical. The vertebræ referred to this genus by Owen are noticed among the *Iguanodontidæ*.

**Suchosaurus cultridens**, Owen<sup>1</sup>.

Syn. *Crocodilus cultridens*, Owen<sup>2</sup>.  
*Suchosaurus lævidens*, Owen<sup>3</sup>.

The type and only known species; of large size.

Hab. Europe (England).

**3309–11–15, 3381.** Several imperfect teeth; from the Wealden of Cuckfield, Sussex.

*Mantell Collection. Purchased, 1838.*

**33121.** The crown of a tooth; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

**36536.** Several specimens of the crowns of teeth; from Cuckfield.

*Same history.*

**R. 635.** The crown of a tooth; from the Hastings Sand of Sandown, Isle of Wight. *Presented by J. E. Lee, Esq., 1885.*

**R. 215.** An imperfect tooth; from the Wealden of the Isle of Wight.

*Fox Collection. Purchased, 1882.*

**R. 977.** The crowns of three teeth; from the Wealden of Cuckfield.

*Presented by Major Sergison, 1887.*

Genus **HYPOSAURUS**, Owen<sup>4</sup>.

Imperfectly known. Mandibular symphysis elongated; anterior dorsal vertebræ with a hæmal spine; teeth carinated, the anterior ones rounded, the posterior compressed and curved, with the enamel ridged and grooved. In the teeth with rounded section the carinæ are placed in a plane coincident with that of the curvature of the crown (as in *Goniopholis*), while in the compressed teeth they are in a plane at right angles to that of the curvature (as in *Suchosaurus*).

Cope refers the genus to the *Teleosauridæ*, but its geological horizon and the resemblance of the teeth to those of *Goniopholis* render it more probable that it should be referred to the present family.

<sup>1</sup> Rep. Brit. Assoc. for 1841, p. 67 (1842).

<sup>2</sup> 'Odontography,' p. 287 (1840–45).

<sup>3</sup> British Fossil Reptilia, vol. ii. expl. of Crocodilia, pl. v. fig. 4 (no date).

<sup>4</sup> Quart. Journ. Geol. Soc. vol. v. p. 383 (1849).

**Hyposaurus derbianus**, Cope<sup>1</sup>.

Twenty lower teeth ; mandibular rami compressed ; splenial extending as far forwards as the fourth tooth from the commencement of the symphysis ; twenty alveoli in the symphysis.

*Hab.* South America (Brazil).

**R. 86, 305.** A series of teeth ; from the Lower Cretaceous of Olaria Station, Bahia, Brazil. Some of these specimens agree in size with the typical examples from Pernambuco described by Cope, while others are much larger. Both the compressed and rounded types are exhibited, similar to those of the corresponding teeth of *H. rodgersi*, figured by Leidy in the 'Smith. Contrib. Knowl.' vol. xiv. pl. iii.

*Presented by Joseph Mawson, Esq., 1881–82.*

## Family TELEOSAURIDÆ.

Orbit separated from infratemporal fossa, and smaller than the supratemporal fossa, which may be of enormous size ; a preorbital vacuity ; on the palate the premaxillæ interpenetrated by the maxillæ. Dorsal scutes rounded, and arranged in two rows ; and the ventral buckler divided, with the scutes posteriorly suturally united. Marine.

Subfamily METRIORHYNCHINÆ<sup>2</sup>.

Skull short or moderately long, with the teeth stout, and not very numerous ; and the orbits completely lateral, irregular, and only visible as triangular notches from the frontal aspect. Anterior nares heart-shaped and directed frontally ; nasals large, broad, and either reaching the premaxillæ, or separated from them by a short interval ; premaxillæ elongated, with a slight or no terminal expansion and three dental alveoli. Palatal aspect of maxillæ and mandible either flat or channelled ; lachrymals invisible externally ; frontals and prefrontals very large ; and palato-pterygoid vacuities extensive.

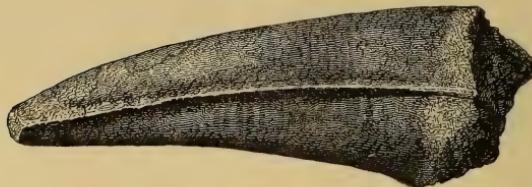
<sup>1</sup> Proc. Amer. Phil. Soc. vol. xxiii. p. 15 (1886).

<sup>2</sup> There may be a question whether the term *Steneosaurus* was not originally intended to apply to the members of this group (see Hulke, Proc. Geol. Soc. 1884, p. 46), but however this may have been, it is advisable to follow the nomenclature employed by Deslongchamps.

Genus **DACOSAURUS**, Quenstedt<sup>1</sup>.Syn. *Plesiosuchus*, Owen<sup>2</sup>.

The skull short and broad, with no trace of premaxillary expansion, and without sculpture; palatal aspect of anterior part of

Fig. 13.



*Dacosaurus maximus*.—Crown of tooth ; from the Kimeridge Clay of Ely.  
1. (From the 'Quart. Journ. Geol. Soc.')

maxillæ flat ; teeth (fig. 13) few in number, stout, smooth, with two slightly serrated carinæ, and a suboval cross-section.

**Dacosaurus maximus** (Plieninger<sup>3</sup>).Syn. *Geosaurus maximus*, Plieninger<sup>4</sup>.Including :—*Steneosaurus manseli*, Hulke<sup>5</sup>.*Dacosaurus lisocephalus*, Seeley<sup>6</sup>.*Dacosaurus primævus*, Sauvage<sup>7</sup>.*Plesiosuchus manseli*, Owen<sup>8</sup>.*Dacosaurus manseli*, A. S. Woodward<sup>9</sup>.

The type species ; somewhat smaller than *Machimosaurus mosæ*. Teeth  $\frac{17}{15}$ , three or four of the lower ones being post-symphysial. Nasals not reaching the premaxillæ (*infra* No. 40103). The writer sees no reason for separating *Steneosaurus manseli* from the present

<sup>1</sup> Sonst und Jetzt, p. 131 (1856).—Amended.<sup>2</sup> Quart. Journ. Geol. Soc. vol. xl. p. 153 (1884).<sup>3</sup> Jahresh. Ver. Nat. Württ. vol. ii. p. 150 (1846).—*Geosaurus*.<sup>4</sup> Loc. cit.<sup>5</sup> Quart. Journ. Geol. Soc. vol. xxvi. p. 170 (1870).<sup>6</sup> Index to Aves &c., in Cambridge Museum, p. 92 (1869).—Not figured.<sup>7</sup> Bull. Soc. Géol. France, sér. 3, vol. i. p. 380 (1873).<sup>8</sup> Quart. Journ. Geol. Soc. vol. xl. p. 153 (1884).<sup>9</sup> Geol. Mag. dec. 3, vol. ii., table facing p. 508 (1885).

form (with which it was originally identified by its describer<sup>1</sup>), and both *D. lisocephalus* and *D. primævus* are in all probability also identical.

*Hab.* Europe.

- 40103.** The cranium, imperfect posteriorly; from the Kimeridge (Fig.) Clay of Kimeridge Bay, Dorsetshire. The type specimen of *Steneosaurus manseli*; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxvi. pl. ix., the extremity of the premaxillæ being also figured in vol. xxv. pl. vii. figs. 1-3. From a comparison with the figures of *Metriorhynchus* given by Deslongchamps, the writer feels assured that the bones marked *a* in the former figure are the nasals, while those marked *b* appear to be portions of the maxillæ and premaxillæ marked off by a ridge for muscular attachment. Figures of two teeth and diagrams of the palatal and upper surfaces are also given by Owen in his 'British Fossil Reptilia,'—Crocodilia, pl. xx., a reduced figure of the diagram of the frontal aspect being also given in the 'Quart. Journ. Geol. Soc.' vol. xl. p. 158, fig. 2 (as *Plesiosuchus*). In these figures Hulke's view of the homology and arrangement of the bones on the frontal surface is followed, but the orbits are represented as directed frontally in place of laterally.

*Presented by J. C. Mansel-Pleydell, Esq., 1866.*

- 40103 a.** The greater part of the right ramus of the mandible, (Fig.) together with portions of a rib and a femur, doubtless belonging to the same individual as the preceding; from Kimeridge. Figured by Hulke, *op. cit.* vol. xxv. pl. xvii. fig. 4. *Same history.*

- 40103 b.** A mass of matrix exhibiting the hæmal aspect of three entire cervical vertebræ with their ribs; associated with the cranium. *Same history.*

<sup>1</sup> Subsequently referred to a distinct species on account of the presumed identity of *Dacosaurus maximus* with Cuvier's 'Gavial à museau plus court'; the latter having been shown to be made up of fragments of more than one species and genus, some of which belong to the Oxfordian *Metriorhynchus superciliosus* (page 96), while others are Kimeridgian, this identification falls to the ground. In describing the species, Hulke employs the term *Steneosaurus* in the sense in which *Metriorhynchus* is used by Deslongchamps, who is followed here.

**33186.** The crowns of two very large teeth ; from the White Jura (Kimeridgian) of Schnaitheim. *Purchased.* About 1858.

**35825-7.** The crowns of three smaller teeth ; from Schnaitheim. *Purchased,* 1860.

**35766.** The crowns of three large teeth ; from Schnaitheim. *Purchased,* 1860.

**33186.** The crowns of five teeth ; from Schnaitheim. *Purchased,* 1860.

**32414.** The imperfect crowns of two very large teeth ; from the Kimeridge Clay of Boulogne, France. Noticed by Wood-Mason in the ‘ Quart. Journ. Geol. Soc.’ vol. xxv. p. 219 (1869). This specimen agrees precisely with *D. primævus* of Sauvage. *Purchased,* 1857.

**44905.** The crown of a tooth ; probably from the Kimeridge Clay (no locality). *Presented by Sir R. Owen, K.C.B.,* 1877.

**20283.** The crown of a tooth ; from the Kimeridge Clay of Ely, Cambridgeshire. Noticed by Wood-Mason, *loc. cit.* *Purchased,* 1846.

**43030.** The crown of a small tooth ; from the Kimeridge Clay of Weymouth, Dorsetshire. *Purchased,* 1871.

**46342.** The crown of a very small tooth ; from the Kimeridge Clay of Culham. *Cunnington Collection.* *Purchased,* 1875.

**40438.** The crowns of five teeth ; from the Neocomian bone-bed of Potton, Cambridgeshire. Probably derived from the Kimeridge Clay. *Purchased,* 1867.

*The following specimens may indicate a distinct species.*

**R. 486.** The imperfect crown of a tooth ; from the Oxford Clay of Oxford. *Presented by Sir R. Owen, K.C.B.,* 1884.

**47989-90.** The crowns of five teeth ; from the Oxford Clay of Oxford. *Presented by the Hon. R. Marsham,* 1877.

**32648.** The crown of a tooth ; from the Oxford Clay of Vaches Noires, Normandy. *Tesson Collection.* *Purchased,* 1857.

**32643-4.** The crowns of two smaller teeth, apparently belonging to this genus ; from Vaches Noires. *Same history.*

*The generic reference of the following specimen is provisional.*

40428. The centrum and part of the arch of a large dorsal vertebræ; from the Neocomian of Potton (derived).

*Purchased, 1867.*

Genus **METRIORHYNCHUS**, Meyer<sup>1</sup>.

Syn. *Cricosaurus*, Wagner<sup>2</sup>.

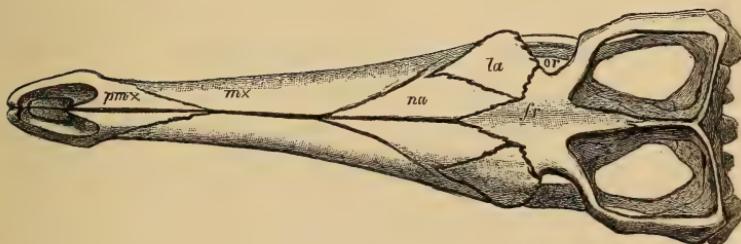
(?) *Gnathosaurus*, Meyer<sup>3</sup>.

(?) *Rhacheosaurus*, Meyer<sup>4</sup>.

(?) *Crocodilemus*, Jourdan<sup>5</sup>.

The skull (fig. 14) generally longer and more slender than in *Dacosaurus*, with a slight premaxillary expansion, and with sculpture; splenial part of mandibular symphysis forming a narrow elongated triangle; palatal aspect of anterior part of maxillæ and mandible channelled; teeth usually more numerous, slender, slightly curved, carinated, and frequently with the enamel fluted.

Fig. 14.



*Metriorhynchus hastifer*, Deslongchamps.—The cranium; from the Kimeridge Clay of Normandy.  $\frac{1}{6}$ . pmx, premaxilla; mx, maxilla; na, nasal; la, lachrymal; fr, frontal; or, orbit. (After Deslongchamps.)

This genus has been the subject of great confusion owing to the false restoration of the original Honfleur skulls, and its real definition must date from the description of Deslongchamps. *Cricosaurus*, of the Solenhofen Limestones, presents all the characters of

<sup>1</sup> Palæologica, p. 106 (1832). For application, see page 91, note 2.

<sup>2</sup> Abh. k.-bay. Ak. Wiss. vol. viii. p. 417 (1860).

<sup>3</sup> Museum Senckenburg, vol. i. p. 3 (1834).

<sup>4</sup> Nova Acta Ac. Cæs. Leop.-Car. vol. x. pt. 2, p. 173 (1831).

<sup>5</sup> Quoted in Deslongchamps' 'Notes Paléontologiques,' p. 119 (1867).

the present genus, while *Gnathosaurus*, from the same deposits, may perhaps be also included. *Rhacheosaurus*, which was founded upon vertebræ from the last-named formation, was identified by D'Alton and Burmeister<sup>1</sup> with *Æolodon*, but from its larger size it is more probable that it may have belonged to the present genus. *Crocodilæmus* was identified by Deslongchamps provisionally with *Æolodon*, from which it differs in the character of the teeth and armour.

**Metriorhynchus superciliösus**, Deslongchamps<sup>2</sup> (*ex*  
Blainville, MS.).

Syn. *Crocodilus superciliösus*, Blainville (MS.).

*Teleosaurus superciliösus*, Deslongchamps<sup>3</sup>.

Of medium size, with the nasals not reaching the premaxillæ; the prefrontals large and very convex externally; the frontals strongly pitted posteriorly.

This species must apparently be regarded as the type of the genus, since it was on fragments of its skull joined to those of other genera and species that Cuvier founded both his ‘*Gavial à museau allongé*’ and ‘*Gavial à museau plus court d'Honfleur*’<sup>4</sup>; the latter being the *Steneosaurus rostro-minor* of authors, to which Meyer applied the generic name *Metriorhynchus* with the affix *geoffroyi*<sup>5</sup>.

**32617.** The imperfect hinder portion of the cranium, showing the occipito-parietal region and the hinder part of the frontals; from the Oxford Clay (Middle Jurassic) of Vaches-Noires (Calvados), France. It agrees exactly with the corresponding portion of the type cranium figured by Deslongchamps in his ‘*Notes Paléontologiques*,’ pl. xx. fig. 2 *a*.

*Tesson Collection. Purchased, 1857.*

**32614.** Fragment of the anterior portion of the cranial rostrum, showing four dental alveoli on either side, and one replacing tooth *in situ*; from Vaches-Noires.

*Same history.*

**32616.** The imperfect frontal; from Vaches-Noires. *Same history.*

<sup>1</sup> Der fossile Gavial von Boll, p. 77 (1854).

<sup>2</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. i. p. 149 (1867).—*Teleosaurus*.

<sup>3</sup> *Loc. cit.*

<sup>4</sup> See Deslongchamps, ‘*Notes Paléontologiques*,’ p. 309.

<sup>5</sup> The writer thinks it might have been advisable to retain this name.

**Metriorhynchus moreli**, Deslongchamps<sup>1</sup>.

Of considerably larger size than the preceding ; from which it is readily distinguished by the outer border of the prefrontals being much less convex, and the pitting of the posterior part of the frontals very indistinct.

*Hab.* Europe (France and England).

- 32618.** The imperfect hinder portion of the cranium, showing the occipito-parietal region, the frontals, prefrontals, and proximal extremities of the nasals ; from the Oxford Clay (Middle Jurassic) of Vaches-Noires (Calvados), France. This specimen accords precisely with the corresponding region of the type cranium figured by Deslongchamps in his 'Notes Paléontologiques,' pl. xxii. fig. 1 *a*.

*Tesson Collection. Purchased, 1857.*

- 32625.** The imperfect anterior extremity of the cranial rostrum in a rolled condition ; from Vaches-Noires. *Same history.*

- 32623.** The greater portion of the cranial rostrum, showing the imperfect nasals, maxillæ, and premaxillæ ; from Vaches-Noires. *Same history.*

- 32622.** The greater portion of the right ramus of the mandible, wanting the two extremities ; from Vaches-Noires.

*Same history.*

- 46323.** The symphysis of the mandible ; from the Oxford Clay of Chippenham, Wiltshire. This specimen agrees precisely with the type mandible figured by Deslongchamps, *op. cit.* pl. xxii. fig. 2 *a* ; it is noticed by A. Smith Woodward in the 'Geol. Mag.' dec. 3, vol. ii. p. 503 (1885).

*Cunnington Collection. Purchased, 1875.*

- 46323 a.** Crown of a large tooth said to have been found with the preceding specimen. *Same history.*

- 46797.** Mass of matrix containing portions of the cranium and mandible ; from the Oxford Clay of Melksham, Wiltshire. The occipital condyle, part of the premaxillæ with teeth, as well as a large portion of the left ramus of the mandible with teeth are well preserved ; the enamel of the teeth is fluted. *Same history.*

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. iii. p. 187 (1869).

- 32643, 4, 5, 9.** Crowns of teeth, probably belonging to the present species ; from Vaches-Noires. *Tesson Collection.*

**Metriorhynchus elegans** (Wagner<sup>1</sup>).

Syn. *Steneosaurus elegans*, Wagner<sup>2</sup>.  
*Cricosaurus elegans*, Wagner<sup>3</sup>.

If the type specimen be adult, this form is distinguished by its comparatively small size, the length of the cranium being about 0,250 ; the details of cranial structure are unknown.

*Hab.* Europe (Germany).

- 43005.** A split slab of lithographic limestone containing the skull and part of the vertebral column in a crushed condition ; from the Kimeridgian (Upper Jurassic) of Eichstadt, Bavaria. The skull agrees exactly in size with the type specimen figured by Wagner in the ‘Abh. k.-bay. Ak. Wiss.’ vol. viii. pl. xiv.

*Van Breda Collection. Purchased, 1871.*

- 37006.** A slab of limestone containing the anterior portion of a skull, not improbably belonging to an immature individual of this species ; from the Kimeridgian of Solenhofen, Bavaria. *Purchased, 1862.*

**Metriorhynchus (?)**, sp.

The following form (*Crocodilæmus* of Jourdan, MS.) was provisionally identified by Deslongchamps<sup>4</sup> with *Aeolodon*, but the ventral scutes are pitted and the teeth are subequal, so that there seems no reason for separating it from the present genus, although the upper surface of the cranium is not shown.

*Hab.* Europe (France).

- 40344.** Cast of a slab of limestone exhibiting the ventral aspect of the nearly entire endo- and exo-skeleton, probably of a young individual. The original was obtained from the Kimeridgian (Upper Jurassic) of Cirin (Aix), France, and is believed to be in the Museum at Lyons. The mandibular symphysis has been separated ; the scales of the ventral buckler are arranged in eight rows, and are strongly pitted, with slight carinae. *Purchased, 1867.*

<sup>1</sup> Abh. k.-bay. Ak. Wiss. vol. vi. p. 705 (1852).—*Steneosaurus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Ibid. vol. viii. p. 436 (1860).

<sup>4</sup> Notes Paléontologiques, p. 119.

SPECIMENS OF WHICH AT LEAST SOME BELONG TO *Metriorhynchus*.

A. From the Middle Jurassic of England (some may be *Steneosaurus*).

- 47044.** The crowns of two teeth; from the Calcareous Grit of Heddington, Oxfordshire.

*Presented by Sir R. Owen, K.C.B.*

- R. 471.** Several imperfect and crushed cervical and dorsal vertebræ; from the Oxford Clay of Stanground, near Peterborough, Northamptonshire. These specimens agree in general characters with the vertebræ of *M. palpebrosus*, figured by Phillips in his 'Geology of Oxford,' p. 382, fig. 185 (as *Steneosaurus*). *Same history.*

- 36336–39.** The crowns of four teeth; from the Coralline Oolite of Malton, Yorkshire. *Bean Collection.* *Purchased, 1862.*

- B. From the Middle Jurassic (Oxford Clay) of *Vaches-Noires (Calvados)*, France (some may be *Steneosaurus*). Unless it is otherwise stated, these specimens belong to the Tesson Collection. *Purchased, 1857.*

*The following indicate large individuals.*

- 32627.** An imperfect sacral vertebra, with the left rib.

- 32628.** An imperfect late dorsal or lumbar vertebra.

- 32629.** A slightly imperfect early dorsal vertebra.

- 32630.** A somewhat imperfect middle caudal vertebra.

- 32632.** An imperfect dorsal vertebra.

- 32633.** A late trunk vertebra.

- 32634.** An imperfect early dorsal vertebra.

- 32635.** The centrum and part of the arch of an early caudal vertebra.

*Some of the following indicate smaller individuals.*

- 32636.** A slightly imperfect middle dorsal vertebra.

- 32637.** The somewhat imperfect third dorsal vertebra.

- 32639.** A mass of matrix with two slightly imperfect late dorsal vertebræ.
- 32640.** The centrum of a late dorsal or lumbar vertebra.
- 32641.** The rolled centrum of a sacral vertebra.
- 27488.** The centrum and part of the arch of a cervical vertebra.  
*Hastings Collection. Purchased, 1855.*
- 27488 a.** Two slightly imperfect dorsal vertebræ. *Same history.*
- 27488 b.** A somewhat imperfect middle caudal vertebra.  
*Same history.*

C. *From the Upper Jurassic of England (all are probably Metriorhynchus).*

Some of the following may be referable to *M. palpebrosus* (Phillips<sup>1</sup>), which appears very closely allied to the French *M. hastifer*, Deslongchamps<sup>2</sup>; the distinction of the latter from the German *M. grandis* (Wagner<sup>3</sup>) being not apparent.

**43000.** The crowns of two teeth; from the Kimeridge Clay of Weymouth, Dorsetshire. *Purchased, 1871.*

**R. 411.** The crown of a tooth; from the Kimeridge Clay of Weymouth. *Presented by C. Westendarp, Esq., 1884.*

**24803.** The centrum of a dorsal or lumbar vertebra; from the Kimeridge Clay of Wootton-Bassett, Wiltshire. Although smaller, this specimen agrees with the vertebra of *M. palpebrosus*, figured by Phillips, *op. cit.* p. 382, fig. 185.  
*Purchased, 1849.*

**24803 a.** An imperfect dorsal vertebra; from Wootton-Bassett.  
*Same history.*

**46492.** An imperfect dorsal vertebra; from the Kimeridge Clay of Foxhangers, near Devizes, Wiltshire.  
*Purchased, 1875.*

**45911.** The centrum of a dorsal or lumbar vertebra of a narrower type; from the Kimeridge Clay of Weymouth.  
*Purchased, 1874.*

<sup>1</sup> 'Geology of Oxford,' p. 381, figs. 182, 183.—*Steneosaurus*.

<sup>2</sup> See 'Notes Paléontologiques,' pl. xxiv.

<sup>3</sup> Abh. k.-bay. Ak. Wiss. vol. viii. pl. xii.—*Cricosaurus*.

**47435.** The centrum of a similar vertebra; from the Kimeridge Clay of Ely, Cambridgeshire.

*Sharp Collection. Purchased, 1876.*

**43032, 44179.** The centra of two caudal vertebræ; from Weymouth.  
*Purchased, 1873.*

**41233.** A ventral dermal scute; from the Kimeridge Clay of Ely.  
Closely resembles the specimen figured by Deslongchamps,  
*op. cit. pl. xxiv. fig. 6*, as *M. incertus*.  
*Purchased, 1868.*

**41973.** Part of a similar scute.  
*Purchased, 1870.*

*Incertæ sedis.*

Genus **ÆOLODON**, Meyer<sup>1</sup>.

Characters of cranium imperfectly known, owing to crushing; teeth of unequal size, a long and a short one being arranged alternately; orbits apparently directed somewhat outwardly; mandibular symphysis wide and slightly concave anteriorly; anterior nares apparently like those of the next subfamily; ventral armour consisting of small, closely-joined scutes, only slightly pitted.

Reasons have been already adduced for doubting the identification with this genus of *Rhacheosaurus* and *Crocodilæmus*.

**Æolodon priscus** (Sömmering<sup>2</sup>).

Syn. *Crocodilus priscus*, Sömmering .

*Teleosaurus soemmerringi*, Holl<sup>4</sup>.

*Gavialis priscus*, Gray<sup>5</sup>.

*Teleosaurus priscus*, Owen<sup>6</sup>.

*Teleosaurus gracilis*, D'Alton & Burmeister<sup>7</sup> (*in parte*).

The type species; if the type is adult it is of small size, the length of the cranium being about 0,175; teeth  $\frac{(25-26)}{(25-26)}$ .

*Hab.* Europe (Germany and France).

**R. 1086.** A split slab of lithographic limestone, containing the nearly (Fig.) entire skeleton; from the Kimeridgian (Upper Jurassic)

<sup>1</sup> *Isis*, 1830, p. 518.

<sup>2</sup> *Denkschr. k. Ak. München*, vol. v. p. 9 (1814).—*Crocodilus*.

<sup>3</sup> *Loc. cit.*      <sup>4</sup> *Handbuch der Petrefactenkunde*, vol. i. p. 87 (1829).

<sup>5</sup> *Synopsis Reptilium*, p. 56 (1831).

<sup>6</sup> *Rep. Brit. Assoc. for 1841*, p. 76.

<sup>7</sup> *Der fossile Gavial von Boll*, p. 77 (1854).

of Daiting, near Monheim, Bavaria. The type specimen ; figured by Sömmerring in the 'Abh. k.-bay. Ak. Wiss.' vol. v. pl. i., and by Cuvier in the 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, pl. vi. fig. 1 ; and noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 76, and by D'Alton and Burmeister in their 'Gavial von Boll,' pp. 69, 77.

*Sömmerring Collection. Purchased, 1827.*

- 37007.** A split slab of limestone containing part of a badly preserved skull, not improbably belonging to this species ; from the Kimeridgian of Solenhofen, Bavaria.

*Purchased, 1862.*

#### Subfamily TELEOSAURINÆ.

Skull either moderately or excessively elongated, with the teeth moderately or very slender, and orbits regular and directed more or less frontally, so as to be completely visible from the frontal aspect. Anterior nares transversely elongated, and directed more or less anteriorly ; nasals separated by a long interval from the premaxillæ ; premaxillæ usually short and more or less expanded, and generally with four dental alveoli. The palatal aspect of the maxillæ and mandible somewhat convex. Nasals small ; lachrymals large ; frontals and prefrontals small ; palato-pterygoid vacuities not extensive.

The terms *Teleidosaurus*, *Pelagosaurus*, and *Steneosaurus* were originally employed by Deslongchamps as subgenera of *Teleosaurus*, but were subsequently raised to the rank of genera.

#### Genus **TELEIDOSAURUS**, Deslongchamps<sup>1</sup>.

Skull with the rostrum comparatively short and broad, and the teeth few, rather stout, carinated, vertical, and curved ; premaxillæ elongated and slightly expanded, with three dental alveoli on either side ; orbits not perfectly regular, and directed somewhat laterally ; supratemporal fossæ moderately large and angulated ; frontals large ; posterior nares unknown ; 23 upper teeth in type species.

This and the following genus connect the typical members of this subfamily with the *Metriorhynchinae*.

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. iii. p. 142 (1869).—As a subgenus.

**Teleidosaurus joberti**, Deslongchamps<sup>1</sup>.

Distinguished from the typical *T. calvadosi* by the narrower and more compressed mandible, and the relative position of its four anterior dental alveoli.

*Hab.* Europe (France).

- 32612.** Cast of a portion of the right ramus of the mandible. The original was obtained from the Fuller's-earth (Lower Jurassic) near Caen (Calvados), France, and forms part of the type specimen figured (reversed) by Deslongchamps in his 'Notes Paléontologiques,' pl. xviii. fig. 4.

*Tesson Collection. Purchased, 1857.*

Genus **MACHIMOSAURUS**, Meyer<sup>2</sup>.

Skull with the rostrum short and broad, and the teeth comparatively few, very stout, vertical, nearly straight, with fluted enamel, but without carinæ; premaxillæ considerably expanded, with three dental alveoli; orbits directed mainly frontally, and elongated transversely; supratemporal fossæ very large and ovoid, with posterior angulation; frontals small; posterior nares unknown. About 17 upper teeth in type species. Splenial element of symphysis forming a short triangle. This genus is regarded by Sauvage and Lienard as most nearly allied to *Teleidosaurus*.

**Machimosaurus hughi**, Meyer<sup>3</sup>.

The type species. Of comparatively large size, but the skull unknown.

*Hab.* Europe (Germany).

- R. 233.** Cast of a tooth. The original was obtained from the Portlandian (Upper Jurassic) of Soleure (or Solothurn), Switzerland.  
*Egerton Collection. Purchased, 1882.*

- 33239, 43638.** Three imperfect teeth; from Soleure.

*Hastings Collection. Purchased, 1855.*

- R. 5.** Five imperfect teeth; from Soleure.  
*Purchased, 1880.*

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. iii. p. 155 (1869).

<sup>2</sup> Neues Jahrb. 1837, p. 560.—*Errorim Madrimosaurus*.

<sup>3</sup> Loc. cit.

**Machimosaurus mosæ**, Sauvage & Lienard<sup>1</sup>.

Syn. *Teleosaurus mosæ*, Lienard<sup>2</sup> (MS.).

The largest known Crocodilian; its distinctness from the type species not very apparent. Typically from the Kimeridgian of France. Thirteen lower teeth, of which three or four are postsymphysial; the length of the mandible is usually about 1,322 (52 in.).

*Hab.* Europe (France and England).

**R. 1089.** The occipital region of the cranium and the associated mandible; from the Kimeridge Clay (Upper Jurassic) of Kimeridge Bay, Dorsetshire. The mandible is figured by Owen in his 'Reptilia of the Kimeridge Clay' (Mon. Pal.

<sup>†</sup> Soc.), pl. xii. figs. 3–5 (1868), under the name of *Pliosaurus trochanterius*. Its crocodilian nature was pointed out by Deslongchamps in his 'Notes Paléontologiques,' p. 329, where it is referred to *Metriorhynchus*; and it is mentioned under that name by A. Smith Woodward in the 'Geol. Mag.' 1885, p. 502. The mandible cannot be distinguished from that of the type of the present species figured by Sauvage and Lienard, in the 'Mém. Soc. Géol. France,' sér. 3, vol. i. art. 4, pl. xxiii. (iv.); but the present specimen shows there was no terminal expansion of the symphysis; there are thirteen lower teeth; the hinder portion of the cranium is essentially of a Teleosaurine type, and agrees with the fragments of the same part in the type specimen. The length of the entire mandible is 1,322 (52 inches), the length of the type mandible, as restored by Sauvage and Lienard, to the extremity of the glenoid cavity, being 1,296 (51 inches); the length from the posterior extremity of the glenoid cavity to the extremity of the splenial is 1,020 (42 inches) in the former, and from the condyle 1,090 (42·6 inches) in the latter; and the width of the posterior part of the symphysis 0,203 (8 inches) in the former, and 0,208 (8·2 inches) in the latter. *Presented by J. C. Mansel-Pleydell, Esq.*, 1866.

<sup>1</sup> Mém. Soc. Géol. France, sér. 3, vol. i. art 4, p. 11 (1879).

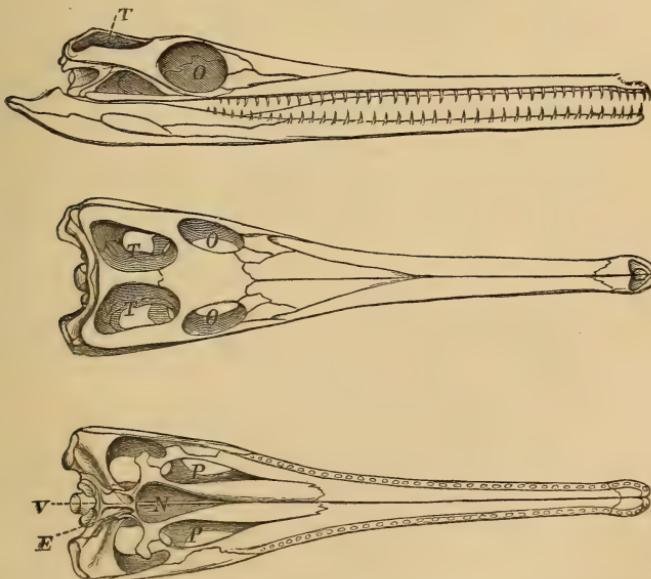
<sup>2</sup> Vide Sauvage and Lienard, *op. cit.* p. 7, note 1.

Genus **PELAGOSAURUS**, Bronn<sup>1</sup>.

Syn. *Engyommasaurus*, Kaup<sup>2</sup>.  
*Mosellosaurus*, Monard<sup>3</sup>.

Cranium more or less elongated and narrow, with the teeth numerous, frequently widely separated, comparatively slender, grooved, and implanted nearly vertically; premaxillæ short and slightly expanded; orbits regular, and placed more or less laterally; supratemporal fossæ moderately large and subovate; postorbital bar inclined obliquely backwards, so that the posterior border of the orbit is placed nearly on the same line as the anterior border of the supratemporal fossa; infraorbital bar very shallow; upper temporal arcade sculptured; posterior nares narrow and pear-shaped, with their anterior extremity extending between the palatines; palato-pterygoid vacuities large.

Fig. 15.



*Pelagosaurus typus*.—Lateral view of skull and upper and lower views of cranium; from the Upper Lias. *E*, eustachian aperture; *N*, posterior nares; *O*, orbit; *P*, palatine vacuity; *T*, supratemporal fossa; *V*, basioccipital.  $\frac{1}{4}$ .

<sup>1</sup> In Bronn and Kaup's 'Gavialartigen Reptilien,' p. 28 (1841).

<sup>2</sup> Quoted in Neues Jahrb. 1835, p. 623. This name has the priority.

<sup>3</sup> Ann. Soc. R. Sci. Orléans, vol. ix. p. 1 (1847).

**Pelagosaurus typus**, Bronn<sup>1</sup>.

- Syn. *Steneosaurus bromii*, Laurillard<sup>2</sup>.  
*Mosellosaurus rostro-minor*, Monard<sup>3</sup>.  
*Crocodilus temporalis*, Blainville<sup>4</sup>.  
*Teleosaurus mosellana*, Terquem<sup>5</sup>.  
*Teleosaurus temporalis*, Gervais<sup>6</sup>.

Of small size, measuring from 1 metre to 1·20 in length. Rostrum comparatively short, sculpture on cranium (fig. 15) strongly marked; orbits extremely lateral; teeth  $\frac{39}{30}$ , very nearly vertical, and widely spaced; preorbital vacuity of medium size, and placed at some distance in advance of the orbit. Length of cranium 0,280.

*Hab.* Europe.

- 15296.** Cast of the nearly entire skeleton. The original, which is the type, was obtained from the Upper Lias of Boll, Würtemberg, and is figured in Bronn and Kaup's 'Gavialartigen Reptilien,' pls. iii., iii. A, iii. B.

*Purchased.* About 1840.

- 19735.** Cast of the skull and anterior cervical vertebrae. The original is from Boll, and is figured by D'Alton and Burmeister in their 'Fossile Gavial von Boll,' pl. xi. and pl. xii. fig. 1. A similar cast is apparently the one referred to by Deslongchamps in his 'Notes Paléontologiques,' p. 263.

*Same history.*

- R. 1087.** Cast of the entire endo- and exoskeleton. The original was obtained from the Upper Lias of Curey (Calvados), France, and is preserved in the Paris Museum of Natural History.

*Purchased.*

- 14437.** The imperfect hinder portion of the cranium, with the outer surface of the bones much corroded; from the Upper Lias, probably of Whitby, Yorkshire.

*No history.*

- 32598.** The nearly entire vertebral column with the overlying (*Fig.*) dermal scutes; from Curey. Figured by Deslongchamps in the 'Mém. Soc. Linn. Normandie,' vol. xii. pl. vii., and

<sup>1</sup> *Gavialartigen Reptilien*, p. 28 (1841).

<sup>2</sup> *Dict. Univ. Hist. Nat.* vol. iv. p. 365 (1841).

<sup>3</sup> *Ann. Soc. R. Sci. Orléans*, vol. ix. p. 1 (1847).

<sup>4</sup> *Ostéographie—Genus Crocodilus*, pl. vi. (no date).

<sup>5</sup> *Paléontologie de la Moselle*, p. 22 (1855).

<sup>6</sup> *Zool. et Pal. Françaises*, 2nd ed. p. 449 (1859).

also by Huxley in the 'Mem. Geol. Surv. Eng.' Monograph iii. (*Stagonolepis*) pl. xii.

*Tesson Collection. Purchased, 1857.*

32599. The skull, wanting the anterior extremity; from the Upper (Fig.) Lias of Amayé-sur-Orne (Calvados). Figured (with some restoration) by Deslongchamps, *op. cit.* pl. i. figs. 1–6, and (cranium only) in his 'Le Jura Normand,' pt. 4, pl. iv. figs. 2a, 2d, and also by Huxley, *op. cit.* pl. xi. figs. 1, 1a, 1b. *Same history.*
32600. The occipital and fronto-parietal regions of the cranium; (Fig.) from Curey. Figured by Deslongchamps in the 'Mém. Soc. Linn. Normandie,' vol. xii. pl. i. figs. 7–9, and also in 'Le Jura Normand,' pl. iv. figs. 4a, 4b. *Same history.*
32601. The greater portion of the ventral dermal buckler; from (Fig.) Curey. Figured (with restoration) by Deslongchamps in the 'Mém. Soc. Linn. Normandie,' vol. xii. pl. viii. fig. 9, and also by Huxley, *op. cit.* pl. xi. fig. 2. *Same history.*
32602. Ten dorsal vertebræ; from Curey. *Same history.*
32603. Four cervical vertebræ; from Curey. *Same history.*
32604. The left pubis; from Curey. *Same history.*
32605. The left ischium; from Curey. *Same history.*
32606. The proximal portions of the right and left femora; from Curey. *Same history.*
32607. Two cervical ribs; from Curcy. *Same history.*

### **Pelagosaurus bronniarti** (Kaup<sup>1</sup>).

- Syn. *Engyommasaurus bronniarti*, Kaup<sup>2</sup>.  
*Mystriosaurus bronniarti*, Bronn<sup>3</sup>.  
*Mystriosaurus tenuirostris*, Münster<sup>4</sup>.  
*Teleosaurus opilites*, Deslongchamps<sup>5</sup>.

Of large size, the entire length being about two metres. Rostrum much elongated and slender; sculpture on cranium slight; orbits more anterior than in the last species; teeth stouter and less nearly

<sup>1</sup> Quoted in Neues Jahrb. 1835, p. 623.—*Engyommasaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> In Bronn and Kaup's 'Gavialartigen Reptilien,' p. 35 (1841).

<sup>4</sup> Neues Jahrb. 1843, p. 130.

<sup>5</sup> Mém. Soc. Linn. Normandie, vol. xiii. p. 126 (1863).

vertical, long and slightly curved,  $\frac{4}{40}$  in number; preorbital vacuity large, and approximated to orbit.

**14792.** The anterior portion of the skeleton; from the Upper Lias (*Fig.*) of Whitby, Yorkshire. Figured by Owen in his 'British Fossil Reptiles'—*Crocodilia*, pl. xv. fig. 1, under the name of *Teleosaurus chapmani*, and referred to the present species by Deslongchamps in 'Le Jura Normand,' pt. iv. p. 11. The tail of another Teleosaurian has been affixed to the specimen, and represented in the figure.

*Purchased. About 1840.*

**15500.** The greater part of the skeleton, the skull being entire; from Whitby. *Purchased. About 1840.*

**R. 757.** The nearly entire cranium; from Whitby. *No history.*

**R. 4.** The cranium, wanting the rostrum; from Whitby.

*Purchased, 1880.*

**11589.** Cast of a crushed cranium, without the rostrum. The original was obtained from Whitby.

*Mantell Collection. Purchased, 1838.*

#### Genus **STENEOSAURUS**, E. Geoffroy<sup>1</sup>.

Including *Mystriosaurus*, Kaup<sup>2</sup> = *Macropondylus*, Meyer<sup>3</sup>.

Rostrum more or less elongated and narrow, with the teeth numerous, generally stout and directed somewhat obliquely outwards, grooved, and with vertical carinae; premaxillæ obliquely truncated anteriorly, with a marked deflection of the extremity, which is more or less expanded; orbits regular, and directed more or less completely frontally; supratemporal fossæ usually very large and angulated; postorbital bar directed more or less nearly at right angles to the longer axis of the cranium, so that the posterior border of the orbit is placed well in advance of the adjacent border of the supratemporal fossa; infraorbital bar deep; upper temporal arcade not sculptured; posterior nares broad, ovate or rounded, and placed in advance of temporal fosse; palato-pterygoid vacuities large.

The writer follows the original view of Deslongchamps<sup>4</sup> of regarding *Mystriosaurus* as not generically separable from *Steneosaurus*.

<sup>1</sup> Mém. du Muséum, vol. xii. p. 146 (1825). Regarding the application of the term, see page 91, note 2.

<sup>2</sup> In Bronn's 'Lethaea,' 1st ed. vol. i. (1835).—(Page 525 in 2nd ed.)

<sup>3</sup> Nova Acta Ac. Cæs. Leop.-Car., vol. xv. pt. 2, p. 196 (1831).

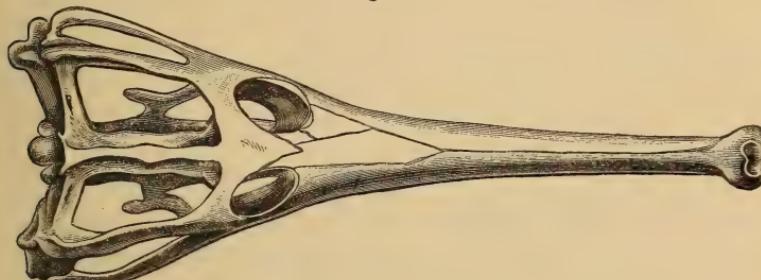
<sup>4</sup> Notes Paléontologiques, p. 128. Subsequently this writer considered the two as distinct.

### A. *Mystriosaurine Group.*

The orbits placed more or less laterally; the posterior nares elongated and ovate, the middle line of the cranium more or less convex, and the supratemporal fossæ generally not excessively large.

*Steneosaurus heberti*, Morel de Glasville<sup>1</sup> (fig. 16), from the Lower Oxfordian of Normandy, seems to be the latest representative of the group, but in its large supratemporal fossæ approximates to the next group.

Fig. 16.



*Steneosaurus heberti*.—Upper view of the cranium; from the Lower Oxfordian of Normandy. About  $\frac{1}{2}$ . The bones on the right side of the rostrum are imperfect; there should have been a line connecting the apex of the frontals with the suture dividing the maxillæ; the preorbital vacuity is not shown.

### *Steneosaurus bollensis* (Jäger<sup>2</sup>).

Syn. *Crocodilus bollensis*, Jäger<sup>3</sup>.

*Teleosaurus bollensis*, Holl<sup>4</sup>.

*Macropondylus bollensis*, Meyer<sup>5</sup>.

*Mystriosaurus bollensis*, D'Alton and Burmeister<sup>6</sup>.

*Mystriosaurus teidmanni*, Bronn<sup>7</sup>.

*Mystriosaurus egertoni*, Kaup<sup>8</sup>.

*Mystriosaurus schmidti*, Bronn<sup>9</sup>.

*Mystriosaurus mandelslohi*, Bronn<sup>10</sup>.

*Mystriosaurus longipes*, Bronn<sup>11</sup>.

*Mystriosaurus muensteri*, Wagner<sup>12</sup>.

*Mystriosaurus stukelyi*, Winckler<sup>13</sup> (*in parte*).

<sup>1</sup> Bull. Soc. Géol. France, sér. 3, vol. iv. p. 342 (1876). See also vol. viii. p. 318 (1880).

<sup>2</sup> Foss. Rept. Würtemberg, p. 6 (1828).—*Crocodilus*.

<sup>3</sup> Loc. cit.

<sup>4</sup> Handbuch der Petrefactenkunde, vol. i. p. 87 (1829).

<sup>5</sup> Nova Acta Ac. Cœs. Leop.-Car. vol. xv. pt. 2, p. 196 (1831).

<sup>6</sup> Der fossile Gavial von Boll, p. 73 (1854).

<sup>7</sup> In Bronn and Kaup's 'Gavialartigen Reptilien,' p. 28 (1841).

<sup>8</sup> Ibid. p. 3. <sup>9</sup> Ibid. p. 28. <sup>10</sup> Ibid. p. 28. <sup>11</sup> Ibid. p. 46.

<sup>12</sup> Abh. k.-bay. Ak. Wiss. vol. v. p. 516 (1850).

<sup>13</sup> Arch. Mus. Teyler, vol. iv. art. 1, p. 132 (1876).

The rostrum very long and narrow, the teeth slender, the orbits small and placed somewhat laterally, the supratemporal fossæ small. The synonymy is given on the authority of Burmeister and D'Alton<sup>1</sup>, who regard the type vertebræ as belonging to the same form as the crania.

*Hab.* Europe (Germany and England).

- 21546.** The nearly entire skeleton; from the Upper Lias of Boll, Würtemberg. The skull is perfectly preserved.

*Purchased*, 1847.

- 15295.** Cast of the nearly entire skeleton. The original was obtained from Boll, and is figured in Kaup and Bronn's 'Gavialartigen Reptilien,' pls. ii. A, ii. B, ii. C, under the name of *Mystriosaurus teidemanni*, of which it is the type.

*Purchased.* About 1840.

- 14436.** The hinder part of the cranium and mandible; from the Upper Lias of Whitby, Yorkshire. The characteristic form of the postorbital bar is well shown; while the small, ovate orbits, and minute preorbital vacuities are also distinctive features of this species. *No history.*

**Steneosaurus chapmani** (Buckland<sup>2</sup> [*ex* König, MS.]).

Syn. *Teleosaurus chapmani*, Buckland<sup>3</sup> (*in parte*).

*Mystriosaurus laurillardi*, Kaup<sup>4</sup>.

*Mystriosaurus chapmani*, Bronn<sup>5</sup>.

*Mystriosaurus macrolepidotus*, Wagner<sup>6</sup>.

? *Mystriosaurus speciosus*, Münster<sup>7</sup>.

*Mystriosaurus stukelyi*, Winckler<sup>8</sup> (*in parte*).

The rostrum shorter and wider than in the last species, with the orbits relatively larger.

Winckler has proposed to regard this species merely as a variety of *S. bollensis*.

*Hab.* Europe (England and Germany).

<sup>1</sup> See Winckler, Arch. Mus. Teyler, vol. iv. art. 1, p. 132 (1876),

<sup>2</sup> Geology and Mineralogy (Bridgewater Treatise), 1st ed. vol. ii. p. 35 (1837).—*Teleosaurus (errorim, chapmanni)*.

<sup>3</sup> *Loc. cit.*

<sup>4</sup> Quoted in Neues Jahrb. 1835, p. 623.

<sup>5</sup> Gavialartigen Reptilien, p. 27 (1854).

<sup>6</sup> Abh. k.-bay. Ak. Wiss. vol. v. p. 555 (1850).

<sup>7</sup> Neues Jahrb. 1843, p. 129.

<sup>8</sup> Arch. Mus. Teyler, vol. iv. art. 1, p. 132 (1876).

**R. 1087** a. The cranium and the anterior part of the axial skeleton, (*Fig.*) and various dorsal scutes; from the Upper Lias of Whitby, Yorkshire. This specimen appears to be the one discovered by Captain Chapman in 1758, and figured in the Phil. Trans. for that year, pls. xxii. and xxx., and should thus be regarded as the type of the species. Originally the specimen was curved laterally as in the figure, but the head was subsequently chiselled out and placed in its present position. When figured some of the caudal vertebrae remained, but these were lost in extraction.

*Presented by the Council of the Royal Society.*

**R. 324.** The hinder portion of an immature cranium, apparently belonging to this species; from Whitby.

*Enniskillen Collection. Purchased, 1882.*

**14438.** The crushed middle and rostral portions of a cranium probably referable to an immature individual of this species; from Whitby. *No history.*

*The following specimens may probably be referred to the present species.*

**47157.** A large portion of the mandibular symphysis; from the Lias of Greens-Norton, near Towcester, Northamptonshire. This specimen apparently agrees precisely with the corresponding portion of the type specimen; the splenial element is long and narrow.

*Sharp Collection. Purchased, 1876.*

**39154.** The greater portion of the mandibular symphysis, containing many of the teeth; from Whitby.

*Bowerbank Collection. Purchased, 1865.*

**14439.** A mass of dorsal vertebrae, ribs, and dermal scutes, belonging either to the present or following species; from Whitby. *No history.*

**33107.** A mass of rock containing two later dorsal vertebrae agreeing in size with the preceding; from Whitby.

*Purchased. About 1857.*

### **Steneosaurus brevior**, Blake<sup>1</sup> (*ex* Owen, MS).

Syn. *Teleosaurus brevior*, Owen<sup>2</sup>.

*Mystriosaurus brevior*, A. S. Woodward<sup>3</sup>.

<sup>1</sup> In Tate and Blake's 'Yorkshire Liias,' p. 244 (1876).

<sup>2</sup> 'British Fossil Reptilia'—*Crocodilia*, p. 140 (no date).

<sup>3</sup> Geol. Mag. dec. 3, vol. ii. p. 499 (1885).

The rostrum comparatively short and wide; the teeth about  $\frac{28}{25}$ , and stout; the orbits placed more anteriorly; the middle line of the cranium depressed; and the supratemporal fossæ large.

*Hab.* Europe (England).

- 14781.** The skull; from the Upper Lias of Whitby, Yorkshire.  
*(Fig.)* The type specimen; figured by Tate and Blake in their 'Yorkshire Lias,' pl. i. figs. 1, 2; and also by Owen in his 'British Fossil Reptilia'—*Crocodilia*, pl. xvi.

*Purchased. About 1840.*

- R. 756.** The hinder portion of the cranium, wanting the temporal arcades; from Whitby. Figured by Tate and Blake, *op. cit.* pl. i. fig. 3 (without specific name).

*No history.*

- R. 282 a.** The greater portion of a mandible perhaps belonging to an immature individual of this species; from Whitby. The splenial element is shorter and wider than in the specimen No. 47157 provisionally referred to *S. chapmani*.

*Egerton Collection. Purchased, 1882.*

- 20691.** The anterior extremity of a mandibular symphysis provisionally referred to this species; from Whitby. The reference is made on account of the large size of the teeth.

*Purchased, 1847.*

\*\* ***Steneosaurus minimus* (Quenstedt<sup>1</sup>).**

*Syn. Teleosaurus minimus*, Quenstedt<sup>2</sup>.

*Mystriosaurus minimus*, Winckler<sup>3</sup>.

Probably the young of one of the three preceding species.

*Hab.* Europe.

- 37991.** Cast of a slab containing the entire cranium. The original, which is the type, was obtained from the Upper Lias of Würtemberg, and is figured by Quenstedt in his 'Handbuch der Petrefactenkunde,' pl. vi. fig. 15.

*Purchased, 1864.*

*Generically undetermined specimens from the Upper Lias.*

- 33095.** The occipito-parietal region of a small cranium from Whitby.  
*Purchased. About 1857.*

<sup>1</sup> *Handbuch der Petrefactenkunde*, p. 101 (1852).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Arch. Mus. Teyler*, vol. iv. art. 1, p. 117 (1876).

- R. 1091. The corresponding portion of another cranium, apparently belonging to a different genus ; from Whitby. *No history.*
- R. 63. The imperfect cranial rostrum of a young individual ; from Whitby. *Purchased, 1881.*
- R. 63 a. The mandibular symphysis of a young individual ; from Whitby. *Same history.*
- R. 405. The anterior portion of the mandibular symphysis of a young individual ; from Saltwick Bay, Yorkshire. *Presented by C. Westendarp, Esq., 1884.*
47445. Several imperfect dorsal vertebræ and ventral scutes ; from Whitby. *Purchased, 1876.*
33105. Two larger imperfect dorsal vertebræ ; from Whitby. *Purchased. About 1857.*
- R. 65. An imperfect 6th or 7th dorsal vertebra ; from Boll. *Purchased, 1881.*

#### B. *Steneosaurine Group.*

The orbits directed frontally ; the posterior nares short and rounded, the middle line of the cranium much depressed, and the supratemporal fossæ in some instances very large.

#### **Steneosaurus latifrons** (Owen<sup>1</sup>).

Syn. *Teleosaurus latifrons*, Owen<sup>2</sup>.

Rostrum comparatively wide and flattened ; frontals flat ; orbits round, and not oblique ; premaxillæ moderately expanded ; supratemporal fossæ short and wide ; teeth about  $\frac{35}{35}$ , large.

*Hab.* Europe (England).

The type specimen is from Northamptonshire, and is said to be from the Great Oolite, but from the evidence of the following specimen its horizon may be lower.

47171. The nearly entire skull, together with thirteen associated imperfect dorsal vertebræ and four dorsal scutes ; from the Upper Lias of Northamptonshire. This specimen accords so exactly with the type cranium figured in

<sup>1</sup> British Fossil Reptilia, vol. iii. p. 141 (no date).—*Teleosaurus.*

<sup>2</sup> *Loc. cit.*

Owen's 'British Fossil Reptilia'—*Crocodilia*, pl. xvii., that there appears every reason for referring it to the same species; the type is, however, said to be from the "Great Oolite" of Northamptonshire, but the horizon may perhaps be incorrect. *Sharp Collection. Purchased, 1876.*

- 47171 a.** A detached tooth perhaps belonging to this species; from the Lias of Northamptonshire. *Same history.*

***Steneosaurus larteti*, Deslongchamps<sup>1</sup>.**

Syn. *Teleosaurus larteti*, Deslongchamps<sup>2</sup>.

Rostrum comparatively wide and convex; frontals strongly pitted and concave; orbits rounded and not oblique; premaxillæ slightly expanded; supratemporal fossæ excessively elongated; teeth  $\frac{(32-33)}{(32-33)}$ , stout, and short.

*Hab. Europe (France).*

- 32653-4.** Two teeth apparently agreeing precisely with the specimen figured in pl. xiv. fig. 5 of the 'Notes Paléontologiques' of Deslongchamps; from the Fuller's earth (Lower Jurassic) of Caen (Calvados), France.

*Tesson Collection. Purchased, 1857.*

- 33125.** The hinder extremity of a mandibular symphysis provisionally referred to this species; from Caen.

*Purchased. About 1857.*

***Steneosaurus stephani*, Hulke<sup>3</sup>.**

Apparently allied to the preceding species, but with the supratemporal fossæ relatively wider, and the outer border of the orbit straighter, and the inner more curved. Its right to distinction from the next species requires confirmation.

*Hab. Europe (England).*

- 49126.** Portions of the cranium and mandible; from the Cornbrash (*Fig.*) (Lower Jurassic) of Clasworth, Dorsetshire. The type specimen; figured by Hulke in the 'Proc. Dorset. Nat. Hist. Club,' vol. i. pl. i. *Purchased, 1878.*

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. i. p. 155 (1868).—*Teleosaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Proc. Dorset. Nat. Hist. Club, vol. i. p. 29 (1877).

**Steneosaurus brevidens** (Phillips<sup>1</sup>).

Syn. *Teleosaurus brevidens*, Phillips<sup>2</sup>.

So far as the small type figure<sup>3</sup> admits of judging, the supratemporal fossæ are relatively wider than in *S. larteti*, the orbits more oval and oblique, and the extremity of the muzzle more expanded. Teeth<sup>(31-32)</sup><sup>(31-32)</sup>.

*Hab.* Europe (England).

- R. 78. The greater portion of a broken mandible probably belonging to this species ; from the Great Oolite (Lower Jurassic) of Enslow Bridge, near Bletchington, Oxfordshire. This specimen apparently agrees closely with the mandible figured by Phillips, *op. cit.* p. 187, fig. 44.

*Presented by J. Wood-Mason, Esq., 1880.*

28609. Part of the right maxilla of a Steneosaure not improbably belonging to this species ; from the Great Oolite of Stonesfield, Oxfordshire.

*Purchased, 1853.*

*The following specimens from the Stonesfield Slate agree with the teeth referred to the present species by Phillips, op. cit. p. 185, fig. 42.*

40127. Nine specimens of crowns of teeth ; from Stonesfield.

*Purchased. About 1866.*

28611. Three specimens of crowns of teeth ; from Eyeford, Gloucestershire.

*Purchased, 1853.*

*Several of the following specimens may probably be referred to the present species ; but others may belong to the next.*

4821. The imperfect third (?) cervical vertebra ; from the Great Oolite of Little Gibraltar, near Enslow Bridge, Oxfordshire.

*Presented by B. Bright, Esq., 1873.*

- R. 79. Three imperfect dorsal vertebræ ; from the Great Oolite of Enslow Bridge. These specimens agree precisely with the one figured by Phillips, *op. cit.* p. 190, fig. 47.

*Presented by J. Wood-Mason, Esq., 1880.*

- R. 82. An imperfect later dorsal vertebra in a laterally crushed condition ; probably from the Great Oolite of Oxfordshire.

*Same history.*

<sup>1</sup> 'Geology of Oxford,' p. 185 (1871).—*Teleosaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Ibid.* p. 186, fig. 43.

37720. Slab of sandstone with an imperfect vertebra; from Stonesfield. *Purchased*, 1863.
40126. A slab with a crushed late caudal vertebra; from Stonesfield. *Purchased*. *About* 1866.
- R. 78. Four fragments of late dorsal scutes; from Enslow Bridge. These resemble the specimen figured by Phillips, *op. cit.* p. 182, fig. 41. *Presented by J. Wood-Mason, Esq.*, 1880.
47998. Fragment of a (?) dorsal scute; from Stonesfield. *Presented by the Hon. R. Marsham*, 1877.
- 47998 a. Fragment of stone showing the under surface of a scute; from Stonesfield. *Same history*.
28497. Fragment of stone exhibiting the under surface of a scute; from Stonesfield. *Dixon Collection*. *Purchased*, 1851.
41312. An imperfect scute, seen from the inner surface; from Stonesfield. *Purchased*, 1869.

**Steneosaurus megistorhynchus**, Deslongchamps<sup>1</sup>.

Syn. *Teleosaurus megistorhynchus*, Deslongchamps<sup>2</sup>.  
*Steneosaurus rostro-major*, auct. (*in parte*).  
*Steneosaurus longirostris*, auct. (*in parte*).

Rostrum extremely elongated, narrow, and depressed; orbits ovoid, with the longer axis oblique; frontals depressed and moderately pitted; supratemporal fossæ comparatively small; teeth  $\frac{(37-38)}{(37-38)}$ , slender, spaced, with elongated curved crowns.

*Hab.* Europe (France and [?] England).

40907. Fragment of a maxillary rostrum, showing three dental alveoli, provisionally referred to this species; from the Gryphite Grit (Upper Inferior Oolite) of Leckhampton, Gloucestershire. This specimen apparently agrees precisely with the type figured by Deslongchamps in his 'Notes Paléontologiques,' pl. xv., and its horizon is only just below that of the Fuller's earth.

*Presented by C. Falconer, Esq.*, 1867.

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. i. p. 155 (1868).—*Teleosaurus*. This name is a modification of Geoffroy's *Sténosaure aux longs maxillaries*, with which Deslongchamps identifies this species, which is thus the type of the genus.

<sup>2</sup> *Loc. cit.*

**Steneosaurus edwardsi**, Deslongchamps<sup>1</sup>.

Syn. *Teleosaurus edwardsi*, Deslongchamps<sup>2</sup>.

Rostrum comparatively short and wide, with the interval between the nasals and premaxillæ short; frontals slightly pitted and concave; orbits ovoid and oblique; premaxillæ only very slightly expanded; supratemporal fossæ probably large; teeth  $\frac{28}{28}$ , with small alveoli.

*Hab.* Europe (France).

32620. Fragment of the hinder part of the cranial rostrum; from the Oxford Clay (Middle Jurassic) of Vaches-Noires (Calvados) France. It agrees with the corresponding part of the cranium figured by Deslongchamps in his 'Notes Paléontologiques,' pl. xvii.

*Tesson Collection. Purchased, 1857.*

**Steneosaurus megarhinus** (Hulke<sup>3</sup>).

Syn. *Teleosaurus megarhinus*, Hulke<sup>4</sup>.

Known only by the cranial rostrum, which is characterized by its slenderness, convexity, and great expansion of the premaxillæ.

*Hab.* Europe (England).

43086. The greater portion of the cranial rostrum; from the (Fig.) Kimeridge Clay (Upper Jurassic) of Kimeridge Bay, Dorsetshire. The type specimen; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxvii. pl. xviii.

*Presented by J. C. Mansel-Pleydell, Esq., 1870.*

**Steneosaurus, sp.**

The rostrum much elongated and narrow, with the teeth large, laterally compressed, and strongly carinated.

*Hab.* Europe (France).

33127. Fragment of the cranial rostrum, showing the bases of several teeth broken off in their alveoli together with their detached crowns; from the Fuller's earth (Lower Jurassic) of Caen (Calvados), France. In its elongated

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. i. p. 155 (1868).—*Teleosaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xxvii. p. 442 (1871).—*Teleosaurus*.

<sup>4</sup> *Loc. cit.*

form this specimen agrees with *S. megistorhynchus*<sup>1</sup>, but differs by its much larger teeth, which have an antero-posterior diameter of 0,011 and a transverse of 0,007.

*Purchased*, 1857.

SPECIFICALLY UNDETERMINED SPECIMENS.

**32650.** The crowns of three teeth ; from the Fuller's earth of Caen (Calvados), France. *Tesson Collection.* *Purchased*, 1857.

**32586.** An associated series of smaller teeth ; from Caen. *Same history.*

**47419.** The right and left femur ; from the Cornbrash of Peterborough, Northamptonshire.

*Sharp Collection.* *Purchased*, 1876.

**47168.** The proximal half of the right femur of a smaller form ; from the Cornbrash of Peterborough. *Same history.*

**47170.** Fourteen associated ventral scutes of the anterior and middle part of the posterior buckler, not improbably belonging to this genus ; from the Great Oolite of Belminsthorpe, near Stamford, Northamptonshire. Some of these specimens are nearly an inch in thickness, and the transition from an imbricating junction anteriorly to a sutural one posteriorly is well exhibited. *Same history.*

Genus **TELEOSAURUS**, Geoffroy<sup>2</sup>.

Rostrum greatly elongated, depressed, and slender, with crenulated alveolar borders, and the teeth very numerous, slender, and directed outwards, without carinae ; premaxillæ very short and obliquely truncated ; orbits completely circular and directed anteriorly ; supratemporal fossæ moderately large and angulated ; infraorbital bar deep ; posterior nares very broad, rounded, and placed in a line with the temporal fossæ ; palato-pterygoid vacuities small.

**Teleosaurus cadomensis**, Geoffroy<sup>3</sup>.

Syn. (?) *Crocodilus cadomensis*, Lamouroux<sup>4</sup>.

The type species. Of small size, the length of the cranium being

<sup>1</sup> See Deslongchamps 'Notes Paléontologiques,' pl. xv.

<sup>2</sup> Mém. du Muséum, vol. xii. p. 135 (1825).

<sup>3</sup> Ibid. p. 145.

<sup>4</sup> Ann. Gén. Sci. Phys. Brux. vol. iii. p. 163 (1820).

about 0,340; hinder portion of cranium much expanded, with large supratemporal fossæ; teeth  $\frac{(45-50)}{(45-50)}$ , approximated, and arranged in groups of three, of which the middle one is placed on a higher level than the others; nasals simple posteriorly.

*Hab.* Europe (France).

*The following specimens are from the Fuller's earth (Lower Jurassic) of Caen (Calvados), France, and the majority of them belong to the present species, although some may be referable to the closely allied *T. gladius*<sup>1</sup>. Unless it is stated to the contrary the specimens belong to the Tesson Collection. Purchased, 1857.*

**R. 880.** Cast of the left half of the cranium proper. The original is one of the types, and is figured by Cuvier in the 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, pl. vii. figs. 1-5; by Geoffroy in the 'Mém. du Muséum,' vol. xii. pl. xvi. figs. 1-3; and by De Blainville in his 'Ostéographie,' genus *Crocodilus*, pl. vi. *Purchased.*

**R. 880 a.** Cast of the cranium, wanting the rostrum. *Purchased.*

**32594.** Slab containing nine cervical and dorsal vertebræ with the ribs and dorsal scutes of the right side.

**32594 a.** Slab showing the last two lumbar, sacral, and first four caudal vertebræ, partly imperfect.

**32575.** Block with portions of two late dorsal vertebræ and right ribs.

**119.** Cast of a block exhibiting fifteen trunk vertebræ and the right anterior ribs and dorsal scutes. *Purchased, 1836.*

**32588.** The associated last dorsal, sacral, and first two caudal vertebræ.

**32611 a.** Two centra of cervical vertebræ.

**32609.** Two centra of late trunk vertebræ.

**32610.** A slightly imperfect late dorsal vertebra.

**32585.** Three ribs.

**32680.** The left ischium.

**28296.** The right femur. *Purchased, 1851.*

**28296.** Cast of the right femur.

<sup>1</sup> See Deslongchamps, 'Notes Paléontologiques,' pl. xii,

**32584.** An associated series of detached dorsal scutes.

**32584 a.** Four ventral (?) scutes.

**32584 x.** Matrix, showing the impression of the outer surface of the scutes of the dorsal buckler.

**32591.** A block, showing a number of ventral scutes in apposition belonging to the hinder part of the posterior buckler.

**32592.** Slab, showing the inner surface of a number of ventral scutes belonging to the anterior or middle regions of the same.

**32593.** A smaller slab, showing the inner surface of the ventral scutes.

**32593 a.** A similar specimen, in which the impression of the outer surface of some of the scutes is seen.

**32505.** Slab with ventral scutes and ribs.

*Hastings Collection. Purchased, 1855.*

**119 a.** Cast of the nearly entire posterior ventral buckler.

*Purchased, 1836.*

**Teleosaurus geoffroyi**, Deslongchamps<sup>1</sup>.

Imperfectly known, but larger than the preceding, with the teeth arranged in a straight line, of relatively larger size, fewer in number, and separated by wider intervals, the number being estimated by Deslongchamps at from 35 to 40 on each side. The width of the type mandibular symphysis at the extremity of the splenial is 0,029.

*Hab.* Europe (France and [?] England).

**33126.** Fragment of sandstone, showing a portion of a mandibular symphysis apparently belonging to this species; from the Stonesfield Slate (Lower Jurassic) of Stonesfield, Oxfordshire. This specimen, of which the inferior aspect is exposed, exhibits seven dental alveoli on either side, two of which retain their teeth. Except for being slightly smaller, the specimen cannot be distinguished from the type fragment figured by Deslongchamps in his 'Notes Paléontologiques,' pl. xii. fig. 8.

*Purchased. About 1857.*

**39788.** The greater portion of a cranial rostrum agreeing in size and characters with the preceding; from Stonesfield. Ante-

<sup>1</sup> Bull. Soc. Linn. Normandie, sér. 2, vol. i. p. 348 (1868).

riorly the specimen is broken off at the commencement of the premaxillary expansion, which appears to have been well marked; the dental alveoli are arranged in a straight line; and the premaxillæ are more elongated than in *T. cadomensis*.     *Morris Collection. Purchased, 1862.*

- R. 236.** A slab of sandstone, showing the damaged upper surface of the anterior half of a similar rostrum; from Stonesfield.

*Egerton Collection. Purchased, 1882.*

**Teleosaurus subulidens**, Phillips<sup>1</sup>.

It will be convenient to take as the type the mandible represented in Phillips's 'Geology of Oxford,' p. 195, fig. 55, since some of the teeth represented in fig. 42 of the same under this name may belong to the preceding species.

Of larger size than *T. geoffroyi*, the width of the type mandibular symphysis at the extremity of the splenial being 0,050; the number of the teeth in each ramus is estimated by Phillips at 35 or 36. Whether the present form be anything more than the adult of the preceding cannot yet be determined.

*Hab.* Europe (England).

- R. 236 a.** The posterior portion of the mandibular symphysis, showing several broken teeth; from the Stonesfield Slate of Stonesfield, Oxfordshire. The diameter at the anterior extremity of the splenial is 0,040.

*Egerton Collection. Purchased, 1882.*

- 33124.** The posterior portion of the symphysis of a larger mandible; from Stonesfield. The diameter at the end of the splenial is 0,056.     *Purchased. About 1857.*

*Of the following specimens some may belong to the present and others to the preceding form.*

- 28611.** Five teeth; from the Stonesfield Slate of Eyeford, Gloucestershire. These resemble the specimens figured by Phillips, *op. cit. fig. 42 (6, 7).*     *Purchased, 1853.*

- 48041.** Two teeth; from Stonesfield.

*Presented by Sir R. Owen, K.C.B., 1860.*

<sup>1</sup> 'Geology of Oxford,' p. 194 (1871).

23407. A tooth; from Stonesfield. *Purchased*, 1849.
11044. A tooth; from Stonesfield. *Mantell Collection. Purchased*, 1838.
44863. A tooth; from Stonesfield. *Presented by B. Bright, Esq.*, 1873.
25584. Two larger teeth; from Stonesfield. *Presented by Mrs. Townsend*, 1851.
47996. Four teeth; from Stonesfield. One is of large size, and agrees with the unnamed specimen figured by Phillips, *op. cit.* fig. 42 (4), and in relative size with the mandible No. 33124. *Presented by the Hon. R. Marsham*, 1877.
28497. Several teeth; from Stonesfield. *Dixon Collection. Purchased*, 1851.
11143. A tooth; from Stonesfield. *Mantell Collection. Purchased*, 1838.
31830. The imperfect left scapula; from Stonesfield. *Purchased. About* 1852.
47997. The left ischium; from Stonesfield. This specimen agrees closely in contour with the corresponding bone of *T. cadoensis*, and differs both in this respect and its greatly inferior size from the ischium probably referable to *Steneosaurus brevidens* figured by Phillips, *op. cit.* p. 192, fig. 51. *Presented by the Hon. R. Marsham*, 1877.
41311. A split slab, showing the left pubis; from Stonesfield. Length 0.138. *Purchased*, 1869.

#### GENERICALLY UNDETERMINED SPECIMENS.

The name *Oolithes bathonicae*, J. Buckman<sup>1</sup>, has been applied to specimens resembling the following:—

37987. Fragments of rock with natural casts of eggs of Teleosaurians; from the Great Oolite (Lower Jurassic), near Cirencester, Gloucestershire. *Presented by Joshua Brown, Esq.*, 1864.

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xvi. p. 110 (1860).

- R. 499. Fragment of rock, showing polished sections of casts of similar eggs; from the Great Oolite, near Cirencester.

*Presented by Joshua Brown, Esq., 1884.*

40308. Two fragments of rock, showing broken hollow natural casts of similar eggs; from the Great Oolite of Burford Road, Wiltshire. *Morris Collection. Purchased, 1862.*

40361. Two fragments of rock with similar broken natural casts, of which some are hollow; from the Great Oolite near Cirencester. *Purchased, 1867.*

- R. 905. Natural cast of a similar egg; from the Great Oolite, locality unknown. *No history.*

#### Suborder *PARASUCHIA*.

No palatal plates developed from the bones of the roof of the mouth, and consequently no secondary posterior nares; a columella; anterior nares posterior and divided; vomers apparent on the palate; a distinct postfrontal<sup>1</sup>; the middle eustachian canal not enclosed in bone; and the premaxillæ (typically) carrying some 21 teeth, and forming a rostrum. Probably a clavicle; coracoid short and rounded, with a very large fontanelle; humerus with an ectepicondylar groove; pubis entering into acetabulum; probably five digits in each foot<sup>2</sup>. Vertebrae amphicoelous. Dorsal scutes keeled, and arranged in two rows; ventral scutes (when present) arranged in not more than eight rows, and each scute consisting of a single bone.

This Suborder connects the Crocodylia very closely with the Sauro-podus Dinosauria.

#### Family PHYTOSAURIDÆ<sup>3</sup>.

A descending portion in the basioccipital and basisphenoid; the premaxillæ interpenetrating the maxillæ on the palate; the orbits completely separated from the large infratemporal fossæ; the pre-orbital vacuities very large; the supratemporal fossæ exceedingly small and rudimentary<sup>4</sup>.

<sup>1</sup> Baur, Zool. Anzeiger, vol. ix. p. 740 (1886).

<sup>2</sup> Baur, loc. cit.

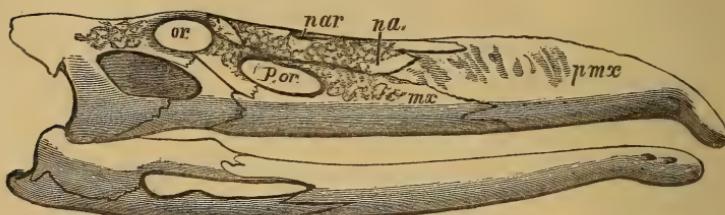
<sup>3</sup> = *Belodontidæ*.

<sup>4</sup> Many of these characters are known only from the type genus.

Genus **PHYTOSAURUS**, Jäger<sup>1</sup>.Syn. *Belodon*, Meyer<sup>2</sup>.

No ventral buckler. The nasals reaching the premaxillæ and completely surrounding the nares; premaxillæ and extremity of

Fig. 17.



*Phytosaurus cylindricodon*.—Skull; from the Keuper of Würtemberg. About  $\frac{1}{8}$ . *pmx*, premaxilla; *mx*, maxilla; *na*, nasal; *nar*, nares; *or*, orbit; *p.or*, preorbital vacuity.

mandible much deflected, and more or less expanded; orbits somewhat irregular, and directed partly laterally, and partly frontally. Teeth sharp and pointed, with serrated carinæ; anteriorly subcircular in section, but posteriorly much compressed laterally. Sculpture of scutes radiate.

Forms referred to this genus have been obtained from the Lower Mesozoic of Europe, N. America, and India<sup>3</sup>.

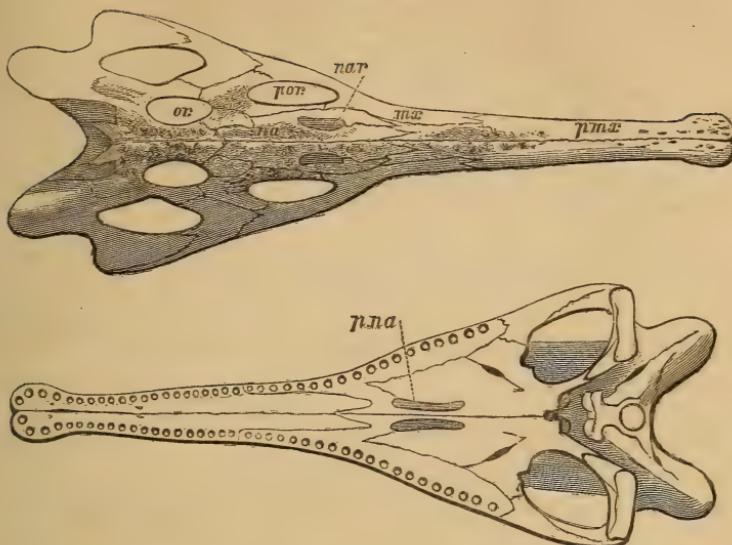
**Phytosaurus cylindricodon**, Jäger<sup>4</sup>.Syn. *Phytosaurus cubicodon*, Jäger<sup>5</sup>.*Belodon kappfi*, Meyer<sup>6</sup>.

The type species; of very large size, with the cranial rostrum of great vertical depth, the mandible broad and considerably expanded at the extremity, and the teeth stout. Number of teeth  $\frac{39}{44}$ .

*Hab.* Europe (Germany).

<sup>1</sup> Foss. Rept. Würtemberg, p. 22 (1828).<sup>2</sup> Neues Jahrb. 1842, p. 302.<sup>3</sup> See 'Palaeontologia Indica' (Mem. Geol. Surv. Ind.), ser. 4, vol. i. pt. 5, p. 21 (1885).<sup>4</sup> Op. cit. p. 23 (1828).<sup>5</sup> Ibid. p. 33.<sup>6</sup> 'Palaeontographica,' vol. vii. art. 5, p. 256 (1861).

Fig. 18.



*Phytosaurus cylindricodon*.—Frontal and oral aspects of the cranium; from the Keuper of Würtemberg. [About  $\frac{1}{2}$ . p.na, posterior nares; other letters as in fig. 17.]

The following specimens were obtained from the Keuper (Upper Trias) of Stuttgart, Würtemberg, unless it is stated to the contrary.

39477. Cast of the cranium. The original is figured by Meyer in the 'Palæontographica,' vol. x. pls. xxxviii. to xl.

Purchased, 1864.

42743. The cranium. Van Breda Collection. Purchased, 1871.

38037. The hinder portion of the cranium. Purchased, 1864.

38039. Part of the left palato-maxillary region. Same history.

38040. The hinder part of the left premaxilla. Same history.

38041. Fragment showing some of the upper dental alveoli, longitudinally split. Figured by Meyer, *op. cit.* vol. xiv. pl. xxviii. figs. 10, 11. Same history.

38042. Fragment of the left temporal region. Same history.

38043. Fragment of the left temporal region. Same history.

38044. The right parietal. Same history.

- 37994.** Cast of the anterior extremity of the mandibular symphysis.

The original, which came from Altenberg, near Tübingen, is the type of the genus, and, together with an associated fragment, is figured by Jäger in his 'Foss. Rept. Würtemberg,' pl. xiii. fig. 3. Some restoration has apparently been made in the cast.

*Purchased*, 1864.

- 38036.** The mandible, containing many of the teeth.

*Purchased*, 1864.

- 42744.** The mandible, with several teeth remaining.

*Van Breda Collection. Purchased*, 1871.

- 38045.** The imperfect right dentary portion of the mandible, showing three teeth.

*Purchased*, 1864.

- 38046.** The greater portion of the left half of the mandibular symphysis of a small individual.

*Same history.*

- 38047.** The right splenial element of the mandible.

*Same history.*

- 38048.** Part of the left splenial.

*Same history.*

- 38049.** Part of the right splenial.

*Same history.*

- 38050.** Fragment of the right splenial.

*Same history.*

- 38052.** Part of the right dentary of a young individual.

*Same history.*

- 38068.** A large series of teeth.

*Same history.*

- 38060-61.** Two bones not improbably belonging to the hyoid apparatus.

*Purchased*, 1864.

*At least the majority of the following belong to this species.*

- 38069.** Two cervical vertebræ in apposition.

*Purchased*, 1864.

- 38070.** The nearly entire sixth (?) dorsal vertebra. Figured by (Fig.) Meyer, *op. cit. vol. xiv. pl. xxvii. figs. 1-3.*

*Same history.*

- 38071-79.** Several imperfect dorsal vertebræ.

*Same history.*

- 38080.** The centra of four caudal vertebræ.

*Same history.*

- 38081.** A chevron-bone.

*Same history.*

- 38082.** The arch and part of the centrum of the eighth (?) dorsal vertebra.

*Same history.*

42746. An imperfect late dorsal vertebra.

*Van Breda Collection.* Purchased, 1871.

38091. Three imperfect ribs.

Purchased, 1864.

42747. An abdominal rib.

*Van Breda Collection.* Purchased, 1871.

38067. The imperfect right scapula of an immature individual.

Purchased, 1867.

38066. The left coracoid. Figured by Meyer, vol. xiv. pl. xxvii.  
(Fig.) fig. 10. Same history.

38055. The imperfect right humerus of a very large individual.  
Same history.

38056. The nearly entire left humerus in a somewhat crushed  
condition. The ectepicondylar groove is shown.  
Same history.

38057. The distal half of a similar left humerus. Same history.

38063. The left ilium. Figured by Meyer, *op. cit.* vol. xiv. pl. xxix.  
(Fig.) fig. 1. Same history.

38064. The imperfect right ilium of a smaller individual.  
Same history.

38065. A pubis. Figured by Meyer, *op. cit.* vol. xiv. pl. xxvii.  
(Fig.) fig. 11. Same history.

38054. The right femur. Same history.

38059. The left tibia. Same history.

38083. A nearly entire dorsal scute, probably belonging to the  
middle of the buckler. Same history.

38084. A somewhat imperfect right dorsal scute from the same  
region. Same history.

38085. The outer half of a right dorsal scute from the same region.  
(Fig.) Figured by Meyer, *op. cit.* vol. xiv. pl. xxviii. figs. 4-6.  
Same history.

38086. The inner half of a right dorsal scute from the same region.  
Same history.

38087. A small dorsal scute. Figured by Meyer, *op. cit.* vol. xiv.  
(Fig.) pl. xxviii. figs. 7-9. Same history.

38088. A dorsal scute, probably from the anterior part of the buckler. *Purchased*, 1867.
38089. Three similar dorsal scutes. *Same history*.
38090. Several imperfect dorsal scutes. *Same history*.
42748. A broken nodule containing a similar scute. *Van Breda Collection*.
- 42748 a. An imperfect dorsal scute. *Same history*.

**Phytosaurus plieningeri** (Meyer<sup>1</sup>).

Syn. *Belodon plieningeri*, Meyer<sup>2</sup>.

Distinguished from the preceding by the cranial rostrum being shallow vertically, by the more slender and less expanded mandible, the relatively smaller teeth, and the generally smaller and lighter structure of the whole skull. Number of teeth<sup>3</sup>  $\frac{39}{57}$ .

*Hab.* Europe (Germany).

42745. The nearly entire cranium; from the Keuper (Upper (Fig.) Triassic) Sandstone of Stuttgart, Würtemberg. Described and figured by Meyer in the 'Palaeontographica,' vol. xiv. p. 104, pls. xxiv.-xxvi.

*Van Breda Collection. Purchased*, 1871.

38038. The right ramus of the mandible, containing most of the (Fig.) teeth; from the Keuper of Stuttgart. Described and figured by Meyer, *op. cit.* p. 100, pl. xxiii.

*Purchased*, 1864.

Genus **STAGONOLEPIS**, Agassiz<sup>4</sup>.

A ventral armour; skull apparently like that of *Phytosaurus*; teeth blunt and swollen; sculpture of scutes more distinctly pitted.

Made by some writers the type of a distinct family—*Stagonolepididae*.

<sup>1</sup> Neues Jahrb. 1842, p. 302.—*Belodon*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> The great discrepancy in the number of the upper and lower teeth in the two known entire specimens indicates the probability of individual variation in this respect.

<sup>4</sup> 'Recherches sur les Poissons Fossiles du Vieux Grès-Rouge,' p. 139 (1844).

**Stagonolepis robertsoni**, Agassiz<sup>1</sup>.

The type and only known species.

*Hab.* Europe (England).

*All the following specimens are from the Keuper (Upper Triassic), and, unless it is stated to the contrary, were obtained from Lossiemouth, Elginshire.*

- R. 582.** Cast of a dorsal scute and a bone of the foot. The original specimen is in the Elgin Museum, and consists of a block of sandstone containing the impression of the scute and bone. The cast of the scute is figured by Huxley in the ‘Mem. Geol. Surv. Eng.’ Mon. iii. pl. ii. fig. 1 (reversed).

*Presented by Sir R. Owen, K.C.B., 1884.*

- 27404.** Cast of a slab of sandstone exhibiting a considerable portion of the ventral buckler. The original was obtained from Morayshire, and is the type of the genus; it is figured by Agassiz in his ‘Poissons Fossiles du Vieux Grès-Rouge,’ pl. xxxi. figs. 13, 14, and also by Huxley, *op. cit.* pl. i. fig. 1 (reversed).

*Presented by Dr. Mantell, 1851.*

- 36392.** Slab of sandstone, showing five imperfect dorsal scutes in sequence, and the impression of a ventral scute.

*Presented by J. Taylor, Esq., 1859.*

- 36393.** Slab of sandstone, with impressions of two or three scutes and fragments of a bone. *Same history.*

- 36394.** Slab of sandstone showing the inner surfaces or impressions of the outer surfaces of eight pairs of scutes belonging to the two middle rows of the ventral buckler, together with portions of scutes from the adjacent rows. *Same history.*

- 36395.** Slab showing the inner surfaces and outer impressions of numerous imperfect scutes. *Same history.*

- 36396.** Slab showing several imperfect scutes or their impressions. *Same history.*

- 36397.** Slab with impressions of several associated apparently ventral scutes. *Same history.*

<sup>1</sup> ‘Recherches sur les Poissons Fossiles du Vieux Grès-Rouge,’ p. 139 (1844).

**36398.** Slab with part of a large crushed bone.

*Presented by J. Taylor, Esq., 1859.*

**36399.** Slab showing the inner surface and part of the impression of the outer surface of a small scute, and the impression of a bone (? femur). *Same history.*

**R. 581.** Cast of a slab showing the distal two thirds of the left humerus. The original is preserved in the Museum at Elgin, and is figured by Huxley, *op. cit.* pl. vii. fig. 7 (reversed). *Presented by Sir R. Owen, K.C.B., 1884.*

### Family PARASUCHIDÆ.

No descending portion in the basioccipital and basisphenoid; other cranial characters unknown.

#### Genus **PARASUCHUS**, Huxley<sup>1</sup>.

The only known genus.

#### **Parasuchus hislopi**, Lydekker<sup>2</sup> (*ex* Huxley, MS.)

The type and only known species. The description of the complete skeleton of *Hyperodapedon* by Huxley<sup>3</sup>, together with the probable presence of a clavicle in *Phytosaurus*, renders it most likely that the appendicular bones provisionally referred by the writer<sup>4</sup> to *Hyperodapedon* really belong to the present form.

*Hab.* India.

**R. 1097.** Cast of the conjoint basioccipital and basisphenoid. The original, which is one of the types, was obtained from the Maleri beds (Lower Mesozoic) of the Gondwana system at Maleri, near Sironcha, Central Provinces, India, and is preserved in the Indian Museum, Calcutta; it is figured by the present writer in the 'Palaeontologia Indica,' ser. 4, vol. i. pt. 5, pl. iii. figs. 1, 1 *a*, 1 *b*.

*Presented by the Director of the Geological Survey of India, 1887.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxvi. p. 49 (1870).

<sup>2</sup> Rec. Geol. Surv. Ind. vol. xvi. p. 86 (1883).

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xlivi. p. 675 (1887). *Vide infrà.*

<sup>4</sup> 'Palaeontologia Indica' (Mem. Geol. Surv. Ind.), ser. iv. vol. i. pt. 5, pl. iv. (1885).

## Order DINOSAURIA.

Body and limbs varying from a more or less lacertiform to an ornithoid type, the latter feature being especially shown in the pelvic girdle and limb; pelvic limbs moderately or very long; body with or without dermal armour, which does not take the form of pitted imbricating scutes. Vertebræ very generally amphicœlous, but frequently opisthocœlous in the cervico-dorsal, and very rarely procœlous in the caudal region; neuro-central suture persistent till a late date; usually from three to six sacral vertebræ, but occasionally only two; cervical ribs without long antero-posterior processes; no uncinate processes to ribs; rib-facets of middle dorsal vertebræ sometimes forming a "step" on the transverse process, and in other cases placed on the lamina of the arch. Skull relatively small; palate imperfectly known, but probably in some cases approaching the type of the Parasuchian Crocodilia, and in others of the Rhynchocephalia; quadrate not wedged in among adjacent bones; mandibular symphysis cartilaginous; a columella and sclerotic ossifications in some instances. Teeth with compressed and often complex crowns; not always implanted in distinct sockets. Sternal region not fully known, but frequently a pair of symmetrical ossifications, of which the exact homology is in some cases doubtful, and apparently no clavicles<sup>1</sup>. Limb-bones solid or hollow; coracoid short, with fontanelle; humerus with head more differentiated than in the Crocodilia, and the deltoid crest terminating less abruptly. Ilium (fig. 21) with distinct pubic and preacetabular processes; pubis (fig. 21) entering into acetabulum, directed backwards or forwards; ischium frequently with obturator process, and slender. Femur with curved or straight shaft, head either oblique or at right angles to condyles, and with or without inner trochanter; tibia with cnemial crest; astragalus frequently flattened and applied to tibia. Habits quadrupedal or bipedal.

The less specialized forms approximate to the generalized Crocodilia and it is probable that in the Lower Trias the two orders were indistinguishable; there are also indications of affinity with the Rhynchocephalia.

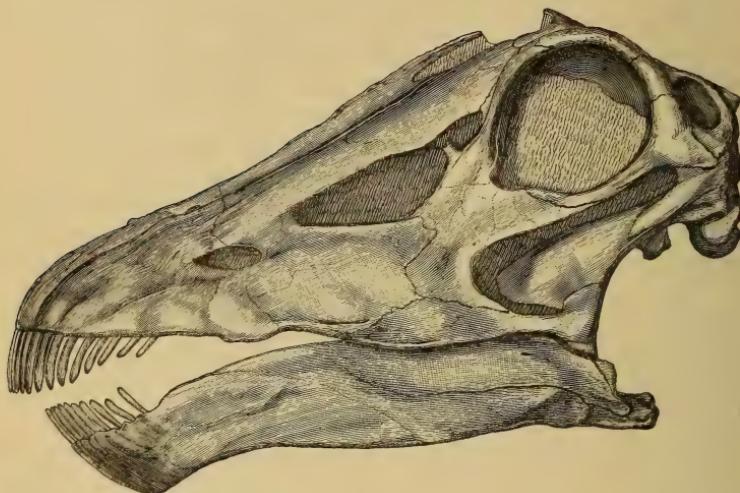
### Suborder SAUROPODA.

Premaxilla completely toothed; nares (fig. 19), when known, in middle of skull; a large preorbital vacuity; quadrate with condyle

<sup>1</sup> The so-called clavicles of *Iguanodon* are noticed below, where they are provisionally referred to the sternal region.

more or less in advance of the posterior extremity; teeth (fig. 20) simple, usually spatulate, and set in distinct sockets; generally a columella. Vertebrae with zygosphenal articulations; anterior ones opisthocelous; centra of presacrals with lateral vacuities generally communicating with complex internal cavities by which the centra are more or less penetrated; cervicals longer than dorsals, with ankylosed ribs and no neural spines; dorsals with neural spines laterally expanded; each posterior sacral arch supported by one vertebra; caudals with or without postzygapophyses;

Fig. 19.



*Diplodocus longus*, Marsh.—Skull; from the Upper Jurassic of North America.  
 $\frac{1}{6}$ . (From the 'Amer. Journ.' )

chevrons double, closed, or open. Rib-facets of dorsal vertebræ placed on the arches. Sternal bones ovate. Limb-bones solid, and pectoral limb nearly as long as pelvic; scapula much expanded proximally, and frequently also distally, with concave anterior border; coracoid without descending process; humerus of a Crocodilian type, but with small distinct head, and deltoid crest terminating less abruptly; five digits in manus and pes, armed with short, thick, compressed claws. Ilium (fig. 21) deep, with short preacetabular process, and slight arching of superior border; pubis (fig. 21) directed forwards, with cartilaginous symphysis and small distal expansion; ischium short and wide, without obturator process; femur much longer than tibia, with straight shaft, head nearly in

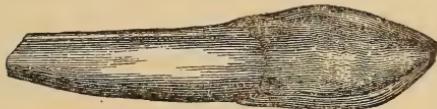
plane of condyles and not excessively flattened, and no inner trochanter; astragalus not applied to tibia; metacarpals short; feet plantigrade.

All the members were probably mainly of quadrupedal habits.

### Family CETIOSAURIDÆ.

Cervical vertebræ narrow and elongate, with rim of posterior cup oblique, inferior surface of middle dorsal vertebræ narrow and more

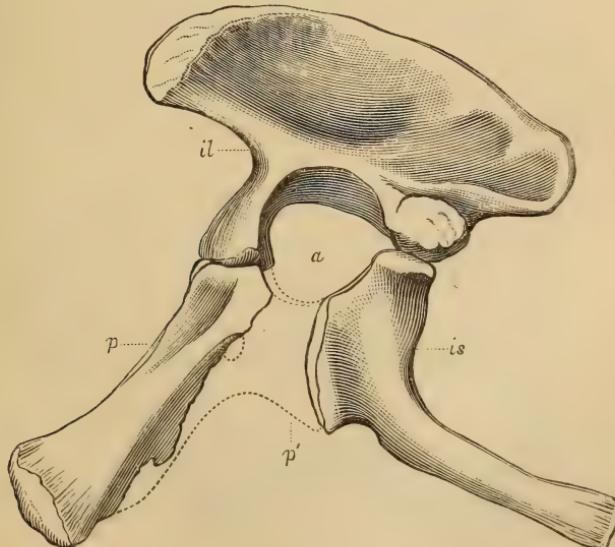
Fig. 20.



*Morosaurus grandis*, Marsh.—Tooth; from the Upper Jurassic of North America.  $\frac{1}{2}$ .

or less rounded; sacral vertebræ mostly solid, and only the posterior ones bearing their own arch; caudals without postzygapophyses, the prezygapophyses forming indents on sides of neural spines; chevrons

Fig. 21.



*Morosaurus grandis*.—Left side of pelvis.  $\frac{1}{6}$ . *a*, acetabulum; *il*, ilium; *is*, ischium; *p*, *p'*, pubis. (From the 'Amer. Journ.')

usually open and articulating by two facets. Distal extremity of scapula much expanded; humerus relatively wide and stout; ischium (fig. 21) directed backwards, with middle of acetabular portion placed considerably above axis of shaft, and latter slender and without distal expansion<sup>1</sup>.

Equivalent to the *Morosauridæ* of Marsh<sup>2</sup>. The apparent close relationship of *Morosaurus* and *Cetiosaurus* has been noticed by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 58.

### Genus **TITANOSAURUS**, Lydekker<sup>3</sup>.

This genus is provisionally included in the present family on account of its open chevron-bones which articulate with the vertebræ by two facets.

Postmedian caudal vertebrae (fig. 22) procœlous; femur apparently like that of *Cetiosaurus*. It has been suggested that this genus might be identical with *Ornithopsis*, but the resemblance of the type species of the latter to *Brontosaurus* (in which the caudals are amphicœlous) forbids this view; the procœlous character of the caudals has been regarded as indicating a distinct family, but this does not appear a necessary conclusion.

### **Titanosaurus indicus**, Lydekker<sup>4</sup>.

The type species; of gigantic size. Centra of posterior caudal vertebrae much compressed laterally, and facets for chevrons strongly marked. Length of femur about 1,587 (55 inches).

*Hab.* India.

**40867.** Cast of a postmedian caudal vertebra. The original, which is the type, was obtained from the Lameta beds (probably Middle Cretaceous = Upper Greensand) near Jabalpur, India; and is preserved in the Indian Museum, Calcutta. It is figured and described in 'Falconer's Palæontological Memoirs,' vol. i. p. 418, pl. xxxiv. figs. 3-5, without name;

<sup>1</sup> In the pelvis of *Cetiosaurus* figured in Phillips's 'Geology of Oxford,' p. 277, the positions of the pubis and ischium are reversed from their natural one, their iliac surfaces being placed in apposition, and the proper adjacent surfaces made the iliac ones. If the pubis in its correct position be compared with that of *Morosaurus* (fig. 21), it will be seen that the contour of the two is almost identical; the distal expansion in Phillips's figure is incorrect.

<sup>2</sup> *Pleurocalus*, Marsh, Amer. Journ. ser. 3, vol. xxv. p. 90 (1888), apparently belongs to the same family.

<sup>3</sup> Rec. Geol. Surv. Ind. vol. x. p. 38 (1877).

<sup>4</sup> Loc. cit.

it is described by the present writer in 'Rec. Geol. Surv. Ind.' vol. x. p. 38, and described and figured in the 'Palaeontologia Indica' (Mem. Geol. Surv. Ind.), ser. 4, vol. i. pt. 3, p. 20, pl. iv. figs. 1, 2, and pl. v. fig. 3. On p. 37 of pt. 5 of the same work the genus is made the type of a distinct family, which, however, may be withdrawn.

*Presented by C. Falconer, Esq., 1867.*

- R. 902. The centrum and base of the arch of a smaller caudal vertebra apparently belonging to this species; from the Lametas of Pisdura, near Jabalpur.

*Presented by the Director of the Geological Survey of India, 1887.*

- R. 903. The centrum of a still smaller caudal vertebra; from Pisdura. *Same history.*

- R. 904. Part of the neural arch of a vertebra; from Pisdura.

*Same history.*

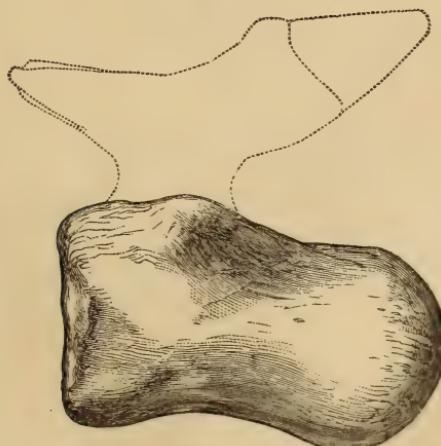
### **Titanosaurus, sp. a.**

Apparently as large as the type species, but with the centrum of the caudal vertebrae less compressed.

*Hab.* Europe (England).

- R. 151. The centrum of a postmedian caudal vertebra; from the (Fig.) Wealden of Brook, Isle of Wight. Described and figured

Fig. 22.



*Titanosaurus, sp.*—Left lateral aspect of caudal vertebra, with the neural arch restored; from the Wealden of Brook.  $\frac{1}{2}$ . (From the 'Quart. Journ. Geol. Soc.')

by the writer in the 'Quart. Journ. Geol. Soc.' vol. xlvi. pp. 156-158 (where it was suggested that it might belong to *Ornithopsis*); the figure being reproduced in the accompanying woodcut. *Fox Collection. Purchased, 1882.*

**R. 146 a.** The anterior half of the centrum of a caudal vertebra of similar general type; from Brook. Noticed by the writer *op. cit.* p. 158. *Same history.*

**Titanosaurus, sp. b.**

Apparently larger than either of the preceding.

*Hab.* Europe (England).

**32390.** A slightly imperfect postmedian caudal vertebra; from the Upper Greensand of the Isle of Wight. Noticed by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 54. The length of the centrum is 0.175, the vertical diameter of its anterior cup 0.140, and the transverse 0.120.

*Purchased. About 1857.*

Genus **DINODOCUS**, Owen<sup>1</sup>.

Very imperfectly known. From its geological horizon, as suggested by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 58, it is not improbable that this form may be identical with *Titanosaurus*, on which grounds it is placed here.

**Dinodocus mackesoni**, Owen<sup>2</sup>.

The type species.

*Hab.* Europe (England).

**14695.** A series of broken limb and pelvic bones; from the Lower (Fig.) Greensand of Hythe, Kent. The type specimens; discovered in 1840. Described by Owen in the 'Proc. Geol. Soc.' vol. iii. pp. 325, 451 (1842); and figured by the same writer in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pls. xii., xiii. (1851), under the name of *Polyptychodon continuus*. *Presented by P. H. Mackeson, Esq., 1841.*

Genus **CETIOSAURUS**, Owen<sup>3</sup>.

The type genus. Caudal vertebræ amphicoelous.

<sup>1</sup> History of British Fossil Reptilia, Index to vol. ii. p. ix (1884).

<sup>2</sup> Loc. cit.

<sup>3</sup> Rep. Brit. Assoc. for 1841, p. 94 (1842).

**Cetiosaurus oxoniensis**, Phillips<sup>1</sup>.

Syn. (?) *Cetiosaurus medius*, Owen<sup>2</sup>.  
*Cetiosaurus longus*, Owen<sup>3</sup> (*in parte*).

The type species<sup>4</sup>. The dorsal vertebrae considerably smaller than those of *Ornithopsis hulkei*. Centra of posterior caudal vertebrae comparatively short; chevrons sometimes closed. Length of femur 1,850 (64 inches).

*Hab.* Europe (England).

**R. 979.** The imperfect centrum and base of the arch of a trunk vertebra provisionally referred to a small individual of this species; found at Bibury, near Cirencester, Gloucestershire, and probably from the Great Oolite (Lower Jurassic). There are deep lateral pits in the centrum, which appears to be otherwise solid. The transverse diameter of the posterior face of the centrum is 0,120, and the length 0,065. Although smaller it resembles the specimen figured in Phillips's 'Geology of Oxford,' p. 254, fig. 86.

*Presented by Hon. and Rev. F. Dutton, 1887.*

**16091.** The imperfect centrum of one of the most anterior caudal vertebrae; from the Great Oolite of Blisworth, Northamptonshire. This specimen closely resembles the example figured by Phillips in his 'Geology of Oxford,' p. 262, figs. 92, 93. Together with the following specimen, it was originally in the collection of Miss Baker of Nottingham, and is probably one of the specimens mentioned by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 101, as *C. medius*. *Purchased. About 1843.*

**16090.** The imperfect centrum and part of the arch of a somewhat later caudal vertebra; from Blisworth. *Same history.*

**12425.** Cast of the centrum of an anterior caudal vertebra. The original was obtained from the Great Oolite of Buckinghamshire, but is now lost; the cast is described in Phillips's 'Geology of Oxford,' pp. 246, 265; the length of the centrum is 0,154 (6 inches).

*Mantell Collection. Purchased, 1838.*

<sup>1</sup> Geology of Oxford, p. 291 (1871).

<sup>2</sup> Rep. Brit. Assoc. for 1841, p. 100 (1842). Not figured.

<sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. ii. p. 27 (1875).

<sup>4</sup> See Hulke, Quart. Journ. Geol. Soc. vol. xxviii. p. 37; and Owen, Mesozoic Reptilia, pt. ii. p. 29, note 4.

*The originals of the following casts were obtained from the Great Oolite of Enslow, Oxfordshire, and are preserved in the Museum at Oxford; they are some of the types.*

- R. 1092. Cast of one of the sternal bones. Original figured by Phillips in his 'Geology of Oxford,' p. 268, fig. 98, as an azygos median bone<sup>1</sup>.

*By exchange with the Oxford Museum.*

- R. 1093. Cast of the right humerus. Original figured by Phillips, *op. cit.* p. 272, fig. 100. *Same history.*

- R. 1094. Cast of an imperfect ulna. Original figured by Phillips, *op. cit.* p. 275, fig. 103. *Same history.*

- R. 1095. Cast of the right femur. Original figured by Phillips, *op. cit.* p. 281, fig. 108. *Same history.*

- R. 1096. Cast of a tibia. Original figured by Phillips, *op. cit.* p. 282, fig. 109. *Same history.*

### **Cetiosaurus glymptonensis**, Phillips<sup>2</sup>.

Founded upon caudal vertebrae, which are of a more elongated type than those of the last species, and thereby resemble the Upper Jurassic specimens described by Owen as *Cetiosaurus longus*.

*Hab.* Europe (England).

47150. The centrum of a postmedian caudal vertebra; from the Forest Marble (Lower Jurassic) of Cogenhoe, Northamptonshire. This specimen agrees very closely with the type vertebra figured by Phillips in his 'Geology of Oxford,' p. 266, fig. 96; its length being 0.165, and its height 0.081. *Sharp Collection. Purchased, 1876.*

47412. The centrum of an earlier caudal vertebra, not improbably belonging to this species; probably from the Lower Jurassic of Northamptonshire. *Same history.*

<sup>1</sup> This and the other figures are reproduced in part ii. of Owen's 'Mesozoic Reptilia,' as *C. longus*.

<sup>2</sup> 'Geology of Oxford,' p. 291 (1871).

**Cetiosaurus brevis**, Owen<sup>1</sup>.

Imperfectly known, and provisionally referred to this genus. Chevrons always open superiorly; first sacral vertebra with lateral pits; four vertebrae in sacrum.

Mantell identified this form with *Pelorosaurus*; and Seeley, who adopts the same view, regards both as referable to *Ornithopsis*. The anterior caudal vertebrae of the present form resemble those of *C. oxoniensis* in the broad, angulated faces of their centra and open chevrons, and thereby differ from those of *Brontosaurus*, while the sacrum differs from that of both the latter and *Ornithopsis*. If the elongated cervical vertebrae, mentioned on p. 142, belong to this form, its distinction from *Ornithopsis* will be still more closely marked; while if the fore limb, mentioned on the same page, be referable to it, there will be a probability of its distinction from *Cetiosaurus*.

*Hab.* Europe (England).

*All the following specimens are from the Wealden.*

- 2249.** One imperfect extremity of a dorsal vertebra, probably belonging to this form; from Cuckfield, Sussex. The inferior and one lateral surface, together with the floor of one of the lateral vacuities, are shown. This bone is smaller and narrower inferiorly than the vertebrae of *Ornithopsis*, and in this respect comes nearer to the smaller undetermined vertebra, No. 2239 (p. 142).

*Mantell Collection. Purchased, 1828.*

- 36559.** The centrum of the last lumbar vertebra ankylosed to the anterior half of that of the first sacral; from Brook. The lumbar vertebra shows small lateral pits descending obliquely towards the middle of the centrum. The sacral as well as the following specimens from the same part are completely solid. Noticed, together with the following specimens, by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 56. The lumbar vertebra differs considerably from that of *Ornithopsis* (No. R. 209).

*Hastings Collection. Purchased, 1855.*

- 36559 a.** Portions of the centra of the second and third sacral vertebrae, associated with the preceding. *Same history.*

<sup>1</sup> Rep. Brit. Assoc. for 1841, p. 94 (1842).

**36559 b.** The hinder part of the centrum of the third sacral vertebra of the same individual. *Hastings Collection.*

**28640.** The centrum of the fourth sacral vertebra of the same individual. *Mantell Collection. Purchased, 1853.*

**36559 c.** The imperfect centrum and arch of an anterior caudal vertebra of the same individual. This specimen agrees precisely with the type anterior caudals, No. 10390, on which resemblance the identification of the entire set of associated specimens rests. *Hastings Collection.*

**36559 d.** The lower and one lateral surface of a later dorsal vertebra of the same individual. Double chevron-facets are shown. *Same history.*

**36559 e.** Two metatarsals and four phalangeals, of which two are terminal, of the same individual. The terminal bones are much smaller than those of *Ornithopsis* (No. R. 986). *Same history.*

**28641.** The imperfect centrum of a sacral vertebra belonging to a different individual from the preceding. *Mantell Collection.*

**2544-50.** Four associated anterior caudal vertebrae, with two associated chevrons; from Cuckfield. These specimens, which are described by Owen in the 'Rep. Brit. Assoc.' for 1841, pp. 97-99, it will be convenient to regard as the types. They are noticed by Melville in the 'Phil. Trans.' 1849, p. 296, and figured by Mantell in the 'Phil. Trans.' 1850, pls. xxii., xxiv., xxv., as *Pelorosaurus*; one of them being also figured by the latter writer in his 'Petrifications and their Teachings,' p. 331, fig. 72. They are figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ii. pl. x. Their close resemblance to the anterior caudals of *C. oxoniensis* figured in Phillips's 'Geology of Oxford,' p. 259, fig. 89, is noticed in that work.

*Mantell Collection. Purchased, 1838.*

**28943.** The centrum and base of the arch of a later caudal vertebra of apparently similar type; from the Isle of Wight.

*Hastings Collection. Purchased, 1855.*

**2144.** A nearly entire postmedian caudal vertebra, with the chevron (Fig.) ankylosed to it; from Cuckfield. Figured by Mantell in

the 'Phil. Trans.' 1841, pl. ix. fig. 7, and 1850, pl. xxiii. figs. 11 *a*, 11 *b*, and pl. xxvi., as a premedian of *Pelotosaurus*, and by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ii. pl. v. figs. 3, 4, under the same name; its close resemblance to the postmedian caudal of *C. oxoniensis* figured by Philipps, *op. cit.* p. 261, fig. 91, is noticed on page 266 of the work quoted; both showing the absence of distinct postzygapophyses.

*Mantell Collection. Purchased, 1838.*

- R. 141.** The centrum of a very similar vertebra; from the Isle of Wight. *Fox Collection. Purchased, 1882.*

- 2166.** The centrum and greater part of the arch of a somewhat later caudal vertebra; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

- 28346.** An imperfect posterior caudal vertebra; from Cuckfield. (*Fig.*) Figured by Mantell in the Phil. Trans. 1850, pl. xxiii. figs. 10 *a*, 10 *b*, 10 *c*.

*Mantell Collection. Purchased, 1853.*

- 28343 a.** The centrum of a very similar caudal vertebra; from Cuckfield. *Same history.*

- 27500.** Three associated bones, comprising the chevron of an anterior caudal vertebra, a posterior caudal vertebra, and a portion of the pubis and ischium; from Brook. These specimens resemble No. 36559 in their white colour, and may not improbably have belonged to the same individual. In the posterior caudal the prezygapophyses are very long, and project far in advance of the centrum.

*Hastings Collection.*

- R. 206.** A series of associated bones, probably belonging to this species, and not improbably to the same individual as No. 36559; from Brook. They comprise portions of the two bones of the second segment of a limb, five metapodials, and four phalangeals. *Fox Collection.*

*Generically undetermined Specimens, some of which may belong to the present family.*

- R. 96. Part of the centrum and one rib of a cervical vertebra in a decomposed condition; from the Wealden of Brixton, Isle of Wight. The total length is nearly 0,700 (24 inches). In its extremely elongated form this specimen approximates to the cervical vertebrae of *Morosaurus*, and may perhaps therefore be referable to *Cetiosaurus brevis*.

*Fox Collection. Purchased, 1882.*

46780. The anterior portion of an apparently similar cervical (Fig.) vertebra; from the Wealden of the Isle of Wight. This specimen has been longitudinally cut and polished, and is figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. ii. pl. v., as *Chondrosteosaurus gigas*, of which it is one of the types. *Purchased, 1875.*

2239. The centrum and part of the arch of a middle or posterior (Fig.) dorsal vertebra; from the Wealden of Cuckfield, Sussex. Figured by Mantell in his 'Geology of the South-east of England,' pl. ii. fig. 5, and noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 124, and figured by him in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. x., as the quadrate (tympanic) of *Iguanodon*. Described by Seeley in the 'Ann. Mag. Nat. Hist.' ser. 4, vol. v. pp. 281–282, as one of the types of *Ornithopsis hulkei*. Figured by Owen in his 'Mesozoic Reptilia' (Mon. Pal. Soc.), pt. ii. pl. vii., as *Bothriospondylus elongatus*, of which species it is the type; and noticed by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxviii. p. 375. In the latter notice it is proposed that this specimen should be regarded as the type of *Ornithopsis hulkei*. The centrum is much narrower and more rounded inferiorly than in the posterior dorsal vertebrae of that species, and the specimen may perhaps have belonged either to *Cetiosaurus brevis* or *Titanosaurus*, or to the same form as the undermentioned casts.

*Mantell Collection. Purchased, 1838.*

28701. Cast of an associated left humerus, radius, and ulna. The originals were obtained from the Wealden of the Isle of Wight, and are in the Collection of Mr. S. H. Beckles. Noticed by the writer in the 'Quart. Journ. Geol. Soc.'

vol. xliv. p. 58. The humerus has a length of 0,620 (24.5 inches); it has a proportionately much shorter shaft than the humerus of *Cetiosaurus oxoniensis*, but approximates to that type in its widely expanded head. Possibly these specimens may be referable to *Cetiosaurus brevis*; but the specialized character, indicated by the shortness of the humerus, may perhaps point to their affinity with *Titanosaurus*, of which the procœlous caudal vertebrae are evidently of a more specialized type than those of other Sauropoda. On the other hand, these specimens may indicate a distinct genus. (See No. R. 722, p. 246.)      *Mantell Collection. Purchased*, 1853.

- 2576.** An imperfect right ilium; from the Wealden of Cuckfield. This specimen, which wants the two extremities, the lower half of the acetabular portion, and the pubic process, apparently approximates to the ilium of *Morosaurus* (fig. 21), showing the same outward direction of the upper half of the acetabular portion, and the deep concavity of the external surface of the anterior part of the body.      *Mantell Collection. Purchased*, 1838.
- 46017.** A bone, wanting the distal extremity, which is probably the right fibula; from Sandown, Isle of Wight. The absence of a medullary cavity is shown.

*Purchased*, 1874.

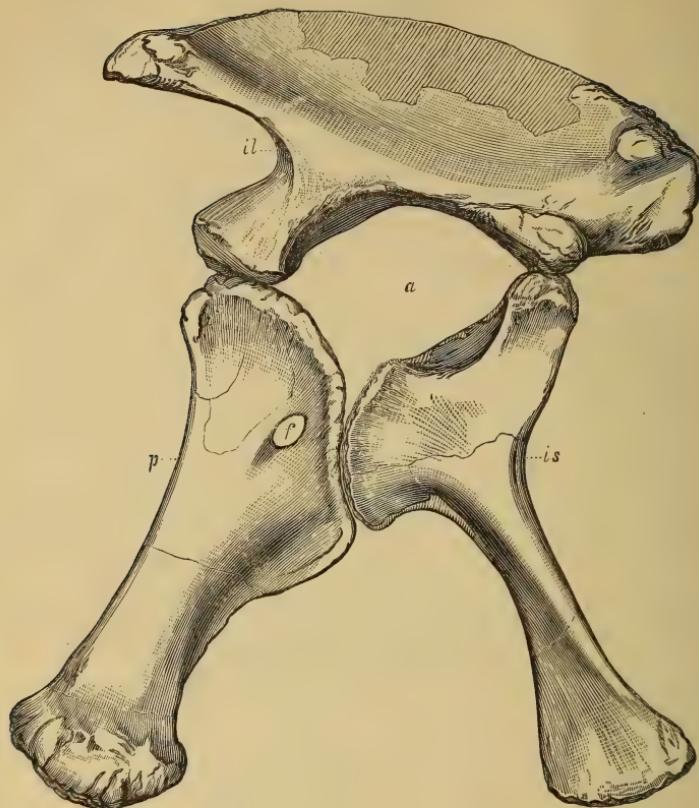
### Family ATLANTOSAURIDÆ.

Maxillary region of cranium much depressed. Cervical vertebrae broad, of moderate length, with rim of posterior cup vertical; inferior surface of middle dorsal vertebrae broad and flat; typically, each sacral bearing its own arch, and the centrum hollowed; caudals typically with postzygapophyses; chevrons closed, and articulating by single facets. Distal extremity of scapula not expanded; humerus comparatively slender; ischium (fig. 23) directed downwards, with middle of acetabular portion on line of axis of shaft, and latter broad and distally expanded.

The transverse diameter of the caudal vertebrae exceeds the vertical, and the neural canal is very large.

The family name is taken from one of the American genera, which, although of later date than *Ornithopsis*, was one of the first well-defined forms.

Fig. 23.



*Brontosaurus excelsus*, Marsh.—Left side of pelvis; from the Upper Jurassic of North America. *il.* *a*, acetabulum; *is*, ischium; *p*, pubis; *f*, pubic foramen. (From the 'Amer. Journ.')

#### Genus **ATLANTOSAURUS**, Marsh<sup>1</sup>.

Syn. *Titanosaurus*, Marsh<sup>2</sup>.

The type genus. Four sacral vertebrae, of which the centra of the second and third are constricted inferiorly.

<sup>1</sup> Amer. Journ. ser. 3, vol. xiv. p. 514 (1877).

<sup>2</sup> *Ibid.* p. 88.—Preoccupied.

**Atlantosaurus immanis**, Marsh<sup>1</sup>.

Distinguished from *A. montanus* by its superior dimensions; the length of the femur being 2,700 (96 inches). Possibly this species should be referred to *Apatosaurus*<sup>2</sup>.

*Hab.* North America.

- R. 338. Cast of the left femur. The original is the type, and was obtained from the Upper Jurassic of Colorado, U.S.A.; it is preserved in the Museum of Yale College, Newhaven, Connecticut, U.S.A., and is described by Marsh in the 'Amer. Journ.' ser. 3, vol. xv. p. 240 (1878).

*Presented by Prof. O. C. Marsh, 1883.*

\*\* Genus **PELOROSAURUS**, Mantell<sup>3</sup>.

Known only by the humerus. That bone approximates to the humerus of *Brontosaurus*, and may not improbably, as suggested by Seeley<sup>4</sup>, belong to *Ornithopsis*. The type specimen has a median cavity, but this may perhaps be due to decay. Although the name *Pelorosaurus* is much earlier than *Ornithopsis*, it seems preferable, if the two be identical, to retain the latter.

\*\* **Pelorosaurus conybeari**, Mantell<sup>5</sup>.

The type species. The type specimen agrees in relative size with the pelvis of *Ornithopsis hulkei*.

*Hab.* Europe (England).

28626. The slightly imperfect right humerus; from the Wealden of (Fig.) Cuckfield, Sussex. The type specimen; figured by Mantell in the 'Phil. Trans.' 1850, pl. xxi., and by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ii. pl. xii.

*Mantell Collection. Purchased, 1853.*

- R. 713. The shaft of a left humerus, provisionally referred to a young or female individual of this form; from the Wealden of Sandown, Isle of Wight. This bone apparently presents no characters by which it can be specifically distinguished from the type specimen.

*Presented by J. E. Lee, Esq., 1885.*

<sup>1</sup> Amer. Journ. ser. 3, vol. xv. p. 241 (1878).

<sup>2</sup> See Marsh, *op. cit.* vol. xvii. p. 89 (1879).

*Phil. Trans.* 1850, p. 379.

<sup>4</sup> Geol. Mag. 1887, p. 479.

<sup>5</sup> *Op. cit.* p. 386.

Genus **ORNITHOPSIS**, Seeley<sup>1</sup>.

Including *Eucamerotus*, Hulke<sup>2</sup>.

*Chondrosteosaurus*, Owen<sup>3</sup>.

*Gigantosaurus*, Seeley<sup>4</sup>.

*Ischyrosaurus*, Hulke<sup>5</sup>.

Apparently closely allied to the American *Brontosaurus*. Number of sacral vertebrae unknown.

The probability of *Pelorosaurus* being identical has been mentioned under that head.

**Ornithopsis hulkei**, Seeley<sup>6</sup>.

Syn. *Bothriospodus magnus*, Owen<sup>7</sup>.

*Chondrosteosaurus gigas*, Owen<sup>8</sup> (*in parte*).

*Chondrosteosaurus magnus*, Owen<sup>9</sup> (*in parte*).

*Ornithopsis eucamerotus*, Hulke<sup>10</sup>.

The type species. Fully equal in size to *Brontosaurus excelsus*, Marsh, of which the length is estimated at 50 feet. The length of the cervical vertebrae is usually about 0,350 (12 inches), and that of the larger specimens from the dorsal region 0,230 (8 inches).

Hab. Europe (England).

*The reference of some of the vertebrae is provisional; all the following specimens were obtained from the Wealden.*

R. 964. A nearly entire tooth, probably belonging to the present (Fig.) form; from Brixton Bay, Isle of Wight. Figured by Wright in the 'Ann. Mag. Nat. Hist.' ser. 2, vol. x. p. 90 (1852), as the tooth of an unknown reptile; and also by Owen in his 'British Fossil Reptilia,' vol. iii. p. 422, where it is provisionally referred to *Pelorosaurus*; and by the present writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. pl. iii. fig. 4. The superiority in the size of this tooth (fig. 24) over that of *Morosaurus* (fig. 20) renders it

<sup>1</sup> Ann. Mag. Nat. Hist. ser. 4, vol. v. p. 279 (1870).

<sup>2</sup> Quart. Journ. Geol. Soc. vol. xxviii. p. 36 (1872). Reference in this passage is made to vol. xxvi. p. 318 (1870), but the name does not occur there.

<sup>3</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. vii. p. 7 (1876).

<sup>4</sup> Index to Aves &c. in Cambridge Museum, p. 94 (1869).—Not figured.

<sup>5</sup> Quart. Journ. Geol. Soc. vol. xxx. p. 16 (1874).—Preoccupied by Cope, Trans. Amer. Phil. Soc. vol. xiv. pt. 1, p. 38 (1870).

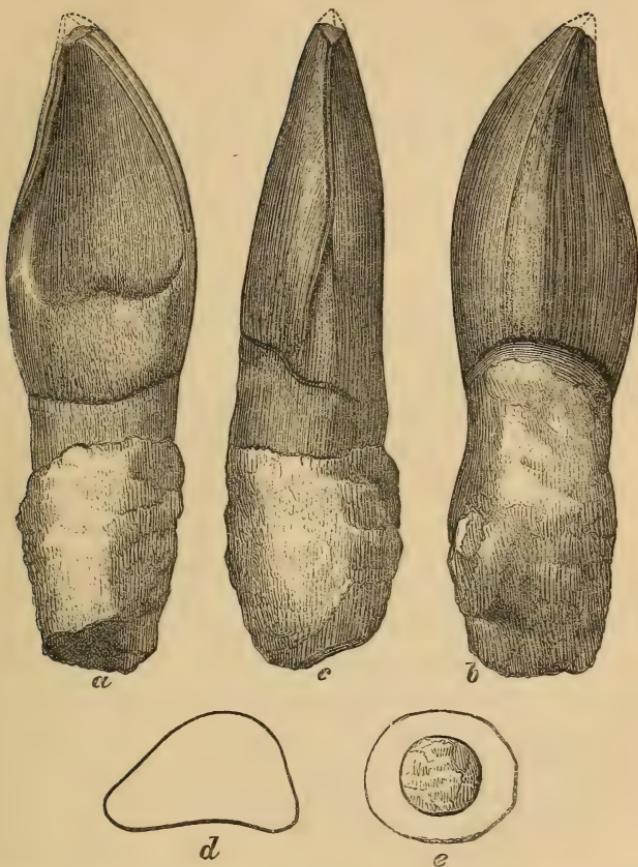
<sup>6</sup> Ann. Mag. Nat. Hist. ser. 4, vol. v. p. 283 (1870).

<sup>7</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. ii. p. 24 (1875).

<sup>8</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. vii. p. 5 (1876).

<sup>9</sup> Ibid. p. 7. <sup>10</sup> Quart. Journ. Geol. Soc. vol. xxxviii. p. 375 (1882).

Fig. 24.



*Ornithopsis hulkei* (?).—*a–b*, three views of tooth; *d*, section of crown; *e*, section of root. From the Wealden of the Isle of Wight. †.

probable that it belongs to the present form rather than to *Cetiosaurus*. The tooth of *C. oxoniensis* figured by Phillips in his ‘Geology of Oxford,’ p. 253, fig. 85, is still smaller than that of *Morosaurus*, but that specimen is probably unusually diminutive.

*Wright Collection. Purchased, 1887.*

R. 751. Part of a right maxilla belonging to the same form as the (Fig.) preceding; from the Isle of Wight. Described and figured by the writer in the ‘Quart. Journ. Geol. Soc.’ vol. xliv. p. 54, pl. iii. figs. 1–3. This specimen shows a

row of nine dental alveoli on the outer border, internally to which there are seen near the anterior part the crowns of two replacing teeth *in alveolo*. The first and best preserved of these teeth agrees exactly with No. R. 964. The maxilla is depressed, like that of a Crocodile, and shows three large foramina on the outer surface. It apparently agrees very closely with the minute outline of the maxilla of *Brontosaurus* given by Marsh in the 'Amer. Journ.' ser. 3, vol. xxvi. pl. i.

*Fox Collection. Purchased, 1882.*

**R. 87.** An imperfect cervical vertebra; from the Isle of Wight. (*Fig.*) Figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. pl. iii. fig. 1. *Fox Collection.*

**R. 87 a.** An imperfect cervical vertebra, with the right rib attached; (*Fig.*) from the Isle of Wight. Figured by Hulke, *op. cit.* pl. iii. figs. 3, 4. *Same history.*

**R. 173.** Two imperfect cervical vertebræ; from the Isle of Wight. *Same history.*

**R. 93.** Three more or less imperfect centra of cervical vertebræ; from the Isle of Wight. *Same history.*

**R. 94.** Portions of vertebral processes from the thoracic region; from the Isle of Wight. *Same history.*

**46869.** The somewhat imperfect centrum of a cervical vertebra, (*Fig.*) provisionally referred to this form; from the Isle of Wight. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. vii. pls. ii. & iii., as *Chondrosteosaurus gigas*, of which it is one of the types.

*Purchased, 1875.*

**28632.** An imperfect anterior dorsal vertebra; from the Isle of Wight. The type specimen. Noticed by Seeley in his 'Ornithosauria,' p. 103, note, and described by him in the 'Ann. Mag. Nat. Hist.' ser. 4, vol. v. p. 280; figured by Owen in his 'Mesozoic Reptilia' (Mon. Pal. Soc.), pt. ii. pl. viii., as the type of *Bothriospondylus magnus*; and noticed by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxv. pp. 754, 755, and vol. xxxviii. p. 357. The latter writer, in the former passage (p. 755), distinctly states that this specimen must be taken as the type of the genus (and therefore of the species); but in the second passage he makes the specimen No. 2239, noticed on p. 142, the type, and refers the present specimen to *O. eucame-*

*rotus*, a name of later date than Owen's *Bothriospondylus magnus*. The present writer has the verbal authority of the founder of the genus for regarding this specimen as its type.      *Mantell Collection. Purchased, 1853.*

R. 88. A nearly entire middle or posterior dorsal vertebra; from (Fig.) the Isle of Wight. Figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. pl. iv.      *Fox Collection.*

R. 89. A slightly imperfect dorsal vertebra of similar type, wanting the transverse processes; from the Isle of Wight.

*Same history.*

R. 90. Two imperfect middle or posterior dorsal vertebræ, retaining the greater part of their neural arches; from the Isle of Wight.      *Same history.*

R. 91. Five more or less imperfect centra of trunk vertebræ; from the Isle of Wight.      *Same history.*

R. 92. An imperfect (?) lumbar vertebra; from the Isle of Wight. This specimen is relatively shorter than either of the preceding.      *Same history.*

48410. The imperfect centrum and part of the arch of a similar vertebra; from Sandown, Isle of Wight. *Purchased, 1877.*

R. 406. The posterior extremity of the centrum of a very large trunk vertebra; from Brook, Isle of Wight.

*Presented by C. Westendarp, Esq., 1884.*

R. 406 a. The summit of the neural arch of a trunk vertebra; from Brook. Closely resembles the corresponding portion of a dorsal of *Brontosaurus* figured by Marsh in the 'Amer. Journ.' ser. 3, vol. xxi. pl. xv. (1881).

*Same history.*

R. 208. The anterior articulation of a very large trunk vertebra; from the Isle of Wight.      *Fox Collection.*

28937. Part of the waterworn centrum of a trunk vertebra; from the Isle of Wight. *Hastings Collection. Purchased, 1855.*

R. 95. Three small imperfect vertebræ, not improbably belonging to young individuals of the present form; from the Isle of Wight.      *Fox Collection.*

R. 98. An imperfect trunk vertebra, provisionally referred to this (Fig.) form; from the Isle of Wight. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. vii. pl. vi., as *Chondrostesaurus maguus*.      *Same history.*

- R. 985.** Fragment of the worn centrum of an enormous trunk vertebra, provisionally referred to this form; from Hastings, Sussex. *No history.*
- R. 209.** The right half of the hæmal portion of what appears to be a posterior (?) last) lumbar vertebra; from the Isle of Wight. The floor of a large lateral pit remains, and is directed horizontally, while the centrum is internally honeycombed by cavities. This specimen differs very widely from the last lumbar of *Cetiosaurus brevis* (No. 36559); it is noticed by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 56. *Fox Collection.*
- R. 141.** The centra and bases of the arches of three associated posterior caudal vertebrae, probably belonging to this form; from the Isle of Wight. *Same history.*
- R. 141 a.** Four imperfect posterior caudal vertebrae, probably belonging to this form; from the Isle of Wight. *Same history.*
- R. 156.** A bone, provisionally regarded as a left posterior sacral rib of this form; from the Isle of Wight. Noticed by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 55; it apparently corresponds fairly with the rib of the fourth sacral of *Brontosaurus* figured by Marsh in the 'Amer. Journ.' ser. 3, vol. xxi. pl. xvi. *Fox Collection.*
- 46781.** A smaller imperfect bone, of the opposite side, agreeing in structure with the preceding; from the Isle of Wight. *Purchased, 1875.*
- R. 212.** The distal extremity of the left scapula; from the Isle of Wight. Noticed by the writer, *op. cit.* p. 55; although rather smaller, this specimen closely resembles the corresponding part of the scapula of *Brontosaurus* figured by Marsh in the 'Amer. Journ.' ser. 3, vol. xxi. pl. xii. *Fox Collection.*
- R. 97.** The associated right ischium and pubis, in a slightly imperfect condition; from Brixton, Isle of Wight. The type of *O. eucamerotus*; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxviii. pl. xiv. These specimens closely resemble the corresponding bones of *Brontosaurus* (fig. 23); part of the head of the pubis is wanting. *Same history.*

- R. 97 a. The imperfect left ischium ; from the Isle of Wight.  
*Fox Collection.*
28688. The proximal portion of the right ischium of an individual of larger size than No. R. 97 ; from the Isle of Wight.  
*Mantell Collection. Purchased, 1853.*
- R. 164. The proximal portion of the right ischium of a young individual ; from the Isle of Wight. *Fox Collection.*
- R. 164 a. The proximal portion of the left ischium ; from the Isle of Wight. *Same history.*
- R. 986. A terminal phalangeal of the pes, wanting the extremity, together with an associated foot-bone ; from Hastings. The phalangeal accords closely with the specimen referred to *Ornithopsis humerocristatus* ; its large size indicates that it probably belonged to the present species, since it is nearly twice the dimensions of the phalangeal of *Cetiosaurus brevis*, No. 36559. *No history.*
- R. 986 a. A rib, not improbably belonging to this form ; locality unknown. It differs from the ribs of *Iguanodon bernissartensis*, not only by its superior size, but also in contour, and appears to resemble those of *Brontosaurus*. *No history.*
- R. 986 b. A larger rib of similar type ; from Hastings.  
*Dawson Collection. Purchased, 1888.*

### **Ornithopsis humerocristatus** (Hulke<sup>1</sup>).

Syn. *Cetiosaurus humerocristatus*, Hulke<sup>2</sup>.  
 (?) *Gigantosaurus megalonyx*, Seeley<sup>3</sup>.  
 (?) *Ornithopsis leedsi*, Hulke<sup>4</sup>.

The humerus is of the type of *Brontosaurus*, and quite different from that of *Cetiosaurus*. There is great probability that *Gigantosaurus megalonyx* and *Ornithopsis leedsi* are specifically identical. The pelvis of the latter is of the type of *O. hulkei*, although presenting well-marked specific differences.

Hab. Europe (England).

44635. The left humerus ; from the Kimeridge Clay (Upper Jurassic) of Weymouth, Dorsetshire. The type specimen ; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxx. pl. ii. ; referred to this genus by the writer in vol. xliv. p. 57. *Purchased, 1873.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxx. p. 17 (1874).—*Cetiosaurus*. <sup>2</sup> Loc. cit.

<sup>3</sup> Index to Aves &c. in Cambridge Museum, p. 94 (1869).—Not figured.

<sup>4</sup> Quart. Journ. Geol. Soc. vol. xlvi. p. 695 (1887).

- 49165.** An imperfect bone, which is probably the dorsal half of the right pubis; from the Kimeridge Clay of Weymouth. Corresponds with the homologous half of the pubis figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xlvi. p. 697, fig. 1, as *O. leedsi*.

*Presented by J. C. Mansel-Pleydell, Esq., 1878.*

*The following specimens have been named Gigantosaurus megalonyx by Seeley.*

- 32498.** Cast of a fibula, probably belonging to this species. The original was obtained from the Kimeridge Clay of Ely, Cambridgeshire; a similar cast is noticed by Seeley, *op. cit.* p. 95, and referred to *G. megalonyx*.

*Presented by G. Bard, Esq., 1857.*

- 32499.** Cast of a terminal phalangeal, agreeing in relative size with the humerus. The original was obtained from the Kimeridge Clay of Ely; a similar cast is noticed by Seeley, *op. cit.* p. 95, and appears to be the type of *G. megalonyx*.  
*Same history.*

#### **Ornithopsis manseli** (Hulke, MS.).

Syn. *Ischyrosaurus manseli*, Hulke (MS.).

The type of *Ischyrosaurus*; if the type specimen be adult it indicates a much smaller species than the preceding.

*Hab.* Europe (England).

- 41626.** The left humerus, with the deltoid ridge broken away; from (Fig.) the Kimeridge Clay (Upper Jurassic) near Kimeridge Bay, Dorsetshire. The type specimen; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxv. pl. xvi., without generic determination, but referred to in vol. xxx. p. 16 as the type of *Ischyrosaurus*. When entire this bone must have agreed very closely in contour with the humerus of *O. humerocristatus*.

*Presented by J. C. Mansel-Pleydell, Esq., 1869.*

#### *Incertæ sedis.*

#### Genus **THECOSPONDYLUS**, Seeley<sup>2</sup>.

It was suggested in the original description that the specimen on

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxx. p. 16 (1874).

<sup>2</sup> *Ibid.* vol. xxxviii. p. 457 (1882).

which this genus was founded might belong to a member of the present Suborder; it indicates a comparatively large form. (See *Cœlurus daviesi*, p. 156.)

**Thecospondylus horneri**, Seeley<sup>1</sup>.

*Hab.* Europe (England).

- R. 291. A specimen described in the first notice as a natural cast of (*Fig.*) the neural canal of the sacrum; from the Hastings Sand (Lower Wealden) of Southborough, Kent. The type specimen. Figured by Seeley in the ‘Quart. Journ. Geol. Soc.’ vol. xxxviii. pl. xix.; and noticed in vol. xliv. p. 79, where it is regarded as a mould of the entire sacrum. Small fragments of bone remain in places.

*Presented by Dr. A. C. Horner, 1882.*

Genus **MACRUROSAURUS**, Seeley<sup>2</sup>.

This genus may belong to the present or next Suborder, and is known only by caudal vertebrae, which are much elongated in the postmedian region, have no distinct postzygapophyses, and in the anterior and medial part of the series are procœlous; the entire length of the tail is estimated at 15 feet. It is suggested by the founder of the genus that the metapodium to which the name *Acanthopholis platypus*<sup>3</sup> has been applied may belong to the present form; that metapodium is of a Sauropodous type.

**Macrurosaurus semnus**, Seeley<sup>4</sup>.

The type species.

*Hab.* Europe (England).

35252. The centrum and part of the arch of a postmedian caudal vertebra; from the Cambridge Greensand.

*Purchased, 1859.*

35253. A very similar specimen; from Cambridge. *Same history.*

35338. The centrum and greater part of the arch of a somewhat smaller caudal vertebra; from Cambridge. *Same history.*

35389. The centrum of a considerably smaller posterior caudal vertebra; from Cambridge. *Same history.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxxviii. p. 457 (1882).

<sup>2</sup> *Ibid.* vol. xxxii. p. 440 (1876).

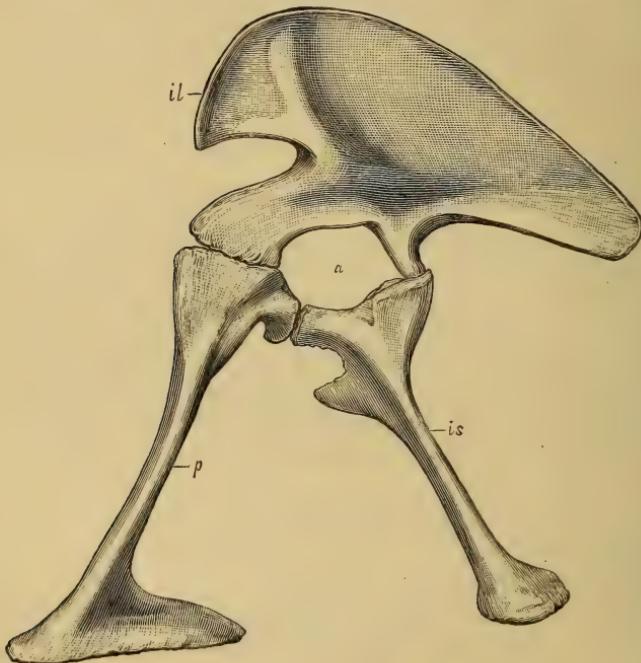
<sup>3</sup> Seeley, Ann. Mag. Nat. Hist. ser. 4, vol. viii. p. 305, pl. vii. (1871).

<sup>4</sup> Quart. Journ. Geol. Soc. vol. xxxii. p. 400 (1876).

## Suborder THEROPODA.

Premaxilla completely toothed; nares, when known (fig. 26) terminal, and a large preorbital vacuity; quadrate elongated, and directed backwards; teeth (fig. 28) simple, laterally compressed, backwardly curved, with serrations on the posterior and frequently on at least a portion of the anterior border, and set in distinct sockets. Vertebræ usually with internal cavities, and frequently

Fig. 25.



*Allosaurus fragilis*, Marsh.—Left side of pelvis; from the Upper Jurassic of North America.  $\frac{1}{2}$ . *a*, acetabulum; *il*, ilium; *is*, ischium; *p*, pubis. (From the 'Amer. Journ.'.)

lateral pits; zygosphenial articulations present; cervicals opistho- or amphicoelous, longer or shorter than dorsals, and usually with free ribs; postcervicals amphicoelous; sacral arches usually supported by single vertebræ; in some instances only two sacral vertebræ; caudals usually with postzygapophyses; chevrons closed; rib-facets of middle dorsal vertebræ apparently on the transverse processes. Limb-bones hollow; pectoral limb much shorter than

pelvic; scapula expanded proximally, with concave anterior border; coracoid with descending process; humerus usually with head imperfectly differentiated from tuberosities; terminal phalangeals of manus long, curved, and compressed. Ilium (fig. 25) deep, with superior border usually greatly arched, and short preacetabular and long postacetabular process; pubis directed downwards and forwards, with an antero-posteriorly expanded bony symphysis, and, at least usually, a considerable osseous union of the lower part of the anterior border, which consequently resembles an elongated Y; ischium comparatively slender and of moderate length, usually with an obturator process. Femur usually with inner trochanter, curved shaft, and of a more or less Crocodilian type, slightly longer or shorter than tibia; astragalus applied to tibia; metatarsals elongated; terminal digits of pes short and rounded; feet usually digitigrade. The more specialized members were of bipedal habits.

Seeley<sup>1</sup> has proposed to unite the present with the preceding Suborder, under the name of Saurischia, and to regard this larger group as an Order.

### Family CŒLURIDÆ.

Vertebræ completely hollowed, as in the presacral series of the Sauropoda; cervicals episthocoelous, longer than dorsals, with ankylosed ribs and no neural spines; sacral arches probably supported by single vertebrae. Anterior bony union of pubis much elongated. Skull unknown.

In the structure of the vertebral column this family closely resembles the Sauropoda; it appears connected with the *Megalo-sauridæ* by *Aristosuchus*.

### Genus CŒLURUS, Marsh<sup>2</sup>.

The type genus. In allied Triassic forms referred by Cope<sup>3</sup> to *Tanystropheus*, there are four vertebrae in the sacrum, and the femur has no distinct inner trochanter. All the species were of comparatively small size.

<sup>1</sup> Rep. Brit. Assoc. for 1887, p. 699, and Proc. R. Soc. vol. xlivi. p. 171 (1887).

<sup>2</sup> Amer. Journ. ser. 3, vol. xviii. p. 504 (1879).

<sup>3</sup> Amer. Nat. vol. xxi. p. 367 (1887), and Proc. Amer. Phil. Soc. vol. xxiv. p. 221 (1887).

**Cœlurus daviesi** (Seeley<sup>1</sup>).

Syn. *Thecospondylus daviesi*, Seeley<sup>2</sup>.

Imperfectly known, and provisionally referred by Hulke<sup>3</sup> to this genus. Somewhat larger than the typical *C. fragilis*, Marsh.

*Hab.* Europe (England).

**R. 181.** The imperfect anterior portion of a cervical vertebra; from (*Fig.*) the Wealden of the Isle of Wight. The type specimen; described and figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 79 *et seq.*

*Fox Collection. Purchased 1882.*

### Family COMPSOGNATHIDÆ.

Internal structure of vertebræ unknown; cervicals opisthocœlous, longer than dorsals, probably with free ribs; sacrum unknown. Three functional digits in manus and pes; femur shorter than tibia; metatarsals greatly elongated; astragalus suturally united to tibia<sup>4</sup>.

The Upper Jurassic North-American genus *Hallopus* may be included in this family; it has two vertebræ in the sacrum.

#### Genus **COMPSOGNATHUS** Wagner<sup>5</sup>.

The type genus.

#### **Compsognathus longipes**, Wagner<sup>6</sup>.

The type species. Length about 0,450.

*Hab.* Europe (Germany).

**49159.** Cast of a slab of lithographic limestone, showing the greater part of the skeleton. The original, which is the type and only known specimen, was obtained from the Kimeridgian of Solenhofen, Bavaria, and is preserved in the Museum at Munich; it is figured by Wagner in the 'Abh. k.-bay. Ak. Wiss.' vol. ix. pt. i. pl. iii. Marsh (Amer. Journ. ser. 3, vol. xxii. p. 340) states that there is the skeleton of a young individual within the ribs. *Purchased, 1878.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xliv. p. 79 (1888).—*Thecospondylus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Ibid.* p. 87.

<sup>4</sup> Marsh states that it is not ankylosed.

<sup>5</sup> Abh. k.-bay. Ak. Wiss. vol. ix. pt. i. p. 94 (1861).

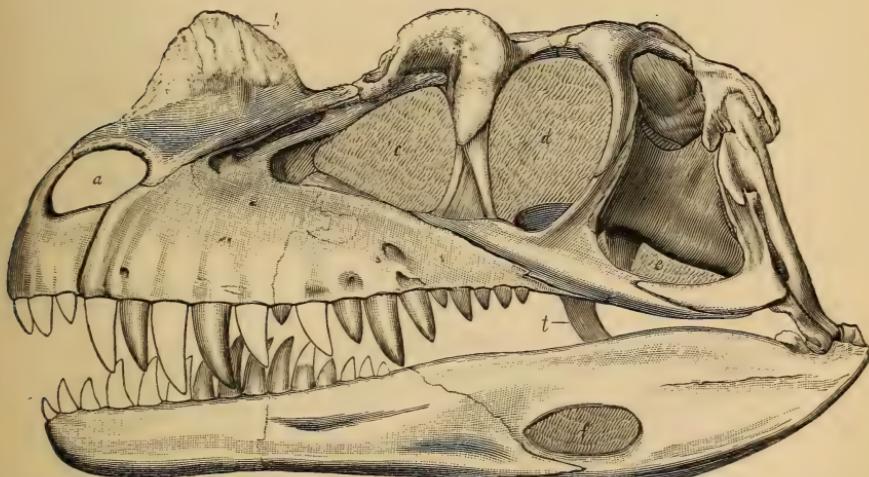
<sup>6</sup> *Loc. cit.*

## Family MEGALOSAURIDÆ.

Teeth usually with serrations on some portions of the anterior border; mandible at least in some instances (*Ceratosaurus*, fig. 26) with lateral vacuity. Vertebræ with lateral pits and fusiform central cavities; cervicals shorter than dorsals, with free ribs; sacral arches generally supported by single vertebræ. Humerus with head imperfectly differentiated from tuberosities, and deltoid crest terminating abruptly; four or five digits in manus; femur slightly longer than tibia, with head much flattened and placed obliquely to condyles; astragalus short and wide; three to five digits in pes.

This family is taken to include the *Zanclodontidæ*, *Labrosauridæ*, and *Ceratosauridæ* of Marsh.

Fig. 26.



*Ceratosaurus nasicornis*, Marsh.—Left lateral view of skull; from the Upper Jurassic of North America. 1. a, nares; b, bony prominence; c, preorbital vacuity; d, orbit; e, infratemporal fossa; f, mandibular vacuity; t, transverse bone. (From the 'Amer. Journ.'.)

Genus **ARISTOSUCHUS**, Seeley<sup>1</sup>.

Vertebræ with a longitudinal fusiform cavity in the middle of centrum; sacrum with probably five vertebræ, each of which supports its own arch. Pubes with very long bony union on the

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xlivi. p. 221 (1887).

anterior border, and the symphysis much produced posteriorly. This genus, which is provisionally included in the family, appears to connect the other members with the *Cœluridae*.

**Aristosuchus pusillus** (Owen<sup>1</sup>).

Syn. *Poikilopleuron pusillus*, Owen<sup>2</sup>.

The type species. Approximating in size to *Hypsilophodon foxi*.

*Hab.* Europe (England).

**R. 178.** Portion of the lumbo-sacral region of the vertebral column, (Fig.) containing five centra with portions of their arches, and the associated pubes; from the Wealden of Brook, Isle of Wight. This specimen is one of the types, and is figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. vii. pl. i. fig. 4, as *Poikilopleuron*; noticed by Marsh in the 'Amer. Journ.' ser. 3, vol. xxvii. p. 335 (1884), as *Cœlurus*; and figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xlivi. pl. xii. figs. 13, 14, and woodcut p. 223. Owen (with whom Hulke is inclined to agree) considers that there were only two sacral vertebrae (as in *Creosaurus*), but Seeley refers all the five vertebrae of this specimen to the sacrum.

*Fox Collection. Purchased, 1882.*

**R. 178 a.** One lateral half of a dorsal vertebra, of which the split (Fig.) surface has been polished; from Brook. Figured by Owen, *op. cit.* pl. i. fig. 3; and noticed by Seeley, *op. cit.* p. 27. *Same history.*

**R. 178 b.** Two imperfect caudal vertebrae; from Brook. Noticed by Seeley, *op. cit.* p. 27. *Same history.*

**R. 179.** A terminal phalangeal, probably belonging to the manus of (Fig.) this form; from Brook. Figured by Owen, *op. cit.* pl. i. figs. 12, 13; also noticed by Seeley, *op. cit.* p. 27, who suggests that it may be Ornithosaurian. It agrees so closely in contour and in the deep lateral claw-groove with the corresponding phalangeal of the third digit of the

<sup>1</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), suppl. vii. p. 2 (1876).—*Poikilopleuron*.

*Loc. cit.*

manus of *Allosaurus* (Marsh, 'Amer. Journ.' ser. 3, vol. xxvii. pl. xii.), that there seems little doubt as to its belonging to the present form. *Fox Collection.*

- R. 899. Part of an apparently similar phalangeal; from the Wealden of the Isle of Wight. *Same history.*

Genus **MEGALOSAURUS**, Buckland<sup>1</sup>.

Syn. *Pœkilopleuron*, Deslongchamps<sup>2</sup>.

Serrations not embracing the whole of anterior border of teeth. Cervical vertebræ opisthocœlous; dorsals with centra much constricted inferiorly and laterally, and subcircular terminal faces; their arches tall, with three lateral pits separated by ridges between the zygapophyses, and spines very lofty; five vertebræ in sacrum, of which adjacent ones support the arches. Probably four digits in manus; astragalus with process ascending anterior surface of tibia; three digits in pes.

The North-American genera *Allosaurus*<sup>3</sup> and *Dryptosaurus*<sup>4</sup> appear to be very closely allied; the pelvis<sup>5</sup> of the former is represented in fig. 25.

**Megalosaurus bucklandi**, Meyer<sup>6</sup>.

Syn. *Pœkilopleuron bucklandi*, Deslongchamps<sup>7</sup> (*in parte*).

The type species. Apparently somewhat larger than *Allosaurus fragilis*, Marsh, of which the estimated length is about 25 feet; the length of the femur of the former, figured by Marsh, is 0,850 (30 inches), and that of *Megalosaurus*, figured by Phillips, 0,978 (35 inches). The upper half of the anterior border of the teeth is serrated.

For the identity of *Pœkilopleuron bucklandi* with this species see Hulke, 'Quart. Journ. Geol. Soc.' vol. xxxv. p. 233 (1879).

*Hab.* Europe (England and France).

<sup>1</sup> Trans. Geol. Soc. ser. 2, vol. i. p. 390 (1824).

<sup>2</sup> Mém. Soc. Linn. Normandie, vol. vi. p. 37 (1834).

<sup>3</sup> See Marsh, Amer. Journ. ser. 3, vol. xxvii. pls. xi., xii. (1884).

<sup>4</sup> *Infrà*, p. 169.

<sup>5</sup> In Phillips's 'Geology of Oxford,' p. 210, fig. 64, the ilium of *Megalosaurus* is turned the wrong way forward.

<sup>6</sup> Palæologica, p. 110 (1832).

Mém. Soc. Linn. Normandie, vol. vi. p. 37 (1838).

*The following specimens may indicate more than one species; they are all from Lower Jurassic strata.*

**R. 332, 333.** Cast of a split slab containing the right premaxilla and maxilla, together with the counterpart of the original specimen; from the Inferior Oolite of Greenhill, Sherbourne, Dorsetshire. The original is figured by Owen in the 'Quart. Journ. Geol. Soc.' vol. xxxix. pl. xi. fig. 1, and is in the possession of E. Cleminshaw, Esq.

*Counterpart presented by E. Cleminshaw, Esq., 1883; cast made in the Museum.*

**R. 334, 335.** Casts of two portions of mandibular rami. The originals were obtained from Sherbourne, and are figured by Owen, *op. cit.* pl. xi. figs. 2, 3. *Made in the Museum.*

**2301.** Cast of a portion of the right ramus of the mandible, containing one fully protruded tooth and others in their alveoli. The original, which is one of the types, was obtained from the Great Oolite of Stonesfield, Oxfordshire, and is preserved in the museum at Oxford. It is figured by Buckland, in the 'Trans. Geol. Soc.' ser. 2, vol. i. pl. xl. and pl. xli. figs. 1-3, and in his 'Geology and Mineralogy' (Bridgewater Treatise), pl. xxiii. figs. 1, 2; by Cuvier, in the 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, pl. xxi. figs. 9, 10; and also by Owen, in his 'Odontography,' pl. lxx. fig. 8, and in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. 3, pl. xi. figs. 1, 2.

*Mantell Collection. Purchased, 1838.*

**28608.** A tooth; from the Stonesfield Slate of Eyeford, Oxfordshire. *Purchased, 1853.*

**47963.** A tooth; from Stonesfield.

*Presented by the Hon. R. Marsham, 1877.*

**31834.** A small tooth; from Stonesfield. *Purchased. About 1854.*

**42024.** A tooth; from Stonesfield.

*Purchased, 1870.*

**R. 234.** Two teeth; from Stonesfield.

*Egerton Collection. Purchased, 1882.*

**41305.** An imperfect tooth; from Stonesfield. *Purchased, 1869.*

**39476.** A water-worn tooth; from the Forest Marble of Stanton, Wiltshire. *Purchased, 1865.*

**47152.** A small tooth; from the Inferior Oolite of Daston, Northamptonshire. *Sharp Collection. Purchased, 1876.*

- R. 497. The middle part of the crown of a tooth ; from the Inferior (Fig.) Oolite of Selsly Hill, Gloucestershire. Figured by Owen, in his 'Wealden and Purbeck Reptilia,' pt. iii. pl. xii. fig. 5 ; formerly in the collection of Dr. S. P. Woodward.

*Presented by Sir R. Owen, K.C.B., 1882.*

- R. 285. An imperfect small cervical vertebra, provisionally referred to this form ; from Stonesfield.

*Egerton Collection. Purchased, 1882.*

31813. Two imperfect dorsal vertebræ ; from Stonesfield.

*Purchased. About 1850.*

47169. The centrum of a trunk vertebra, provisionally referred to this species ; from the Cornbrash, locality unknown.

*Sharp Collection. Purchased, 1876.*

42028. The imperfect centrum of a (probably) lumbar vertebra, provisionally referred to this species ; from the Neocomian bone-bed of Potton, Bedfordshire. *Purchased, 1870.*

- R. 1027. Cast of the sacrum, imperfect posteriorly. The original was obtained from the Coral Rag of Dry Sandford, Oxfordshire, and is preserved in the museum of the Geological Society ; it is noticed by Owen, *op. cit.* p. 8.

*Made in the Museum, 1887.*

- R. 1098. The imperfect sacrum ; from Stonesfield. Figured by (Fig.) Owen, *op. cit.* pls. ii. & iii., where it is erroneously stated to be from the Wealden. *No history.*

28957. Portions of two sacral vertebræ ; from Stonesfield.

*Hastings Collection. Purchased, 1855.*

- R. 700. The first four vertebræ of the sacrum of an immature individual ; from Stonesfield.

*Presented by J. E. Lee, Esq., 1885.*

36585. A sacral rib ; from Stonesfield. *Purchased, 1862.*

25581. One extremity of the centrum of a caudal vertebra ; from Stonesfield. *Presented by Mrs. Townsend, 1851.*

37303. A rib ; from Stonesfield. *Purchased, 1863.*

44097. A rib ; from Stonesfield. *Purchased, 1873.*

- 44097 a. A rib ; from Stonesfield. *Same history.*

- 31824-5. A split slab o Stonesfield slate, showing the head of a rib.

*Purchased. About 1850.*

- R. 1099. The left scapula and coracoid ; from Stonesfield. Similar to the specimen figured in Phillips's 'Geology of Oxford,' p. 208, fig. 63. *No history.*
31810. The right coracoid ; from Stonesfield. *Purchased. About 1850.*
40131. The imperfect left coracoid ; from Stonesfield. *Purchased. About 1866.*
- R. 283. The imperfect right ilium ; from Stonesfield. *Egerton Collection. Purchased. About 1882.*
31811. The left ilium ; from Stonesfield. Figured by Owen, *op. cit.* (*Fig.*) pl. vi. (as a coracoid). *Purchased. About 1850.*
- R. 1100. The right ilium, imperfect anteriorly ; from Stonesfield. *No history.*
- R. 1101. The right ilium ; from Stonesfield. *No history.*
25582. The ischium, imperfect distally ; from Stonesfield. *Presented by Mrs. Townsend, 1851.*
28301. An imperfect bone which is apparently a pubis ; from Stonesfield. *Presented by Lord Alfred Churchill, 1853.*
31806. The right femur ; from Stonesfield. Figured by Owen, (*Fig.*) *op. cit.* pls. vii., viii. *Purchased. About 1850.*
31804. The left femur ; from Stonesfield. *Same history.*
31808. The left femur ; from Stonesfield. *Same history.*
31809. The right tibia ; from Stonesfield. Figured by Owen, *op. cit.* (*Fig.*) pl. ix. *Same history.*
- R. 1102. The left tibia ; from Stonesfield. *No history.*
- R. 1103. The distal portion of the right tibia ; probably from Stonesfield. *No history.*
32725. The proximal extremity of a very large left tibia ; probably from the Fuller's earth near Caen (Calvados), France. *Tesson Collection. Purchased, 1857.*
- R. 1104. Cast of a median metatarsal. The original was obtained from Stonesfield, and is preserved in the museum at Oxford ; it is described and figured by Phillips, in his 'Geology of Oxford,' pp. 216, 217, fig. 79. *No history.*

**R. 413.** A median metatarsal ; from the Great Oolite of Sarsgrove, Sarsden, Chipping Norton, Wiltshire.

*Presented by the Earl of Ducie, 1884.*

**40125 a.** An imperfect lateral metatarsal ; probably from Stonesfield, although labelled Purbeck. *Purchased. About 1850.*

**31932.** A phalangeal ; from Stonesfield. *Purchased. About 1850.*

### **Megalosaurus, sp. a.**

The affinities of the Middle Jurassic species are not yet determined.

*Hab. Europe (France).*

**32724.** The centrum and arch of a dorsal vertebra probably belonging to this genus ; from the 'Argile de Dives' (Oxford Clay) of Vaches-Noires (Calvados), France.

*Tesson Collection. Purchased, 1857.*

### **Megalosaurus insignis, Deslongchamps<sup>1</sup>.**

Of very large size ; the teeth very wide, with the serrations on the anterior border usually extending more than two thirds the entire length of the border, and the serrations themselves very bold.

Typically from the Kimeridgian and Portlandian.

*Hab. Europe (France and England).*

**35553 a.** The crown of a small tooth, with the greater part of the outer coat scaled off ; from the Portlandian of Ningle, near Boulogne, France. *Presented by Dr. T. Davidson, 1859.*

**46388.** The summit of the crown of a very large tooth ; from the Kimeridge Clay of Foxhangers, Devizes, Wiltshire. This specimen is almost identical with the corresponding part of the tooth figured by Sauvage in the 'Mém. Soc. Géol. France,' sér. 2, vol. x. pl. v. fig. 1.

*Cunnington Collection. Purchased, 1876.*

### **Megalosaurus dunkeri, Koken<sup>2</sup>.**

The teeth comparatively narrow, with the serrations on the anterior border extending to about half the length of the crown, and the serrations themselves slight and worn away at an early age on the

<sup>1</sup> In Lennier's 'Études Géologiques et Paléontologiques sur l'Embouchure de la Seine, &c.' p. 35 (1870).

<sup>2</sup> Pal. Abhandl. vol. iii. p. 316 (1887).

anterior border. Generally of smaller size than *M. bucklandi*. If the undermentioned sacrum belongs to this species it may be entitled to generic distinction. The species was founded on the supposition that the anterior border of the teeth was devoid of serrations; but a large series of specimens shows that this is due to wear, every intermediate gradation between a completely serrated and a smooth border being observable.

*Hab.* Europe (Germany and England).

*Unless it is stated to the contrary all the following specimens are from the Wealden.*

- 44806.** The crown of a large tooth probably belonging to this form; from the Purbeck, locality unknown.

*Presented by B. Bright, Esq., 1873.*

- 2828.** Fragment of Tilgate Grit containing the crown of a tooth; (*Fig.*) from Cuckfield, Sussex. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. iii. pl. xi. fig. 4, as *M. bucklandi*. On the anterior border the serrations are worn off. *Mantell Collection. Purchased, 1838.*

- 2332.** The crown of a tooth in a fragment of sandstone; from (*Fig.*) Cuckfield. Figured by Owen, *op. cit.* pl. xi. fig. 3, as *M. bucklandi*. The serrations have nearly disappeared from the anterior border, although faint traces here and there remain. *Same history.*

- 3222.** The imperfect crown of a tooth; from Cuckfield. Figured by (*Fig.*) Owen, *op. cit.* pl. xi. fig. 5, as *M. bucklandi*. A faint trace of serrations remains on one part of the anterior border.

*Same history.*

- 3223-4.** The crowns of four small teeth; from Cuckfield. Figured (*Fig.*) by Owen, *op. cit.* pl. xi. figs. 7-10, as *M. bucklandi*.

*Same history.*

- 3225.** The crown of a much abraded tooth; from Cuckfield. Figured (*Fig.*) by Owen, *op. cit.* pl. xi. fig. 11, as *M. bucklandi*.

*Same history.*

- 3221.** The crown of a tooth; from Sussex. Figured by Mantell in (*Fig.*) his 'Geology of the South-east of England,' p. 261, fig. 1. The serrations have totally disappeared from the anterior border, although they are introduced in the figure.

*Same history.*

- 36552.** The basal half of the crown of a large tooth ; from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. ix. fig. 3.

*Mantell Collection. Purchased, 1853.*

- 36522 a.** The crowns of three teeth ; from Cuckfield. The largest specimen closely resembles the still larger type specimen figured by Koken in the 'Pal. Abhandl.' vol. iii. pl. ii. fig. 2, but retains a few traces of serrations on the anterior border.

*Same history.*

- 2315.** A tooth in a fragment of sandstone ; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

- 3333.** A tooth in a fragment of grit ; from Cuckfield.

*Same history.*

- 26012.** A small tooth in a fragment of grit ; from Cuckfield.

*Dixon Collection. Purchased, 1851.*

- 28422.** A very small tooth in a fragment of sandstone ; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

- 36523.** A tooth in a fragment of sandstone ; from Cuckfield.

*Same history.*

- R. 235.** A tooth in a fragment of sandstone ; from Cuckfield. The serrations have entirely disappeared from the anterior border.

*Egerton Collection. Purchased, 1882.*

- 39197.** The crown of a small tooth in a fragment of sandstone ; from Tunbridge Wells, Sussex.

*Bowerbank Collection. Purchased, 1865.*

- 39213.** Fragment of grit containing a small tooth (together with one of *Goniopholis*) ; from Battle, near Hastings, Sussex.

*Same history.*

- R. 641.** Fragment of grit containing the crown of a tooth, and two detached crowns of teeth ; from near Hastings. The serrations on the anterior borders of these teeth have disappeared.

*Presented by J. E. Lee, Esq., 1885.*

- R. 604.** The crowns of two teeth, one very small ; from the Wadhurst Clay (Lower Wealden), near Hastings.

*Dawson Collection. Purchased, 1884.*

- R. 210.** The crowns of five small teeth ; from the Isle of Wight. In two specimens the serrations on the anterior border are very distinct, while in the others they have disappeared. *Fox Collection. Purchased, 1882.*

- R. 604 a.** An imperfect anterior dorsal vertebra ; from the Wadhurst Clay (Lower Wealden), near Hastings, Sussex. This specimen is strongly opisthocelous, which indicates that its position is earlier in the series than the three vertebrae from Battle figured by Owen in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. xix. Probably associated with the teeth No. R. 604. *Dawson Collection.*

- 28958.** The imperfect centrum of a more posterior trunk vertebra ; probably from the Isle of Wight. Agrees closely with the specimens figured by Owen ; a transverse fracture shows the central cavity.

*Hastings Collection. Purchased, 1855.*

- 2513.** An imperfect trunk vertebra of similar type ; from Sussex. Referred by Owen in MS. to *Bothriospondylus*.

*Mantell Collection. Purchased, 1838.*

- R. 141.** The centrum of a trunk vertebra of a somewhat more elongated type ; from the Isle of Wight. A fracture shows the internal cavity. *Fox Collection. Purchased, 1882.*

- 2141.** The imperfect neural arch and spine of a lumbar (?) vertebra ; (Fig.) from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xii. fig. 1, as *Iguanodon*; the zygosphenal facet on the postzygapophysis is distinctly shown, as well as the characteristic lateral pits.

*Mantell Collection. Purchased, 1838.*

- 42032.** The centrum of a trunk vertebra ; from the Lower Greensand of Potton, Bedfordshire. *Purchased, 1870.*

- 37691.** The centrum of a trunk vertebra ; from Sussex.

*Mantell Collection. Purchased, 1853.*

- R. 139.** Two fragments of the inferior portion of a sacrum provisionally referred to this form ; from the Isle of Wight. Although differing considerably from the sacrum of *M. bucklandi* this specimen apparently makes a nearer approach to that type than to any other with which the writer is acquainted. *Fox Collection.*

- 2294, 2295.** Two portions of a caudal vertebra ; from Cuckfield. Noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 84, as *Pækilopleuron bucklandi*.

*Mantell Collection. Purchased, 1838.*

- 40455.** An imperfect posterior caudal vertebra ; from the Lower Greensand of Potton. *Purchased, 1874.*

- R. 604 b.** An imperfect right scapula provisionally referred to this genus and species ; from near Hastings.

*Dawson Collection. Purchased, 1884.*

- 36495.** An imperfect metacarpal ; from Cuckfield. The proportion between this bone and the metatarsals is approximately the same as that in the corresponding bones of *Allosaurus* referred to below. *Mantell Collection. Purchased, 1853.*

- 36496.** An imperfect metacarpal ; from Cuckfield. *Same history.*

- 2553.** Cast of a metacarpal closely resembling the preceding specimen ; original from Cuckfield.

*Mantell Collection. Purchased, 1838.*

- R. 1105.** The imperfect terminal phalangeal of the third (?) digit (*Fig.*) of the manus ; from Cuckfield. Figured by Owen, *op. cit.* pt. iii. pl. x. figs. 1-4, as *M. bucklandi*. In its extreme curvature this specimen closely resembles the terminal phalangeal of the third digit of the manus of *Allosaurus* figured by Marsh in the 'Amer. Journ.' ser. 3, vol. xxvii. pl. xii. *No history.*

- R. 604 c.** The imperfect shaft of the right tibia ; from the Wadhurst Clay near Hastings. Probably associated with the vertebra No. R. 604 a. *Dawson Collection.*

- R. 604 d.** The fourth left metatarsal ; from the Wadhurst Clay near Hastings. Doubtless associated with the last specimen ; length 0,245. Agrees precisely with the corresponding bone of *M. bucklandi* figured by Phillips in his 'Geology of Oxford,' p. 215, fig. 68, but is of smaller dimensions. *Dawson Collection.*

- 2559.** The imperfect left metatarsus, the proximal extremities of (*Fig.*) the three metatarsals and the distal portion of the fourth being wanting ; from Cuckfield. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. iv.

pl. xi., as *Hylaeosaurus*; noticed by Hulke in the 'Phil. Trans.' 1881, p. 660, and its probable distinctness from that genus pointed out; and referred to the present genus by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 53. The fourth metatarsal agrees with No. R. 604 d.

*Mantell Collection. Purchased, 1838.*

2661. The second right metatarsal; from Cuckfield.

*Same history.*

2680. The third left metatarsal; from Cuckfield. *Same history.*

2574. The imperfect distal portion of the third left metatarsal; from Cuckfield. *Same history.*

36551. The imperfect proximal extremity of a first phalangeal of (Fig.) the pes; from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xiii. fig. 3.

*Mantell Collection. Purchased, 1853.*

3640. The proximal extremity of a first phalangeal of the pes; from Cuckfield. *Mantell Collection. Purchased, 1838.*

2501. A first phalangeal of the pes; from Cuckfield. Although smaller this bone closely resembles the first phalangeal No. 44898 referred to *Dryptosaurus*. *Same history.*

2503. The second phalangeal probably of the third digit of the pes; (Fig.) from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xvii. figs. 28, 29; closely resembles the corresponding bone of the phalangeals (No. 44898) referred to *Dryptosaurus*. *Same history.*

2482. The terminal phalangeal of one of the digits of the pes; from (Fig.) Cuckfield. Figured by Mantell in his 'Geology of the South-east of England,' pl. iii. fig. 1, as *Iguanodon*; and by Owen, *op. cit. pt. iii. pl. x. fig. 5*, as *M. bucklandi*.

*Same history.*

### **Megalosaurus bredai, Seeley<sup>1</sup>.**

Founded upon a femur, which is provisionally referred to the present genus. The distal extremity of that bone (fig. 27) is more compressed antero-posteriorly, the great and inner trochanter situated more proximally, and the shaft more curved.

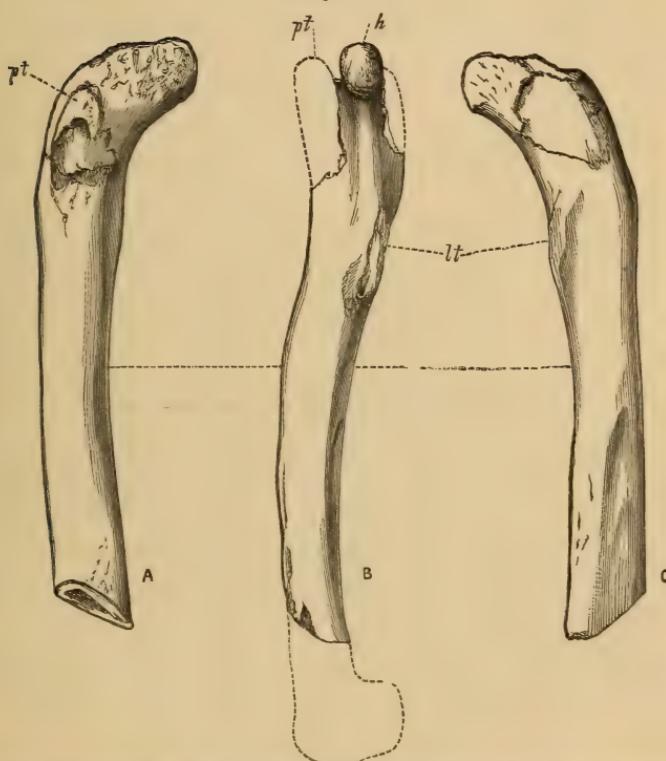
*Hab. Europe (Holland).*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxxix. p. 246 (1883).

42997. The right femur, imperfect proximally and distally; from (Fig.) the Upper Cretaceous of Maastricht, Holland. The type (fig. 27); figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxix. p. 247, fig. 1.

*Van Breda Collection, Purchased, 1871.*

Fig. 27.



*Megalosaurus bredai*.—The right femur, from the anter or (A), inner (B), and outer (C) aspects; from the Maastricht beds.  $\frac{1}{4}$ . h, head; lt, inner trochanter; pt, great (proximal) trochanter. (From the 'Quart. Journ. Geol. Soc'.)

### Genus DRYPTOSAURUS, Marsh<sup>1</sup>.

Syn. *Lælaps*, Cope<sup>2</sup>.

Nearly allied to *Megalosaurus*, with which Leidy (Proc. Ac. Nat. Sci. Philad. 1868, p. 198) suggests that it may prove identical.

<sup>1</sup> Amer. Journ. ser. 3, vol. xiv. p. 88, note (1877).

<sup>2</sup> Proc. Ac. Nat. Sci. Philad. 1866, p. 276.—Preoccupied by a genus of Arachnida.

**Dryptosaurus aquilunguis** (Cope<sup>1</sup>).

Syn. *Lælaps aquilunguis*, Cope<sup>2</sup>.

Apparently equal in size to *Megalosaurus bucklandi*.

Hab. North America.

**50100.** A series of casts of bones, comprising (among others) parts of the mandible, dorsal and caudal vertebræ, the tibiae, an astragalus, a metatarsal, and phalangeals. The originals, which are the types, were obtained from the Greensand of Barsborough, Gloucester county, New Jersey, U.S.A.; and are figured by Cope in the 'Trans. Amer. Phil. Soc.' vol. xiv. pls. viii.-xi. *Purchased.*

**44898.** Casts of the first and second phalangeals of one digit of the pes provisionally referred to this genus. The originals were probably obtained from the Greensand of New Jersey.

*Presented by Sir R. Owen, K.C.B., 1874.*

Genus **BOTHRIOSPONDYLUS**, Owen<sup>3</sup>.

Cervical vertebræ probably opisthocelous; postcervicals with their centra greatly constricted inferiorly and laterally, and having a large pit on either side below the neuro-central suture; there appear to have been at least three sacral vertebræ, one of which carries its own arch. Teeth of this genus may be included under the head of *Megalosaurus*.

*Creosaurus*, Marsh<sup>4</sup>, appears to be a closely allied form, in which there are two sacral vertebræ, and the ilium has a deep postacetabular portion, with a slight incision above the pubic process.

**Bothriospondylus suffosus**, Owen<sup>5</sup>.

The type species. Considerably smaller than *Megalosaurus bucklandi*, with the pits in the vertebral centra deep.

Hab. Europe (England).

<sup>1</sup> Proc. Ac. Nat. Sci. Philad. 1866, p. 276.—*Lælaps*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. ii. p. 15 (1875).

<sup>4</sup> Amer. Journ. ser. 3, vol. xv. p. 243 (1878). See vol. xxvii. pl. xiv.; the vertebræ figured in the latter plate were also figured in vol. xvii. pl. x. as *Allosaurus*.

<sup>5</sup> *Loc. cit.*

*The following specimens are the types, and were obtained from the Kimeridge Clay of Swindon, Wiltshire.*

- 44592.** The centrum of a trunk vertebra. Figured by Owen in his (*Fig.*) ‘Mesozoic Reptilia,’ pt. ii. pl. v. figs. 1, 2, 4, 5. The length is 0,090. *Presented by the Swindon Brick and Tile Company, 1873.*

- 44593.** The centrum of a trunk vertebra. Figured by Owen, *op. cit.* pl. v. fig. 3. *Same history.*

- 44594–5.** Two centra of trunk vertebræ. *Same history.*

- 44589.** The centrum of a sacral vertebra. Figured by Owen, *op. cit.* pl. iii. figs 1–4. *Same history.*

- 44590.** The centrum of a sacral vertebra. Figured by Owen, *op. cit.* pl. iv. figs. 1–3. *Same history.*

- 44591.** The centrum of a sacral vertebra. Figured by Owen, *op. cit.* pl. iv. figs. 4–6. *Same history.*

### **Bothriospondylus robustus**, Owen<sup>1</sup>.

Larger than the preceding species.

*Hab.* Europe (England).

- 22428.** The centrum of a trunk vertebra; from the Forest Marble (*Fig.*) (Lower Jurassic) of Bradford, Wiltshire. The type; figured by Owen in his ‘Mesozoic Reptilia,’ pt. ii. pl. vi. fig. 1. *Purchased, 1848.*

### Genus **ZANCLODON**, Plieninger<sup>2</sup>.

Syn. *Gresslysaurus*, Rütimeyer<sup>3</sup>.

*Dinosaurus*, Rütimeyer<sup>4</sup>.

*Teratosaurus*, Meyer<sup>5</sup>.

Cervical vertebræ amphicoelous; two vertebræ in sacrum. Serrations on anterior border of teeth extending nearly to base of crown, of which the compression is excessive. Five digits in

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. ii. p. 21 (1875).

<sup>2</sup> Jahresh. Ver. nat. Württ. vol. ii. p. 248 (1846).

<sup>3</sup> Verh. schw. nat. Ges. vol. xli. p. 64 (1856).

<sup>4</sup> Arch. Sci. Phys. Nat. vol. xxxiii. p. 53 (1856).

<sup>5</sup> Palæontographica, vol. vii. p. 258 (1861).

manus and pes ; pubes broad, with long anterior union ; astragalus without ascending process. There seems no reasonable doubt as to the generic unity of *Teratosaurus* and *Zancloodon* ; Huxley<sup>1</sup> identifies the type of the former with the skeleton originally described by Plieninger<sup>2</sup> as *Belodon*, while Baur<sup>3</sup> refers the latter to *Zancloodon*.

[***Zancloodon suevicus*** (Meyer<sup>4</sup>).

Syn. *Teratosaurus suevicus*, Meyer<sup>5</sup>.

*Gresslysaurus ingens*, Rütimeyer<sup>6</sup>.

*Dinosaurus gresslyi*, Rütimeyer<sup>7</sup>.

Of large size, with the serrations on the anterior border of the teeth extending very close to the base. Whether this form is really distinct from *Z. levius*, Plieninger<sup>8</sup>, from the Lettenkohle (Bunter) of Gaildorf, remains to be proved ; the type specimen of the latter is smaller than the type of the present form.

*Hab.* Europe.

**38646.** The left maxilla, showing five protruded teeth and the germs (Fig.) of several in their alveoli ; from the Upper Keuper (Upper Trias) of Stuttgart. The type specimen ; figured and described by Meyer in the 'Palaeontographica,' vol. vii. p. 258, pl. xlvi. *Purchased*, 1864.

**38647-8.** Two imperfect teeth ; from Stuttgart. *Same history.*

**38649.** An imperfect bone, which is not improbably the right coracoid ; from Stuttgart. *Same history.*

**38058.** A crushed bone, which is not improbably a tibia of this form ; from Stuttgart. The medullary cavity is distinctly shown. The specimen indicates a small individual.

*Same history.*

***Zancloodon* (?), sp. a.**

This form may be identical with the preceding ; the tooth from the Keuper figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xxvi. pl. iii. fig. 11, may belong to it.

*Hab.* Europe (England).

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxvi. p. 42 (1870).

<sup>2</sup> Jahresh. Ver. nat. Württ. vol. viii. pls. viii.-xii. (1852).

<sup>3</sup> Zool. Anzeiger, vol. ix. pp. 742-743 (1886).

<sup>4</sup> Palaeontographica, vol. vii. p. 267 (1861).—*Teratosaurus*. <sup>5</sup> Loc. cit.

Verh. schw. nat. Ges. vol. xli. p. 64 (1856). Not figured.

<sup>7</sup> Arch. Sci. Phys. Nat. vol. xxiii. p. 53 (1856). Not figured.

<sup>8</sup> Op. cit. pl. iii. fig. 3.

- 23812.** The two extremities of a proximal phalangeal, together with a fragment of another (? terminal) phalangeal; from the Rhætic (Upper Trias) of Aust Cliff, near Bristol, Warwickshire. The first specimen, although of rather smaller size, resembles one of the phalangeals figured by Plieninger in the 'Jahresh. Ver. nat. Württ.' vol. viii. pl. ix. fig. 2 (1852), as *Belodon*.      *Purchased*, 1849.

**Zanclodon (?)**, sp. b.

The serrations on the anterior border of the tooth stopping at a rather greater distance above the root of the crown. The generic reference is provisional.

*Hab.* Europe (England).

Fig. 28.



*Zanclodon (?)* sp.—Crown of a tooth; from the Lower Lias of Lyme-Regis.  $\frac{1}{1}$ .

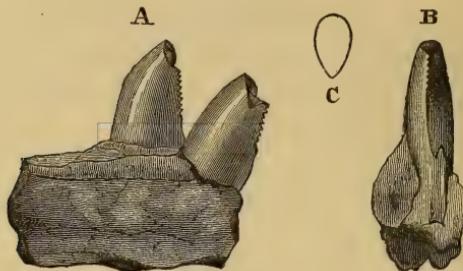
- 41352.** The crown of a tooth; from the Lower Lias of Lyme Regis, Dorsetshire. Figured in the accompanying wood-cut. This specimen indicates a much smaller animal than the type of *Z. suevicus*; the serrations on the anterior border stop at a distance of 0,004 above the root of the crown. In its great lateral compression and longitudinal raised lines on the enamel this specimen apparently comes nearer to *Zanclodon* than to *Megalosaurus*.

*Purchased*, 1869.

## Family ANCHISAURIDÆ.

Imperfectly known. Teeth in some instances (fig. 29) without serrations on the anterior border, but in others (fig. 30) with oblique serrations on both borders. Cervical vertebrae amphicoelous; typically (*Anchisaurus*<sup>1</sup>) five digits in manus and three in pes; and pubis rod-like.

Fig. 29.



*Epicampodon*<sup>2</sup> *indicus* (Huxley).—Fragment of mandible; from the Panchet beds of the Lower Gondwanas of Bengal.  $\frac{3}{4}$ . A, lateral aspect; B, posterior do.; C, section of tooth. (From the 'Palaeontologia Indica'.)

Genus **THECODONTOSAURUS**, Riley & Stutchbury<sup>3</sup>.

Teeth (fig. 30) with oblique serrations on both borders; ilium<sup>4</sup> (provisional) of a Megalosaurian type. Referred to this family by Marsh.

Fig. 30.



*Thecodontosaurus platyodon* (R. & S.).<sup>5</sup>—Lateral aspect of tooth; from the Upper Trias of Bristol.  $\frac{1}{2}$ .

<sup>1</sup> Originally *Amphisaurus*, but altered by Marsh in Amer. Journ. ser. 3, vol. xxix, p. 169.

<sup>2</sup> Syn. *Ankistrodon*.—Preoccupied.

<sup>3</sup> Proc. Geol. Soc. vol. ii. p. 398 (1836—vol. dated 1838).

<sup>4</sup> Huxley, Quart. Journ. Geol. Soc. vol. xxvi. pl. iii. fig. 7; the anterior part is described as posterior.

<sup>5</sup> Referred to this genus by Huxley, *op. cit.*

**Thecodontosaurus antiquus**, Morris<sup>1</sup>.

The type species. Of small size; 21 lower teeth.

Hab. Europe (England).

R. 1108. Cast of the greater part of the left ramus of the mandible. The original is from the Upper Triassic Conglomerate of Durdham Down, near Bristol, Gloucestershire, and is preserved in the Museum at Bristol; it is figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xxvi. pl. iii. figs. 1, 2. *Made in the Museum, 1887.*

Suborder *ORNITHOPODA*.

Premaxilla (when known) edentulous entirely or anteriorly; no preorbital vacuity; nares terminal or subterminal; quadrate elongated and slightly inclined forward; teeth usually serrated, complex, and not set in distinct sockets. Frequently a predentary bone. Vertebræ without internal cavities<sup>2</sup> or zygosphenial articulations; cervicals shorter than dorsals, with free ribs, and either opistho- or amphicoelous; anterior and middle caudals with postzygapophyses; chevrons usually closed; rib-facets of dorsal vertebræ either on arches or transverse processes. Pectoral limb much shorter than pelvic; scapula with proximal extremity greatly or moderately expanded, and frequently with the anterior border convex and posterior concave; humerus with head usually well differentiated from tuberosities; five digits in manus. Ilium shallow, generally with elongated preacetabular process; pubis directed backwards parallel to ischium, without symphysis, and with large preacetabular (pectineal) process; ischium with obturator process, short or elongated. Femur with straight shaft, generally large inner trochanter, and the head globular, differentiated from upper trochanters, and set nearly parallel to condyles; astragalus applied to tibia; metatarsals long or short; terminal digits of pes either laterally or vertically compressed; feet digitigrade or plantigrade.

This Suborder is taken (after Cope) to include the Stegosauria of Marsh<sup>3</sup>. The more specialized forms were mainly of bipedal habits.

<sup>1</sup> Cat. Brit. Foss. 1st ed. p. 211 (1843). This name is commonly quoted as Riley and Stutchbury, but it does not occur in either of their memoirs.

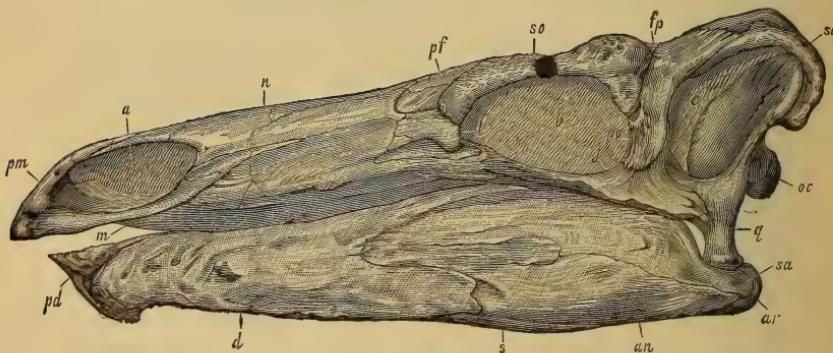
<sup>2</sup> If *Stenopelix* (see Koken, Pal. Abhandl. vol. iii. pl. xxx. 1887) belong to this suborder (with which it agrees in the form of the ilium) it will be an exception in this respect.

<sup>3</sup> Seeley has proposed to substitute the name Ornithischia for this group, and to make it of ordinal rank. See Rep. Brit. Assoc. for 1887, p. 698, and Proc. R. Soc. vol. xlivi. p. 170 (1887).

## Family OMOSAURIDÆ.

Cranium (fig. 31) typically elongated, low, and narrow anteriorly, with large orbits, low infratemporal fossæ, and moderate nares; mandibular rami rather shallow, with narrow symphysis terminated by a predentary bone. Teeth scelidosauroid. Vertebræ amphicoelous; dorsals with slight lateral depressions on centrum, very narrow neural canal, and lofty arch without deep pits in front of postzygapophyses; each sacral bearing entirely or partly its own arch; anterior caudals with transverse diameter of centrum longer than vertical; chevrons open; rib-facets of middle dorsal vertebræ on arch. Limb-bones solid; scapula (fig. 32) with large glenoidal expansion, forming a right angle with anterior border of shaft; coracoid without descending process; humerus short and thick, with expanded extremities. Ilium (fig. 32) with very long and stout

Fig. 31.



*Stegosaurus stenops*, Marsh.—Left lateral view of cranium; from the Upper Jurassic of North America.  $\frac{1}{4}$ . *a*, nares; *b*, orbit; *c*, infratemporal fossa; *pm*, premaxilla; *m*, maxilla; *n*, nasal; *pf*, prefrontal; *so*, supraorbital<sup>1</sup>; *fp*, postfrontal; *po*, postorbital; *l*, lachrymal; *j*, jugal; *q*, quadrate; *sq*, squamosal; *oc*, occipital condyle; *ar*, articular; *sa*, surangular; *an*, angular; *s*, splenial; *d*, dentary; *pd*, predentary. (From the 'Amer. Journ.'.)

preacetabular, and short postacetabular process; pubis and ischium short, without distal expansion; femur with or without distinct inner trochanter, much longer than tibia, which is not greatly longer than

<sup>1</sup> This bone, forming the upper border of the orbit and connecting the pre- and post-frontals, appears to be an element usually not represented as a distinct bone.

humerus; astragalus ankylosed to tibia; five digits in pes, which is plantigrade. A dermal armour, consisting of scutes and long spines attached by their expanded bases.

Equivalent to the *Stegosauridæ*, Marsh; in the characters of the limb-bones and sacrum this family approximates to the Sauropoda, which it connects with the *Scelidosauridæ*.

### Genus **OMOSAURUS**, Owen<sup>1</sup>.

The type genus. Skull unknown. Four sacral vertebrae; femur with inner trochanter, and nearly double the length of tibia; metapodials extremely short.

The American *Stegosaurus*, Marsh<sup>2</sup>, differs by the absence of an inner trochanter to the femur<sup>3</sup>.

### **Omrosaurus armatus**, Owen<sup>4</sup>.

The type species. Of large size, although much smaller than *Cetiosaurus oxoniensis*.

*Hab.* Europe (England).

*The following specimens are the types, and belong to a single individual; they were obtained from the Kimeridge Clay (Upper Jurassic) of Swindon, Wiltshire; and were presented by the Swindon Brick and Tile Company, 1879. A note on their exhumation, with figures of some of them, is given by W. Davies in the 'Geol Mag.' dec. 2, vol. iii. pp. 193-197, pls. vii., viii.*

**46013.** The neural arch of a cervical vertebra. Figured by Owen (*Fig.*) in his 'Mesozoic Reptilia,' pt. ii. pl. xi. (1876).

**46013 a.** An imperfect dorsal vertebra. Figured, *op. cit.* pl. xii. (*Fig.*) figs. 2, 3.

**46013 b.** The centrum of a dorsal vertebra. Figured, *op. cit.* pl. xiii. (*Fig.*) fig. 3.

**46013 c.** Six imperfect dorsal vertebrae.

**46013 d.** An anterior caudal vertebra with its chevron. Figured, (*Fig.*) *op. cit.* pl. xiv. figs. 1-4, and pl. xv. figs. 1-3.

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. ii. p. 45 (1875).

<sup>2</sup> Amer. Journ. ser. 3, vol. xiv. p. 513 (1877). See also vol. xix. pp. 253-259, pls. vi.-xii. (1880) (the teeth figured in pl. vi. were subsequently referred to *Diplodocus*); and vol. xxi. pp. 167-170, pls. vi.-viii. (1881).

<sup>3</sup> See Hulke, Quart. Journ. Geol. Soc. vol. xlivi. p. 702 (1887).

<sup>4</sup> *Loc. cit.*

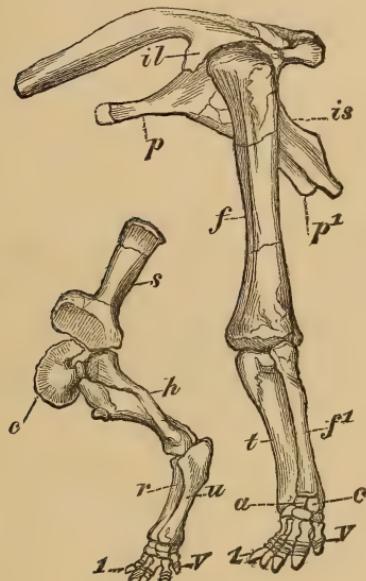
- 46013 e.** A middle caudal vertebra. Figured, *op. cit. pl. xvi.* (*Fig.*) figs. 1-3.
- 46013 f.** Two anterior caudal vertebræ.
- 46013 g.** The left humerus. Figured, *op. cit. pl. xvii. figs. 1-5.* (*Fig.*)
- 46013 h.** The left ulna. Figured, *op. cit. pl. xvii. figs. 13, 14.* (*Fig.*)
- 46013 i.** The left radius. Figured, *op. cit. pl. xvii. figs. 7-11.* (*Fig.*)
- 46013 j.** The third left metacarpal. Figured, *op. cit. pl. xviii.* (*Fig.*) figs. 3-6.
- 46013 k.** The fourth left metacarpal. Figured, *op. cit. pl. xviii.* (*Fig.*) figs. 1-2.
- 46013 l.** Bones of the carpus and metacarpus, comprising the scaphoid, cuneiform, unciform, and three metacarpals.
- 46013 m.** A phalangeal. Figured, *op. cit. pl. xv. figs. 4, 5,* as a terminal; the terminals of *Stegosaurus* ('Amer. Journ.' ser. 3, vol. xix. pl. viii. fig. 4) show, however, that this determination is not correct.
- 46013 n.** A dermal spine. Figured, *op. cit. pl. xxii. figs. 2-3,* as the left carpal spine; as noticed by Marsh, it agrees in structure with the dermal spine of *Stegosaurus*, figured in the 'Amer. Journ.' *op. cit. pl. x. fig. 2*, numerous specimens of which were found with a single skeleton.
- 46013 o.** A mass of matrix containing dorsal, lumbar, sacral, and caudal vertebræ, ribs, both ilia, and the right ischium and femur. Figured, *op. cit. pl. xix.*
- 46013 p.** The left ischium. Figured, *op. cit. pl. xx. figs. 1-3.* (*Fig.*)
- 46013 q.** The right pubis. Figured, *op. cit. pl. xx. figs. 4-6.* In (*Fig.*) the diagram in the text this bone is incorrectly placed.
- 46013 r.** The left pubis.
- 46013 s.** The right tibia. Figured, *op. cit. pl. xxi. figs. 3-6.* (*Fig.*)

The following specimen is provisionally referred to this form.

47329. The centrum of a posterior caudal vertebra from the Kimeridge Clay of Swindon.

*Presented by the Swindon Brick and Tile Company, 1876.*

Fig. 32.



*Stegosaurus armatus*, Marsh; Upper Jurassic, North America.—Left pectoral and pelvic girdle, and limbs;  $\frac{1}{2}$  nat. size: *s*, scapula; *c*, coracoid; *h*, humerus; *r*, radius; *u*, ulna; *1-v*, phalangeals; *il*, ilium; *is*, ischium; *p*, *p'*, pubis; *f*, femur; *t*, tibia; *f'*, fibula; *a*, astragalus; *c*, calcaneum.  
(After Marsh.)

### **Omosaurus hastiger, Owen<sup>1</sup>.**

Founded upon the following specimens, which were described as carpal spines, and from their marked difference from the dermal spine of the type species, No. 46013 *n*, were regarded as specifically distinct. Other specimens are required to determine the validity of this species.

*Hab.* Europe (England).

46320. A dermal spine, wanting the summit; from the Kimeridge (Fig.) Clay (Upper Jurassic) of Wootton-Bassett, Wiltshire.

<sup>1</sup> Mesozoic Reptilia (Mon. Pal. Soc.), pt. iii. p. 1 (1877).

The type; figured by Owen in his 'Mesozoic Reptilia,' pt. iii. pl. xxiii. and pl. xxiv. figs. 1-3.

*Cunnington Collection. Purchased, 1875.*

**46321.** Transverse section from the upper extremity of the pre-(*Fig.*) ceding specimen. Figured by Owen, *op. cit.* pl. xxiv. fig. 4. *Same history.*

**46322.** A similar dermal spine belonging to the same individual as the preceding; from Wootton-Bassett. *Same history.*

### **Omosaurus (?)**, sp.

*Hab.* Europe (England).

**R. 584.** A dermal spine, wanting the summit; from the Oxford Clay (Middle Jurassic) of Bedford. Very similar in general type to No. 46320. *Presented by W. B. Graham, Esq., 1886.*

**40517.** The distal portion of a fibula not improbably belonging to this or an allied form; from the Oxford Clay of Weymouth, Dorsetshire. This bone is solid throughout.

*Purchased, 1867.*

### Family SCELIDOSAURIDÆ.

Typically the cranium tapering anteriorly, with circular orbits which are not prominent superiorly, and the infratemporal fossæ (and probably the nares) small; mandibular rami slender and aperting to a point, which may have had a predentary; teeth (fig. 33) in a single row, with compressed, sharp-edged, triangular crowns, of which the borders usually bear oblique serrations. Vertebrae amphicoelous; dorsals with slight depressions on the sides of the centrum, narrow neural canal, and no deep pits on the arches in front of the postzygapophyses; sacral arches supported by two centra; anterior caudals with transverse diameter of centrum longer than vertical; rib-facets of middle dorsal vertebrae typically forming a "step" on the transverse process, but in the later forms placed on the arch. Limb-bones solid. Scapula with large glenoid expansion, forming an obtuse angle with anterior border of shaft; coracoid with descending process; humerus short, with much expanded head, and shaft without angulation. Ilium with long pre- and postacetabular processes, the latter being broad and with an inner horizontal plate; pubis and ischium comparatively short; femur with distinct inner trochanter, and slightly

longer than tibia, the latter being nearly the length of the humerus; astragalus distinct from tibia; metatarsals short and not interlocking; four functional digits in pes, which was probably plantigrade. A dermal armour in the form of scutes and spines.

Genus **SCELIDOSAURUS**, Owen<sup>1</sup>.

The type genus. The teeth (fig. 33) strongly serrated; tibia rather shorter than the humerus; posterior chevrons not antero-posteriorly elongated; dermal spines forming short subsymmetrical cones, slightly compressed, with convex sides and fore-and-aft ridges. Preacetabular process of ilium vertically compressed.

Fig. 33.



*Scelidosaurus harrisoni*.—An upper tooth; from the Lower Lias of Dorsetshire. ♀.

**Scelidosaurus harrisoni**, Owen<sup>2</sup>.

The type species. The larger specimens indicate an animal of considerable size. There are four sacral vertebræ.

*Hab.* Europe (England).

*All the following specimens are from the Lower Lias of Dorsetshire.*

**R. 1111.** The skeleton, almost entire except the extremity of the (Fig.) skull; from Charmouth. The skull is figured by Owen in his ‘Liassic Reptilia,’ pt. i. pls. iv.–vi., and the remainder of the skeleton in pt. ii. pls. i.–xi. This specimen indicates an individual much smaller than the type, its total length being about 11 feet 3 inches. *Purchased, 1865.*

**39517.** An imperfect anterior caudal vertebra; from Lyme-Regis. *Purchased, 1866.*

<sup>1</sup> ‘Encyclopædia Britannica,’ 8th ed. vol. xvii. p. 150 (1859).

<sup>2</sup> *Liassic Reptilia* (*Mon. Pal. Soc.*), pt. i. p. 1 (1861).

- 39517 a. Two posterior caudal vertebræ (one imperfect); from Lyme-Regis. *Purchased*, 1866.
41327. Two posterior caudal vertebræ; from Lyme-Regis. *Purchased*, 1869.
39518. A chevron-bone; from Lyme-Regis. *Purchased*, 1866.
41324. The imperfect glenoidal half of the right scapula; from Lyme-Regis. *Purchased*, 1869.
41325. The shaft of the right humerus; from Lyme-Regis. *Same history*.
39496. The adjacent extremities of the right femur, tibia, and fibula, (*Fig.*) cemented together by matrix, of a large individual; from Charmouth. The type; figured by Owen, *op. cit.* pt. i, pl. ii, figs. 1-3. *Purchased*, 1865.
41322. The left femur; from Lyme-Regis. Smaller than the corresponding bone of the entire skeleton; closely resembles the smaller specimen figured by Owen, *op. cit.* pt. i. pl. iii. figs. 5, 6. *Purchased*, 1867.
42069. The distal portion of the right femur of a small individual; from Lyme-Regis. *Purchased*, 1870.
40503. The imperfect proximal half of a small left tibia; from Lyme-Regis. *Purchased*, 1867.
41328. Three metatarsals; from Lyme-Regis. *Purchased*, 1869.
42070. A phalangeal; from Lyme-Regis. *Purchased*, 1870.
39519. Two phalangeals (one imperfect); from Lyme-Regis. *Purchased*, 1866.
39520. A terminal phalangeal; from Lyme-Regis. *Same history*.
39516. Numerous imperfect dermal spines; from Lyme-Regis. *Purchased*, 1866.
41329. Several dermal spines; from Lyme-Regis. *Purchased*, 1869.
42068. Numerous dermal spines; from Lyme-Regis. *Purchased*, 1870.
39497. An undetermined long-bone, wanting the extremities; from Lyme-Regis. *Purchased*, 1865.

**41323.** An undetermined bone; from Lyme-Regis.

*Purchased*, 1869.

**42074.** An undetermined bone; from Lyme-Regis.

*Purchased*, 1870.

Genus **ACANTHOPHOLIS**, Huxley<sup>1</sup>.

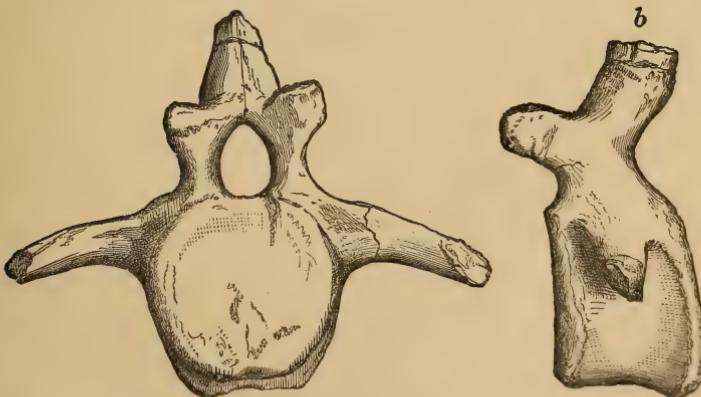
The serrations of the teeth more complex than in *Scelidosaurus*, and descending nearer to the base of the crown, which is lance-shaped. The dermal spines unsymmetrical, compressed, convex on one side and concave on the other, with a sinuous convex anterior and concave posterior edge. The vertebræ approximate to those of *Scelidosaurus*, but the posterior dorsals are less compressed, and the anterior caudals are shorter and less oblique, with the neural spine more inclined backwards.

**Acanthopholis horridus**, Huxley<sup>2</sup>.

The type species. The type specimen indicates an individual approximately equal in size to the skeleton No. R. 1111 of *Scelidosaurus harrisoni*.

*Hab.* Europe (England).

a Fig. 34.



*Acanthopholis horridus*.—Anterior (a) and left lateral (b) views of an anterior caudal vertebra; from the Chalk-Marl of Folkestone.  $\frac{1}{2}$ . (From the 'Quart. Journ. Geol. Soc.'

**44581.** An anterior caudal vertebra, wanting the extremities of the (Fig.) transverse processes and of the neural spine and the post-

<sup>1</sup> Geol. Mag. dec. 1, vol. iv. p. 65 (1867).

<sup>2</sup> Loc. cit.

zygapophyses ; from the Lower Chalk of Folkestone, Kent. Figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxv. p. 597, fig. 2, the figures being reproduced in the accompanying woodcut. *Purchased*, 1873.

**47234.** The centra of two trunk vertebræ with two associated dermal scutes ; from Folkestone. The less imperfect scute is of the type of the one figured by Huxley in the 'Geol. Mag.' 1867, pl. v. fig. 2. *Purchased*, 1876.

**47234 a.** Five dermal scutes ; from Folkestone. *Same history.*

**49917.** A dermal scute ; from Folkestone. This specimen is of a broad and expanded type. *Purchased*, 1879.

**35280-2.** Five imperfect centra of posterior caudal vertebræ, provisionally referred to this species ; from the Cambridge Greensand. *Purchased*, 1859.

#### Genus **REGNOSAURUS**, Mantell<sup>1</sup>.

Founded upon a mandible regarded by Owen as belonging to *Hylaeosaurus*. The roots of the teeth in that specimen are, however, much smaller than those of the teeth referred by the same writer to that genus ; and it may be that *Vectisaurus*<sup>2</sup>, which appears to belong to this family, is identical with the present genus. (See 'Quart. Journ. Geol. Soc.' vol. xliv. p. 52.)

#### **Regnosaurus northamptoni**, Mantell<sup>3</sup>.

The type species. Probably about the size of *Acanthopholis horridus*.

*Hab.* Europe (England).

**2422.** Part of a right ramus of the mandible, showing dental alveoli (*Fig.*) and the bases of the teeth ; from the Wealden of Cuckfield, Sussex. Figured by Mantell in the 'Phil. Trans.' 1841, pl. v., as *Iguanodon*, and made the type of the present genus in the 'Phil. Trans.' 1848, p. 198 ; figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. iv. pl. viii. figs. 1-5, as (?) *Hylaeosaurus*. In general contour, and especially in the strong median external ridge

<sup>1</sup> Phil. Trans. 1848, p. 198.

<sup>2</sup> Hulke, Quart. Journ. Geol. Soc. vol. xxxv. p. 421 (1879).

<sup>3</sup> Loc. cit.

and the lozenge-shaped section anteriorly, it approximates to the mandible of *Scelidosaurus*.

*Mantell Collection. Purchased, 1838.*

Genus **HYLÆOSAURUS**, Mantell<sup>1</sup>.

The teeth provisionally referred to this genus have no serrations<sup>2</sup>. The anterior dorsal vertebræ have broad centra, with a thick hæmal ridge, while the later ones are compressed and show a distinct lateral hollow; posterior chevrons antero-posteriorly elongated inferiorly. Dermal spines much compressed, convex anteriorly and concave posteriorly, and sometimes comparatively narrow; probably placed in the anterior part of the trunk. Preacetabular process of ilium (provisional) laterally compressed. Feet unknown.

**Hylæosaurus oweni**, Mantell<sup>3</sup>.

The type species. The type specimen indicates an animal considerably smaller than the type of *Scelidosaurus harrisoni*, but other specimens provisionally referred to the same species are of larger size, and may be distinct.

*Hab. Europe (England).*

*All the following specimens are from the Wealden.*

**2310, 3326.** Several teeth, resembling those figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. iv. pl. viii., and provisionally referred to this form; from Cuckfield, Sussex. *Mantell Collection. Purchased, 1838.*

**26034, 36488.** Two similar teeth; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

**43172.** A similar tooth; from Cuckfield.

*Wetherell Collection. Purchased, 1871.*

**R. 739.** A similar tooth; from the Wadhurst Clay (Lower Wealden) of Silver Hill, near Hastings, Sussex.

*Dawson Collection. Purchased, 1886.*

**R. 647.** two similar teeth; from Battle, near Hastings.

*Presented by J. E. Lee, Esq., 1885.*

<sup>1</sup> Proc. Geol. Soc. vol. i. p. 411 (1834).

<sup>2</sup> Teeth of similar type are provisionally referred to *Cratoëmus* (Quart. Journ. Geol. Soc. vol. xxxvii. pl. xxvii. figs. 13, 14), another member of this family.

<sup>3</sup> 'Medals of Creation,' 1st ed. p. 734 (1844).

**R. 647 a.** A similar tooth; from St. Leonards, Sussex.

*Presented by J. E. Lee, Esq., 1885.*

**3775.** A slab containing a large portion of the skeleton; from (*Fig.*) Cuckfield. The type specimen; discovered in 1832, and figured by Mantell in his 'Geology of the South-east of England,' pl. v. (1833), and also in his 'Wonders of Geology,' pl. iv., and 'Petrifications and their Teachings,' p. 316, fig. 66; and by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. iv. pl. iv. (1858). This specimen shows a large series of dorsal vertebræ, with their ribs, the scapula, coracoid, dermal bones, and a fragment of the cranium.

*Mantell Collection. Purchased, 1838.*

**2123.** The centrum and part of the arch of a (? posterior) dorsal vertebra, provisionally referred to this species; from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. ix. fig. 11; and noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 69, where it is referred to *Suchosaurus*. In its narrow neural canal, the form of the centrum, and the depression on the side of the latter, this specimen apparently resembles the later dorsals of the type.

*Same history.*

**2585.** An imperfect trunk (?lumbar) vertebra, referred by Owen (*Fig.*) to this species; from Cuckfield. Figured by Owen in his 'Wealden and Purbeck Reptilia,' pt. iv. pl. viii. figs. 10, 11. The centrum is rounded, but has the depression on its lateral surface.

*Same history.*

**2484.** An imperfect sacrum, referred by Owen to this form; from Cuckfield. The reference of this and the next specimen is very problematical, and is doubted by Hulke in the 'Phil. Trans.' 1881, p. 660.

*Same history.*

**36487.** The centra of four ankylosed sacral vertebræ, agreeing in (*Fig.*) structure with the preceding specimen; from Cuckfield. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxvii., where they are provisionally referred to this genus, and by Owen, *op. cit.* pl. v.

*Mantell Collection. Purchased, 1853.*

**28936.** The middle of a sacrum, referred by Owen to the present (*Fig.*) genus; from the Isle of Wight. Figured by Owen, *op. cit.* pl. vi. figs. 3, 4.

*Same history.*

- 2511.** An imperfect anterior caudal vertebra; from Cuckfield. In general structure this specimen approximates to the caudals of *Acanthopholis* (fig. 34).

*Mantell Collection. Purchased, 1838.*

- 3789.** A slab containing the greater number of the caudal vertebræ, with their chevrons; from Sussex. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxxii. fig. 22, and by Owen, *op. cit.* pl. x. The vertebræ accord so closely in size and general characters with the dorsals of the type specimen that there seems no doubt of the specific identity of the two. The chevrons are in several instances attached to the caudals.

*Same history.*

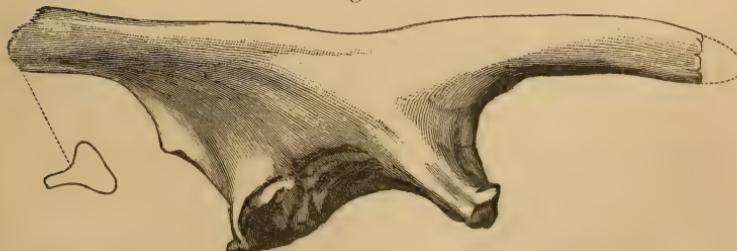
- 2584.** A left scapula, provisionally referred to this species; from (Fig.) Bolney, Sussex. Figured by Mantell in the 'Phil. Trans.' 1841, pl. x. fig. 10, and described by Owen, *op. cit.* figs. 16, 17; of larger size than the scapula of the type, but of similar contour.

*Same history.*

- R. 1106.** Cast of the left humerus. The original was obtained from Brixton, Isle of Wight, and was formerly in the collection of the late Dr. Wilkins, of Newport; it is figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxx. pl. xxxi. figs. 3, 4, and provisionally referred to the present genus. The resemblance of this specimen to the humerus of *Scelidosaurus*, coupled with its association with the tibia No. R. 1107, renders it probable that this reference is correct; and in any case the specimen belongs to a member of the present family.

*Made in the Museum.*

Fig. 35.



(?) *Hylaeosaurus oweni*.—Outer view of the right ilium, with transverse section of the postacetabular process; from the Wealden of Sussex. †.

- 2150.** A right ilium, provisionally referred to this form; from (Fig.) Cuckfield. This specimen (fig. 35), which wants the

extremities of the two dorsal processes, has been already figured by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 53, woodcut fig. 3. It has a considerable resemblance to the ilium of *Scelidosaurus*, and also approximates to that of *Vectisaurus*<sup>1</sup>; the latter resemblance indicating that that genus may belong to the present family.      *Mantell Collection. Purchased, 1838.*

**2132.** The middle portion of a similar but smaller ilium; from Cuckfield.      *Same history.*

**2615.** The right tibia; from Bolney. Associated with the scapula (Fig.) No. 2584; figured by Mantell in the 'Phil. Trans.' 1841, pl. x. fig. 11 (as a humerus), by Owen, *op. cit.* pl. vii., and the distal extremity by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxv. pl. xii. fig. 7.      *Same history.*

**R. 1107.** Cast of the left tibia. The original was associated with that of the humerus No. R. 1106, and is figured by Hulke, *op. cit.* figs. 1, 2; it presents slight differences from No. 2615, which may be either of sexual or specific value.      *Made in the Museum.*

**2188.** A bone which is apparently an imperfect tibia; from Cuckfield.      *Mantell Collection. Purchased, 1838.*

**28681.** A dermal spine; from Cuckfield. Figured by Owen, *op. cit.* (Fig.) pl. ix.      *Mantell Collection. Purchased, 1853.*

**36490-94.** Several dermal scutes; from Cuckfield.      *Same history.*

**3782.** Fragment of a small subcylindrical dermal spine, perhaps belonging to this form; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

**2417.** Fragment of a dermal spine of similar type; from Cuckfield.      *Same history.*

**R. 695.** A small compressed dermal spine, not improbably belonging to this form; from Sussex.      *Dawson Collection.*

**2193.** A bone which appears to be a small dermal spine of this or (Fig.) an allied form; from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xx. fig. 7, as an undetermined bone.      *Mantell Collection. Purchased, 1838.*

<sup>1</sup> Hulke, Quart. Journ. Geol. Soc. vol. xxxv. pl. xxi.

**2583, 2587.** Two undetermined bones, perhaps referable to this genus; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

Genus **POLACANTHUS**, Hulke<sup>1</sup> (*ex* Owen, MS.).

The characteristic feature of this genus is the enormous dermal buckler in the lumbar region, consisting of firmly united bony scutes, some of which are tuberculated and others keeled; large detached spines were probably placed in the anterior region of the trunk. The lumbar as well as the sacral vertebrae were united together, and, with the ilia, were ankylosed to the lumbar buckler.

**Polacanthus foxi**, Hulke (*ex* Owen, MS.).

The type species. Agreeing approximately in size with the skeleton of *Scelidosaurus harrisoni*, No. R. 1111.

*Hab.* Europe (England).

*The following specimens, which include the types, belong to a single individual, and were obtained from the Wealden near Barne's Chine, Brixton, Isle of Wight. They belong to the Fox Collection. Purchased, 1882.*

**R. 175.** An imperfect cervical vertebra.

**R. 175 a.** An anterior dorsal vertebra. Figured by Hulke in the (*Fig.*) 'Phil. Trans.' 1881, pl. lxx. figs. 1, 2.

**R. 175 b.** Four imperfect trunk vertebrae.

**R. 175 c.** An anterior caudal vertebra. Figured, *op. cit.* pl. lxxii. (*Fig.*) figs. 1, 2.

**R. 175 d.** Seven anterior caudal vertebrae.

**R. 175 e.** A posterior caudal vertebra. Figured, *op. cit.* pl. lxxv. figs. 3, 4.

**R. 175 f.** Three separate and two united posterior caudal vertebrae.

**R. 175 g.** The extremity of the tail, showing dermal scutes and (*Fig.*) ossified tendons. Figured, *op. cit.* pl. lxxiii. figs. 1-3.

**R. 175 h.** A chevron, with another attached bone.

<sup>1</sup> *Phil. Trans.* 1881, p. 653.

**R. 175 i.** Proximal portion of a rib. Figured, *op. cit.* pl. lxxvi. (*Fig.*) fig. 2.

**R. 175 j.** Four specimens of the proximal portions of ribs.

**R. 175 k.** The sacrum and lumbar dermal buckler, together with a (*Fig.*) cast of the upper surface of the latter. The sacrum is figured, *op. cit.* pl. lxxi. fig. 1, and the entire specimen in the 'Phil. Trans.' 1887, pls. viii., ix.

**R. 175 l.** The right femur. Figured in the 'Phil. Trans.' 1881, (*Fig.*) pl. lxxiv.

**R. 175 m.** The left femur.

**R. 175 n.** The left tibia. Figured, *op. cit.* pl. lxxv. figs. 1, 2. (*Fig.*)

**R. 175 o.** Two metatarsals. Figured, *op. cit.* pl. lxxii. fig. 3. (*Fig.*)

**R. 175 p.** A series of flat, irregular dermal scutes.

**R. 175 q.** A pair of angulated symmetrical scutes.

**R. 175 r.** A larger pair of similar scutes.

**R. 175 s.** A dermal scute bearing a short spine.

**R. 175 t.** Three short dermal spines.

**R. 175 u.** A somewhat similar spine. Figured, *op. cit.* pl. lxxi. (*Fig.*) fig. 7.

**R. 175 v.** A tall dermal spine. Figured, *op. cit.* pl. lxxi. figs. 4, 5. (*Fig.*) The summit has been attached since it was figured.

**R. 175 w.** A tall spine. Figured, *op. cit.* pl. lxxi. fig. 6, and (*Fig.*) pl. lxxvi. fig. 1; the summit having been subsequently attached.

**R. 175 x.** Four similar spines.

*The following specimen apparently belonged to a different individual.*

**R. 175 y.** An imperfect posterior caudal and another vertebra; from the Isle of Wight. *Fox Collection.*

**R. 203.** A tall spine. *Same history.*

## GENERICALLY UNDETERMINED SPECIMENS.

*The following are from the Wealden of the Isle of Wight.*

39533. A dermal spine. This specimen has not the compressed form characteristic of *Polacanthus* and *Hylaeosaurus*.

*Presented by E. Backhouse, Esq., 1866.*

- R. 202. A shorter dermal spine. *Fox Collection. Purchased, 1882.*

- R. 202 a. A somewhat shorter dermal spine. *Same history.*

- 36515-17. Three still shorter dermal spines; from Sandown.

*Mantell Collection. Purchased, 1853.*

- R. 133. Two dermal spines of somewhat similar type.  
*Fox Collection.*

- R. 133 a. Two smaller dermal spines. *Same history.*

- R. 202. Two dermal scutes. *Same history.*

- 37713-14. Two dermal scutes. *Saul Collection. Purchased, 1863.*

- R. 643. A dermal scute; from Brook.  
*Presented by J. E. Lee, Esq., 1885.*

*The following is from the Lower Wealden (Wadhurst Clay),  
near Hastings.*

- R. 604 a. A tall dermal spine. *Dawson Collection. Purchased, 1885.*

*The following is from the Neocomian Bone-bed of Potton, Bedfordshire,  
but is probably derived.*

40458. A water-worn dermal scute. *Purchased, 1867.*

## Family IGUANODONTIDÆ.

Cranium (fig. 41) typically somewhat short, elevated, and broad anteriorly, with small and somewhat prominent orbits, tall infratemporal fossæ, and large terminal nares; mandibular rami deep, and uniting in a broad and channelled symphysis, terminated by a predentary bone. Teeth (fig. 37) in a single row, with obtuse subtriangular crowns, having (at least usually) serrations on the borders and vertical ridges on the outer surface, and being worn more or less horizontally by use. Cervical vertebrae usually opistho- and dorsals amphicoelous; anterior and middle dorsals with either tall or low arches, wide neural canal, and deep pits in front of postzygapophyses; their centra more or less compressed laterally, and

generally with a hæmal carina in the anterior part of the series; posterior dorsals and lumbars with rounded centra, low arches, and less distinct post-zygapophysial pits; each sacral arch supported by two centra; anterior caudals short, with vertical diameter of centrum slightly exceeding transverse, posterior ones with longer and compressed centra; rib-facets in anterior and middle dorsals placed on the arch at foot of transverse process. Sternal (?) bones

Fig. 36.



*Camptosaurus*<sup>1</sup> *dispar*, Marsh.—The left side of the pelvis. Upper Jurassic, North America.  $\frac{1}{2}$ . (From the 'Amer. Journ.'.)

typically hatchet-shaped, with obliquely directed processes. Limb-bones hollow; scapula (fig. 44) with small glenoidal expansion; coracoid (fig. 45) with descending process; humerus long and slender, with small terminal expansions, distinct head, angulated shaft, and prominent condyles. Ilium with postacetabular portion moderately long, and preacetabular portion usually long, slender, and laterally compressed (fig. 39), but occasionally very short (fig. 36), without inner horizontal plate; pubis slender, sometimes shorter than ischium; ischium long, more or less slender, with a distal expansion; femur with large inner trochanter, and either slightly longer or shorter than tibia, which is considerably longer than humerus; metatarsals more or less elongated and mutually interlocking; three or four digits in pes, which is digitigrade. Dermal armour generally absent, and never with spines.

<sup>1</sup> Originally *Camptonotus*, but altered by its founder (Marsh) in 'Amer. Journ.' ser. 3, vol. xxix. p. 169.

Genus **HYPSILOPHODON**, Huxley<sup>1</sup>.

Premaxilla with teeth; orbits regular, with bony plates in sclerotic. Cervical vertebræ opisthocœlous; dorsals amphicœlous and moderately compressed; sacrals somewhat compressed, rounded inferiorly. Scapula distally expanded; manus with first digit normal. Ilium with long preacetabular process, and postacetabular portion deep, with squared termination; shaft of pubis comparatively broad, and as long as ischium; ischium with hammer-shaped head, and moderately long and broad shaft, which is not twisted. Femur shorter than tibia; metatarsals long and slender; pes with four functional digits, of which the terminal digits are curved and laterally compressed. Dollo ('Comptes Rendus,' vol. evi. p. 775, 1888) describes the sternum as rhomboidal, and makes this genus the type of a family.

**Hypsilophodon foxi**, Huxley<sup>2</sup>.

Syn. *Iguanodon foxi*, Owen<sup>3</sup>.

The type species. Usually of small size, the length of a skeleton of average dimensions being about four feet. Five sacral vertebræ; inner trochanter of femur in upper third of the shaft.

*Hab.* Europe (England).

*All the following specimens are from the Wealden; and, unless it is stated to the contrary, were obtained from the Isle of Wight, and belong to the Fox Collection. Purchased, 1882.*

**R. 196 a.** The nearly entire skeleton, in a block of sandstone; from (Fig.) Cowleaze Chine, near Brixton. Figured by Hulke in the 'Phil. Trans.' 1882, pl. lxxii. fig. 2 (mandible), pl. lxxv. (vertebræ and pelvis), and pl. lxxxix. figs. 2, 3 (pectoral limb).

**R. 196.** Slab showing portions of vertebral column and of pelvic girdle and limbs; from Cowleaze Chine.

**R. 193.** Hinder half of thoracic region of the vertebral column and anterior half of caudal ditto, with the pelvis and right hind limb.

**39460-1.** Slab with the greater part of the vertebral column and (Fig.) some of the limb-bones; from Cowleaze Chine. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. ii. pl. i. (1855), as *Iguanodon*; described by Hulke, *op. cit.* p. 1044, three cervical vertebræ being

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxvi. p. 3 (1870).      <sup>2</sup> Loc. cit.

<sup>3</sup> Ibid. vol. xxix. p. 531 (1873).

figured by him in pl. lxxiv. figs. 1, 2. The latter are also figured by Mantell in the 'Phil. Trans.' 1849, pl. xxix. fig. 9. *Mantell and Bowerbank Collections*<sup>1</sup>.

- R. 192.** Portion of skeleton, showing vertebræ, the right pectoral (*Fig.*) girdle, and imperfect humerus; from Cowleaze Chine. Figured by Hulke, *op. cit.* pl. lxxiii.
- R. 197.** The imperfect skull and mandible; from Cowleaze Chine. (*Fig.*) The type; figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxvi. pl. i. figs. 1-5.
- R. 189.** Part of the right ramus of the mandible; from Cowleaze (*Fig.*) Chine. Figured by Owen, *op. cit.* suppl. ii. pl. ii. figs. 8-11 (1874).
- R. 191.** A tooth; from Cowleaze Chine. Figured by Owen, *op. cit.* (*Fig.*) pl. ii. figs. 12-15.
- R. 190.** An imperfect mandibular ramus, with two associated (*Fig.*) posterior caudal vertebræ and several ribs. Figured by Owen, *op. cit.* pp. 12, 13, woodcuts, figs. 1, 2.
- R. 202 a.** An imperfect dorsal vertebra; from Cowleaze Chine.
- R. 183.** An ulna.
- R. 194.** The imperfect pelvis and bones of the hind limb; from Cowleaze Chine.
- R. 195.** The lumbar and sacral regions of the vertebral column, (*Fig.*) with the associated ischia; from Cowleaze Chine. Figured by Hulke, *op. cit.* pl. lxxviii. figs. 1-5.
- R. 192 a.** The left femur; from Cowleaze Chine. Figured by (*Fig.*) Hulke, *op. cit.* pl. lxxviii. figs. 1-5.
- R. 184-5.** The associated right and left femora of a smaller individual.
- 36509.** The distal half of a right femur; from Cuckfield, Sussex. *Mantell Collection. Purchased*, 1853.
- R. 199.** The right tibia. Figured by Hulke, *op. cit.* pl. lxxx. fig. 2, (*Fig.*) and pl. lxxxi. fig. 1.
- R. 752.** A smaller left tibia.
- R. 170.** The proximal half of a very similar right tibia.
- R. 186.** A still smaller left tibia; apparently associated with the femora Nos. R. 184-5.
- R. 200.** The left pes; from Cowleaze Chine. Figured by Hulke, (*Fig.*) *op. cit.* pl. lxxxi. fig. 3.

<sup>1</sup> One half of the slab belonged to each.

*From its superior size the following specimen may indicate a distinct species.*

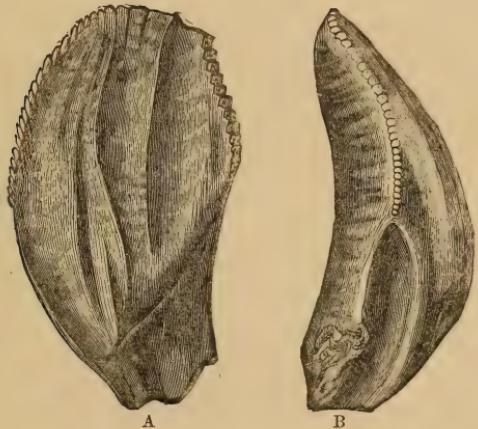
R. 167. A left femur, imperfect at the extremities.

Genus **IGUANODON**, Mantell<sup>1</sup>.

Including *Cumnoria*, Seeley<sup>2</sup>.

Premaxilla edentulous; maxillary and mandibular teeth (fig. 37) with marginal and sometimes lateral serrations; orbits (fig. 41) irregular, and apparently no sclerotic ossifications. Cervical, and apparently the first dorsal, vertebrae opisthocelous; the others

Fig. 37.



*Iguanodon*, sp.—Lateral (A) and profile (B) views of a lower tooth; from the English Wealden. †.

amphicelous; sacrals either compressed or inferiorly flattened, four to five in number. Manus with first digit modified into a conical spine. Ilium (figs. 39 & 46) with long preacetabular process, and postacetabular portion either rounded or pointed posteriorly; ischium in some instances longer than slender pubis. Femur longer than tibia; three digits in pes, with short and stout metatarsals and phalangeals, the terminal joints being very broad and depressed.

a. *Proiguanodont Group.*

Anterior dorsal vertebrae with arches moderately or very tall, and centra of these and middle dorsals less compressed and more wedge-

<sup>1</sup> Phil. Trans. 1825, p. 184.

<sup>2</sup> Rep. Brit. Assoc. for 1887, p. 698 (1888).

shaped in section than in the Euiguanodont group; sacrals with flattened hæmal surfaces.

In the one species in which the pelvis (fig. 39) is known, the ilium has its postacetabular portion long, deep, and rounded terminally, without inflexion of the superior border; the ischium has a hammer-shaped head, of which the pubic process is separated by a long notch from the obturator process; the shaft is without twist, stout, and moderate in length.

This group connects *Hypsilophodon* and *Camptosaurus* with the Euiguanodont group.

**Iguanodon prestwichi**, Hulke<sup>1</sup>.

Syn. *Cumnoria prestwichi*, Seeley<sup>2</sup>.

Typically of very small size. The arches of the anterior dorsal vertebræ tall, with the rib-facet not extending to the summit of the platform; four sacral vertebræ. Teeth simpler than in the Euiguanodont group. Pelvis and limbs imperfectly known.

*Hab.* Europe (England).

**R. 716-8.** Casts of the calcaneum and astragalus. The originals, which belong to the type skeleton, were obtained from the Kimeridge Clay of Cumnor-Hurst, Oxfordshire, and are preserved in the Museum at Oxford; they are figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. pl. xx. figs. 3-5. *Made in the Museum*, 1880.

**Iguanodon dawsoni**, Lydekker<sup>3</sup>.

Typically intermediate in size between *I. mantelli* and *I. bernissartensis*. Arches of anterior and middle dorsal vertebræ lower than in *I. prestwichi*, and the rib-facet rising to summit of platform; probably five vertebræ in sacrum; spines of caudals very long. Preacetabular process of pubis narrow. The scapula provisionally referred is relatively wide.

*Hab.* Europe (England).

*All the following specimens are from the Wadhurst Clay, or Lower Wealden, and belong to the Dawson Collection. Purchased, 1884-87.*

**R. 798.** A (probably) middle dorsal vertebra; from near Hastings, (Fig.) Sussex. One of the types; described and figured by the

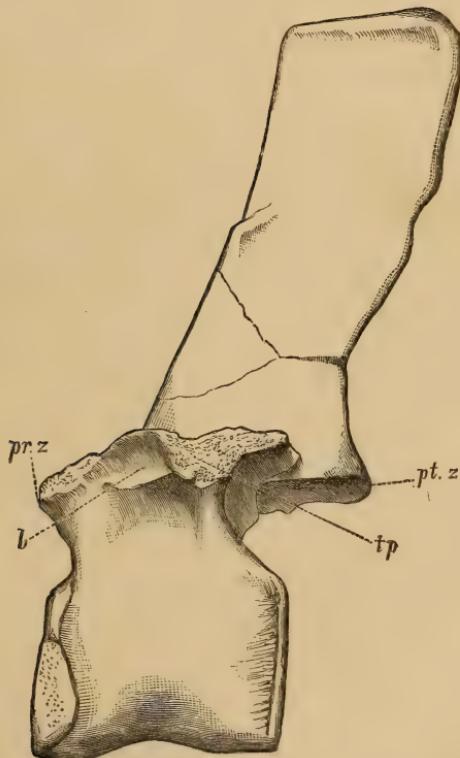
<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxxvi. p. 433 (1880).

<sup>2</sup> Rep. Brit. Assoc. for 1887, p. 698 (1888).

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xliv. p. 51 (1888).

writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 47, fig. 1; the figure being reproduced in the accompanying woodcut. The length of the centrum is 0,120, the vertical diameter of its anterior face 0,110, the transverse 0,118, and the total height of the specimen 0,447. The position of the rib-facet is like that in the vertebra of *Sphenospondylus* (fig. 47).

Fig. 38.



*Iguanodon dawsoni*.—Left lateral aspect of middle dorsal vertebra; from the Wadhurst Clay of Hastings. About  $\frac{1}{5}$ . *b*, rib-facet; *tp*, transverse process; *pr.z*, and *pt.z*, pre- and postzygapophyses.

R. 798 a. A posterior dorsal or lumbar vertebra, associated with the preceding. The posterior surface of the centrum is much larger than the anterior, and is distinctly concave, while there is a well-marked haemal carina which is wanting in

No. R. 798. This specimen closely resembles the lumbar vertebra of *I. prestwichi*, figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol xxxvi. pl. xix. figs. 6-8.

**R. 803, 804, 805.** Three trunk vertebrae, associated with the preceding.

**R. 806.** The proximal portion of a chevron-bone of the same individual.

**R. 798 b.** A numerous series of trunk and caudal vertebrae, associated with the preceding. In one of the larger caudals the length of the centrum is 0,138, and the vertical diameter of its anterior face 0,143.

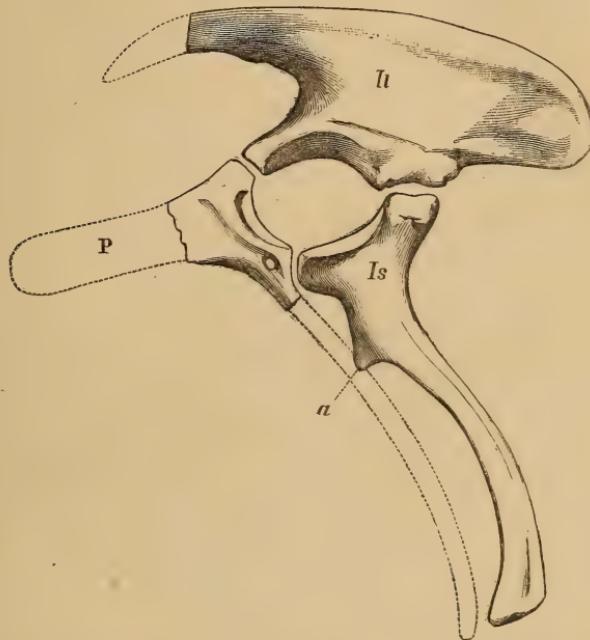
**R. 604.** A series of more or less imperfect trunk and caudal vertebrae, apparently belonging to the same individual as the ischia No. R. 811, and, if so, referable to this species. One of the anterior dorsals (No. 1) has the arch as high as in the corresponding vertebra of *I. mantelli*, No. 2137, but the centrum is relatively longer and more decidedly wedge-shaped in section. In a middle dorsal (No. 2) the rib-facet rises to near the summit of the platform. In an anterior caudal (No. 3), which may be the second or third in the series, the length of the centrum is 0,087, the vertical diameter of its anterior face 0,135, and the transverse 0,160; there is a small chevron-facet on the posterior face. In a more posterior, but still early, caudal vertebra (No. 4) the length of the neural spine is rather more than three times the vertical diameter of the centrum, in which the chevron-facets are large and encroach to a great extent upon the hæmal surface.

**R. 604 a.** A series of imperfect ribs, apparently associated with No. R. 604.

**R. 802.** The left ilium, wanting the extremity of the preacetabular process, and the associated acetabular portion of the pubis of the same side; associated with the vertebra No. R. 798. These specimens are two of the types, and are figured by the writer, *op. cit.* p. 49, fig. 2, in conjunction with the ischium No. R. 811, the pubis being restored from that of *Campitosaurus*; this figure is reproduced in fig. 39. The length of the ilium to the point of fracture is 0,830, and its greatest depth posteriorly 0,260; the pubis differs

from that of *I. bernissartensis* by the greater vertical depth of the preacetabular portion.

Fig. 39.



*Iguanodon dawsoni*.—The left side of the pelvis; from the Wadhurst Clay of Hastings. About  $\frac{1}{6}$ . *Ii*, ilium; *Is*, ischium; *P*, pubis; *a*, obturator process. The descending part of the pubis is conjectural.

R. 811. The imperfect centra of the sacrum and the associated (Fig.) ischia; from Hastings, and apparently associated with the vertebræ No. R. 640. There are five sacral vertebræ ankylosed together, which have flattened hæmal surfaces. The left ischium, which has been described by the writer, *op. cit.* p. 50, is represented in fig. 39; its total length is 0,870 (36·5 inches). Apart from the evidence of the vertebræ, the fact that the ischium agrees in relative size with the type ilium, and comes from the same horizon, leaves little doubt as to its specific identity. The resemblance of these bones to the ischia of *Camptosaurus* and *Hypsilophodon* renders it probable that the pubis was of the elongated type of these genera.

R. 811 a. The imperfect right pubis, apparently associated with the

ischium No. R. 811. This specimen appears to accord very closely with the pubis of No. R. 802; and is deeper in advance of the acetabulum than in *I. bernissartensis*.

- R. 802 a.** The proximal portion of the right tibia, associated with the ilium No. R. 802. The transverse diameter of the head is 0.380 (13 inches).
- R. 799.** A second left metatarsal, apparently associated with the type ilium; noticed by the writer, *op. cit.* p. 50 (as No. R. 999).
- R. 800.** The proximal extremity of the second right metatarsal of the same individual.
- R. 801.** A larger crushed metatarsal, probably belonging to the third digit of the same individual.
- R. 966.** A left scapula, provisionally referred to this form; from near Hastings. This specimen is noticed by the writer, *op. cit.* p. 51; it differs from the scapula of *I. bernissartensis*, figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix., by the straighter anterior border, and the greater expansion of the distal extremity. It is remarkable for having a puncture on its outer surface, which appears to have been formed by the carpal spine of a male, and would thus indicate that the specimen belongs to a female; it shows a facet on the anterior extremity of the proximal extension, which may have borne a cartilaginous process.

*The following specimen is from the Upper Wealden, and may perhaps belong to this form.*

- R. 136.** The centrum and part of the arch of a posterior dorsal or lumbar vertebra; from the Isle of Wight. Noticed by the writer, *op. cit.* p. 51; although slightly larger this specimen agrees very closely with the dorsal vertebra No. R. 798 a.      *Fox Collection. Purchased, 1882.*

b. *Euiguanodont Group.*

The anterior dorsal vertebrae with very tall arches, their rib-facets vertically elongated and not reaching the platform, and their centra greatly compressed, short, and tall; sacrals laterally compressed. Teeth with complex lateral serrations, and one of the

lateral ridges also serrated. Ilium (fig. 46) with postacetabular portion tapering to a point; ischium very long and slender, with short head, small notch between latter and obturator process, and shaft twisted, with small distal expansion; pubis shorter than ischium.

**Iguanodon bernissartensis**, Boulenger<sup>1</sup>.

Syn. *Iguanodon seelyi*, Hulke<sup>2</sup>.

(?) *Streptospondylus major*, Owen<sup>3</sup>.

Larger and stouter than type species; typically total length from 8,000 to 10,000 (33 feet)<sup>4</sup>. Cranium (fig. 40) 0,650 in length, relatively broad; nares shorter and wider than in *I. mantelli*, their

Fig. 40.



*Iguanodon bernissartensis*.—The skeleton; from the Wealden of Belgium.

About  $\frac{1}{75}$ . The scale indicates metres.

(Reduced from the figure published by M. L. Dollo, Bull. Mus. Roy. Hist. Nat. Belg. 1883, t. ii. pl. v.)

length being one third that of the mandible; orbit with vertical diameter longer than transverse; supratemporal fossa broad and angulated. Anterior dorsal vertebrae with very tall arches, in which

<sup>1</sup> Bull. Ac. R. Belg. sér. 3, vol. i. p. 606 (1881).

<sup>2</sup> Quart. Journ. Geol. Soc. vol. xxxviii. p. 135 (1882).

<sup>3</sup> Rep. Brit. Assoc. for 1841, p. 91 (1842).

<sup>4</sup> Some of the following dimensions are exceeded by specimens in the Museum.

the vertically elongated rib-facet does not reach the platform. Six vertebrae in sacrum. Scapula stout and short, its length (0,900) = six times its width; coracoid typically long and narrow, with fontanelle forming a notch, but apparently in some instances wider, with complete foramen; humerus long (0,800); metacarpals short and squared. Ilium with preacetabular process = one third entire length (1,150), and postacetabular portion long; pubis with preacetabular process long, thick, and nearly straight (width at extremity 0,170); femur with inner trochanter in lower third of shaft (length 1,080); tibia relatively short (length 0,840).

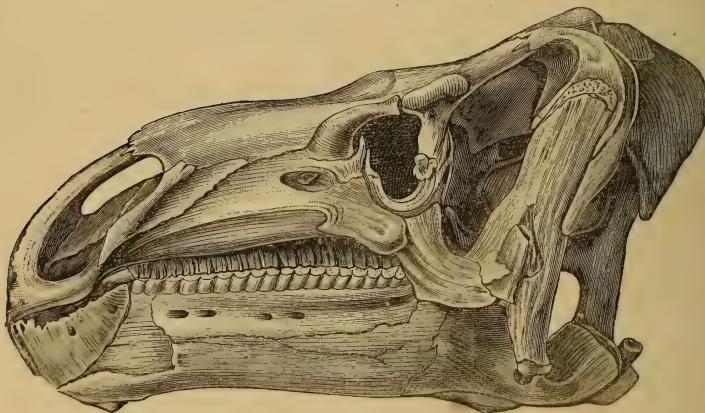
*Hab.* Europe (England and Belgium).

*All the following specimens are from the Wealden.*

- R. 99. Fragment from the posterior and basal part of a cranium, probably belonging to this species; from the Isle of Wight.

*Fox Collection. Purchased, 1882.*

Fig. 41.



*Iguanodon bernissartensis.*—Lateral view of skull; from the Wealden of Belgium.  $\frac{1}{8}$ .

- R. 100. Another basicranial fragment, of similar dimensions; from the Isle of Wight. *Same history.*

28670. Fragment of the hinder portion of a right maxilla, probably (Fig.) belonging to this species; from Brook, Isle of Wight. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. ii. pl. xiii. figs. 3, 4 (1855). This specimen has been transversely bisected.

*Mantell Collection. Purchased, 1853.*

R. 101. Fragment of the left maxilla, showing some imperfect teeth in their alveoli ; from the Isle of Wight. *Fox Collection.*

R. 102 x. The predentary bone ; from the Isle of Wight.

*Same history.*

28660. The nearly entire dentary bone of the right ramus of the (Fig.) mandible, with one tooth remaining *in alveolo* ; from Cuckfield, Sussex. Discovered by Major Lambert Brickenden about 1848 ; figured by Mantell in the 'Phil. Trans.' 1848, pl. xvi., and his 'Petrifications and their Teachings,' p. 243, fig. 3, and also by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. ii. pl. xiii. fig. 1 (1855). In size this specimen agrees precisely with the mandible of the skull figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. ii. pl. ix., of which a reduced reproduction is given in fig. 41.

*Mantell Collection. Purchased, 1853.*

28662. Fragment of the dentary of a similar right mandibular ramus ; from the Isle of Wight. Portions of two teeth remain *in alveolo.* *Same history.*

R. 105. An imperfect right articular, probably belonging to this (Fig.) species ; from the Isle of Wight. Figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxiv. pp. 745-6, woodcuts figs. 1-4. It agrees very closely with the articular of the mandible figured by Dollo, *op. cit.* pl. ix. fig. 4.

*Fox Collection.*

R. 105 a. Two specimens of the imperfect right articular of rather smaller individuals, belonging either to this or the following species ; from the Isle of Wight. *Same history.*

*Of the following cervical vertebrae some of the smaller may belong to I. dawsoni.*

28637. A slightly imperfect cervical vertebra ; from the Isle of Wight. This specimen appears to have been associated with the Mantellian dorsals.

*Mantell Collection. Purchased, 1853.*

37688. An imperfect cervical vertebra ; from Sandown Bay, Isle of Wight. *Saul Collection. Purchased, 1863.*

R. 91. A considerably larger imperfect cervical vertebra, much obscured by matrix ; from the Isle of Wight.

*Fox Collection.*

R. 92. A still larger imperfect cervical vertebra ; from the Isle of Wight. The transverse diameter of the posterior cup of the centrum is 0,203. *Fox Collection.*

R. 1011. The centrum and part of the arch of a cervical vertebra, agreeing approximately in size with No. 28637 ; locality unknown. *No history.*

28961. The rolled centrum of a smaller cervical vertebra, which has been longitudinally bisected ; from the Isle of Wight. *Mantell Collection. Purchased, 1853.*

47400. The centrum and part of the arch of a smaller cervical vertebra, not improbably belonging to a young or female individual of this species ; from the Isle of Wight. This specimen is considerably larger than the cervicals of No. R. 33. *Purchased, 1876.*

47400 a. The crushed centrum of a similar cervical vertebra ; from the Isle of Wight. *Same history.*

R. 702. The centrum of a similar vertebra ; from Brixton Bay. *Presented by J. E. Lee, Esq., 1885.*

2116. A crushed cervical vertebra, agreeing approximately in size (*Fig.*) with the preceding ; from Cuckfield. One of the types of *Streptospondylus major*. Described by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 92, and figured in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), Suppl. ii. pl. vi. fig. 1 (1859), under that name.

*Mantell Collection. Purchased, 1838.*

28639. A similar cervical vertebra ; from the Isle of Wight. Figured (*Fig.*) by Mantell in the 'Phil. Trans.' 1849, pl. xxviii. fig. 4 (as *Iguanodon*), and by Owen, *op. cit.* pl. v. fig. 1, and pl. vi. figs. 1-3 (as *Streptospondylus major*). *Mantell Collection. Purchased, 1853.*

R. 706. An imperfect vertebra, which may perhaps be a late cervical of this form ; from the Isle of Wight. The zygapophyses are broken away, there is a tall neural spine, and the centrum is cylindrical and strongly opisthocelous.

*Presented by J. E. Lee, Esq., 1885.*

28508. An imperfect vertebra of similar type ; from Sussex. *Dixon Collection. Purchased, 1851.*

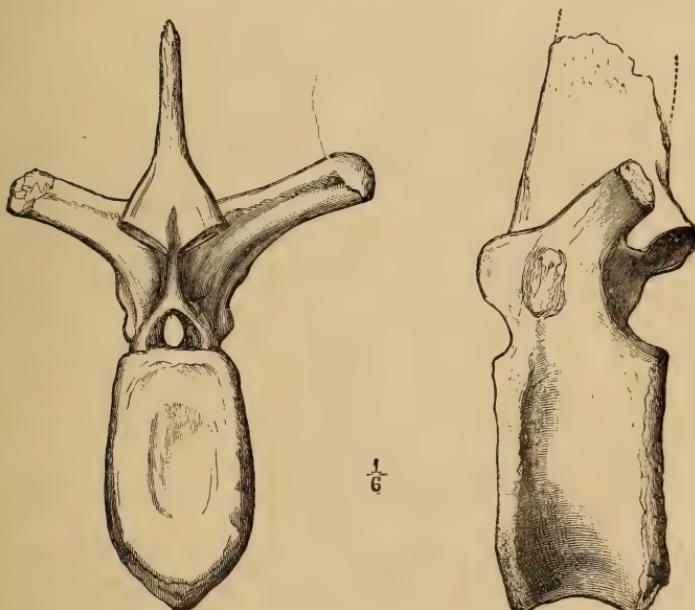
28674. An imperfect vertebra which may be the first dorsal of the (Fig.) present form; from the Isle of Wight. Figured by Owen, op. cit. pl. vi. fig. 5, as *Streptospondylus major*. This large vertebra is strongly opisthocœlous; but in the general contour of the centrum it accords so closely with the following specimens that there is every probability of its belonging to the same species.

*Mantell Collection. Purchased, 1853.*

28629. An anterior dorsal vertebra; from the Isle of Wight.

*Same history.*

Fig. 42.



*Iguanodon bernissartensis*.—Posterior and left lateral views of an anterior dorsal vertebra; from the Isle of Wight.  $\frac{1}{6}$ . (From the 'Quart. Journ. Geol. Soc.')

28630. An apparently associated dorsal vertebra; from the Isle of (Fig.) Wight. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. ii. pl. vii. fig. 46, and by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxix. p. 61 (as *I. mantelli*), the latter figure being reproduced in fig. 42. The height of the posterior face of the centrum is 0,200.

*Same history.*

- R. 704.** An anterior dorsal vertebra ; from the Isle of Wight.  
*Presented by J. E. Lee, Esq., 1885.*
- 28931.** An anterior dorsal vertebra ; from the Isle of Wight.  
*Hastings Collection. Purchased, 1855.*
- 28932.** A similar vertebra ; from the Isle of Wight. *Same history.*
- R. 106.** An anterior or middle dorsal vertebra ; from the Isle of Wight. *Fox Collection.*
- R. 106 a.** A similar and apparently associated dorsal vertebra ; from the Isle of Wight. *Same history.*
- R. 106 b.** An apparently associated dorsal vertebra ; from the Isle of Wight. *Same history.*
- R. 106 c.** An imperfect dorsal vertebra, apparently associated with the preceding. *Same history.*
- 28630 a.** An imperfect middle dorsal vertebra ; from the Isle of (Fig.) Wight. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxix. fig. 8. *Mantell Collection.*
- R. 106 d.** The centrum and part of the arch of an anterior dorsal vertebra ; from the Isle of Wight. *Fox Collection.*
- .46292.** The centrum of an anterior dorsal vertebra ; dredged off the Eastern Coast. *Owles Collection. Purchased, 1874.*
- 28665.** A posterior dorsal vertebra, wanting the zygapophyses and (Fig.) the extremities of the transverse processes ; from the Isle of Wight. The rib-facets form "steps" on the transverse processes. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxix. fig. 9. *Mantell Collection. Purchased, 1853.*
- 2115.** The imperfect centrum of a posterior dorsal or lumbar vertebra ; from Cuckfield, Sussex. Noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 97, as *Cetiosaurus brevis*, but referred to the present genus by Melville in the 'Phil. Trans.' for 1849, p. 293.  
*Mantell Collection. Purchased, 1838.*
- 2133.** The centrum and part of the arch of a posterior dorsal or lumbar vertebra ; from Cuckfield. Noticed by Owen, *op. cit.* p. 96, as *Cetiosaurus*, but referred to *Iguanodon* by Melville, *op. cit.* p. 293. *Same history.*
- R. 1010.** A posterior dorsal or lumbar vertebra which has been (Fig.) longitudinally bisected ; from the Isle of Wight. This

specimen is distinctly procoelous, like some of the lumbars of *I. prestwichi*; it is figured by Owen in his 'Wealden and Purbeck Reptilia,' suppl. ii. pl. ix., as *Cetiosaurus brevis*, and erroneously stated to be the specimen from Culver Cliff noticed by him in the 'Rep. Brit. Assoc.' for 1841, p. 94, under that name.

*Mantell Collection. Purchased, 1853.*

28508. A posterior dorsal or lumbar vertebra, wanting the greater portion of the neural spine; probably from the Isle of Wight.  
*Dixon Collection.*

28635. A somewhat larger posterior dorsal or lumbar vertebra, (Fig.) wanting the summit of the neural spine; from Brook. This and other vertebrae from the same locality appear to have been associated with the coracoid No. 28643; they were referred in MS. by Mantell to *Pelorosaurus*, an identification which, although apparently subsequently abandoned by him, was followed to a certain extent by Owen. The present specimen is figured by the latter writer in his 'Wealden and Purbeck Reptilia,' suppl. ii. pl. viii., as *Cetiosaurus*, while on p. 37 of the same work it is referred to *Pelorosaurus*, without any reference to its being the specimen figured under the former name. In general contour this specimen presents a striking resemblance to the lumbar vertebra of *I. prestwichi* figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. pl. xix. figs. 6-8.

*Mantell Collection. Purchased, 1853.*

28634. A similar vertebra; from Brook. Noticed by Owen, *op. cit.* p. 37, as *Pelorosaurus*.  
*Same history.*

28654. A similar vertebra; from Brook. Noticed by Owen, *op. cit.* p. 37, as *Pelorosaurus*.  
*Same history.*

28657. A similar vertebra; from Brook. Noticed by Owen, *op. cit.* p. 37, as *Pelorosaurus*.  
*Same history.*

- R. 137. Two vertebrae of similar type; from the Isle of Wight. The neural spines are imperfect.  
*Fox Collection.*

- R. 107. An imperfect posterior dorsal or lumbar vertebra; from the Isle of Wight.  
*Same history.*

28683. The neural arch of a trunk vertebra; from the Isle of Wight.  
*Mantell Collection.*

- 28659.** The proximal portion of a rib; from Brook. Apparently (Fig.) the one figured by Owen in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. ii. fig. 9. Appears to have been associated with the vertebrae of the same collection.

*Mantell Collection. Purchased, 1853.*

- 28659 a.** Portion of a somewhat larger rib, apparently associated with the preceding.

*Same history.*

- 28659 b.** A similar and apparently associated specimen.

*Same history.*

- 39555.** The proximal extremity of a very large rib; from the Isle of Wight.

*Presented by E. Backhouse, Esq., 1866.*

- 28628.** Anterior portion of the sacrum; from the Isle of Wight.

This specimen appears to have been associated with the above-mentioned posterior dorsal or lumbar vertebrae of the Mantell Collection. Three ankylosed vertebrae remain, of which the first is somewhat flattened inferiorly, while the others are laterally compressed, although to a somewhat less extent than in *I. mantelli*.

*Mantell Collection. Purchased, 1853.*

- 28631.** Part of the sacrum; from the Isle of Wight.

*Same history.*

- 28689.** The centrum of a sacral vertebra, not improbably belonging to this genus and species; from the Isle of Wight.

*Same history.*

- R. 148.** The centrum and base of the arch of a sacral vertebra, perhaps belonging to this form; from the Isle of Wight. This specimen belongs to a different part of the sacrum from the preceding.

*Fox Collection.*

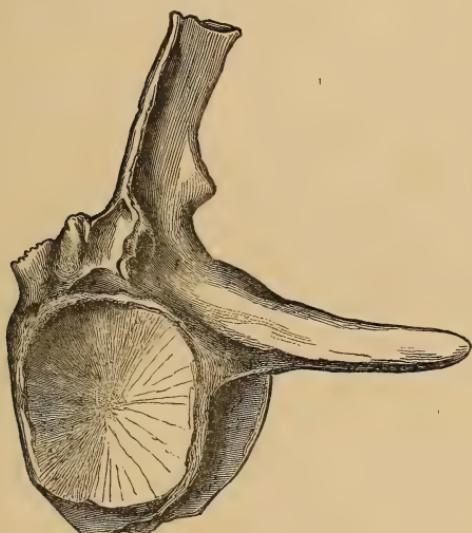
- 28633.** An anterior caudal vertebra, wanting the extremity of the (Fig.) neural spine; from Brook. Figured by Owen, *op. cit.*

pl. xi., as *Pelorosaurus*, and erroneously stated to be from Sussex. The length of the centrum superiorly is 0,102, its vertical diameter 0,225, and the transverse 0,198. These dimensions are slightly larger than those of the caudal vertebra (fig. 43) described and figured by

Hulke, *op. cit.* pp. 141–143, who pointed out the resemblance. The present specimen exhibits very clearly the reduction of the hæmal surface by the encroachment of the chevron-facets, of which the posterior is much the larger.

*Mantell Collection. Purchased, 1853.*

Fig. 43.



*Iguanodon bernissartensis*.—Oblique anterior view of an imperfect anterior caudal vertebra; from the Wealden of Brook. About  $\frac{1}{2}$ .

28627. An anterior caudal vertebra, wanting the extremities of the transverse processes; from Brook. The length of the neural spine is twice the vertical diameter of the centrum.

*Same history.*

28656. A similar vertebra, wanting the extremities of the transverse processes; from Brook.

*Same history.*

28655. The centrum of a similar vertebra; from Brook.

*Same history.*

28667. The chevron of an anterior caudal vertebra; from Brook. This specimen agrees closely with the type specimen described by Hulke, *op. cit.* p. 142; the length of the forked portion being 0,125, and that of the entire bone about 0,400.

*Same history.*

- 28668.** An imperfect chevron of an anterior caudal vertebra ; from Brook. *Mantell Collection. Purchased, 1853.*

*Of the following caudals some may belong to *I. dawsoni*.*

- 46014.** The centrum of a later caudal vertebra ; from Sandown, Isle of Wight. *Purchased, 1874.*

- R. 145.** The centrum of two middle caudal vertebræ ; from the Isle of Wight. *Fox Collection.*

- R. 145 a.** The centrum and base of the arch of a middle caudal vertebra ; from the Isle of Wight. *Same history.*

- R. 145 b.** The centrum and base of the arch of a middle caudal vertebra ; from the Isle of Wight. *Same history.*

- R. 145 c.** The centrum and base of the arch of a smaller middle caudal vertebra ; from the Isle of Wight. *Same history.*

- R. 145 d.** A very similar specimen ; from the Isle of Wight. *Same history.*

- R. 145 e.** An imperfect middle caudal vertebra ; from the Isle of Wight. This specimen closely resembles the caudals of *I. dawsoni*. *Same history.*

- 37691.** The rolled centrum and arch of a middle caudal vertebra ; from the Isle of Wight. *Saul Collection. Purchased, 1863.*

- 28638.** A smaller entire middle caudal vertebra ; from Brook Point. *Mantell Collection.*

- R. 712 b.** An imperfect middle caudal vertebra ; from Brixton Bay. *Presented by J. E. Lee, Esq., 1885.*

- R. 1018 a.** An imperfect posterior caudal vertebra probably referable to this species ; from Hastings. Probably belongs to the same individual as the phalangeal No. R. 1018. *No history.*

- R. 712 c.** An imperfect middle caudal vertebra of a very large individual ; from Sandown Bay. *Presented by J. E. Lee, Esq., 1885.*

- R. 145 f.** An imperfect middle caudal vertebra ; from the Isle of Wight. *Fox Collection.*

**43502.** An imperfect middle caudal vertebra; from the Isle of Wight.  
*Purchased, 1872.*

**R. 145 g.** Two associated middle caudal vertebrae; from the Isle of Wight.  
*Fox Collection.*

**28643.** The somewhat imperfect left coracoid; from the Isle of Wight.  
 This specimen, which was associated with the ilium No. 28685, agrees with the corresponding bone of the Belgian example figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix., showing the same narrow contour and the presence of a notch instead of a foramen.  
*Mantell Collection. Purchased, 1853.*

**R. 1012.** A left scapula wanting the distal extremity, provisionally referred to this species; from the Isle of Wight. This specimen (fig. 44) is noticed by the writer, *op. cit.* p. 52; it differs from the scapula of the Belgian skeleton figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix., by its greater curvature. The transverse diameter at the glenoid expansion is 0,364 (14·5 inches), and

Fig. 44.

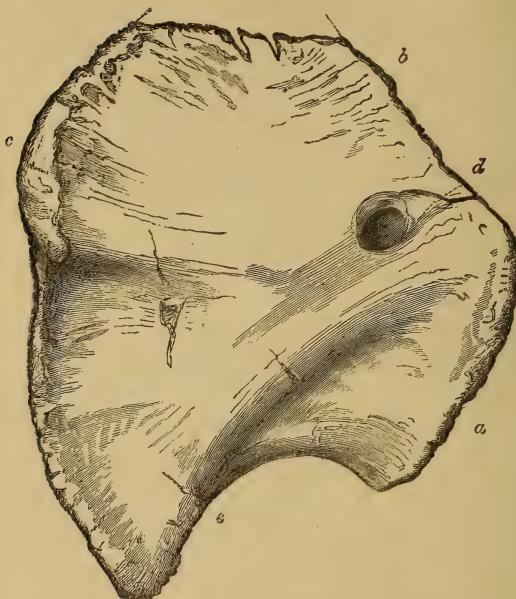


? *Iguanodon bernissartensis*.—The left scapula; from the Isle of Wight. About  $\frac{1}{2}$ . *g*, glenoid cavity.

immediately above 0,228 (9 inches). The left coracoid (fig. 45) from Brook, figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxviii. pp. 367–371, figs. 1–3, and provisionally referred to *Ornithopsis*, is certainly an Iguanodont, and from its great size probably belongs to the same form as the scapula; it is wider than the coracoid of the Belgian skeleton figured by Dollo, *op. cit.*, and has a

complete foramen. The scapula appears from its condition to be from the same beds as some of the above-mentioned

Fig. 45.



? *Iguanodon bernissartensis*.—The left coracoid ; from the Wealden of Brook.  
†. *a*, glenoid cavity; *b*, scapular articulation; *c*, anterior border; *d*, foramen; *e*, descending process. (From the 'Quart. Journ. Geol. Soc.')

vertebræ, which would suggest that these variations are of not more than individual or sexual value.

*Mantell Collection.*

32913. The proximal half of a rather larger left scapula, wanting part of the anterior border of the glenoid expansion ; from the Isle of Wight. Noticed by the writer, *op. cit.*

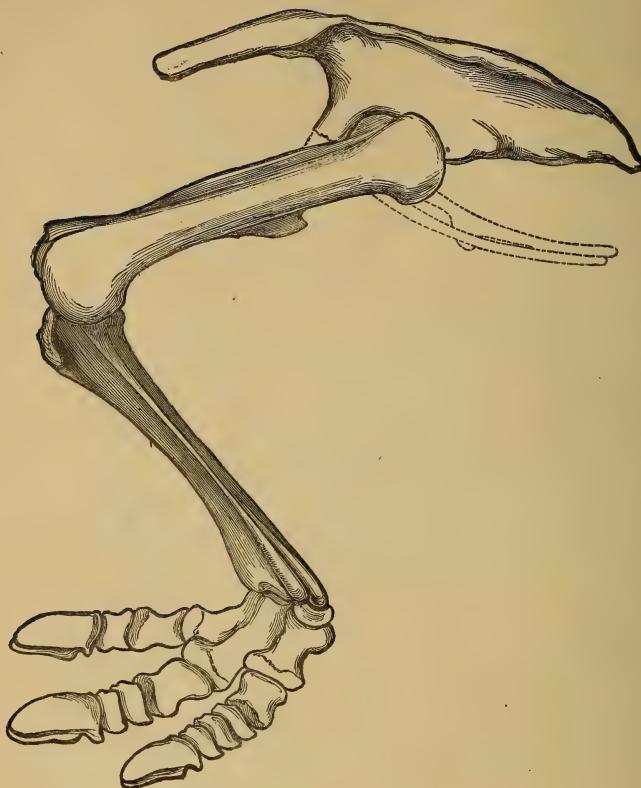
*Mantell Collection. Purchased, 1853.*

28642. The proximal half of a much smaller left scapula of similar type ; from the Isle of Wight. *Same history.*

R. 117. The proximal extremity of the left humerus of a very large individual ; from the Isle of Wight. The greatest transverse diameter is 0,320. *Fox Collection.*

- R. 159. The crushed proximal extremity of a rather smaller right humerus ; from the Isle of Wight. *Fox Collection.*
- R. 844. Cast of a considerably smaller right humerus. The original was obtained from the Isle of Wight, and was formerly in the collection of Mr. Fowlstone, of Ryde ; it is figured by Mantell in the 'Phil. Trans.' 1849, pl. xxxi. fig. 19 ; it is slightly smaller than the humerus figured by Dollo, *op. cit.* pl. i. fig. 3. The shaft has been fractured in several places and naturally re-cemented. *Made in the Museum.*
31815. The distal extremity of the left humerus ; from the Isle of Wight. *Mantell Collection.* *Purchased, 1853.*
- R. 140. The left ulna ; from the Isle of Wight. Agrees with the corresponding bone of Dollo's figure (*op. cit.*).  
*Fox Collection.*
- R. 132-3. The proximal phalangeals of the second and third digits and the fourth metacarpal of the left manus, provisionally referred to a small individual of this species ; from the Isle of Wight. The metacarpal is much shorter than that of *I. mantelli*, and thereby agrees with the corresponding bone of the present species figured by Dollo, *op. cit.*  
*Fox Collection.*
28685. The anterior half of the right ilium, wanting the extremity of the preacetabular process ; from Brook. Associated with the coracoid No. 28643 ; agrees precisely with the corresponding part of the ilium figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxviii. pl. iv. fig. 1, of which a reproduction is given in woodcut fig. 46 (the pubis and ischium being incorrect). *Mantell Collection.*
28686. The hinder part of the same ilium. This specimen shows a well-marked longitudinal ridge in the middle of the outer surface which is not represented in the specimen figured by Hulke. *Same history.*
28658. The left ischium, imperfect superiorly and wanting the distal extremity ; from Brook. This specimen appears to have belonged to the same individual as the preceding ; the twisting of the shaft characteristic of the group is well shown. *Same history.*
46016. The distal extremity of the left ischium ; from Sandown. One angle of the extremity is broken off ; when entire the greatest distal width was about 0,190. *Purchased, 1874.*

Fig. 46.



*Iguanodon bernissartensis*.—Restoration of the left ilium and hind limb; from the Wealden of the Isle of Wight. About  $\frac{1}{2}$ o. (From the 'Quart. Journ. Geol. Soc.')

R. 169. An imperfect left ischium perhaps belonging to an immature individual of this species; from the Isle of Wight. Although considerably smaller than No. 28658, this specimen appears too large for *I. mantelli*. Fox Collection.

46727. Cast of the imperfect left pubis. The original was obtained from the Isle of Wight, and was formerly in the collection of the late Dr. Wilkins, of Newport; the extremity of the preacetabular process and the greater portion of the shaft are wanting, while the acetabular margin is imperfect; it is figured by Hulke in the 'Quart. Journ. Geol.

Soc.' vol. xxx. pl. xxxii. figs. 3, 4, as a Dinosaurian ilium, but was identified by the same writer in vol. xxxii. p. 364 as a pubis of the present genus. It accords closely with Dollo's figure of the Belgian form. *Made in the Museum.*

- 2675.** The middle of the right femur of a very large individual; from the Isle of Wight.

*Mantell Collection. Purchased, 1838.*

- 2649.** The somewhat imperfect left femur of a smaller individual; from the Isle of Wight. *Same history.*

- 2152.** The imperfect right femur of a still smaller individual; from Cuckfield. *Same history.*

- 10443.** The middle portion of a left femur, agreeing in size with No. 2649; from Cuckfield. Noticed in Mantell's 'Petrifactions,' p. 294 (as No. 4).

*Mantell Collection. Purchased, 1838.*

- R. 701.** The distal extremity of the left tibia, with the imperfect astragalus attached; from Brixton Bay, Isle of Wight.

*Presented by J. E. Lee, Esq., 1885.*

- R. 168.** An imperfect fibula, wanting both extremities, not improbably belonging to this species; from the Isle of Wight. A fracture in the shaft has been polished in order to show the medullary cavity. *Fox Collection.*

- R. 1109.** Cast of the left hind foot. The original, which is one of the types of *I. seelyi*, was obtained from Brook, and is in the collection of Mr. J. W. Hulke, by whom it is figured in pl. iv. fig. 5 of the memoir already cited; a more reduced figure is given in woodcut fig. 46 of this volume.

*Made in the Museum.*

- 2537.** The second right metatarsal of a slightly smaller individual; (Fig.) from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xv. fig. 8, and in the 'Phil. Trans.' 1841, pl. ix. fig. 2. This and the next bone agree very closely with the corresponding bone of *I. dawsoni* (No. R. 799), but show slight differences in contour, on which account they are provisionally referred to the present species. *Mantell Collection. Purchased, 1838.*

R. 132 a. A similar metatarsal of the opposite side ; from the Isle of Wight. *Fox Collection.*

28652. The distal extremity of the third right metatarsal ; from the Isle of Wight. *Mantell Collection. Purchased, 1853.*

28644. The third left metatarsal ; from the Isle of Wight. *Same history.*

28645. The fourth right metatarsal ; from the Isle of Wight. This and the two preceding specimens may very probably have belonged to a single individual. *Same history.*

2553. Cast of the proximal phalangeal of the second digit of the left pes. The original was obtained from Sandown, Isle of Wight, and is probably preserved in the Museum at Oxford; it is figured by Buckland in the 'Trans. Geol. Soc.' pl. xli. ser. 2, vol. iii. figs. 1, 2, as a metacarpal. In size this specimen slightly exceeds the corresponding bone of the entire foot, No. R. 1109 ; the contour of the distal extremity has been somewhat altered by crushing.

*Mantell Collection. Purchased, 1838.*

R. 1014. Cast of a smaller specimen of the same bone. The original was probably obtained from Cuckfield. *No history.*

R. 1015. Cast of an imperfect specimen of the same bone. The original probably came from Cuckfield, and appears to have received an injury during the life of its owner.

*No history.*

R. 1016. The proximal phalangeal of the second digit of the right pes ; from Hastings. *No history.*

R. 1017. The proximal phalangeal of the third digit of the left pes, apparently belonging to this species ; from Hastings. This bone is remarkable for its unusual shortness, which is enhanced by the effects of rolling. *No history.*

40412. An imperfect specimen of the proximal phalangeal of the third digit of the pes ; from the Neocomian bone-bed of Potton, Bedfordshire. *Purchased, 1867.*

40434. The second phalangeal of the third digit of the pes of a very large individual ; from the Neocomian of Potton.

*Same history.*

- 40422.** The terminal phalangeal of the third digit of the pes of a very large individual ; from the Neocomian of Potton.

*Purchased*, 1867.

- 28679.** Cast of a corresponding bone. The original was probably obtained from the Isle of Wight.

*Mantell Collection. Purchased*, 1853.

- 40423.** The homologous bone of a smaller individual probably belonging to this species ; from the Neocomian of Potton. When perfect this bone must have been larger than the corresponding one in the foot of the Bernissart specimen of *I. mantelli*.

*Purchased*, 1867.

- 40411.** The proximal phalangeal of the fourth digit of the left pes of a very large individual ; from the Neocomian of Potton.

*Same history.*

- R. 1018.** A smaller specimen of the homologous bone ; from Hastings. Probably associated with No. R. 1016.

*No history.*

- R. 1019.** A slightly smaller specimen of the homologous bone of the opposite side ; from Brook.

*No history.*

- 28704.** Cast of the terminal phalangeal of one of the lateral digits of the pes. The original was probably obtained from the Isle of Wight.

*Mantell Collection. Purchased*, 1853.

- R. 1020.** A terminal phalangeal of one of the lateral digits of the pes ; probably from Brook.

*No history.*

- 37702.** An imperfect terminal phalangeal of one of the lateral digits of the pes ; from the Isle of Wight.

*Saul Collection. Purchased*, 1863.

- 46870-2.** The distal portions of a right and left hind foot, provisionally referred to a small individual of this species ; from Knellstone, Rivermore, Sussex. The terminal phalangeal of the third digit agrees in size with No. 40423.

*Presented by Sir R. Owen, K.C.B., 1875.*

- R. 1148.** An associated right femur, proximal portion of right tibia, the third right metatarsal, and two imperfect vertebrae provisionally referred to an immature individual of this species ; from the Wadhurst Clay of Hollington, Sussex. The femur has the inner trochanter descending low down as in typical examples of this species, but these specimens may belong to *I. dawsoni*.

*Dawson Collection. Purchased*, 1887.

**Iguanodon mantelli**, Meyer<sup>1</sup>.

The type species. Proportions slender; length from 5,000 to 6,000 (nearly 20 feet). Cranium 0,500 in length, narrow and elongated; nares forming long narrow slits, half the length of the mandible; orbit with horizontal diameter longer than vertical; supratemporal fossa narrow. Five vertebrae in sacrum. Scapula long and narrow, its length (0,620 to 0,720) equal eight times its width; coracoid small, short, and broad, with complete foramen; humerus short (0,430 to 0,470); metacarpals elongated and laterally compressed. Ilium with preacetabular process equal nearly one half its entire length (0,710 to 0,750); postacetabular portion short; pubis with preacetabular process short, thin, and much expanded (width at extremity 0,200); femur with inner trochanter in middle of shaft (length 0,710 to 0,810); tibia relatively long (length 0,670 to 0,750).

*Hab.* Europe (England and Belgium).

*Unless stated to the contrary, the following specimens are from the Wealden.*

**40100.** Numerous associated fragments of jaws and teeth; from the Lower Greensand of Black-Gang Chine, Isle of Wight. These specimens are referred to the present species on account of their apparent association with the scapula No. 40102. *Purchased, 1859.*

**R. 754.** A nearly entire left maxilla with teeth, probably belonging (*Fig.*) to this species; from Cuckfield, Sussex. Figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xlvi. pl. xiv. *Presented by H. Willett, Esq., 1886.*

**2211.** An imperfect left maxilla, showing dental alveoli, probably (*Fig.*) belonging to this species; from Cuckfield. Figured by Mantell in the 'Phil. Trans.' 1848, pl. ix. *Mantell Collection. Purchased, 1838.*

**R. 102-3.** Portions of the right and left dentary bones of a mandible, probably belonging to this species; from the Isle of Wight. *Fox Collection. Purchased, 1882.*

**28663.** Fragment of a mandibular ramus, agreeing in size with the preceding; from the Isle of Wight.

*Mantell Collection. Purchased, 1853.*

<sup>1</sup> *Palaeologica*, p. 110 (1832).

\* Slab of sandstone; from the Kentish Rag (Hythe beds of (Fig.) Lower Greensand) of Maidstone, Kent. This specimen may be taken as the type of the species, and was discovered by W. H. Bensted in 1834; it shows the impression of a tooth, a number of trunk and caudal vertebræ, ribs, a sternal (?) bone, and most of the bones of the scapular and pelvic girdles and fore and hind limbs. Noticed in the 'London and Edinburgh Philosophical Magazine,' July 1834, figured by Mantell in his 'Wonders of Geology,' 1st ed. pl. iii. (1844), and by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.) pt. i. pls. xxxiii., xxxiv. (1851). The right humerus is figured by Mantell in the 'Phil. Trans.' 1849, pl. xxxi. fig. 20; and two dorsal vertebræ are figured by Owen, *op. cit.* pls. xxv., xxvi.

Mantell Collection. Purchased, 1838.

**2160.** An imperfect anterior dorsal vertebra; from Cuckfield. (Fig.) Noticed by Owen in the 'Rep. Brit. Assoc.' 1841, p. 128, and figured by Mantell in the 'Phil. Trans.' 1849, pl. xxviii. figs. 7 *a*, 7 *b*. The arch is very tall, and the rib-facet long. Since this specimen seems to be adult, it is referred to the present species rather than to a young individual of *I. bernissartensis*. *Same history.*

**2137.** An imperfect later dorsal vertebra; from Cuckfield. The arch is lower, and the rib-facet must have been shorter. This specimen apparently agrees precisely with the first of the four dorsals in apposition on the right side of the top of the type slab. *Same history.*

**143 c.** An imperfect anterior or middle dorsal vertebra, not improbably belonging to this species; from the Isle of Wight. The arch has been crushed down. *Fox Collection.*

**2124.** The centrum and base of the arch of an anterior or middle dorsal vertebra provisionally referred to this species; from Cuckfield. *Mantell Collection. Purchased, 1838.*

**37711.** A very similar centrum; locality unknown. *Saul Collection. Purchased, 1863.*

**28940.** A rather larger centrum of similar type; from the Isle of Wight. *Mantell Collection. Purchased, 1853.*

**28939.** The centrum and base of the arch of a very similar specimen; from the Isle of Wight. *Same history.*

- 10451 a.** A rib provisionally referred to this species; from Cuckfield. (Fig.) Figured by Owen in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. ii. fig. 8.

*Mantell Collection. Purchased, 1838.*

- 10451.** A longer rib of similar type; from Cuckfield.

*Same history.*

- 2556.** Slab of sandstone, containing the centrum and base of the arch, together with the detached neural spine of a middle dorsal vertebra, probably belonging to this species; from Cuckfield. Noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 129. The rib-facet is nearly on the level of the platform.

*Same history.*

- R. 721.** A nearly entire anterior lumbar vertebra, probably belonging to this species; from near Horsham, Sussex. The neural spine is of great height, and there are rudimental ribs attached to the transverse processes. The centrum accords closely with that of one of the posterior dorsals or lumbars in the type slab.

*Purchased, 1886.*

- 37685.** A nearly entire sacrum and last lumbar vertebra, with a portion of the right ilium attached, referred by Owen to this species; from Brook Point, Isle of Wight. Described by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 131; figured by Mantell in the 'Phil. Trans.' 1849, pl. xxvi., and by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. ii. pls. iii.-vi. (1854), and noticed by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. p. 447 (where doubt of the determination is suggested):

*Saul Collection. Purchased, 1863.*

- 28690.** Fragment of a sacrum, apparently identical with the preceding; from the Isle of Wight.

*Mantell Collection. Purchased, 1853.*

- 40101.** The centra of three associated imperfect anterior and middle and one posterior caudal vertebra; from the Lower Greensand of Black-Gang Chine. Associated with the scapula No. 40102.

*Purchased, 1859.*

- 3790.** Six associated premedial caudal vertebræ, with two chevrons; (Fig.) referred by Owen to this species: from Cuckfield. Noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 132; figured by Mantell in his 'Medals of Creation,' 2nd ed.

p. 699, and by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. ii. pl. viii.

*Mantell Collection. Purchased, 1838.*

- 2400.** A chevron-bone, provisionally referred to this species; from (Fig.) Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xii. fig. 4. *Same history.*

- 36514.** A later chevron-bone of similar dimensions; from Cuckfield. *Mantell Collection. Purchased, 1853.*

*The following girdle- and limb-bones accord in type with those of the present species, but some of them may belong to the next form, and others of smaller size to Sphenospondylus gracilis.*

- 40102.** The left scapula and left<sup>1</sup> associated sternal (?) bone; from the Lower Greensand of Black-Gang Chine, Isle of Wight. The scapula is somewhat longer than in the type-specimen, the sternal bone is of the same contour as that of *I. bernissartensis*, figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. xii. *Purchased, 1859.*

- 2196.** A smaller right scapula; from Cuckfield. This specimen agrees very closely with the one figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix. fig. 2, although of smaller size.

*Mantell Collection. Purchased, 1838.*

- 2196 a.** The proximal half of a left scapula of apparently similar type, from Cuckfield. *Same history.*

- R. 115.** The proximal half of a right scapula; from the Isle of Wight. *Fox Collection.*

- R. 118.** A left coracoid; from the Isle of Wight. Agrees very closely with the specimen figured by Dollo, *op. cit.* Longest diameter 0,190. *Same history.*

- 2543.** Cast of an imperfect left coracoid, agreeing very closely with the preceding, but having a notch instead of a foramen. The original was obtained from Cuckfield, and

<sup>1</sup> This scapula and the undermentioned associated humerus belonging to the left side, the presumption is that the sternal bone is also of the same side. If this be so, it would indicate that Cope's view of the position of the sternals mentioned on p. 233 must be correct.

is not improbably the one figured (reversed and restored) by Mantell in the 'Phil. Trans.' 1849, pl. xxx. fig. 11.

*Mantell Collection.*

**40432.** A smaller right coracoid, agreeing in contour with No. R. 118; from the Neocomian bone-bed of Potton, Bedfordshire. Longer diameter 0,105. *Purchased*, 1867.

**R. 116.** A left humerus, imperfect proximally; from the Isle of Wight. Agrees approximately with the humerus of the type specimen. *Fox Collection.*

**40102 a.** The distal extremity of a slightly larger left humerus, associated with the scapula No. 40102.

*Mantell Collection. Purchased*, 1853.

**R. 407.** The proximal half of a small right humerus, probably belonging to this form; from the Isle of Wight.

*Presented by C. Westendarp, Esq.*, 1884.

**36519.** The proximal extremity of a very small left humerus, not (*Fig.*) improbably belonging to this species; from Cuckfield. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxxi. fig. 21. *Mantell Collection. Purchased*, 1853.

**36540.** The distal extremity of a right humerus, not improbably (*Fig.*) belonging to the same individual as the preceding; from Cuckfield. Figured by Mantell, *op. cit.* pl. xxxi. fig. 18.

*Same history.*

**28516.** The distal extremity of a left humerus, perhaps referable to this species; probably from Sussex.

*Dixon Collection. Purchased*, 1851.

**R. 1112.** Cast of the left manus. The original was obtained from Bernissart, in Belgium, and is preserved in the Museum at Brussels; it is figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix. fig. 2.

*Presented by the Director of the Royal Museum of Natural History, Brussels*, 1886.

**R. 113.** The left ilium, wanting the extremity of the postacetabular process; from the Isle of Wight. Closely resembles the ilium of the type specimen. *Fox Collection.*

**R. 114.** The left ilium, wanting the preacetabular process; from the Isle of Wight. *Same history.*

- 2158.** The right ischium; from Cuckfield. Figured by Mantell in (*Fig.*) his ‘Geology of the South-east of England,’ pl. iii. figs. 1, 2, and also in the ‘Phil. Trans.’ 1841, pl. viii. fig. 18, as an undetermined bone provisionally regarded as the clavicle of *Iguanodon*. It is rather smaller than the ischium of the type skeleton.

*Mantell Collection. Purchased, 1838.*

- R. 110.** A smaller right and left ischium, agreeing in characters with the preceding; from the Isle of Wight.

*Fox Collection.*

- 2194.** The left pubis, wanting the greater part of the shaft; from (*Fig.*) Cuckfield. Figured by Mantell in the ‘Phil. Trans.’ 1841, pl. ix. fig. 10, and noticed by Owen in the ‘Rep. Brit. Assoc.’ 1841, p. 133. The length of the horizontal portion is 0,375 (15½ inches).

*Mantell Collection. Purchased, 1838.*

- R. 109.** The imperfect right pubis; from the Isle of Wight.

*Fox Collection.*

- R. 111.** The imperfect right pubis; from the Isle of Wight.

*Same history.*

- 28507.** Fragment from the acetabular region of the right pubis; probably from Sussex.

*Dixon Collection. Purchased, 1851.*

- R. 720.** The descending portion of a pubis, associated with the vertebra No. R. 721; from Horsham. In size this specimen accords with the corresponding portion of the pubis in the hind limb figured by Dollo in the ‘Bull. Mus. R. Hist. Nat. Belg.’ vol. i. pl. ix. fig. 1. *Purchased, 1868.*

- 2650.** The right femur; from Cuckfield. Agrees very closely with the corresponding bone of the type specimen.

*Mantell Collection. Purchased, 1838.*

- R. 120.** The right femur; from the Isle of Wight. *Fox Collection.*

- R. 120 a.** A crushed right femur, apparently agreeing in form with the preceding; from the Isle of Wight. *Same history.*

- R. 120 b.** A smaller right femur; from the Isle of Wight.

*Same history.*

- R. 119. The left femur of a half-grown individual ; from the Isle of Wight. *Same history.*
2674. The distal extremity of a right femur, said by Mantell to (*Fig.*) have been found in association with the next specimen ; from Cuckfield. Figured by Mantell in his 'Geology of the South-east of England,' pl. iii. figs. 3, 4.  
*Mantell Collection. Purchased, 1838.*
2678. The right tibia ; from Cuckfield. Figured by Mantell, *op. cit.* pl. ii. fig. 8, and by Owen in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. xv. fig. 2. Apparently associated with the preceding specimen. *Same history.*
2734. The right tibia ; from Cuckfield. *Same history.*
28704. The right tibia ; from the Isle of Wight.  
*Mantell Collection. Purchased, 1853.*
- R. 125. The right tibia ; from the Isle of Wight. *Fox Collection.*
28669. A smaller right tibia, imperfect distally, probably belonging to this form ; from the Isle of Wight.  
*Mantell Collection. Purchased, 1853.*
36403. A still smaller left tibia of the same type ; from the Isle of Wight. *Purchased, 1860.*
2677. The right fibula ; from Cuckfield. Associated with the tibia (*Fig.*) No. 2678. Figured by Mantell in his 'Geology of the South-east of England,' pl. ii. fig. 7, and also in the 'Phil. Trans.' 1841, pl. viii. fig. 2. Closely resembles the fibula of the specimen figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix. fig. 1.  
*Mantell Collection. Purchased, 1838.*
- R. 128. An imperfect fibula ; from the Isle of Wight.  
*Fox Collection.*
- R. 1110. Cast of the left astragalus. The original is from Brixton, Isle of Wight, and was in the possession of Dr. Wilkins, of Newport ; it is figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxx. p. 25, woodcut figs. 1-4.  
*Made in the Museum.*
- R. 129. The imperfect right astragalus ; from the Isle of Wight.  
*Fox Collection.*

- R. 130. Fragment of the right astragalus; from the Isle of Wight.  
*Fox Collection.*
- R. 130 a. Fragment of a smaller left astragalus; from the Isle of Wight.  
*Same history.*
- R. 131. An imperfect calcaneum, provisionally referred to this form; from the Isle of Wight.  
*Same history.*
28671. An entire calcaneum, of similar type, of the opposite limb; from Brook.  
*Mantell Collection. Purchased, 1853.*
- R. 1114. Cast of the left pes. The original was obtained from Sussex, and is in the collection of Mr. S. H. Beckles; it is figured (in an imperfect condition, and with some erroneous restorations) by Owen in his 'Wealden and Purbeck Reptilia,' suppl. iv. pl. iii. (1872).  
*Presented by S. H. Beckles, Esq., 1885.*
- R. 1113. Cast of the left pes. The original, which was obtained from Bernissart, Belgium, is preserved in the Museum at Brussels, and is figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. ix. fig. 1.  
*Presented by the Director of the Royal Museum of Natural History, Brussels, 1886.*
2557. A second left metatarsal, of slightly larger size than the corresponding bone of the preceding specimen; from Cuckfield.  
*Mantell Collection. Purchased, 1838.*
2534. A third left metatarsal, apparently associated with the preceding.  
*Same history.*
2536. A fourth left metatarsal, probably belonging to the same (*Fig.*) individual. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xv. fig. 1.  
*Same history.*
2531. A third left metatarsal, agreeing very closely in size with (*Fig.*) that of the cast; from Cuckfield. Figured by Mantell, *op. cit.* pl. xiv. figs. 3-6.  
*Same history.*
28650. The distal extremity of a rather larger third left metatarsal; from the Isle of Wight.  
*Mantell Collection. Purchased, 1853.*
- R. 132. The right metatarsus, of rather smaller size than that of the cast; from the Isle of Wight.  
*Fox Collection.*

**2521.** The proximal phalangeal of the third digit of the pes, provisionally referred to this species ; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

**2627.** The second phalangeal of the second digit of the pes, provisionally referred to this species ; from the Isle of Wight.

*Same history.*

**R. 55.** A very similar specimen ; from Sussex. *Purchased, 1881.*

**36510.** The terminal phalangeal of one of the lateral digits of the pes, not improbably belonging to this species ; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

c. *Of Uncertain Position.*

**Iguanodon, sp.**

Slightly larger than *I. mantelli*. Anterior and middle dorsal vertebrae with moderately tall arches, in which the rib-facet does not reach the level of the platform, and their centra moderately short and somewhat wedge-shaped. The sternal (?) bones are like those of the Euiguanoodont group ; the scapula approximates to that of *I. mantelli*, but is larger in proportion to the other bones, and compared with that species the arches of the anterior dorsal vertebrae appear lower, the centra of the posterior dorsals shorter, the inner trochanter of the femur extending further up and down the shaft, the head of the femur placed more obliquely to the shaft, and the astragalus and apparently the ilium of different contour.

This form probably indicates a new species.

*Hab.* Europe (England).

**R. 33.** A considerable portion of the skeleton ; from the Wadhurst Clay (Lower Wealden) of Hollington, near Hastings, Sussex ; found in 1880. These specimens comprise fragments of the teeth and mandible, a large series of imperfect cervical, dorsal, and caudal vertebrae ; the sternal (?) bones (one imperfect), the proximal half of the right scapula, radius, and ulna, a metacarpal fragment of an ilium, the right femur, part of right astragalus, the entire second and third and the distal extremity of the fourth right metatarsal, and numerous phalangeals. The fragment of the ilium appears to differ very considerably from that of *I. mantelli* ; the astragalus also diverges from the corresponding fragment (No. R. 130) of that of the latter to a

very marked extent. The metatarsals agree in size with those of the cast No. R. 1114 of the specimen in Mr. Beckles's collection. *Purchased*, 1880.

*Specifically undetermined Specimens.*

*Unless it is stated to the contrary, the following specimens are from the Wealden. Some of the smaller ones may belong to Sphenospondylus gracilis.*

- R. 180. The nearly entire dentary bone of the left ramus of the (Fig.) mandible of a young individual; from Brixton, Isle of Wight. Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. iii. pl. x. (1864). Three teeth are shown in their alveoli.

*Fox Collection. Purchased*, 1882.

3388. A very small tooth; from Cuckfield, Sussex. Figured by (Fig.) Mantell in his 'Geology of the South-east of England,' p. 270, fig. 1. *Mantell Collection. Purchased*, 1838.

2390. The crown of a lower tooth; from Cuckfield. Figured by (Fig.) Mantell in his 'Fossils of Tilgate Forest,' pl. iv. fig. 7.

*Same history.*

2394. A much-worn upper tooth; from Cuckfield. Figured by (Fig.) Mantell, *op. cit.* pl. iv. fig. 5 and pl. xvii. fig. 2, and also in his 'Geology of the South-east of England,' p. 270, figs. 4, 5. *Same history.*

2393. A worn upper tooth; from Cuckfield. Figured in 'Fossils (Fig.) of Tilgate Forest,' pl. iv. fig. 12. *Same history.*

2392. A partially worn lower tooth; from Cuckfield. Figured by (Fig.) Mantell, *op. cit.* pl. iv. fig. 4, and in his 'Geology of the South-east of England,' p. 272, figs. 4, 5. *Same history.*

2382. A worn upper tooth; from Cuckfield. Figured by Owen in (Fig.) his 'Wealden and Purbeck Reptilia,' pt. ii. pl. xviii. fig. 1 (1855). *Same history.*

36497. The crown of an unworn lower tooth of large size (? *I. bernissartensis*); from Cuckfield. Figured by Mantell in his 'Petrifications,' p. 235, fig. 50, and by Owen, *op. cit.* pl. xviii. fig. 3. *Mantell Collection. Purchased*, 1853.

- 36499.** An imperfect lower tooth; from Cuckfield. Figured by (*Fig.*) Owen, *op. cit.* pl. xviii. fig. 4.  
*Mantell Collection. Purchased, 1853.*
- 36500.** worn upper tooth; from Cuckfield. Figured by Mantell, (*Fig.*) *op. cit.* p. 238, fig. 52, and by Owen, *op. cit.* pl. xviii. fig. 2.  
*Same history.*
- 10840.** A lower tooth; from Cuckfield.  
*Same history.*
- 2357.** A worn tooth; from Cuckfield.  
*Mantell Collection. Purchased, 1838.*
- 2381.** A worn tooth; from Cuckfield.  
*Same history.*
- 2387.** A worn tooth; from Cuckfield.  
*Same history.*
- 2388.** A small worn upper tooth; from Cuckfield.  
*Same history.*
- 2391.** A very similar specimen; from Cuckfield.  
*Same history.*
- 3419.** A somewhat smaller worn upper tooth; from Cuckfield.  
*Same history.*
- 3423.** A partially worn upper tooth; from Cuckfield.  
*Same history.*
- 3426.** A very similar specimen; from Cuckfield.  
*Same history.*
- 2402.** A worn tooth; from Cuckfield.  
*Same history.*
- 2403.** A worn tooth; from Cuckfield.  
*Same history.*
- 2405.** A worn tooth; from Cuckfield.  
*Same history.*
- 2387.** A slightly worn lower tooth, of large size; from Cuckfield.  
*Same history.*
- 3386.** A partially worn small tooth; from Cuckfield.  
*Same history.*
- 3399.** The crown of a partially worn tooth; from Cuckfield.  
*Same history.*
- 2407, 3355, 3373, 3387, 3391, 3395, 3410, 3418, 26001, 40306.** A series of worn teeth, of small size; from Cuckfield.  
*Mantell Collection.*
- R. 645.** Seven imperfect teeth, of small size; from Battle, near Hastings, Sussex. *Presented by J. E. Lee, Esq., 1885.*
- R. 604.** Three imperfect upper teeth; from Hastings.  
*Dawson Collection. Purchased, 1885.*
- R. 645 a.** The crown of an unworn lower tooth; from the Hastings Sand (Lower Wealden) of Sandown, Isle of Wight.  
*Presented by J. E. Lee, Esq., 1885.*

- R. 134.** A worn lower tooth, of large size (?*I. bernissartensis*) ; from the Isle of Wight. *Fox Collection. Purchased*, 1882.
- R. 134 a.** A worn tooth ; from the Isle of Wight. *Same history.*
- R. 134 b.** A similar specimen ; from the Isle of Wight. *Same history.*
- R. 134 c.** The crown of an unworn upper tooth ; from the Isle of Wight. *Same history.*
- R. 134 d.** An unworn lower tooth, of small size ; from the Isle of Wight. *Same history.*
- R. 967.** The crown of a worn tooth ; from the Wadhurst Clay (Lower Wealden) of the neighbourhood of Hastings. This specimen may not improbably be referable to *I. dawsoni*. *Dawson Collection. Purchased*, 1885.
- R. 1140.** The imperfect centrum of a small cervical vertebra ; obtained in 1825 from near Loxwood, Sussex. *No history.*
- R. 409.** The crushed centrum of a very similar cervical vertebra ; from Brook, Isle of Wight. *Presented by C. Westendarp, Esq.*, 1884.
- 36550.** The centrum of a smaller cervical vertebra ; from the Isle of Wight. *Mantell Collection. Purchased*, 1853.
- R. 894.** An imperfect (?middle) dorsal vertebra, of small size ; from the Isle of Wight. The arch is low, and the rib-facet rises to the summit of the platform. The distinct rib-facet on the centrum indicates that this specimen is not Crocodilian. *Fox Collection. Purchased*, 1882.
- 43503.** A smaller imperfect dorsal vertebra of similar type ; from the Isle of Wight. *Purchased*, 1872.
- R. 1141.** The centrum of a middle dorsal vertebra, apparently associated with No. R. 1140 ; from Loxwood. Figured by Murchison in the 'Geol. Trans.' ser. 2, vol. ii. pl. xv. fig. 2. *No history*
- R. 2127.** An imperfect posterior dorsal vertebra ; from Cuckfield. *Mantell Collection.*
- 2560.** An imperfect rib, provisionally referred to this group ; (Fig.) from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xi. fig. 1. *Same history.*

- 2138.** The centrum of an anterior or middle dorsal vertebra, apparently belonging to this family ; from Cuckfield. Described by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 68, and figured in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. viii. pl. iv. figs. 7, 8, where it is provisionally referred to *Suchosaurus* ; it closely resembles No. R. 894, and also the vertebra of *Sphenospondylus gracilis*, No. R. 142 *a*, and may belong to the latter form.

*Mantell Collection. Purchased, 1838.*

- 46772.** The centrum of a dorsal vertebra of a shorter type than the preceding ; from the Isle of Wight. *Purchased, 1875.*

- 28941.** The centrum of a dorsal vertebra, of the same type as the preceding ; probably from the Isle of Wight.

*Hastings Collection. Purchased, 1855.*

- 28947.** The centrum of a dorsal vertebra, not improbably belonging to this group ; from the Isle of Wight. *Same history.*

- 28952.** A rolled dorsal vertebra of similar type ; from Brook.

*Same history.*

- 46785.** The centrum of a larger dorsal vertebra, agreeing in general characters with No. 2138 ; from the Purbeck of Swanage, Dorsetshire. Referred by Owen (MS.) to *Suchosaurus*.

*Beckles Collection. Purchased, 1876.*

- 46768.** Two ankylosed vertebral centra, apparently of the last lumbar and first sacral, probably belonging to *Iguanodon* ; from the Isle of Wight. Closely resemble the corresponding vertebrae of the sacrum referred to *I. mantelli*, No. 37685 (p. 220). *Purchased, 1875.*

- 28696.** The centrum of a vertebra, agreeing with the first centrum of the preceding specimen ; from the Isle of Wight.

*Mantell Collection. Purchased, 1853.*

- 46773.** An imperfect sacral vertebra, referred by Owen to *Iguanodon* ; from the Isle of Wight. *Purchased, 1875.*

- 2127.** An imperfect sacral vertebra, referred by Owen to *Iguanodon* ; from Cuckfield. Noticed by Owen in the 'Rep. Brit. Assoc.' for 1841, p. 130, and figured by him in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. vii.

*Mantell Collection. Purchased, 1838.*

- 2159.** An imperfect vertebral centrum of large size, which is probably the last lumbar of a member of the present family; from Cuckfield. In contour it closely resembles the last lumbar of *I. prestwichi*, figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxxvi. pl. xx. fig. 1.

*Mantell Collection. Purchased, 1838.*

- 2156.** An imperfect anterior caudal vertebra; from Cuckfield.

*Same history.*

- 2157.** An imperfect anterior caudal vertebra, rather later in the series than the preceding; from Cuckfield. *Same history.*

- R. 108.** Five associated anterior caudal vertebrae; from the Isle of Wight. *Fox Collection.*

- R. 107 a.** Three associated anterior caudal vertebrae; from the Isle of Wight. *Same history.*

- R. 367.** One imperfect extremity of an anterior caudal vertebra, of which the inner surface has been polished.

*Presented by J. E. Lee, Esq., 1885.*

- 37692.** An imperfect anterior caudal vertebra, of small size; from the Isle of Wight. *Saul Collection. Purchased, 1863.*

- R. 367 a.** A smaller imperfect anterior caudal vertebra; from the Isle of Wight. *Presented by J. E. Lee, Esq., 1885.*

- 36541.** A very small imperfect anterior caudal vertebra; from the Isle of Wight. *Mantell Collection. Purchased, 1853.*

- 2164.** The centrum of one of the early middle caudal vertebrae; from Cuckfield. As in one vertebra of No. 40101 (p. 220), the interval between the chevron-facets of the two extremities is very small. *Mantell Collection. Purchased, 1838.*

- R. 1142.** Four imperfect associated caudal vertebrae, of small size; (Fig.) from Loxwood. Three of these specimens, which belong to the same individual as No. R. 1140, are figured by Murchison, *op. cit.* pl. xv. figs. 1, 3, 8. *No history.*

- 2142.** A slightly imperfect middle caudal vertebra; from Cuckfield. *Mantell Collection. Purchased, 1838.*

- R. 145 d.** The centrum of a middle caudal vertebra; from the Isle of Wight. *Fox Collection.*

- R. 145 h. Two associated imperfect middle caudal vertebrae, of smaller size ; from the Isle of Wight. *Fox Collection.*
46015. A small imperfect middle caudal vertebra ; from Sandown, Isle of Wight. *Purchased, 1874.*
- R. 107 a. Seven associated imperfect middle and posterior caudal vertebrae, of small size ; from the Isle of Wight. *Fox Collection.*
36532. An imperfect vertebra, from the hinder part of the middle caudal region ; from Cuckfield. *Mantell Collection. Purchased, 1853.*
43622. An imperfect posterior caudal vertebra, of large size ; from Brook, Isle of Wight (*? I. bernissartensis*). *Purchased, 1872.*
- R. 604. Two imperfect posterior caudal vertebrae ; from Hollington, Sussex. *Dawson Collection. Purchased, 1884.*
- R. 141. An imperfect posterior caudal vertebra ; from the Isle of Wight. *Fox Collection.*
- R. 604 a. An imperfect vertebra from near the extremity of the tail ; from Silverhill, near Hastings. *Dawson Collection.*
36544. A very similar specimen, but less imperfect ; from Cuckfield. (*Fig.*) Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. ix. fig. 8, and in the 'Phil. Trans.' 1849, pl. xxx. fig. 13. *Mantell Collection. Purchased, 1853.*
36547. An imperfect vertebra from the same region ; from the Isle of Wight. *Same history.*
36544. An imperfect vertebra, which appears to have been one of the last two or three of the caudal series ; from Cuckfield. *Mantell Collection.*
44914. Two transverse sections of vertebral centra ; from the Isle of Wight. *Purchased, 1874.*
2146. The proximal portion of a chevron-bone ; from the Isle of Wight. *Mantell Collection. Purchased, 1838.*
- R. 172. An imperfect chevron-bone ; from the Isle of Wight. *Fox Collection.*

**R. 1144.** Cast of the two ossifications of the sternal(?) region. The original was obtained from Hastings, and is in the collection of Mr. S. H. Beckles; it is figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xli. pl. xiv. fig. 1, and regarded as the clavicle and interclavicle. This identification is disputed by Dollo in the 'Rev. Quest. Scient.' 1885, p. 666, who regards these bones as parts of the sternum, but not of either *I. bernissartensis* or *I. mantelli*. The same conclusion is arrived at by Baur in the 'Zool. Anzeig.' vol. viii. p. 561 (1885); while Cope, in the 'Amer. Nat.' 1886, p. 153, compares these and the homologous bones of *I. bernissartensis* to those of *Diclonius*, and considers that Hulke has figured them in a reversed position. The specimen is again noticed by Seeley in the 'Geol. Mag.' 1887, pp. 84-86, who agrees with Cope in regard to the reversion of Hulke's figure, but identifies it with the xiphisternum, and suggests that its process extended backwards to articulate with the 'prepubis.' Finally, these bones are again described and figured by the same writer in the 'Proc. R. Soc.' vol. xlvi. p. 240 (1887), where they are termed prepubis, and are identified with the bones commonly termed pubes in the Eusuchian Crocodilia. The suggestion that this specimen may belong to the *I. dawsoni* form was made by the writer in the 'Quart. Journ. Geol. Soc.' vol. xliv. p. 52. *Made in the Museum.*

**2218.** A single sternal ossification of similar type; from Cuckfield. (*Fig.*) Figured by Mantell in the 'Phil. Trans.' 1841, pl. viii. fig. 20, as an undetermined bone. Although the difference from the corresponding bone of *I. mantelli* (No. R. 33) and of the unnamed form mentioned on p. 226 is difficult to describe, yet it is very marked.

*Mantell Collection. Purchased, 1838.*

**40709.** The proximal half of a right scapula; from Bulverhythe, near Hastings. This specimen apparently closely accords with the scapula provisionally referred to *I. bernissartensis*.

*Mantell Collection. Purchased, 1853.*

**R. 115 a.** The proximal half of a smaller left scapula, not improbably belonging to the same species as the preceding; from the Isle of Wight.

*Fox Collection.*

- 36505.** The entire right scapula of a small individual ; from (Fig.) Cuckfield. Figured by Mantell in the 'Phil. Trans.' 1849, pl. xxx. fig. 10. Total length 0.385 ; in contour this specimen comes nearest to the scapula No. R. 966, provisionally referred to *I. dawsoni*.

*Mantell Collection. Purchased, 1853.*

- 2524.** A large right coracoid ; from Cuckfield. Although smaller, agrees very closely with the specimen represented in fig. 45, and not improbably belongs to the same species.

*Mantell Collection. Purchased, 1838.*

- 2200.** A considerably smaller imperfect right coracoid ; from Cuck- (Fig.) field. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. vii. fig. 9. *Same history.*

- R. 1145.** The distal portion of a medium-sized right humerus ; from Hastings. *No history.*

- R. 604.** An imperfect left humerus, of small size ; from the Wadhurst Clay of Ridge Quarry, near Hastings.

*Dawson Collection.*

- R. 170.** Three specimens of the distal extremity of the humerus of very young individuals ; from the Isle of Wight.

*Fox Collection.*

- 2186.** A radius, not improbably belonging to *I. mantelli* ; from Cuckfield. *Mantell Collection. Purchased, 1838.*

- R. 1143.** A bone, which is apparently a metacarpal ; from Loxwood. (Fig.) Associated with the vertebra No. R. 1140 figured by Murchison, *op. cit.* pl. xv. fig. 7. *No history.*

- 2384.** The terminal phalangeal of the pollex ; from Cuckfield. (Fig.) Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xx. fig. 8, in the 'Phil. Trans.' 1841, pl. ix. fig. 2, and in his 'Wonders of Geology,' 6th ed. p. 431, fig. 106, as the horn of *Iguanodon* ; also by Owen in his 'Wealden and Purbeck Reptilia,' pt. ii. pl. xvii. figs. 1, 2, where it is provisionally referred to the pes.

*Mantell Collection. Purchased, 1838.*

- R. 457.** A larger specimen of the corresponding bone ; probably from the Isle of Wight.

*Presented by Sir R. Owen, K.C.B., 1884.*

40431. A much smaller specimen of the corresponding bone ; from the Lower Greensand of Potton, Bedfordshire.

*Purchased*, 1867.

46782. A very small specimen of the corresponding bone ; from Brook.

*Purchased*, 1875.

46728. Cast of the acetabular region of the left pubis. The original was obtained from Brixton Bay, Isle of Wight, and was formerly in the collection of Dr. Wilkins, of Newport ; it is figured by Hulke in the 'Quart. Journ. Geol. Soc.' vol. xxx. pl. xxxii. figs. 1, 2, as an ilium, and correctly named in vol. xxxii. p. 364. *Made in the Museum.*

36538. The acetabular region of the right pubis of a young individual (*Fig.*) ; from Cuckfield. Figured by Mantell in his 'Fossils of Tilgate Forest,' pl. xvi. fig. 3, as part of the scapula, and so labelled in the handwriting of Cuvier.

*Mantell Collection. Purchased*, 1853.

- R. 169. Fragment of the acetabular region of the right pubis of a young individual ; from the Isle of Wight.

*Fox Collection.*

2183. The proximal portion of a small left ischium, in a block of grit ; from Cuckfield.

*Mantell Collection. Purchased*, 1838.

2167. The proximal portion of a much larger left ischium ; from Cuckfield.

*Same history.*

28677. The distal extremity of a left ischium, agreeing approximately in size with the preceding ; from Brook.

*Mantell Collection. Purchased*, 1853.

28700. A very similar specimen of the opposite side ; from Brook. Not improbably belonging to the same individual as the preceding. These specimens are considerably larger than the corresponding portion of the ischium (No. 2158) of *I. mantelli*, and not improbably belong to small individuals of *I. bernissartensis*. *Same history.*

36507. The left femur of a small individual, wanting a portion of the upper half of the shaft ; from the Isle of Wight. This specimen probably belongs to *I. mantelli*.

*Same history.*

**2152.** The crushed left femur of a smaller animal; from the Isle of Wight. This specimen appears to be incorrectly restored.  
*Mantell Collection. Purchased, 1838.*

**36539.** The distal extremity of the left femur of a very young individual; from Cuckfield.  
*Mantell Collection. Purchased, 1853.*

**2662-2667.** The two extremities of a femur, together with the associated imperfect tibia, fibula, and two left metatarsals of a small animal; from Cuckfield. Noticed in Mantell's 'Petrifications,' p. 294.  
*Mantell Collection. Purchased, 1838.*

**R. 170.** Two specimens of the proximal and two of the distal extremity of the femora of very young individuals; from the Isle of Wight.  
*Fox Collection.*

**2737.** A small femur, of slender type; from Cuckfield. The shaft appears to be more slender, and the inner trochanter lower down than in *I. mantelli*.  
*Mantell Collection. Purchased, 1838.*

**R. 1116.** A large left tibia, in a crushed condition; from the Wadhurst Clay of Hastings. This specimen is rather longer than the next.  
*Dawson Collection. Purchased, 1886.*

**R. 1115.** A right tibia; from Shornden Quarry, near Hastings. This specimen is more slender than typical specimens of *I. mantelli*, and has the two extremities placed less obliquely to one another; it may, perhaps, belong to *I. dawsoni*.  
*Dawson Collection. Purchased, 1887.*

**R. 125.** A slightly smaller left tibia, agreeing in general contour with the preceding; from the Isle of Wight.  
*Fox Collection.*

**R. 1147.** A small right tibia in a crushed condition; locality unknown.  
*No history.*

**R. 604.** An imperfect right tibia, of medium size; from near Hastings.  
*Dawson Collection.*

**R. 659.** The distal extremity of a much smaller left tibia; from the Hastings Sand of Brixton Bay, Isle of Wight.  
*Presented by J. E. Lee, Esq., 1885.*

- 36518.** The distal extremity of the right tibia of a still smaller individual; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

- 36506.** A right tibia, agreeing approximately in size with the preceding; from Cuckfield. Length 0,031; diameter of distal extremity 0,065. *Same history.*

- R. 124.** A smaller right tibia; from the Isle of Wight.

*Fox Collection.*

- 36508.** A considerably smaller left tibia; from the Isle of Wight.

*Mantell Collection. Purchased, 1838.*

- R. 604.** The second left metatarsal of an individual agreeing in size with the Belgian example of *I. mantelli*, No. R. 1113; from the Wadhurst Clay near Hastings. *Dawson Collection.*

- R. 604 a.** A first phalangeal, apparently belonging to the second digit of the right pes of a larger individual; from the Wadhurst Clay near Hastings. *Same history.*

- 2521.** The first phalangeal of the third digit of the pes of an animal agreeing in size with *I. mantelli*; from Cuckfield.

*Mantell Collection. Purchased, 1838.*

- 46512.** The corresponding bone of a much smaller individual; from Cuckfield. *Mantell Collection. Purchased, 1853.*

- R. 604 c.** The second phalangeal of the third digit of the pes; from the Wadhurst Clay of Hastings. *Dawson Collection.*

- 2627.** The second phalangeal of the second digit of the left pes; from the Isle of Wight. Agrees in size with *I. mantelli*.

*Mantell Collection. Purchased, 1838.*

- R. 55.** The imperfect corresponding bone of the opposite foot of a smaller animal; from Sussex. *Purchased, 1881.*

- 36513.** A very small specimen of the corresponding bone of the left pes; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

- R. 604 b.** A terminal phalangeal, apparently belonging to the second digit of the right pes; from the Wadhurst Clay, near Hastings. Probably associated with No. R. 604 a.

*Dawson Collection.*

**36510.** A terminal phalangeal, apparently of the fourth digit of the left pes ; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

**R. 133.** An imperfect terminal phalangeal ; from the Isle of Wight.

*Fox Collection.*

**36511.** The extremity of a terminal phalangeal of a young individual ; from Cuckfield.

*Mantell Collection. Purchased, 1853.*

**19979.** Cast of the impression and counterpart of a hind foot. The original was obtained from Hastings.

*Presented by Bennett Smith, Esq., 1846.*

**R. 1146.** Cast of the impression and counterpart of a hind foot. The original was obtained from Hastings, and is figured (without determination) by Tylor in the 'Quart. Journ. Geol. Soc.' vol. xviii, p. 248. *Purchased. About 1863.*

### Genus **SPHENOSPONDYLUS**, Seeley<sup>1</sup>.

Several of the anterior dorsal vertebrae markedly opisthocelous, and the later ones with posterior cups to the centra, but no anterior balls ; arches of dorsals very low, with the centrum long, moderately compressed, wedge-shaped, and often with a haemal spine or carina. The rib-facet rises to the level of the neural platform in the dorsals. Teeth probably like those of *Iguanodon*.

This genus, which is provisionally accepted, is regarded as probably connecting *Iguanodon* with *Trachodon*, the anterior dorsals resembling those of the latter, while the later ones approximate to those of the undetermined species of *Iguanodon* mentioned on p. 226.

### **Sphenospondylus gracilis**, Lydekker<sup>2</sup>.

The type species. Typically smaller than *Iguanodon mantelli*.

*Hab.* Europe (England).

*The following specimens were obtained from the Wealden of the Isle of Wight, and, unless the contrary is stated, belong to the Fox Collection. Purchased, 1882.*

**R. 143.** An imperfect vertebra, from near the extreme anterior

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxxix. p. 55 (1883).

<sup>2</sup> Ibid. vol. xliv. p. 47 (1888).

extremity of the dorsal series. This specimen was probably associated with No. R. 142; it shows a distinct ball on the anterior face of the centrum, below which is a well-marked haemal spine.

**R. 166.** The centrum of a very similar vertebra, with a less distinct haemal spine.

**R. 142 a.** An imperfect anterior dorsal vertebra. The anterior face of the centrum is flat, but the posterior cupped. All the specimens entered as R. 142 were associated with the present one.

**R. 142 b.** An imperfect anterior dorsal vertebra. There is still a trace of the posterior cup to the centrum.

**R. 142 c.** A slightly imperfect anterior or middle dorsal vertebra. This specimen was evidently somewhat later in the series than the preceding one, the two faces of the centrum being alike.

**R. 142 d.** A slightly imperfect anterior or middle dorsal vertebra.

**R. 142 e.** A more imperfect anterior or middle dorsal vertebra.

**R. 142.** A slightly imperfect anterior or middle dorsal vertebra. One (Fig.) of the type specimens. Figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxix. pp. 58, 59, figs. 2, 3; the former figure being reproduced in the woodcut on the next page. There is a slight cupping of the posterior face of the centrum.

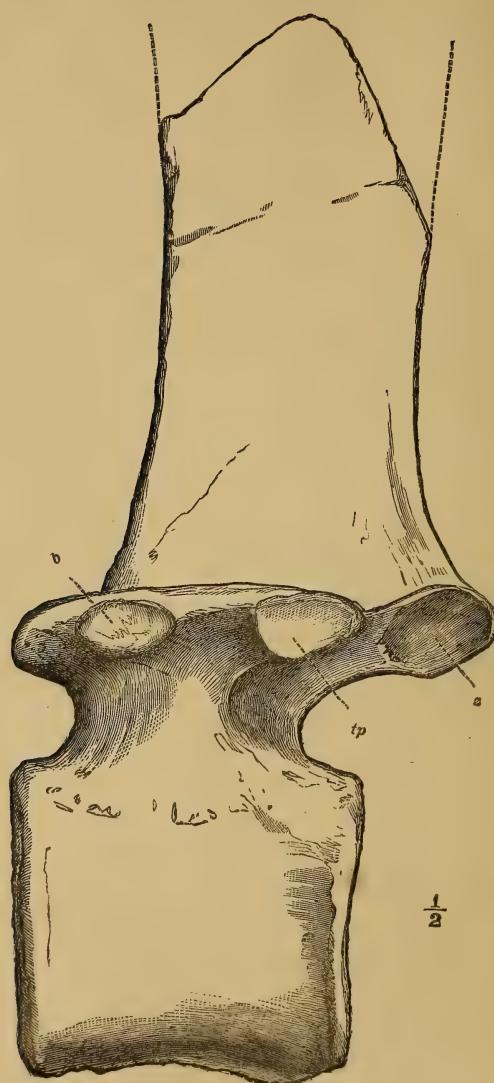
**R. 143 b.** An imperfect anterior or middle dorsal vertebra. Associated with No. R. 143.

**R. 135 a.** An imperfect anterior or middle dorsal vertebra, probably belonging to this form.

**28935.** A series of four united posterior dorsal or lumbar vertebræ probably belonging either to this species or to *I. mantelli*.  
*Hastings Collection. Purchased, 1855.*

**R. 165.** A posterior dorsal or lumbar vertebra, with the arch imperfect, not improbably belonging to this form. The centrum has subcircular terminal faces.

Fig. 47.



*Sphenospondylus gracilis*.—Left lateral aspect of an anterior or middle dorsal vertebra; from the Wealden of the Isle of Wight.  $\frac{1}{2}$ . *b*, rib-facet; *tp*, transverse process; *z*, postzygapophysis. (From the 'Quart. Journ. Geol. Soc.')

### Family TRACHODONTIDÆ<sup>1</sup>.

Closely allied to the preceding family, but with the teeth arranged in vertical rows, and articulating with one another so as to form a more or less complete pavement. In the one genus (*Diclonius*<sup>2</sup>) in which it is known the skull is elongated and much depressed, and the premaxillæ are extended a considerable distance in advance of the large nares, thus producing a very long edentulous portion.

#### Genus ORTHOMERUS, Seeley<sup>3</sup>.

Provisionally referred to this family. Known only by limb-bones and caudal vertebrae, which appear to indicate a form closely allied to *Trachodon*, but presenting some approximation to *Iguanodon*. The caudal vertebrae (fig. 48) have their spines much inclined backwards, and the anterior ones are more elongated<sup>4</sup> than in *Trachodon*; the chevron-facets are double, from which Dollo concludes that the chevrons were open<sup>5</sup>.

#### Orthomerus dolloi, Seeley<sup>6</sup>.

The type species; about the size of *Trachodon foulki*.  
Hab. Europe (Belgium).

*The following specimens are from the Upper Cretaceous of Maastricht, Netherlands, and belong to the Van Breda Collection. Purchased, 1871.*

**42955.** The right femur, with imperfect extremities. Type (fig. 49, (Fig.) A, B, C); figured by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxix. p. 249, fig. 2, A, B, C. Length 0,495 (19·5 inches).

<sup>1</sup> =*Hadrosauridæ*.

<sup>2</sup> See Cope, Proc. Ac. Nat. Sci. Philad. 1883, p. 97, pls. iv.-vii.

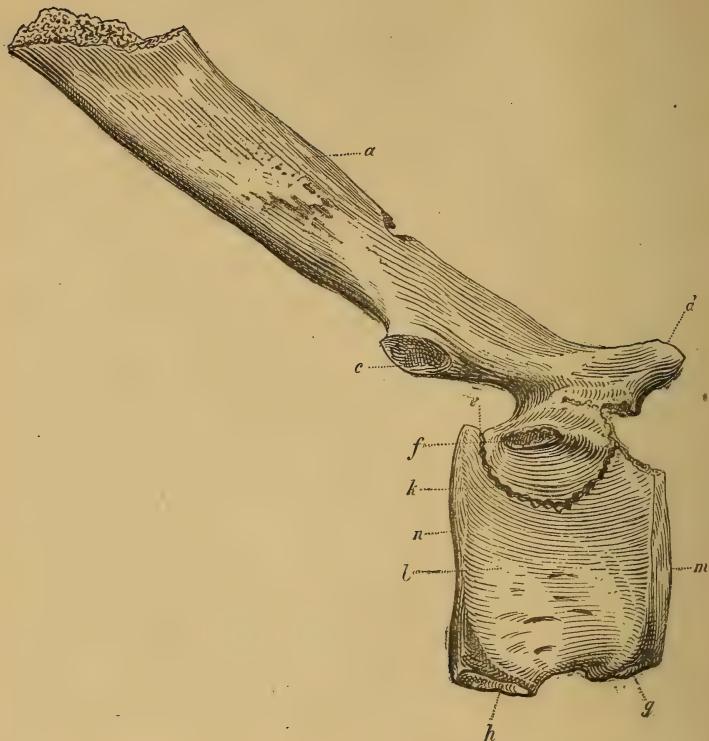
<sup>3</sup> Quart. Journ. Geol. Soc. vol. xxxix. p. 248 (1883).

<sup>4</sup> See Dollo, Bull. Mus. R. Hist. Nat. Belg. vol. ii. p. 211 (1883).

<sup>5</sup> Double facets are sometimes found in *Iguanodon* (Owen, 'British Fossil Reptilia,' Dinosauria, pl. v.).

<sup>6</sup> Loc. cit.

Fig. 48.



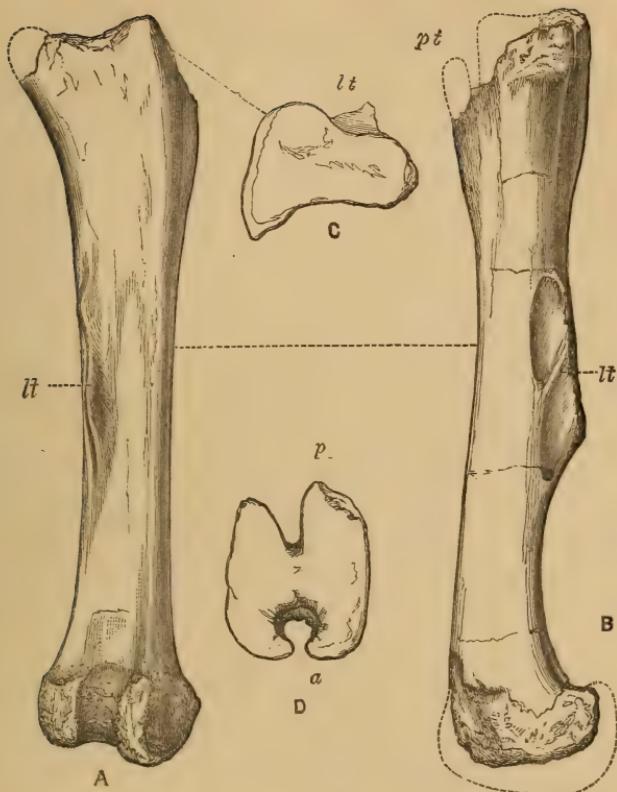
*Orthomerus dolloi*.—Right lateral view of anterior caudal vertebra; from the Maastricht Beds.  $\frac{1}{2}$ . a, spine; b, centrum; c, d, post- and prezygapophysis; e, k, neuro-central suture; f, transverse process; g, h, chevron-facets; m, n, anterior and posterior faces of centrum. (From the 'Bull. Mus. R. Hist. Nat. Belg.'.)

42956. Distal extremity of the right femur (fig. 49, D). Figured (Fig.) by Seeley, *op. cit.* fig. 2, D.

42954. The left tibia, wanting the enemial crest and the two extremities. Figured by Seeley, *op. cit.* p. 252, fig. 3; it is more slender than the corresponding bone of *Iguanodon*, and thereby approximates to that of *Trachodon*.

42957. An imperfect metatarsal. Noticed by Seeley, *op. cit.* p. 253.

Fig. 49.



*Orthomerus dolloi*.—The right femur; from the Maastricht beds. A, posterior; B, inner aspect; C, proximal extremity (restored); D, distal extremity of another specimen. *lt*, inner, *pt*, proximal trochanter; *a*, anterior, *p*, posterior condyles. (From the 'Quart. Journ. Geol. Soc.')

### Genus TRACHODON, Leidy<sup>1</sup>.

Syn. *Hadrosaurus*, Leidy<sup>2</sup>.

The type genus. All the dorsal vertebrae opisthocelous, with low arches, on which the rib-facet rises to the summit of the neural platform; centra moderately compressed, wedge-shaped, with hæmal

<sup>1</sup> Proc. Ac. Nat. Sci. Philad. vol. viii. p. 72 (1856, vol. dated 1857).

<sup>2</sup> Ibid. for 1858, p. 215 (1859).

carina. Teeth (fig. 50) simpler than in *Iguanodon*, with lozenge-shaped crowns, and the inferior surface of the root of each tooth bearing a groove for the reception of the summit of the tooth below.

*Hadrosaurus* is identified with *Trachodon* by Leidy in the 'Proc. Ac. Nat. Sci. Philad.' for 1868, p. 199; the type tooth of the latter being figured by him in the 'Trans. Amer. Phil. Soc.' vol. xi. pt. 2, pl. x. figs. 1-6 (1859).

### **Trachodon foulki**, Leidy<sup>1</sup>.

Syn. *Hadrosaurus foulki*, Leidy<sup>2</sup>.

The distinction from *T. mirabilis* of the Judith-River beds is not very apparent. Estimated length 28 feet.

Hab. North America.

R. 1007. Transverse section of a tooth; from the Upper Cretaceous of Huddersfield, New Jersey, U.S.A. The dentition is figured by Leidy in his 'Cretaceous Reptilia of the United States' (Smiths. Contrib. Knowl. 1864), pl. xiii., from which fig. 50 is copied.

Presented by Sir R. Owen, K.C.B., 1884.

### **Trachodon cantabrigiensis**, Lydekker<sup>3</sup>.

Nearly of the dimensions of *T. foulki*, but with the crowns of the teeth relatively broader.

Hab. Europe (England).

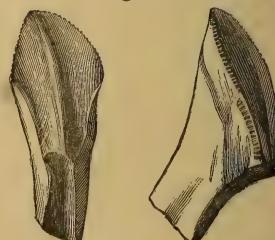
R. 496. A tooth, wanting the base of (Fig.) the root; from the Cambridge Greensand. The type specimen (woodcut, fig. 51); figured by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), suppl. ii. pl. vii. figs. 16, 17, as *Iguanodon man-*

Fig. 50.



*Trachodon foulki*.—Tooth; from the Upper Cretaceous of New Jersey, U.S.A. ¼.

Fig. 51.



*Trachodon cantabrigiensis*.—Lateral and profile views of a tooth; from the Cambridge Greensand. ¼.

<sup>1</sup> Proc. Ac. Nat. Sci. Philad. for 1858, p. 218 (1859).—*Hadrosaurus*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Quart. Journ. Geol. Soc. vol. xliv. p. 47 (1888).

*telli*; noticed by Leidy in the 'Cretaceous Reptiles of the United States' (Smiths. Contrib. Knowl. 1864), p. 86, and also by Seeley in the 'Quart. Journ. Geol. Soc.' vol. xxxv. p. 591, as resembling *Trachodon* (*Hadrosaurus*), and referred to that genus by the writer in vol. xliv. p. 47 of the latter journal.

*Presented by Sir R. Owen, K.C.B., 1884.*

*The following specimens from the Cambridge Greensand are provisionally referred to this species.*

- 33884.** An imperfect proximal phalangeal (? of the pes).

*Purchased, 1859.*

- 33885.** A second or third phalangeal.

*Same history.*

- 33886.** A terminal phalangeal of the third digit of the pes. Closely resembles the corresponding bone of *Iguanodon*.

*Same history.*

- 33887.** A smaller terminal phalangeal of similar type.

*Same history.*

REMAINS OF WEALDEN DINOSAURS OF WHICH THE AFFINITIES  
ARE UNCERTAIN.

- 28649.** The centrum and base of the arch of a cervical vertebra belonging to a form agreeing approximately in size with *Iguanodon mantelli*; from the Isle of Wight. The centrum is longer than in typical cervicals of *Iguanodon*.

*Mantell Collection. Purchased, 1853.*

- 28519.** A centrum of similar type; from Cuckfield. *Same history.*

- R. 604 e.** Four associated imperfect dorsal vertebrae of a much smaller form; from the Wadhurst Clay of Hastings. The centrum has subcircular faces; there is a rib-facet on the arch, and the neural canal is somewhat narrow. These specimens may perhaps belong to the *Scelidosauridæ*.

*Dawson Collection. Purchased, 1884.*

- R. 148.** The centra of two ankylosed sacral vertebrae of a very large form; from the Isle of Wight. These vertebrae are

more flattened inferiorly than in the sacrum referred to *Iguanodon bernissartensis*. It is difficult to think to what form they can belong, as they appear totally unlike the sacrals of the *Atlantosauridae*.

*Fox Collection. Purchased, 1882.*

**R. 148 a.** The centrum of a similar sacral vertebra; from the Isle of Wight. *Same history.*

**R. 148 b.** The centrum of a similar vertebra; from the Isle of Wight. *Same history.*

**R. 148 c, d.** Two smaller sacral vertebrae, of similar type; from the Isle of Wight. *Same history.*

**R. 144.** A sacrum with five imperfect vertebræ, agreeing approximately in size with *Iguanodon mantelli*; from the Isle of Wight. *Fox Collection.*

**41975.** A metapodial of a small form; from the Kimeridge Clay of Weymouth. *Purchased, 1870.*

**46784.** A calcaneum belonging to a large form; from the Isle of Wight. This bone is much shorter than the calcaneum of *Iguanodon mantelli*, and may be referable to the Sauro-poda. *Mantell Collection. Purchased, 1853.*

**R. 722.** Cast of the impression of a portion of the integument of a large Dinosaur. The original was obtained near Hastings, and is in the collection of Mr. S. H. Beckles; it is said to be associated with the humerus No. 28701, mentioned on p. 142. *Made in the Museum, 1885.*

**2390.** A small scale-like bone in a slab of sandstone; from Cuck-(*Fig.*) field. Figured by Mantell in his 'Geology of the South-east of England,' pl. iii. fig. 4, and provisionally regarded as the sternum of a young *Iguanodon*. There is no proof that it is really Dinosaurian.

*Mantell Collection. Purchased, 1838.*

## ORDINAL POSITION UNCERTAIN

The affinities of the two following genera must, for the present, remain undecided. They were regarded by their founder as presenting Lacertilian affinities, but their teeth are more like those of Dinosaurians.

Genus **NUTHETES**, Owen<sup>1</sup>.

Teeth like those of *Megalosaurus*, but, according to Owen, not implanted in distinct alveoli, and partly ankylosed to the sides of the jaw. The serrations disappear by wearing.

**Nuthetes destructor**, Owen<sup>2</sup>.

The type species. Equal in size to the larger existing species of *Varanus*.

*Hab.* Europe (England).

*The following specimens were obtained from the Middle Purbeck (Upper Jurassic) of Durdlestone Bay, Swanage, Dorsetshire, and belong to the Beckles Collection. Purchased, 1876.*

**48207.** Split fragment of rock, showing part of dentary with teeth.  
*(Fig.)* Figured by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), suppl. ix. pl. ii. figs. 13–14 (1879).

**48208.** Twelve teeth in matrix. Five are figured by Owen, *op. cit.* (*Fig.*) fig. 15.

**48247.** Fragments of rock containing conical pustulate bodies, regarded by Owen as dermal bones of this genus. Two are figured by Owen, *op. cit.* figs. 18–21.

Genus **ECHINODON**, Owen<sup>3</sup>.

Teeth implanted in imperfect alveoli; lateral ones with flattened diamond-shaped crowns, having serrations on the fore-and-aft edges of the upper half, and presenting a great resemblance to those of *Scelidosaurus*; anterior ones in upper jaw elongated.

**Echinodon becklesi**, Owen<sup>4</sup>.

The type species. About the size of many existing species of the Lacertilian genus *Eumeceis*.

*Hab.* Europe (England).

<sup>1</sup> Quart. Journ. Geol. Soc., vol. x. p. 120 (1854).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Wealden and Purbeck Reptilia (Mon. Pal. Soc.), pt. v. p. 35 (1861)

<sup>4</sup> *Loc. cit.*

The following specimens were obtained from the Middle Purbeck of Durdlestone Bay, Swanage, Dorsetshire, and belong to the Beckles Collection. Purchased, 1876. They include the types.

**48209-12.** Four fragments of the maxilla. Figured by Owen in his (*Fig.*) 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. v. pl. viii. figs. 1-4 (1861).

**48213.** Portion of the dentary bone. Figured, *op. cit.* fig. 5. (*Fig.*)

**48214.** The imperfect right dentary, with the crowns of the teeth (*Fig.*) broken off. Figured, *op. cit.* figs. 6-8.

**48215.** The two imperfect dentary bones. The right is figured (*Fig.*) (reversed), *op. cit.* fig. 9.

### STREPTOSTYLYC BRANCH.

The four orders included (after Baur<sup>1</sup>) in this branch may be collectively characterized as follows:—

Dentition usually acrodont or pleurodont, and in the adult the teeth ankylosed to the bone, but the teeth may be implanted in a groove without ankylosis; teeth not unfrequently present on the palatine and pterygoid, and more rarely on the vomer<sup>2</sup>. Frequently a parietal foramen; superior temporal arcade generally present, inferior present or absent; quadrate movably or immovably articulated by its proximal extremity; a columella (epipterygoid) generally present. Limbs absent in some cases. Precoracoid, when present, ankylosed to coracoid (fig. 52). A T-shaped inter-clavicle and clavicles present in those terrestrial forms which have limbs, except the Rhiptoglossa. Generally all, or nearly all, the dorsal ribs articulating by single heads; dorsal vertebræ either with short or rudimental transverse processes, which (with the possible exception of the Proterosauria) are never placed entirely on the arch, or (Ichthyopterygia) with a pair of facets on the centrum; with one exception<sup>3</sup>, not more than two vertebræ in sacrum. Abdominal ribs present or absent. Humerus generally with entepicondylar foramen. In terrestrial pentedactylate forms the number of the phalangeals is 2, 3, 4, 5, 3 in the manus, and 2, 3, 4, 5, 4 in the pes. There is never a lateral vacuity in the mandible.

<sup>1</sup> Biol. Centralblatt, vol. vii. p. 486 (1887). The Ichthyopterygia will come in Part II. of the present work.

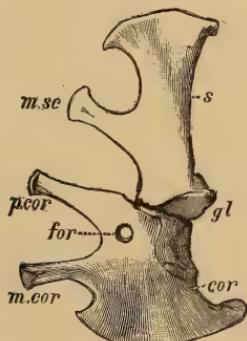
<sup>2</sup> Among recent forms in some *Anguidæ* and the young of *Sphenodon*.

<sup>3</sup> *Proterosaurus linki*, Seeley, Phil. Trans., 1887, p. 201.\*

## Order SQUAMATA.

Body lacertiform or anguiform, generally covered with scales, which may be underlain by bony scutes. Limbs, when present, adapted for walking or swimming. Proximal end of quadrate more or less movably articulated to cranium; lower temporal arcade wanting; postorbital usually united to postfrontal; palate more or less open; and premaxillæ frequently united. Vertebræ generally

Fig. 52.



*Iguana tuberculata*.—Left lateral aspect of the cartilage-bones of the pectoral girdle.  $\frac{1}{2}$ .  $s$ , scapula;  $m.sc$ , mesoscapula;  $gl$ , glenoid cavity;  $cor$ , coracoid;  $pcor$ , precoracoid;  $m.cor$ , mesocoracoid;  $for$ , foramen.

procœlous; with neurocentral suture obliterated; with or without zygosphenes; and no intercentra. Ribs without uncinate processes: and no true abdominal ribs<sup>1</sup>. But one centrale in the carpus; and the precoracoid (fig. 52) often well marked. Includes the orders Ophidia, Pythonomorpha, and Lacertilia of most writers.

## Suborder OPHIDIA.

Body greatly elongated. Alisphenoidal region fully ossified; no temporal arcade, parietal foramen, or columella; quadrate and palato-maxillary region loosely articulated to skull; premaxillæ more or less aborted; mandibular rami united by ligament. Vertebræ with zygosphenes, divisible only into trunk and caudal series; no sacrum; no chevrons. No sternum, pectoral girdle or pectoral limb, and only occasionally traces of pelvic girdle and limb. No dermal scutes.

<sup>1</sup> Ossifications in the abdominal parietes occur among the Lacertilia in the *Anelytropidæ* and also in the *Rhiptoglossa*.

Section COLUBRIFORMES<sup>1</sup>.

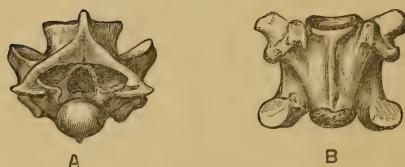
## Family COLUBRIDÆ.

Genus PTYAS, Fitzinger<sup>2</sup>.Syn. *Coryphodon*, Duméril & Bibron<sup>3</sup>.*Ptyas mucosus* (Linn.<sup>4</sup>).Syn. *Coluber mucosus*, Linn.<sup>5</sup>*Coryphodon blumenbachi*, Duméril & Bibron<sup>6</sup>.*Hab.* India.

**R. 737.** A trunk vertebra, provisionally referred to this form; from the Pleistocene of the Billa-Surgam caves, Karnul district, Madras. A similar specimen (fig. 53) is described and figured by the writer in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. iv. p. 56, fig. 13.

*Presented by the Director of the Geological Survey of India, 1886.*

Fig. 53.



*Ptyas mucosus* (?).—Posterior (A) and hæmal (B) aspects of a trunk vertebra; from the Pleistocene of Madras.  $\frac{1}{4}$ . (From the 'Palæontologia Indica'.)

Genus PILEMOPHIS, Rochebrune<sup>7</sup>.

Allied to *Tropidonotus*, but distinguished by the more elongated costal processes and the axe-shaped neural spine. There is a small bourelet behind the zygosphene. The right to generic distinction may be doubtful.

<sup>1</sup> The palæontological characters of the Ophidia being not yet worked out, in many instances no diagnosis of the groups is given.

<sup>2</sup> Syst. Reptilium, p. 26 (1843).

<sup>3</sup> Erpétologie Générale, vol. vii. pt. 1, p. 180 (1854).—Preoccupied.

<sup>4</sup> Syst. Nat. ed. 12, vol. i. p. 388 (1766).—*Coluber*.

<sup>5</sup> Loc. cit.

<sup>6</sup> Op. cit. p. 184.

<sup>7</sup> Nouv. Archiv. d. Muséum, sér. 2, vol. iii. p. 282 (1880).—Amended from *Pylmophis*.

**Pileomophis sansaniensis** (Lartet<sup>1</sup>).

Syn. *Coluber sansaniensis*, Lartet<sup>2</sup>.

The type species.

*Hab.* Europe (France).

33275. Several vertebræ and portions of ribs, of which at least some belong to this species; from the Middle Miocene of Sansan (Gers), France. *Presented by M. E. Lartet, 1857.*

Genus **ELAPHIS**, Duméril & Bibron<sup>3</sup>.

The vertebræ have broad laminæ to the arches, with large zygo-sphenes, oblique costal articulations, and the neural spines tall and obliquely truncated posteriorly.

**Elaphis atavus** (Meyer<sup>4</sup>).

Syn. *Tropidonotus atavus*, Meyer<sup>5</sup>.

*Coluber papyraceus*, Troschel<sup>6</sup>.

Referred to this genus by Rochebrune in the 'Nouv. Archiv. d. Muséum,' sér. 2, vol. iii. p. 291. The upper part of the costal articulation is not acute, and the height of the neural spine is moderate.

*Hab.* Europe (Germany).

*The following specimens are from the Lower Miocene (Upper Oligocene) of Roth, near Bonn; same may, perhaps, be referable to E. elongatus (Troschel<sup>7</sup>).*

36377. Slab of lignite, showing a considerable portion of the skeleton. (*Fig.*) Figured by von Meyer in the 'Palæontographica,' vol. vii. pl. xxv. fig. 1. *Purchased, 1862.*

36378. Counterpart of the hinder portion of the preceding specimen. *Same history.*

33065. Slab of lignite, with portion of the skeleton. *Purchased, 1858.*

<sup>1</sup> 'Notice sur la Colline du Sansan,' p. 40 (1851).—*Coluber.*

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Erpétologie Générale*, vol. vii. pt. 1, p. 241 (1854).

<sup>4</sup> *Palæontographica*, vol. vii. p. 232 (1860).—*Tropidonotus.*

<sup>5</sup> *Loc. cit.* <sup>6</sup> In Fischer's Diss. Zool. p. 26, *teste* Rochebrune.

<sup>7</sup> See Rochebrune, *op. cit.*

- 41088.** A slab and counterpart of lignite, showing a considerable portion of the skeleton of what may be a small individual of this species. *Purchased*, 1868.

**Elaphis oweni** (Meyer<sup>1</sup>).

Syn. *Coluber oweni*, Meyer<sup>2</sup>.

According to Rochebrune, distinguished from the preceding by the acuteness of the upper part of the costal articulations of the vertebræ, and their taller neural spines.

*Hab.* Europe (Switzerland).

- 42734.** Slab of stone containing a small part of the vertebral column and the impression of a larger portion; from the Upper Miocene of Œningen, Switzerland. Closely resembles the type specimen figured by von Meyer.

*Van Breda Collection. Purchased*, 1871.

Genus **PERIOPS**, Wagler<sup>3</sup>.

**Periops gervaisi** (Pomel<sup>4</sup>).

Syn. *Coluber gervaisi*, Pomel<sup>5</sup>.

Referred to this genus by Rochebrune in the 'Nouv. Archiv. d. Muséum,' sér. 2, vol. iii. p. 283, by whom it is stated to be closely allied to the existing *P. parallelus* of Egypt.

*Hab.* Europe (France).

- 26660.** Numerous vertebræ; from the Pleistocene breccia of Coudes, near Issoire (Puy-de-Dôme), France.

*Pomel Collection. Purchased*, 1851.

Family PYTHONIDÆ.

Large land-snakes, with teeth in the premaxillæ. Vertebræ with neural spines of moderate height, and a backwardly projecting process at the summit. Costal articulations placed high up on the centrum, and the zygapophyses widely expanded and reaching far

<sup>1</sup> Fauna der Vorwelt—Säugeth. etc. aus d. Mol. von Œningen, p. 48 (1845).

—*Coluber*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Syst. Amphib. p. 189 (1830).

<sup>4</sup> Catalogue Méthodique, p. 128 (1853).—*Coluber*.

<sup>5</sup> *Loc. cit.*

beyond the lateral borders of the costal articulations. Hæmal carina on centrum never terminating in anterior and posterior processes.

Genus **PYTHON**, Daudin<sup>1</sup>.

The type genus. Centra of vertebræ short and wide, with broad posterior ball, and hæmal carina in posterior trunk-region not very prominent.

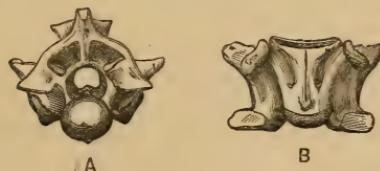
**Python molurus** (Linn.<sup>2</sup>).

Syn. *Coluber molurus*, Linn.<sup>3</sup>

The type species. Attains a length of about 30 feet.

Hab. India and China.

Fig. 54.



*Python molurus*.—Posterior (A) and hæmal (B) aspects of a trunk vertebra; from the Pleistocene of Madras.  $\frac{1}{2}$ . (From the 'Palæontologia Indica'.)

R. 738. A trunk vertebra; from the Pleistocene cave-deposits of the Karnul district, Madras. A similar specimen (fig. 54) is described and figured by the writer in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. 10, vol. iv. p. 55, fig. 12. Both indicate small individuals.

*Presented by the Director of the Geological Survey of India, 1886.*

R. 614. Four imperfect vertebræ, provisionally referred to this species; from the Pliocene Siwaliks of the Punjab, India. Similar specimens are described by the writer, *op. cit.* vol. iii. p. 237, pl. xxxv. *Same history.*

Genus **PALERÝX**, Owen<sup>4</sup>.

Syn. *Palæopython*, Rochebrune<sup>5</sup>.

The centra of the middle and posterior trunk vertebræ differ from those of *Python* by the more strongly marked hæmal carina; but in

<sup>1</sup> Hist. Nat. Rept. vol. v. p. 226 (about 1802).

<sup>2</sup> Syst. Nat. ed. 12, vol. i. p. 225 (1766).—*Coluber*.

<sup>3</sup> Loc. cit.

<sup>4</sup> 'Reptilia of London Clay' (Mon. Pal. Soc.), pt. iii. p. 67 (1850).

<sup>5</sup> Nouv. Archiv. d. Muséum, sér. 2, vol. iii. p. 276 (1880).

all other respects the resemblance between the vertebræ of the two genera is extremely close.

The so-called *Palaeopython* is founded upon specimens which cannot be distinguished from the vertebræ of the type species of *Paleryx*; see 'Geol. Mag.' dec. 3, vol. v. p. 112 (1888).

**Paleryx rhombifer**, Owen<sup>1</sup>.

Syn. (?) *Python cadurcensis*, Filhol<sup>2</sup>.

*Palaeopython cadurcensis*, Rochebrune<sup>3</sup>.

The type species. Typically four or five feet in length, but, if *Python cadurcensis* be identical, reaching to a considerably larger size. The vertebra figured by Rochebrune as *Palaeopython cadurcensis* cannot be distinguished from the type vertebra of the present species, and is probably identical with *Python cadurcensis*; but if not, must be taken as the type of *Palaeopython*.

*Hab.* Europe (England and France).

**25259.** An anterior trunk vertebra; from the Upper Eocene (Lower (Fig.) Oligocene) of Hordwell, Hampshire. The type specimen; figured by Owen in his 'Reptilia of the London Clay,' pt. 3, pl. xiii. figs. 29–32. Noticed in the 'Geol. Mag.' loc. cit. *Presented by S. V. Wood, Esq.*, 1850.

**32837.** A series of vertebræ, of which at least a considerable number belong to the present species; from Hordwell.

*Hastings Collection. Purchased*, 1855.

**32837 a.** Nine associated trunk vertebræ belonging to a small individual of the present or to a closely allied form; from Hordwell. *Same history.*

**32839.** A trunk vertebra in matrix; from Hordwell. *Same history.*

**R. 428.** An anterior trunk vertebra; from the Phosphorites (Upper Eocene=Lower Oligocene) of Caylux (Tarn-et-Garonne), France. *Purchased*, 1885.

**R. 428 a.** Three trunk vertebræ; from the Phosphorites of Caylux. (Fig.) These vertebræ (fig. 55) cannot be specifically distinguished from the type (No. 25259), and also agree exactly with the one figured by Rochebrune in the 'Nouv. Archiv. d. Muséum,' sér. 2, vol. iii. pl. xix. figs. 4, a, b, c, under the name of *Palaeopython cadurcensis*. Noticed in the 'Geol. Mag.' loc. cit. *Same history.*

<sup>1</sup> 'Reptilia of London Clay' (Mon. Pal. Soc.), pt. iii. p. 67 (1850).

<sup>2</sup> Ann. Sci. Géol. vol. viii. p. 270 (1877).

<sup>3</sup> Nouv. Archiv. d. Muséum, sér. 2, vol. iii. p. 276 (1880).

R. 428 b. Numerous vertebræ, of which at least the majority belong to the present form ; from Caylux. *Purchased*, 1885.

26665. A trunk vertebra not improbably belonging to this species ; from the Lower Miocene (Upper Oligocene) of St. Gérand-le-Puy (Allier), France.

*Pomel Collection. Purchased*, 1851.

Fig. 55.



*Paleryx rhombifer*.—Hæmal, anterior, and left lateral view of a trunk vertebra from the Phosphorites of Caylux. 1. c, costal articulation ; zs, zygosphene.

\*\* **Paleryx filholi** (Rochebrune<sup>1</sup>).

Syn. *Palæopython filholi*, Rochebrune<sup>2</sup>.

Probably merely a large form of the next species, with which the vertebræ agree precisely in structure.

*Hab.* Europe (France).

R. 428 c. Three trunk vertebræ ; from the Phosphorites (Upper Eocene = Lower Oligocene) of Caylux (Tarn-et-Garonne), France. Precisely resemble the type specimen figured by Rochebrune in the ‘Nouv. Archiv. d. Muséum, sér. 2, vol. iii. pl. xii. fig. 5, a, b, c. Noticed by the writer in the ‘Geol. Mag.’ dec. 3, vol. v. p. 112. *Purchased*, 1885.

**Paleryx depressus**, Owen<sup>3</sup>.

Typically of small size. The vertebræ distinguished from those of the type species by the depressed arch, and the great width and stoutness of the hæmal carina, which expands anteriorly.

*Hab.* Europe (England and France).

25261. Three trunk vertebræ ; from the Upper Eocene (Lower (Fig.) Oligocene) of Hordwell, Hampshire. The type specimens ; one is figured by Owen in his ‘London Clay Reptilia,’ pt. iii. pl. xiii. figs. 37, 38. Noticed by the writer in the ‘Geol. Mag.’ dec. 3, vol. v. p. 112.

*Presented by S. V. Wood, Esq.*, 1850.

<sup>1</sup> *Nouv. Archiv. d. Muséum*, sér. 2, vol. iii. p. 277 (1880).—*Palæopython*.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Reptilia of the London Clay*, pt. iii. p. 67 (1850).

**32838.** A number of vertebræ of which at least a large proportion belong to this species ; from Hordwell.

*Hastings Collection. Purchased, 1855.*

**32838 a.** Two trunk vertebræ in connection ; from Hordwell.

*Same history.*

**32838 b.** Several vertebræ provisionally referred to this form ; from Hordwell.

*Same history.*

**R. 428 d.** Several trunk vertebræ ; from the Phosphorites (Upper Eocene=Lower Oligocene) of Caylux (Tarn-et-Garonne), France. These specimens cannot be distinguished from the types of the present form, and also present all the characters of the larger vertebræ of the so-called *P. filholi*. Noticed by the writer, *op. cit.* *Purchased, 1885.*

**26665 a.** Four trunk vertebræ probably belonging either to the present or a closely allied species ; from the Lower Miocene (Upper Oligocene) of St. Gérand-le-Puy (Allier), France. *Pomel Collection. Purchased, 1851.*

#### GENUS *non det.*

The following specimens, although of larger size, agree closely with the vertebræ of *Narboa schlegeli*, and probably belong either to that genus or *Liasis* ; but there is no skeleton of the latter in the Museum for comparison. The vertebræ of *Morelia* are different. The vertebral centra are much elongated and have a prominent hæmal carina ; in many respects these vertebræ are very like the one referred to *Ptyas*.

*Hab. Australia.*

**42682.** Six vertebræ of a large snake ; from the Pleistocene of the caves of the Wellington Valley, New South Wales.

*Presented by the Trustees of the Australian Museum, 1876.*

#### Family PALÆOPHIDÆ.

Large snakes of probably marine habits. Vertebræ with very tall neural spines, which have no backwardly directed process at the summit ; costal articulations placed low down on the centrum, and the zygapophyses not expanded and scarcely reaching beyond the lateral borders of the costal articulations. Hæmal carina on centrum not unfrequently terminating in anterior and posterior processes.

The type genus was referred by Owen to the *Hydrophidæ*, but is regarded by Rochebrune<sup>1</sup> (after Cope and Marsh) as more nearly allied to the Pythons, and is included by him in the *Pythonidæ*. The great difference in the structure of the vertebræ, together with the probably marine habits (as deduced from the strata in which the remains occur), and the occurrence of an allied or identical genus (*Titanophis*, Marsh<sup>2</sup>) in the Eocene of N. America (in which country Pythons are unknown), renders it, however, tolerably certain that we have to do with a distinct family, which is only provisionally placed here. The question is more fully discussed by the writer in the 'Geol. Mag.' dec. 3, vol. v. p. 112 (1888).

Genus **PALÆOPHIS**, Owen<sup>3</sup>.

The type genus. Centrum of vertebræ elongated and compressed, with a distinct hæmal carina in the posterior trunk-region.

**Palæophis toliapicus**, Owen<sup>4</sup>.

The type species. Typically from ten to twelve feet in length. Vertebræ long and narrow, with sessile costal tubercles (transverse processes), and the hæmal carina without well-marked terminal processes. The latter character does not appear constant in all specimens.

*Hab.* Europe (England).

*The following specimens are from the London Clay  
(Lower Eocene) of Sheppey.*

39453. Fragment of a nodule containing the hinder part of the (Fig.) vertebral column. Figured by Owen in his 'London Clay Reptilia' (Mon. Pal. Soc.), pt. iii. pl. xvi. figs. 1-3.  
*Bowerbank Collection. Purchased, 1865.*

39447. A nodule with a considerable part of the vertebral column. (Fig.) One of the types; figured by Owen in the 'Trans. Geol. Soc.' ser. 2, vol. vi. pl. xxii. figs. 1-2. *Same history.*

38998. Nodule showing six vertebrae. One of the types; figured (Fig.) by Owen, *op. cit.* pl. xxii. fig. 3. *Same history.*

<sup>1</sup> *Nouv. Archiv. d. Muséum*, sér. 2, vol. iii. pp. 274-276 (1880).

<sup>2</sup> Proc. Amer. Assoc. for 1877, p. 223 (1878); to replace *Dinophis*. Cope, Proc. Ac. Nat. Sci. Philad. 1868, p. 234, and Trans. Amer. Phil. Soc. vol. xiv. p. 227 (1870), identifies these forms with *Palæophis*.

<sup>3</sup> Trans. Geol. Soc. ser. 2, vol. vi. pt. 1, p. 209 (1841).

<sup>4</sup> *Loc. cit.*

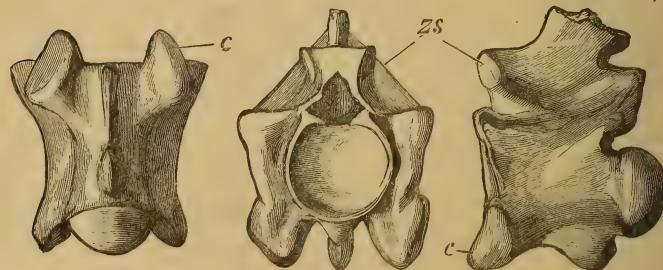
- R. 40. A nodule with a large part of the vertebral column.  
*Shrubsole Collection. Purchased, 1880.*
35690. Nodule with vertebræ and fragment of ribs.  
*Purchased, 1859.*
39772. Nodule with vertebræ and ribs.  
*Bowerbank Collection.*
32836. Nodule with vertebræ.  
*Dixon Collection. Purchased, 1851*
24874. Nodule with vertebræ.  
*Purchased, 1850.*
30535. Nodule with vertebræ.  
*Purchased. About 1854.*
30536. An imperfect vertebra.  
*Same history.*
- 30536 a. Several imperfect vertebræ.  
*Same history.*
38859. An imperfect vertebra.  
*Bowerbank Collection.*

***Palæophis typhæus*, Owen<sup>1</sup>.**

Including *Palæophis porcatus*, Owen<sup>2</sup>.

Larger than the preceding ; attaining a length estimated at twenty feet. Vertebræ generally broader, with the costal tubercles pedunculate, and the hæmal carina in the posterior region terminating in antero-posterior processes.

Fig. 56.



*Palæophis typhæus*.—Hæmal, anterior, and left lateral views of a trunk vertebra, wanting the greater part of the neural spine ; (?) from the Lower Eocene of Sheppéy. †. zs, zygosphene ; c, costal articulation.

The characters on which *P. porcatus* was founded do not appear of specific value.

*Hab.* Europe (England and Belgium).

<sup>1</sup> London Clay Reptilia (Mon. Pal. Soc.), pt. iii. p. 56 (1850).

<sup>2</sup> *Ibid.* p. 61

*The following specimens, unless the contrary is stated, are from the Middle Eocene of Bracklesham, Sussex.*

**33207.** An imperfect vertebra. One of the types ; figured by Owen (*Fig.*) in his ‘*Reptilia of the London Clay*,’ pt. iii. pl. xiv. fig. 1. *Dixon Collection. Purchased, 1851.*

**25600.** A slightly imperfect vertebra. One of the types ; figured, (*Fig.*) *op. cit. pl. xiv. fig. 7.* *Same history.*

**33210.** A small vertebra. One of the types ; figured, *op. cit. (Fig.) pl. xiv. fig. 16.* *Same history.*

**33209.** A small anterior vertebra. One of the types ; figured, *op. (Fig.) cit. pl. xiv. fig. 26.* *Same history.*

**25603.** Several vertebrae. *Same history.*

**28431.** Several vertebrae. *Purchased, 1853.*

**39247.** A vertebra. *Purchased, 1865.*

**40221-3.** Several vertebrae. *Purchased, 1867.*

**28093.** Eight vertebrae. *Presented by F. E. Edwards, Esq., 1856.*

**33206.** A small vertebra. *Dixon Collection.*

**38999.** Several vertebrae. *Bowerbank Collection. Purchased, 1865.*

**37316.** Fragment of rock containing four imperfect vertebrae. *Purchased, 1863.*

**25603.** Three imperfect vertebrae cemented together by matrix. *Dixon Collection.*

**R. 42.** Three vertebrae apparently belonging to this species ; said to be from the London Clay of Sheppey. One of these specimens is represented in fig. 56.

*Shrubsole Collection. Purchased, 1880.*

**R. 1023.** An associated series of 44 imperfect vertebrae. *Presented by P. E. Coombe, Esq., 1888.*

**R. 873.** An imperfect trunk vertebra ; from the Middle (?) Eocene of Brussels, Belgium.

*Presented by Sir R. Owen, K.C.B., 1884.*

*The following specimens are the types of P. porcatus.*

33203. A vertebra ; figured by Owen, *op. cit.* pl. xiv. figs. 18, 19.  
 (Fig.) The alleged specific characters are the ridge connecting  
 the two zygapophyses of each side, and the wider neural  
 arch, but very similar features occur in one of No. 25603.

*Dixon Collection.*

- 33203 a. A similar vertebra. Figured by Owen, *op. cit.* pl. xiv.  
 (Fig.) figs. 20, 21. *Same history.*

25602. A much smaller vertebra. Figured by Owen, *op. cit.*  
 (Fig.). pl. xiv. fig. 13. *Same history.*

### **Palaeophis, sp.**

The following specimens may indicate a form distinct from the preceding.

*All are from the Middle Eocene of Bracklesham, Sussex.*

25601. A vertebra ; figured by Owen in his 'London Clay Reptilia,'  
 (Fig.) pl. xiv. figs. 10-12. *Dixon Collection. Purchased, 1851.*

- 25603 a. A vertebra. *Same history.*

25604. A vertebra. Figured, *op. cit.* pl. xiv. figs. 5-6.  
 (Fig.) *Same history.*

25605. A vertebra. Figured, *op. cit.* pl. xiv. fig. 32.  
 (Fig.) *Same history.*

25607. Numerous imperfect vertebræ and ribs in matrix. Figured,  
 (Fig.) *op. cit.* pl. xvi. fig. 4. *Same history.*

33199. Fragment of rock containing numerous imperfect vertebræ.  
*Same history.*

40224. A vertebra. *Purchased, 1867.*

### *Incertæ sedis.*

42733. A slab of limestone containing the nearly entire skeleton  
 of a small Snake ; from the Upper Miocene of Eningen,  
 Switzerland. This specimen may belong to the same  
 species as the Snake figured by Meyer in his 'Fauna der  
 Vorwelt—Rept. aus. d. Molasse,' pl. vi. fig. 2, under the  
 name of *Coluber kargi*, but referred by Rochebrune, in the  
 'Nouv. Archiv. d. Muséum,' sér. 2, vol. iii. p. 292, to the  
 Viperine genus *Bitis* (*Echidna*).

*Van Breda Collection. Purchased, 1871.*

### Suborder PYTHONOMORPHA.

Body much elongated. Skull of a Varanoid type, with united nasals and premaxillæ, loosely articulated quadrates, teeth on the pterygoids, and frequently sclerotic ossifications<sup>1</sup>. Teeth large, sharp, and ankylosed by expanded bases to the summits of the jaws. Vertebræ with or without zygosphenes, and those of the cervical region in some cases exceeding nine. There is no sternum or clavicle, and usually no interclavicle<sup>2</sup> or sacrum. Limbs in the form of paddles, with the terminal phalangeals devoid of claws, and no foramen to the humerus; pelvis imperfectly developed. No dermal scutes, at least in most forms<sup>3</sup>.

### Family MOSASAURIDÆ.

With the exception of *Plioplatecarpus*, Dollo<sup>4</sup>, all the forms may be included in this family.

#### Genus MOSASAURUS, Conybeare<sup>5</sup>.

Premaxillæ not produced into an edentulous rostrum; teeth smooth, curved, more or less faceted and slightly compressed; pterygoids not uniting in the middle line<sup>6</sup>. Vertebræ without zygosphenes; centra short; chevrons in the middle and posterior caudal region ankylosed to vertebræ.

#### *Mosasaurus camperi*, Meyer<sup>7</sup>.

Syn. *Mosasaurus belgicus*, Holl<sup>8</sup>.

*Mosasaurus hofmanni*, auctorum<sup>9</sup>.

*Mosasaurus giganteus*, Cope<sup>10</sup>.

<sup>1</sup> Dollo suggests that these are absent in *Hainosaurus*; see Bull. Mus. R. Hist. Nat. Belg. vol. iv. p. 31 (1885).

<sup>2</sup> Present in *Plioplatecarpus*.

<sup>3</sup> Marsh has referred scutes to some of the American forms; but the association is doubted by Cope.

<sup>4</sup> See Ann. Soc. Sci. Bruxelles, 1885, pp. 334, 335.

<sup>5</sup> In Cuvier's 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, p. 338 (1824).

<sup>6</sup> United in *Pterycollasaurus*, Dollo, Bull. Mus. R. Hist. Nat. Belg. vol. i. p. 61 (1882).

<sup>7</sup> 'Palæologica,' p. 113 (1832).

<sup>8</sup> 'Handbuch der Petrefactenkunde,' pt. i. p. 84 (1829). Inappropriate, as Maastricht is now in Holland.

<sup>9</sup> This name is quoted by Mantell in Trans. Geol. Soc. ser. 2, vol. iii. p. 207 (1829), where it is applied to Mosasauroid remains from the English Chalk.

<sup>10</sup> Trans. Amer. Phil. Soc. vol. xiv. p. 189 (1870); ex *Monitor giganteus* in Holl's 'Petrefactenkunde,' op. cit.

The type species. Total length of skull 1,200; estimated entire length 7,625 (25 feet); 14 or 15 lower teeth.

*Hab.* Europe (Holland<sup>1</sup>).

*The following specimens or their originals were obtained from the Upper Cretaceous of St. Peter's Mount, near Maastricht, Holland; and, unless it is stated to the contrary, belong to the Van Breda Collection. Purchased, 1871.*

- 11589.** Cast of the imperfect skull with several of the component bones separated, and two cervical vertebræ in the same block. The original was discovered previously to 1785, and may be regarded as the type. It is preserved in the Museum at Paris, and is figured by Cuvier in the 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, pl. xviii., and by Buckland in his 'Geology and Mineralogy' (Bridgewater Treatise), pl. xx. *Mantell Collection. Purchased 1838.*
- 42939.** A bone which is apparently the anterior extremity of the united premaxillæ of a small individual. Corresponds with the larger specimen figured by Dollo in the 'Bull. Mus. R. Hist. Nat. Belg.' vol. i. pl. iv.
- 42928.** Part of the roof of the cranium, embedded in matrix and seen from below.
- 42930.** Slab of matrix, showing the under surface of part of the superior process of the premaxillæ, and of the anterior extremities of the prefrontals. The bones are in their natural position, and are separated by the nares.
- 42935.** The conjoint basioccipital and basisphenoid.
- 42949.** The imperfect left quadrate. Figured by Owen in the (*Fig.*) 'Quart. Journ. Geol. Soc.' vol. xxxiii. pp. 691-2, figs. 9-12.
- 42975.** A much smaller specimen of an imperfect left quadrate.
- R. 1223.** A considerable portion of the left maxilla, showing three fully protruded teeth. *No history.*
- 42940.** Fragment of maxilla, with the alveolus of a young tooth and the broken bases of two others.
- 42936.** Part of the left maxilla, with the bases of two teeth, and two germ-teeth *in alveolo.*
- 42932.** Slab showing part of a pterygoid with two teeth.

<sup>1</sup> Schröder, Jahrb. k. preuss. geol. Landesanst. for 1884, p. 321, records this species from Sweden; but the evidence appears insufficient.

**R. 1224.** The dentary portion of the right ramus of the mandible.  
There are fifteen teeth. *Presented by Dr. Peter Camper, 1784.*

**42931.** The anterior portion of the right ramus of the mandible of a young individual, showing three fully protruded teeth, and others in their alveoli.

**42938.** Part of a small dentary bone with imperfect teeth, provisionally referred to a small individual of this species.

**42950-1.** Undetermined bones of the skull.

**42997 a.** The right splenial. *No history.*

**42939.** A fragment of a jaw perhaps referable to this species.

*Of the following some may be referable to Liodon.*

**42941.** A number of crowns of small teeth, of which some may be either the pterygoidal teeth of this form or may belong to *Liodon*.

**42941.** The crown of a very large tooth, probably from the hinder part of the mandible.

**42929.** Slab with six associated cervical vertebræ and an imperfect bone of the skull.

**R. 1225.** Slab containing a tooth, imperfect humerus, the centrum of a vertebra, portions of ribs, and metapodial bones.

*No history.*

**42933.** Slab showing several trunk vertebræ, a small imperfect quadrate, and the root of a tooth.

**42946.** A slightly imperfect cervical vertebra.

**42946 a.** A more imperfect cervical vertebra.

**42946 b.** The imperfect centrum of a small cervical vertebra.

**42946 c.** An imperfect cervical vertebra of still smaller size.

**42953.** The imperfect neural arch of a cervical or dorsal vertebra.

**42946 d.** An imperfect anterior dorsal vertebra.

**R. 1226.** An imperfect posterior trunk vertebra. Figured by Owen (*Fig.*) in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pl. viii. figs. 4, 5. *No history.*

**42946 e.** The imperfect centrum of a posterior trunk vertebra of a very large individual.

**42946 f.** The centrum of a posterior trunk vertebra.

- 42946 g.** The imperfect centrum of a posterior trunk vertebra.  
**42946 h.** The centrum of a posterior trunk vertebra.  
**42946 i.** The imperfect centrum of a smaller trunk vertebra.  
**42946 j, k.** Two similar but smaller centra.  
**42946 l.** Three imperfect posterior trunk vertebræ.  
**42934.** An anterior or middle caudal vertebra with the entire chevron attached.  
**42946 m.** The centrum of a similar vertebra.  
**42946 n.** The centra of two posterior caudal vertebræ.  
**42946 o.** Six imperfect posterior caudal vertebræ.  
**42944.** An imperfect posterior caudal vertebra.  
**11589 a.** Cast of a bone which is probably an ulna.

*Mantell Collection.*

- 42961.** A bone probably belonging to the carpus.  
**42943, 42945.** Two imperfect undetermined bones.

#### **Mosasaurus dekayi**, Bronn<sup>1</sup>.

The following specimen is provisionally referred to this species, but may belong to *M. maximus*, Cope<sup>2</sup>. The teeth are fully as large as those of *M. camperi*. The synonymy is given by Cope<sup>3</sup>.

*Hab.* North America.

- 11590.** Cast of a tooth. The original was obtained from the Upper Cretaceous of New Jersey, U. S. A., and is figured by Leidy in his 'Cretaceous Reptiles of the United States' (Smith. Contrib. Knowl.), pl. x. fig. 3.

*Mantell Collection. Purchased, 1838.*

#### Genus **LIODON**, Owen<sup>4</sup>.

Including:—*Nectoportheus*, Cope<sup>5</sup>; *Rhinosaurus*, Marsh<sup>6</sup>.

*Rhamphosaurus*, Cope<sup>7</sup>; *Tylosaurus*, Marsh<sup>8</sup>.

Assuming that the American forms are rightly referred to this

<sup>1</sup> 'Lethæa Geognostica,' 2nd ed. p. 760 (1837).

<sup>2</sup> Proc. Bost. Soc. Nat. Hist. vol. xii. p. 262 (1869).

<sup>3</sup> Trans. Amer. Phil. Soc. vol. xiv. p. 193 (1870).

<sup>4</sup> 'Odontography,' p. 261 (1840).—Amended.

<sup>5</sup> Proc. Ac. Nat. Sci. Philad. 1868, p. 181.

<sup>6</sup> Amer. Journ. ser. 3, vol. iii. p. 461 (1872).—Preoccupied.

<sup>7</sup> Proc. Ac. Nat. Sci. Philad. 1872, p. 141.—Preoccupied.

<sup>8</sup> *Op. cit.* vol. iv. p. 147 (1872).

genus, it will be characterized as follows:—Premaxillæ produced into an edentulous rostrum; teeth (fig. 57) nearly smooth, curved, and more or less compressed, and in the posterior part of the jaws with well-defined fore-and-aft carinæ, of which the posterior one may disappear towards the muzzle. Vertebræ short, without zygosphenes, and with weak zygapophyses; chevrons, at least in many cases, free. Humerus long and narrow.

It should be observed that all the Mosasauroid vertebræ from the English Chalk have the chevrons ankylosed to the centra; but it does not certainly follow that they are referable to *L. anceps*.

**Liodon anceps**, Owen<sup>1</sup>.

Syn. *Mosasaurus stenodon*, Charlesworth<sup>2</sup>.

(?) *Liodon lundgreni*, Schröder<sup>3</sup>.

The type species. Only known by fragments of jaws and detached teeth. The latter are much compressed, and indicate an animal much smaller than *Mosasaurus camperi*.

*Hab.* Europe (England, Germany, France, and (?) Sweden).

*The following specimens are from the Upper Chalk.*

**48939.** The crown of a tooth; from Norwich. *Purchased*, 1878.

**48940.** A similar specimen; from Norwich. *Same history*.

**R. 1227.** Cast of the crown of a tooth. The original is from Norwich, and is preserved in the Woodwardian Museum, Cambridge; it is somewhat smaller than No. 48939.

*Made in the Museum*, 1888.

**R. 1228.** Cast of the crown of a larger tooth. The original is from Norwich, and is in the Woodwardian Museum.

*Same history*.

**41639.** Fragment of the mandible, with the broken bases of (*Fig.*) two teeth; from Essex. One of the types. Figured by Owen in his 'Odontography,' pl. lxxii. fig. 12, and his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pl. ix A. figs. 3, 4, and also by Charlesworth in the 'London Geological Journal,' no. i. pls. iv., v., when it was less imperfect. This specimen is the type of *M. stenodon*.

*Toulmin-Smith Collection. Purchased*, 1869.

**41640.** One imperfect half of the siliceous cast of the pulp-cavity (*Fig.*) of a tooth, probably belonging to the same individual as

<sup>1</sup> 'Odontography,' p. 261 (1840).

<sup>2</sup> Charlesworth's 'London Geological Journal,' no. i. p. 23 (1846).

<sup>3</sup> *Jahrb. k. preuss. geol. Landesanst.* for 1884, p. 329 (1885).

the preceding specimen ; from Essex. Figured by Owen, *op. cit. pl. ix. fig. 2'*, and by Charlesworth, *op. cit.* In both cases a section of the tooth itself is also figured.

*Same history.*

**48943.** A tooth; from Norwich. Somewhat smaller than No. 48939.

*Purchased, 1878.*

**36598.** The crown of a tooth; from Norwich.

*Presented by J. Mills, Esq., 1862.*

**48940 b.** The crown of a tooth; from Norwich. *Purchased, 1878.*

**36556.** The crown of a tooth; from Norwich.

*Mantell Collection. Purchased, 1853.*

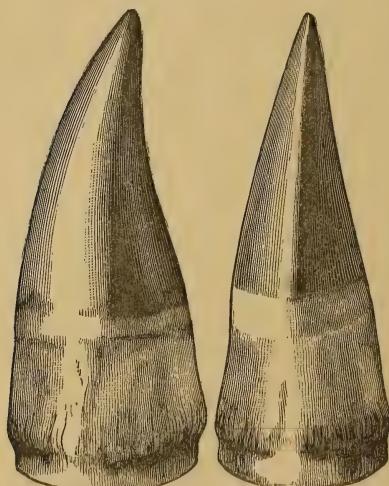
**48941 a.** A series of small teeth provisionally referred to this species; from Norwich. *Purchased, 1878.*

#### ***Liodon, sp.***

Perhaps identical with the preceding species.

*Hab.* Europe (Belgium).

Fig. 57.



*Liodon, sp.*—Lateral and profile views of a lower tooth; from the Upper Cretaceous of Maastricht. {.

**42937.** Part of the alveolar portion of the right ramus of the mandible; from the Upper Cretaceous of Maastricht, Netherlands. These teeth (fig. 57) are perfectly preserved, and

the hindmost resembles No. 48939 of *L. anceps*, while the first is less compressed, and has only an imperfect posterior carina, in which respect it agrees with Cope's description of the American forms.

*Van Breda Collection. Purchased, 1871.*

### **Liodon haumuriensis**, Hector<sup>1</sup>.

Imperfectly known. There are fifteen teeth in the upper jaw, occupying a total length of 26 inches; they are markedly compressed.

*Hab.* New Zealand.

*The following specimens are from the Cretaceous of Amuri Bluff, South Island; and were obtained by exchange with the Trustees of the Colonial Museum, Wellington, 1880.*

- R. 812. Fragments of skull.
- R. 813. Portions of mandible with teeth.
- R. 814. Imperfect vertebræ.
- R. 815. Two teeth (one imperfect) in matrix. These teeth agree with those figured by Hector in the 'Trans. N. Zealand Inst.' vol. vi. pl. xxx.; the entire one has no posterior carina, and belongs to the anterior part of the series.
- R. 815 a. Fragments of jaws.
- R. 816. Impression of vertebra.
- R. 817. Eight caudal vertebræ.
- R. 818. A vertebral centrum.
- R. 819. Part of skull.

### **Liodon perlatus**, Cope<sup>2</sup>.

Of large size, with the anterior trunk vertebræ much depressed, and the teeth but slightly compressed.

Apparently closely allied to *L. dyspelor*, Cope<sup>3</sup>, of New Mexico. Cope separates the present form from the imperfectly known *Liodon brumbyi* (Gibbes<sup>4</sup>) of Alabama; but as the trunk vertebræ of that

<sup>1</sup> Trans. N. Zealand Inst. vol. vi. p. 351 (1874).

<sup>2</sup> Proc. Amer. Phil. Soc. vol. xi. p. 497 (1870).

<sup>3</sup> See Rep. U. S. Geol. Surv. Terrs. vol. ii. pp. 167-177 (1872).

<sup>4</sup> Smiths. Contrib. Knowl. vol. ii. art. 5, p. 11 (1851).—*Amphirosteus*.

species are also of the same depressed type<sup>1</sup>, it does not appear certain that this is correct, in which case the latter specific name should be adopted.

The specimens here included under this head may perhaps be referable to more than a single species; the present species was founded upon caudal vertebrae.

*Hab.* North America (Alabama).

*The following specimens are from the Cretaceous of Alabama, and, unless the contrary is stated, were presented in 1859 by Prof. J. W. Malet.*

- 35615. Part of the left dentary, showing eight teeth, of which only one is entire. Agrees in relative proportions with the maxilla of *L. dyspelor* figured by Cope in the Rep. U. S. Geol. Surv. Terrs. vol. ii. pl. xxviii. fig. 1.
- 35616. Part of the right dentary, showing one entire and three broken teeth, belonging to the same individual.
- 35617. The nearly entire right pterygoid of the same individual. The teeth are wanting.
- 35618. The left surangular and portion of the angular of the same individual.
- 35619. A small imperfect tooth.
- 35620. The extremity of the conjoint premaxillæ and fragments of the anterior portion of the maxillæ of a small individual. The edentulous premaxillary rostrum is well shown.
- 35621-3. Fragments of jaws with teeth.
- 35624. An imperfect cervical vertebra.
- 40984. The centrum of a dorsal vertebra. In its depressed character this specimen agrees with the dorsals of *L. dyspelor* figured by Cope, *op. cit.* pl. xxx.

*Presented by Sir C. Lyell, Bart., 1868.*

40984 a. An imperfect anterior dorsal vertebra. *Same history.*

40984 b. The centrum of a small anterior dorsal vertebra.

*Same history.*

35634. The centrum of a trunk vertebra of similar type. Accords with the specimen belonging to *L. dyspelor*, figured by Cope, *op. cit.* pl. xxx. fig. 8.

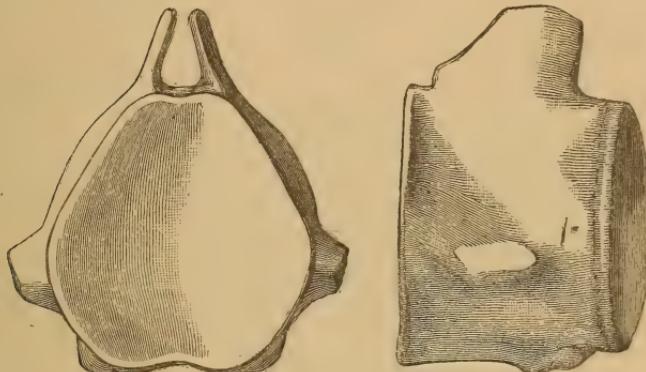
<sup>1</sup> See Cope, Rep. U. S. Geol. Surv. Terrs. vol. ii. p. 176.

35627. A posterior trunk vertebra. The matrix resembles that of No. 35635.

40982. The centrum of a larger posterior trunk vertebra.

*Presented by Sir C. Lyell, Bart., 1868.*

Fig. 58.



*Liodon*, sp.—Anterior and left lateral aspect of an imperfect anterior caudal vertebra; from the Cretaceous of Alabama.  $\frac{1}{2}$ .

35625. The centrum of a large anterior caudal vertebra. The (Fig.) chevron-facets are well shown, and the specimen agrees closely with the anterior caudal of *L. proriger*, figured by Cope, *op. cit. pl. xxx. fig. 11.* This specimen is represented in the accompanying woodcut.

35626. The centrum of a somewhat later caudal vertebra.

35635. The centrum of a much smaller caudal vertebra. The matrix of this and the following specimen differs from that of the jaws, and it may belong to a distinct species.

35636. An imperfect centrum of similar type.

40983. The centrum of an anterior caudal vertebra of similar size but of a larger type. The matrix agrees with that of the jaws. *Presented by Sir C. Lyell, Bart., 1868.*

#### Genus **PLATECARPUS**, Cope<sup>1</sup>.

Syn. *Lestosaurus* Marsh<sup>2</sup>.

*Taniwhasaurus*, Hector<sup>3</sup>.

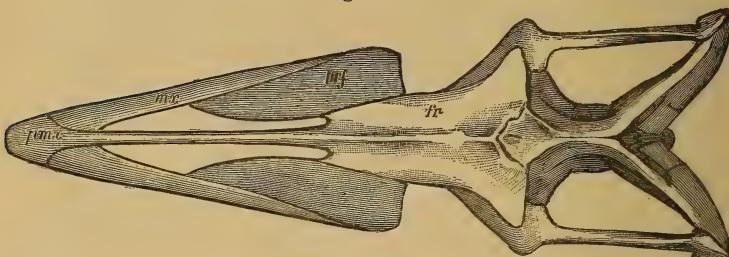
<sup>1</sup> Proc. Bost. Nat. Hist. Soc. vol. xii. p. 264 (1869).

<sup>2</sup> Amer. Journ. ser. 3, vol. iii. p. 454 (1872).

<sup>3</sup> Trans. N. Zealand Inst. vol. vi. p. 353 (1874).

Body much elongated. Premaxillæ not produced into a rostrum. Teeth slightly compressed, acute, curved, often carinated and grooved. Vertebræ without, or with rudimental zygosphenal articulations, and strong zygapophyses; chevrons free. Humerus short and broad. The skull is represented in fig. 59. The so-called *Taniwhasaurus* presents no characters by which it can be distinguished from the

Fig. 59.



*Platecarpus curtirostris*, Cope.—Frontal aspect of the cranium; from the Upper Cretaceous of N. America. Greatly reduced. *pmx*, premaxilla; *mx*, maxilla; *fr*, frontal; *prf*, prefrontal. (After Cope.)

present genus. The limb-bone from the Cambridge Greensand described by Seeley<sup>1</sup> as *Cetarthrosaurus* may indicate a closely allied form<sup>2</sup>. All the species are of medium or small size.

### **Platecarpus oweni** (Hector<sup>3</sup>).

Syn. *Taniwhasaurus oweni*, Hector<sup>4</sup>.

The type of *Taniwhasaurus*; imperfectly known. The crowns of the teeth measure 0,025 in height and have a basal diameter of 0,013; they are grooved, but not distinctly faceted, and with obscure carinæ.

Hab. New Zealand.

*The following specimens, unless it is stated to the contrary, are from the Cretaceous of Amuri Bluff, South Island, and were obtained in 1880 by exchange with the Trustees of the Colonial Museum, Wellington.*

R. 876. A tooth in matrix which agrees with the description of those of the type specimen; from the Cretaceous of Waipara, Canterbury, New Zealand.

*Presented by Sir R. Owen, K.C.B., 1884.*

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xxix. p. 505 (1873).

<sup>2</sup> See Hulke, Proc. Geol. Soc. 1883, p. 50.

<sup>3</sup> Trans. N. Zealand Inst. vol. vi. p. 353 (1874).—*Taniwhasaurus*.

<sup>4</sup> Loc. cit.

- R. 822. Mould of part of the skull<sup>1</sup>.  
 R. 823. Block of matrix with vertebra.  
 R. 824. Matrix with ribs.  
 R. 825. Two pterygoid teeth.  
 R. 826. A vertebra.

**Platecarpus (?)**, sp.

The undermentioned specimen is provisionally referred to this genus.

*Hab.* Europe (England).

39424. The crown of a tooth; from the Chalk of Sussex. The enamel is strongly grooved, and the specimen apparently closely resembles the teeth of *P. mudgei*, figured by Cope in the 'Rep. U.S. Geol. Surv. Terrs.' vol. ii. pl. xxvi.

*Bowerbank Collection. Purchased, 1865.*

Genus **GEOSAURUS**, Cuvier<sup>2</sup>.

Syn. *Halilimnosaurus*, Ritgen<sup>3</sup>.

Imperfectly known, but apparently very closely allied to *Clidastes*, which may prove to be the same.

**Geosaurus giganteus** (Sömmering<sup>4</sup>).

Syn. *Lacerta gigantea*, Sömmering<sup>5</sup>.

*Geosaurus soemmeringii*, Cuvier<sup>6</sup>.

*Halilimnosaurus crocodiloides*, Ritgen<sup>7</sup>.

*Mosasaurus bavaricus*, Holl<sup>8</sup>.

The type species.

*Hab.* Europe (Germany).

- R. 1229. The middle portion of the skull, in a crushed condition (Fig.) from the Kimeridgian (Upper Jurassic) lithographic stone of Monheim, Franconia. The type specimen. Figured by Sömmering in the 'Denkschr. k. Ak. München,' vol. vi. pl. accompanying memoir, figs. 1-7; and also by Cuvier

<sup>1</sup> This and the following specimens were determined by Dr. Hector, on whose authority they are referred to this form.

<sup>2</sup> 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, p. 338 (1824).

<sup>3</sup> *Nova Acta Ac. Cœs. Leop.-Car.* vol. xiii. p. 331 (1826).

<sup>4</sup> *Denkschr. k. Ak. München*, vol. vi. p. 37 (1816; vol. dated 1820).—*Lacerta*.

<sup>5</sup> *Loc. cit.*

<sup>6</sup> *Loc. cit.*

<sup>7</sup> *Loc. cit.*

<sup>8</sup> 'Handbuch der Petrefactenkunde,' pt. i. p. 85 (1829).

in the 'Ossemens Fossiles,' 2nd ed. vol. v. pt. 2, pl. xxi. figs. 2-6, and 4th ed. vol. x. pl. ccxlix. figs. 2-6.

*Sommerring Collection. Purchased, 1827.*

- R. 1230. A considerable portion of the vertebral column, ribs, and (Fig.)

Figured by Sommerring, *op. cit.* figs. 8-10, and by Cuvier, *op. cit.* pl. xxi. figs. 7-8, and pl. coxlii. figs. 7-8. As far as their crushed condition admits of comparison, the vertebrae appear to agree in all respects with those of *Clidastes* (No. R. 473). The pelvis and hind limb also accord very closely with the restoration of the same in *Clidastes*, as given by Cope in the Rep. U.S. Geol. Surv. Terrs. vol. ii. pl. lv., but the bone which is probably the ischium is relatively larger and differently placed.

*Same history.*

37020. An imperfect skull provisionally referred to a large individual of this species; from the Kimeridgian of Solenhofen, Bavaria. This specimen seems to accord with the skull of *Clidastes*, figured by Cope, *op. cit.* pl. xiv. fig 1.

*Purchased, 1862.*

- 37016-7. The crowns of two teeth agreeing with those of the last specimen; from Solenhofen. *Same history.*

21530. The crown of a similar tooth; from Solenhofen.

*Purchased, 1847.*

#### Genus **CLIDASTES**, Cope<sup>1</sup>.

Syn. *Edestosaurus*, Marsh<sup>2</sup> (*teste* Cope).

Body greatly elongated. Premaxillæ not produced into a rostrum. Vertebrae much elongated, with zygosphenes, which are placed but slightly above the plane of the zygapophyses; 8 in the cervical region; chevrons ankylosed to centra. Humerus short and broad. The possibility of this genus proving identical with the preceding is noticed under that head. All the species are of moderate or small size.

#### **Clidastes**, sp.

Hab. North America.

- R. 473. Portions of two associated mandibular rami and five dorsal vertebrae of a small form; from the Cretaceous of Kansas, U. S. A. *Presented by Sir R. Owen, K.C.B., 1884.*

<sup>1</sup> Proc. Ac. Nat. Sci. Philad. 1868, p. 233.

<sup>2</sup> Amer. Journ. ser. 3, vol. i. p. 447 (1871).

## GENERICALLY UNDETERMINED SPECIMENS.

## A. From the Cretaceous of Maastricht.

- R. 291 a. The crown of a large tooth. This specimen is nearly symmetrical, and has very prominent carinae, which form distinct ridges on the fore-and-aft borders.

*Egerton Collection. Purchased, 1882.*

- R. 291 b. A tooth of smaller size, with the crown somewhat compressed, curved, and carinated. This tooth might apparently belong either to *Liodon* or to the hinder part of the mandible of *Mosasaurus*. *Same history.*

- R. 1231. A smaller tooth of similar type. *No history.*

- R. 1232. The crown of a small tooth, with one surface faceted. *No history.*

44822. A small imperfect cervical vertebra. In its depressed centrum this specimen agrees with the trunk vertebra of *Liodon perlatus*. *Presented by B. Bright, Esq., 1873.*

B. From the Upper Chalk of England<sup>1</sup>.

43193. The crown of a tooth of medium size; from Gravesend, (Fig.) Kent. Figured by Mantell in his 'Medals of Creation,' vol. ii. fig. 229, as *Mosasaurus hofmanni*. This tooth resembles the Maastricht specimen No. R. 291 b.

*Wetherell Collection. Purchased, 1871.*

- 48940 d. The crown of a very large tooth; from Norwich. This specimen approximates to the Maastricht specimen No. R. 291 a. *Purchased, 1878.*

39423. The crown of a small tooth, with one surface flattened as in *Mosasaurus*; from Sussex.

*Bowerbank Collection. Purchased, 1865.*

39425. The crown of a tooth resembling No. 39423. *Same history.*

41383. The crown of a very similar tooth; locality unknown.

*Purchased, 1869.*

47954. The crown of a tooth of the same type; from Maidstone, Kent. *Presented by the Hon. R. Marsham, 1877.*

<sup>1</sup> It should be observed that *Mosasaurus gracilis*, Owen, 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. p. 31, is founded on the jaw of a fish.

**36557.** The crowns of two small teeth, of which one is very short and thick; from Sussex.

*Mantell Collection. Purchased, 1853.*

**43194.** The crown of a very small tooth; from Gravesend. Figured (*Fig.*) by Mantell, *op. cit.* fig. 230.

*Weitherell Collection. Purchased, 1871.*

**R. 1233.** A small imperfect caudal vertebra; locality unknown.

*No history.*

**5642.** A small imperfect trunk vertebra; from Sussex. Figured (*Fig.*) by Mantell in his 'Geology of the South-east of England,' p. 146, fig. 2, and in the 'Geology of the South Downs,' pl. xxxiii. fig. 13; and also by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pl. viii. figs. 1-2, as *Mosasaurus gracilis*. *Mantell Collection. Purchased, 1838.*

**5641.** Two associated caudal vertebrae, agreeing in size with the (*Fig.*) preceding; from Sussex. Figured by Mantell, *op. cit.* p. 146, fig. 1, and pl. xli. fig. 3; and also by Owen, *op. cit.* pl. viii. fig. 3, as *M. gracilis*. *Same history.*

**37000 a.** A series of imperfect caudal vertebrae; from Norwich. In all the chevrons are ankylosed to the centra.

*Purchased, 1860.*

**37000 b.** The united atlas and axis vertebrae, apparently associated with the preceding; from Norwich. *Same history.*

**48942.** An imperfect posterior caudal vertebra; from Norwich. This specimen, in which the chevron is ankylosed to the centrum, is said to have been found in association with the tooth No. 48943, referred to *Liodon anceps*.

*Purchased, 1878.*

#### C. From the Cretaceous of Alabama.

**35632.** The centrum and left transverse process of a dorsal vertebra. In the cylindrical centrum this specimen resembles the vertebrae of *Mosasaurus camperi*, and differs from those of *Liodon perlatus*. *Presented by Prof. J. W. Malet, 1859.*

#### Suborder DOLICHOSAURIA.

Body anguiform. Vertebrae with zygosphenes, and more than nine in cervical region. Limbs imperfectly known, but apparently of a Lacertilian type. Sacrum and pectoral and pelvic girdles well developed.

## Family DOLICHOSAURIDÆ.

The only family; also represented by *Acteosaurus*, Meyer<sup>1</sup>, in the Cretaceous of Austria.

Genus DOLICHOSAURUS, Owen<sup>2</sup>.

Vertebrae much elongated; seventeen in the cervical region.

**Dolichosaurus longicollis**, Owen<sup>3</sup>.

The type species. Not larger than the common English snake.  
Hab. Europe (England).

- 49002.** The anterior half of the skeleton; from the Lower Chalk of (Fig.) Burham, Kent. The type specimen. Figured in Dixon's 'Geology of Sussex,' 1st ed. pl. xxxviii. figs. 1, 2; in the 'Geologist,' vol. vi. pl. xiv.; and in Owen's 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pl. x. figs. 1-3.

*Purchased*, 1878.

- 32268.** Portion of the vertebral column; from Burham. Figured (Fig.) by Owen in the 'Trans. Geol. Soc.' ser. 2, vol. vi. pl. xxxix. fig. 4 (1840), and noticed in the Rep. Brit. Assoc. for 1841, p. 145, as *Rhaphiosaurus*; also figured in Dixon's 'Geology of Sussex,' pl. xxxix. fig. 4, and in Owen's 'Cretaceous Reptilia,' pt. i. pl. x. fig. 4.

*Presented by Sir P. de M. G. Egerton, Bart.*, 1856.

- 44141.** Fragments of the skull and some of the anterior vertebrae; from the Chalk of Lidden Spout, near Folkestone, Kent.

*Purchased*, 1873.

- 49907-8.** Fragments of the trunk, tail, and anterior limb; from the Chalk of Southeram Pit, near Lewes, Sussex.

*Purchased*, 1879.

## Suborder LACERTILIA.

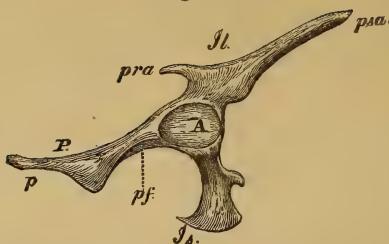
Body usually lacertiform, but occasionally anguiform. Ali- and orbitosphenoidal region imperfectly ossified; superior temporal arcade usually present; quadrate articulating with pterygoid; nasals entering nares; mandibular rami uniting by suture. Vertebrae occasionally amphiecelous; usually without zygosphenes; and never more than nine in the cervical region. When limbs are present

<sup>1</sup> *Palaeontographica*, vol. vii. art. 4, p. 223 (1860).

<sup>2</sup> In Dixon's 'Geology of Sussex,' 1st ed. p. 388 (1850).

<sup>3</sup> *Loc. cit.*

Fig. 60.



Left side of pelvis of Iguanoid Lacertilian.—*Ii*, ilium; *Is*, ischium; *P*, pubis; *A*, acetabulum; *pra*, *psa*, pre- and postacetabular processes; *p*, symphysis pubis; *pf*, ischio-pubic notch. (From the 'Quart. Journ. Geol. Soc.')

there is a sternum, clavicle, interclavicle, and sacrum; and the pelvis (fig. 60) is well developed. The limbs are adapted for walking, with clawed terminal phalangeals, and a foramen to the humerus. Dermal scutes may be present.

Equivalent to the *Lacertilia Vera* of Boulenger<sup>1</sup>; the *Rhiptoglossa* being reckoned as a group of equal rank. Fig. 52 shows the lateral aspect of the Lacertilian pectoral girdle, exclusive of the clavicle and interclavicle.

### Family AGAMIDÆ.

Temporal arcade and postorbital bar complete; supratemporal fossa not roofed over by bone; premaxillæ separate. Dentition acrodont. Vertebræ without zygosphenes.

### Genus CHLAMYDOSAURUS, Gray<sup>2</sup>.

The tympanum distinct.

#### *Chlamydosaurus kingi*, Gray<sup>3</sup>.

The only species.

*Hab.* Australia.

**R. 495.** Portions of a skull, provisionally referred to this species; from the Pleistocene of Gowrie, Queensland. This specimen has been named *C. bennetti* by Owen in MS., but it does not appear to show any characters by which it can be distinguished from the living form.

*Presented by Dr. George Bennett.*

<sup>1</sup> Catalogue of Lizards (1885-87).

<sup>2</sup> In King's 'Voyage to Australia,' vol. ii. p. 424 (1826). <sup>3</sup> *Op. cit.* p. 425.

## Family IGUANIDÆ.

Temporal arcade and postorbital bar complete; supratemporal fossa not roofed over by bone; premaxillæ united. Dentition pleurodont. Vertebræ with zygosphenes.

Genus **IGUANA**, Laurenti<sup>1</sup>.

The type genus. In the case of the undermentioned fossils, the term must be employed in a much wider sense than is the case in recent zoology, where it is restricted to *I. tuberculata* and *I. delicatissima*.

***Iguana europaea*, Filhol<sup>2</sup>.**

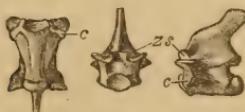
Syn. *Proiguana europeana*, Filhol<sup>3</sup>.

Imperfectly known; if it prove to indicate a distinct genus, the name *Proiguana* might be adopted were it not that this is a hybrid term. The type specimens consist of portions of the jaws from the Quercy Phosphorites; and since the other Squamata from these deposits appear to be identical with those from Hordwell, the presumption is that the undermentioned specimens belong to this species.

*Hab.* Europe (France and ? England).

**32840 a.** Three imperfect vertebræ; from the Upper Eocene (Fig.) (Lower Oligocene) of Hordwell, Hampshire. The best preserved specimen (fig. 61), although of smaller size, agrees precisely with the dorsal vertebræ of existing

Fig. 61.



*Iguana europaea*.—Hæmal, anterior, and lateral views of a dorsal vertebra; from the Upper Eocene of Hordwell.  $\frac{1}{4}$ . *zs*, zygophene; *c*, costal articulation.

Iguanas, and could scarcely be specifically distinguished from the corresponding recent vertebra figured by Owen in the 'Phil. Trans.' 1851, pl. li. figs. 40–43. Noticed by the writer in the 'Geol. Mag.' dec. 3, vol. v. p. 110 (1888).      *Hastings Collection. Purchased, 1855.*

<sup>1</sup> Syn. Rept. p. 47 (1768).

<sup>2</sup> Ann. Sci. Géol. vol. viii. p. 267 (1877).—Amended.

<sup>3</sup> *Ibid.* p. 338.

## Family ANGUIDÆ.

Postorbital bar and temporal arcade complete; supratemporal fossa roofed over by bony scutes; premaxillæ and nasals separate. Dentition usually pleurodont; teeth may be present on the pterygoids, palatines, and vomers, and are generally obtuse. Dermal scutes present and marked by tubercular sculpture. The vertebral centra much flattened inferiorly, and very like those of the *Varanidæ*.

Genus **OPHISAURUS**, Daudin<sup>1</sup>.

Syn. *Pseudopus*, Merrem<sup>2</sup>.

Limbs absent externally, or with only a rudiment of the pelvic pair; teeth on pterygoids, and in some cases on palatines.

**Ophisaurus moguntinus** (Boettger<sup>3</sup>).

Syn. *Pseudopus moguntinus*, Boettger<sup>4</sup>.

The distinctive characters are not clearly known, and this species may belong to *Propseudopus*, Hilgendorf<sup>5</sup>.

*Hab.* Europe (Germany).

**42756.** A split slab of lignite containing the impression of a considerable portion of the skeleton and scales; from the Lower Miocene of Rott, near Bonn. The end of the tail has been renewed during life; the squamation of the renewed part being like that of *Anguis*. The slab also contains the impression of part of the vertebral column of a *Lacerta*.      *Van Breda Collection. Purchased, 1871.*

*The following genus may be included in the present family, although it has been made the type of a distinct family—the Placosauridæ. The American Eocene genera Saniva, Leidy<sup>6</sup>, Glyptosaurus, Marsh<sup>7</sup>, and Peltosaurus, Cope<sup>8</sup>, are probably allied.*

<sup>1</sup> Hist. Rep. vol. vii. p. 346 (1803).

<sup>2</sup> Tent. Syst. Amphib. p. 78 (1820).

<sup>3</sup> Ber. Senckenb. nat. Ges. for 1873–74, p. 79 (1874).—*Pseudopus*.   <sup>4</sup> Loc. cit.

<sup>5</sup> Zeitschr. deutsch. geol. Ges. vol. xxxvii. p. 358 (1885).

<sup>6</sup> See Rep. U.S. Geol. Surv. Terrs. vol. i. pp. 181–183 (1873).

<sup>7</sup> See Leidy, loc. cit.

<sup>8</sup> Rep. U.S. Geol. Surv. Terrs. vol. iii.—Vertebrata of the Tertiary Formations of the West. Book i. pp. 102, 722 (1884).

Genus **PLACOSAURUS**, Gervais<sup>1</sup>.Syn. *Palæovaranus*, Filhol<sup>2</sup>.

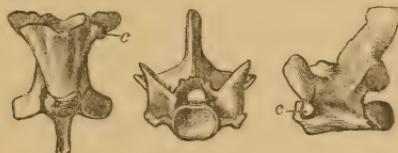
Teeth conical and pointed. The vertebræ appear intermediate between those of *Ophisaurus* and *Diploglossus*, having the tall and broad neural spines of the latter and the extremely flattened centra of the former. The limbs were fully developed.

**Placosaurus margariticeps** (Gervais<sup>3</sup>).Syn. *Varanus* (?) *margariticeps*, Gervais<sup>4</sup>.*Palæovaranus cayluxi*, Filhol<sup>5</sup>.

About once and a half the size of *Diploglossus shawi*. A comparison of the type cranial scutes of *Varanus margariticeps*<sup>6</sup> with those of the typical *Placosaurus rugosus*<sup>7</sup>, from the Eocene of Vaucluse, will leave little doubt as to the generic identity of the two forms, while the right of the present form even to specific distinction has yet to be proved. The undermentioned specimens being evidently the remains of *Anguidæ*, may be pretty safely referred to this species; the provisional identification by Filhol of his *Palæovaranus cayluxi* with *Varanus* (?) *margariticeps* being in all probability correct<sup>8</sup>.

Hab. Europe (France and ? England).

Fig. 62.



*Placosaurus margariticeps*.—Hæmal, anterior, and left lateral views of a dorsal vertebra; from the Phosphorites of Caylux.  $\frac{1}{2}$ .  $c$ , costal articulation.

R. 427. Two imperfect specimens of the dentary bone of the mandible; from the Upper Eocene Phosphorites of Lalbenque (Lot), France. The larger specimen agrees very closely

<sup>1</sup> Zool. et Pal. Françaises, 1st ed. p. 260 (1848-52).<sup>2</sup> Ann. Sci. Géol. vol. viii. p. 268 (1877).<sup>3</sup> Zool. et Pal. Générales, sér. 2, p. 60 (1876).—*Varanus*.<sup>4</sup> Loc. cit.<sup>5</sup> Ann. Sci. Géol. vol. viii. p. 268 (1877).<sup>6</sup> Gervais, loc. cit., woodcut.<sup>7</sup> Gervais, Zool. et Pal. Françaises, 1st ed. pl. lxiv. fig. 2.<sup>8</sup> See a note by the writer in the 'Geol. Mag.' dec. 3, vol. v. p. 111 (1888), where, however, the jaws were still regarded as Varanoid.

with the fragment figured by Filhol in the 'Ann. Sci. Géol.' vol. viii. pl. xxvi. fig. 434, as the type of *Palaeo-varanus*. The teeth are certainly Anguoid.

*Purchased*, 1884.

**R. 428.** Numerous vertebræ, of which at least the majority probably belong to this form, although some may be referable to the next; from Caylux (Tarn-et-Garonne). These specimens comprise dorsals, sacrals, and caudals. The dorsals (fig. 62), although presenting a strong resemblance to those of *Varanus*, differ by the still more marked flatness of the hæmal aspect of the centrum and the lower position of the costal tubercle, in both of which respects they agree with the dorsals of *Ophisaurus*. In their more developed neural spines they differ from *Ophisaurus*, and resemble *Diploglossus*. They are noticed by the writer in the 'Geol. Mag.' dec. 3, vol. v. p. 111. *Purchased*, 1884.

**R. 387.** A left femur, agreeing in relative size with the preceding specimens; from Caylux. Agrees with the specimen of the opposite side figured by Filhol in the 'Ann. Sci. Géol.' vol. viii. pl. xxvi. figs. 445 & 446, as *Palaeo-varanus cayluxi*. This bone differs from the femur of *Varanus* by the relatively longer shaft, the approximation of the great trochanter to the head, and the contour of the latter; in all of which respects it comes much nearer to the femur of *Diploglossus*. Noticed by the writer, *op. cit.*

*Same history.*

**R. 431.** A left femur of similar type, together with a right tibia, apparently belonging to the same individual; from the Phosphorites of Lalbenque (Lot), France. *Same history.*

**32840.** Numerous vertebræ, apparently belonging to small individuals of this genus, and perhaps referable to the present species; from the Upper Eocene (Lower Oligocene) of Hordwell, Hampshire. Noticed by the writer, *op. cit.*, where it is mentioned that they may be equally well referable to *P. rugosus*, if there be two species of the genus.

*Hastings Collection. Purchased*, 1855.

**30968-9.** A dorsal and a caudal vertebra of similar type to the preceding; from the Lower Miocene (Upper Oligocene) of St. Gérard-le-Puy (Allier), France.

*Bravard Collection. Purchased*, 1852.

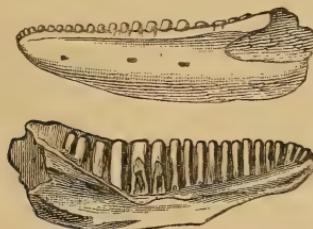
GENUS *non det.*

This form, which appears identical with *Plestiodon cadurcensis* of Filhol<sup>1</sup>, has the teeth tall, cylindrical, and blunt.

*Hab.* Europe (France).

R. 377. The greater part of the left dentary bone; from the Upper (Fig.) Eocene (Lower Oligocene) Phosphorites of Caylux (Tarn-et-Garonne), France. This specimen (fig. 63) apparently agrees with the fragmentary dentary figured by Filhol in the 'Ann. Sci. Géol.' vol. viii. pl. xxvi. fig. 425, under the name of *Plestiodon cadurcensis*. That it cannot, however, belong to that genus is shown by the absence of the ridge on the outer side descending from the coronoid; it agrees very closely with the dentary of *Diploglossus* and *Ophisaurus*. Noticed by the writer in the 'Geol. Mag.' dec. 3, vol. v. p. 111, as *Placosaurus*. Purchased, 1884.

Fig. 63.



External and inner views of the left dentary bone of an Anguoid Lizard; from the Phosphorites of Caylux.  $\frac{1}{4}$ .

## Family VARANIDÆ.

Postorbital bar incomplete; temporal arcade complete; supratemporal fossa not roofed over by dermal bones; both the premaxillæ and nasals united together. Dentition pleurodont; teeth large; palate toothless. Hæmal surface of the centra of the dorsal vertebræ broad, flat, and devoid of carina. No dermal scutes.

Genus **VARANUS**, Merrem<sup>2</sup>.

Including:—*Monitor*, Gray<sup>3</sup>.

*Hydrosaurus*, Wagler<sup>4</sup>.

*Megalania*, Owen<sup>5</sup>.

The only genus, the so-called *Palæovaranus* being an Anguoid.

<sup>1</sup> Ann. Sci. Géol. vol. viii. p. 266 (1877).

<sup>2</sup> Tent. Syst. Amphib. p. 58 (1820).

<sup>3</sup> Ann. Nat. Hist. vol. i. p. 392 (1838).

<sup>4</sup> Syst. Amphib. p. 164 (1830).

<sup>5</sup> Phil. Trans. 1859, p. 43.

Group A.—*The dorsal vertebræ elongated, with broad neural spines.*  
*All the species of moderate size.*

**Varanus bengalensis** (Daudin<sup>1</sup>).

Syn. *Tupinambis bengalensis*, Daudin<sup>2</sup>.

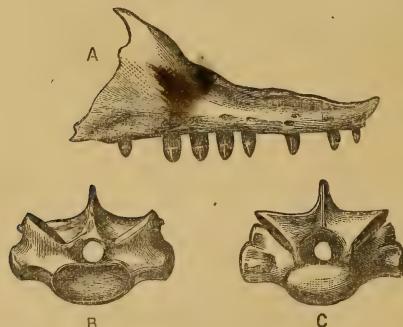
*Monitor dracæna*, Gray<sup>3</sup>.

*Varanus dracæna*, Günther<sup>4</sup>.

Of small size, the total length being 1,710.

Hab. India.

Fig. 64.



*Varanus bengalensis*.—Right maxilla (A), and a dorsal vertebra from the anterior (B) and posterior (C) aspects; from the Pleistocene of Madras.  $\frac{1}{4}$ . (From the 'Palæontologia Indica'.)

R. 719. Fragments of jaws, vertebræ, and imperfect limb-bones, probably belonging to this species; from the Pleistocene of the Billa Surgam Caves, Karnul, Madras. Similar specimens (fig. 64) are described by the writer in the 'Palæontologia Indica' (Mem. Geol. Surv. Ind.), ser. x. vol. iv. p. 55.

Presented by the Director of the  
Geological Survey of India, 1886.

**Varanus, sp.**

The following specimens probably belong to one of the existing Australian species, perhaps *V. giganteus*.

Hab. Australia.

<sup>1</sup> Hist. Rept. vol. iii, p. 67 (1802).—*Tupinambis*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Cat. of Lizards in Brit. Mus. p. 11 (1845).

<sup>4</sup> Reptiles of British India, p. 65 (1864).

42681. Five vertebræ, of which three are dorsal, one sacral, and one caudal; from the Pleistocene cave-deposits of the Wellington Valley, New South Wales.

*Presented by the Trustees of the Australian Museum, 1870.*

Group B.—*The dorsal vertebræ short and wide, with narrow neural spines. Both species of large size.* (Megalania, Owen.)

**Varanus sivalensis**, Falconer<sup>1</sup>.

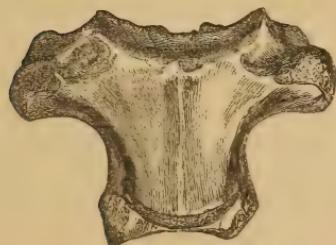
Of large size; the estimated length being about 3,660 (12 feet).

Hab. India.

- R. 739 a. An imperfect anterior dorsal vertebra; from the Lower (Fig.) Pliocene of the Siwalik Hills, India. Figured by the writer in the ‘Palaeontologia Indica’ (Mem. Geol. Surv. Ind.), ser. x. vol. iv. p. 55, fig. 11; one of the figures being reproduced in the accompanying woodcut (fig. 65).

*Cawtley Collection. Presented, 1840.*

Fig. 65.



*Varanus sivalensis*.—Hæmal aspect of an anterior dorsal vertebra; from the Pliocene of the Siwalik Hills. 1. (From the ‘Palaeontologia Indica.’)

- R. 740. A larger posterior dorsal vertebra, wanting the neural spine; from the Siwalik Hills.<sup>2</sup> *Same history.*

40819. The distal portion of the right humerus; from the Siwalik (Fig.) Hills. The type specimen. Figured in ‘Falconer’s Palaeontological Memoirs,’ vol. i. pl. xxxii. figs. 4–7; and also by the writer, *op. cit.* vol. iii. pl. xxxv. figs. 1, 1a, 1b.

*Presented by C. Falconer, Esq., 1867.*

<sup>1</sup> *Palaeontological Memoirs*, vol. i. pl. xxxii. (1868).

<sup>2</sup> The specimen noticed under this number by the writer, *l. c.*, as a cervical vertebra of this species proves to be Chelonian.

R. 1009. The distal extremity of the right femur of a smaller individual than the preceding ; from the Siwalik Hills.

*Caviley Collection.*

**Varanus priscus** (Owen<sup>1</sup>).

Syn. *Megalania prisca*, Owen<sup>2</sup>.

The vertebræ agree in general character with those of *V. sivalensis*, but attain three times the dimensions, which would give an approximate length of at least 9,150 (30 feet) for the entire animal. The shortening of the centrum of the dorsal vertebræ (fig. 66) is proportionately greater than in *V. sivalensis*.

This species is the type of *Megalania*; the skull and caudal sheath referred to it by Owen will be catalogued in the Chelonia.

Hab. Australia.

39965. The occipital segment of the cranium ; from the Pleistocene of Queensland. Figured by Owen in the 'Phil. Trans.' 1880, pl. xxxvi. figs. 1, 2. This specimen agrees in all essential characters with the corresponding part of the cranium of *Varanus salvator*; although a well-marked specific character is shown in the relatively shorter supra-occipital. It is about three times the size of the corresponding part of the cranium of an individual of *V. salvator* measuring six feet in total length.

*Presented by Sir D. Cooper, Bart., 1866.*

32908 a. The right half of an anterior dorsal vertebra ; from the Pleistocene of the Condamine River, Queensland. One of the types. Figured by Owen in the 'Phil. Trans.' 1859, pl. viii. figs. 1, 2 (as a cervical). *Purchased, 1857.*

32908 b. The imperfect centrum of a dorsal vertebra ; from the Condamine River. The second of the types. Figured, *op. cit.* pl. viii. figs. 3, 4. *Same history.*

32908 c. A nearly entire middle dorsal vertebra ; from the Condamine River. The third of the types. Figured, *op. cit.* pl. vii. figs. 1-4. *Same history.*

36273. A somewhat imperfect middle dorsal vertebra ; from the Pleistocene near Melbourne, Victoria. Figured by Owen, *op. cit.* 1880, pl. xxxv. figs. 1, 2.

*Presented by F. M. Raynal, Esq., 1862.*

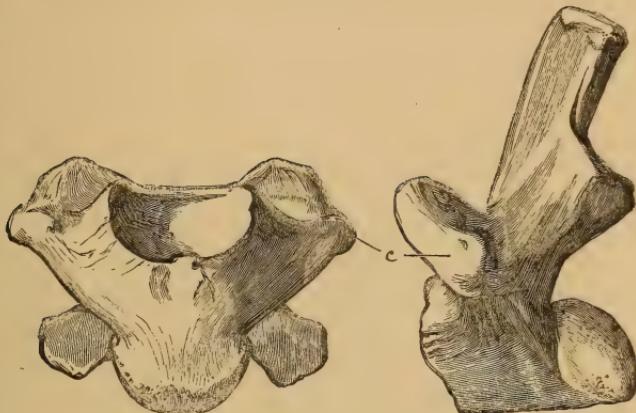
<sup>1</sup> Phil. Trans. 1859, p. 43.—*Megalania.*

<sup>2</sup> *Loc. cit.*

- 35911.** A slightly imperfect middle cervical vertebra; from the Pleistocene of Gowrie, Queensland.

*Presented by Sir D. Cooper, Bart., 1861.*

Fig. 66.



*Varanus priscus*.—Haemal and left lateral aspect of a posterior dorsal vertebra; from the Pleistocene of Queensland.  $\frac{1}{3}$ . c, costal articulation.

- 39966.** A middle dorsal vertebra, wanting the neural spine; from Queensland. *Presented by Sir D. Cooper, Bart., 1866.*

- 47835.** An entire posterior dorsal vertebra; from Queensland.

(Fig.) Figured by Owen, *op. cit.* 1880, pl. xxxiv. figs. 1, 2. This specimen (woodcut fig. 66) closely accords in contour with No. R. 740 of *V. sivalensis*, but the relative shortness of the centrum and arch is still more marked; the neural canal being, as is always the case with larger animals, relatively smaller. *Presented by Dr. George Bennett.*

- 47839.** A slightly imperfect middle dorsal vertebra; from Queensland. *Same history.*

- 47839 a.** A smaller vertebra from the middle or posterior dorsal region; from Queensland. Accords very closely with *V. sivalensis*, No. R. 740, but is about double the size.

*Same history.*

- R. 724.** An imperfect posterior dorsal vertebra; from Queensland. *Presented by Sir R. Owen, K.C.B., 1884.*

- R. 749.** A rolled dorsal vertebra, wanting the neural spine; from Queensland. *Same history.*

R. 391. An imperfect middle dorsal vertebra; from King's Creek, Gowrie, Queensland.

*Presented by C. H. Hartmann, Esq., 1884.*

R. 292. An imperfect middle dorsal vertebra; from Queensland.

*Presented by Dr. George Bennett, 1882.*

47836. A very imperfect dorsal vertebra; from Queensland.

*Presented by Dr. George Bennett.*

R. 391 a. The centrum of a dorsal vertebra; from Queensland.

*Presented by C. H. Hartmann, Esq., 1884.*

39967. The right half of the centrum of a dorsal vertebra; from Queensland. *Presented by Sir D. Cooper, Bart., 1866.*

49655. A crushed and very imperfect dorsal vertebra; from the Pleistocene of the Castlereagh River, New South Wales.

*Presented by the Rev. W. B. Clarke, 1878.*

39967 a. An imperfect caudal vertebra; from Queensland. Figured (*Fig.*) by Owen in the 'Phil. Trans.' 1880, pl. xxxv. figs. 3, 4.

*Presented by Sir D. Cooper, Bart., 1866.*

### Family TEIIDÆ.

Postorbital bar and temporal arcade complete; supratemporal fossa not roofed over. Dentition pleurodont or subacrodont; teeth variable, but always solid at the base; if any are present on the pterygoids they are small. No dermal scutes.

#### Genus **TUPINAMBIS**, Daudin<sup>1</sup>.

Cheek-teeth laterally compressed in the young, but with obtuse crowns in the adult.

*Tupinambis teguixin* (Linn.<sup>2</sup>).

Syn. *Lacerta teguixin*, Linn.<sup>3</sup>

The type species.

*Hab.* South America (Guianas to Uruguay) and West Indies.

18903. The greater part of the right dentary and splenial bones

<sup>1</sup> Syst. Rept. vol. iii. p. 6 (1802).

<sup>2</sup> Syst. Nat. ed. 12, vol. i. p. 368 (1766).—*Lacerta*.

<sup>3</sup> *Loc. cit.*

of a mandible belonging either to this species or to the nearly allied *T. nigropunctatus*; from the Pleistocene cave-deposits of Minas Geraes, Brazil.

*Claussen Collection. Purchased, 1845.*

- 18903 a. Part of the left dentary of a similar mandible; from Minas Geraes. *Same history.*

### Family LACERTIDÆ.

Postorbital bar and temporal arcade complete; supratemporal fossa roofed over by bone; premaxillæ united. Dentition pleurodont; teeth hollow at the base, and the lateral ones bi- or tricuspid; frequently present on the pterygoids. Mandibular symphysis narrow. No dermal scutes.

#### Genus **LACERTA**, Linn.<sup>1</sup>

For palaeontological purposes this genus must be used in a much wider sense than in recent Zoology, since many of the allied genera are mainly distinguished by characters not available in the case of fossils.

#### **Lacerta lamandini**, Filhol<sup>2</sup>.

Apparently allied to the existing *L. ocellata*, but with the lower posterior teeth relatively larger.

*Hab.* Europe (France).

- R. 378. A left dentary bone apparently belonging to this species; from the Upper Eocene (Lower Oligocene) Phosphorites of Caylux (Tarn-et-Garonne), France. *Purchased, 1884.*

#### **Lacerta (?) bifidentata**, Lartet<sup>3</sup>.

Very small, with the crowns of the teeth bifid.

*Hab.* Europe (France).

33276. Two dentary bones and three vertebrae, probably belonging to this species; from the Middle Miocene of Sansan (Gers), France. *Presented by M. E. Lartet, 1854.*

<sup>1</sup> Syst. Nat. ed. 12, vol. i. p. 359 (1766).

<sup>2</sup> Ann. Sci. Géol. vol. viii. p. 269 (1877).

<sup>3</sup> Notice sur la Colline du Sansan, p. 39 (1851).

## Family SCINCIDÆ.

Postorbital bar and temporal arcade complete; supratemporal fossa roofed over by bone; premaxillæ imperfectly united or separated. Dentition pleurodont; teeth conical and bicuspid, or with sphaeroidal or compressed crowns; in some cases present on the pterygoids. Mandibular symphysis wide. Dermal scutes present.

Genus **DRACÆNOSAURUS**, Gervais<sup>1</sup>.

Syn. *Dracosaurus*, Bravard<sup>2</sup>.

The dentary bone of the mandible with seven or eight small obtuse teeth increasing in size posteriorly and followed by one much larger molariform tooth. Probably allied to *Scincus* or *Chalcides*.

**Dracænosaurus croizeti**, Gervais<sup>3</sup>.

Syn. *Scincus croizeti*, Gervais<sup>4</sup>.

The type and only known species. About the size of the existing *Eumeces algeriensis*.

Hab. Europe (France).

- 27594.** The nearly entire left ramus of the mandible; from the (*Fig.*) Lower Miocene (Upper Oligocene) of Limagne (Puy-de-Dôme), France. The type specimen. Figured by Gervais in the 'Zool. et Pal. Françaises,' pl. lxiv. fig. 5.

*Croizet Collection. Purchased, 1848.*

- 27752.** Four imperfect mandibular rami; from the Lower Miocene of Cournon (Puy-de-Dôme). *Same history.*

## GENERICALLY UNDETERMINED SPECIMENS.

The following specimens may belong either to the *Lacertidae* or *Scincidae*.

- R. 379.** The right dentary and splenial of a small form; from the Phosphorites of Caylux. *Purchased, 1884.*

- 30966-7.** Two dentaries agreeing in size with the preceding; from the Lower Miocene (Upper Oligocene) of Allier, France.

*Bravard Collection. Purchased, 1852.*

Family *non det.*

The following forms indicate small Lizards with pleurodont dentition and procelous vertebrae, which probably indicate one or more distinct families of the present Suborder:—

<sup>1</sup> Zool. et Pal. Françaises, 1st ed. p. 259 (1848-52).

<sup>2</sup> Quoted by Gervais, *loc. cit.*—Preoccupied.

<sup>3</sup> Dict. Univ. d'Hist. Nat. vol. xi. p. 56 (1849).—*Scincus.*      <sup>4</sup> *Loc. cit.*

Genus **MACELLODUS**, Owen<sup>1</sup>.

Including *Saurillus*, Owen<sup>2</sup>.

The unworn teeth of the type specimen<sup>3</sup> have compressed crowns, with a serrated superior border; but it seems impossible to distinguish *Saurillus* from this form. Dermal scutes were present.

**Macellocodus brodiei**, Owen<sup>4</sup>.

Including *Saurillus obtusus*, Owen<sup>5</sup>.

The type species. Of very small size.

*Hab.* Europe (England).

- 48230-2. A number of imperfect maxillæ and dentary bones; from the Middle Purbeck (Upper Jurassic) of Durdlestone Bay, Swanage, Dorsetshire. A description is given by Owen in his 'Wealden and Purbeck Reptilia' (Mon. Pal. Soc.), pt. v. p. 33. *Beckles Collection. Purchased, 1876.*
48233. A number of similar specimens, apparently belonging to the same form; from Durdlestone Bay. These specimens include the types of *Saurillus obtusus*. *Same history.*
48385. Slab showing fragment of mandible, a limb-bone, and dermal scutes; from Durdlestone Bay. *Same history.*
48370. Slab with dermal scutes; from Durdlestone Bay. *Same history.*
48368. Slab with procoelous vertebræ and scutes; from Durdlestone Bay. *Same history.*

Genus **CONIASAURUS**, Owen<sup>6</sup>.

Very imperfectly known. Anterior five or six lower teeth slender and curved; the others increasing in thickness towards the proximal end of the jaw, with the crowns expanded, slightly compressed, most convex inwardly, and the anterior border more curved than the posterior. Enamel finely wrinkled. No dermal scutes have been described.

**Coniasaurus crassidens**, Owen<sup>7</sup>.

The type specimen. Of the size of one of the smaller species of

<sup>1</sup> Quart. Journ. Geol. Soc. vol. x. p. 422 (1854)

<sup>2</sup> *Ibid.* vol. xi. p. 123 (1855):

<sup>3</sup> See Owen's 'Palaeontology,' p. 308, fig. 106 (1861).

<sup>4</sup> Quart. Journ. Geol. Soc. vol. x. p. 422 (1854).

<sup>5</sup> *Ibid.* vol. xi. p. 123 (1855).

<sup>6</sup> In Dixon's 'Geology of Sussex,' p. 386 (1850).

<sup>7</sup> *Loc. cit.*

*Varanus*. Mandibular ramus very deep. The best preserved specimens are figured by Owen in his 'Cretaceous Reptilia' (Mon. Pal. Soc.), pt. i. pl. ix. figs. 13-15.

*Hab.* Europe (England).

**25790.** Fragment of the dentary bone of the mandible, with teeth ; from the Chalk of Washington, near Worthing, Sussex  
Mentioned by Owen in Dixon's 'Geology of Sussex,' p. 388.

*Dixon Collection.* Purchased, 1851.

**R. 62.** Fragment of a dentary bone, showing four teeth ; from the Chalk of Hart Hill, Charing, Kent. Purchased, 1881.

### Order RHYNCHOCEPHALIA.

Body and limbs usually more or less lacertiform. Proximal end of quadrate immovably fixed ; inferior temporal arcade present ; postorbital, at least in existing genus, distinct from postfrontal ; palate closed ; and premaxillæ separate. Vertebræ usually amphicoelous, but occasionally opisthocœlous, and sometimes with persistent neurocentral suture ; no zygosphenes ; intercentra in some cases present. Uncinate processes to ribs in some forms ; abdominal ribs present. In the existing genus at least two centralia in carpus ; and no distinct precoracoid.

This order includes Reptiles with more or less generalized affinities, in regard to the serial position of which very different views obtain. By Cope<sup>1</sup> the group is placed between the Sauropterygia and Chelonia, while by Huxley<sup>2</sup> it is included in the Squamata (Lacertilia). The middle course proposed by Baur<sup>3</sup>, of regarding these forms as constituting a distinct order, which is placed next the latter, is here provisionally followed.

### Suborder HOMŒOSAURIA.

Premaxillæ apparently not forming a beak. Ribs without uncinate processes. Palatal dentition unknown. The group is referred to this order by Baur<sup>4</sup>, who quotes the authority of Ammon<sup>5</sup> as to the existence of an inferior temporal arcade, and suggests that intercentra were present.

<sup>1</sup> See Baur, Journ. Morphol. vol. i. pp. 93-99 (1887).

<sup>2</sup> Quart. Journ. Geol. Soc. vol. xlili. p. 692 (1887).

<sup>3</sup> Op. cit. pp. 99-100.

<sup>4</sup> Loc. cit.

<sup>5</sup> Abh. k.-bay. Ak. Wiss. vol. xv. pp. 500-528, pls. i., ii. (1885).

## Family HOMŒOSAURIDÆ.

The type family. Body of a normal lacertiform type; with not more than twenty-six presacral vertebræ. Skull comparatively short and wide, with broad facial portion, oval nares, and a distinct post-orbital bar. No tusk-like teeth in premaxilla or mandible. Phalangeals of fifth digit of pes of the normal Squamate number.

Genus **HOMŒOSAURUS**, Meyer<sup>1</sup>.

The type genus. Skull short, rounded, and broad, with large orbits. Twenty-three presacral vertebræ; tail long, with 40 vertebræ.

**Homœosaurus maximiliani**, Meyer<sup>2</sup>.

The type species. Skull very broad; 17 dorso-lumbar vertebræ; tail slender; manus not longer than forearm; pes short, with slender claws.

*Hab.* Europe (Germany).

**39355.** Cast of a slab of lithographic limestone containing the nearly entire skeleton. The original was obtained from the Kimeridgian of Kelheim, Bavaria, and is described and figured by Meyer in his 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pp. 102, 103, pl. xi, figs. 1-3. *Purchased*, 1865.

**37012.** Slab of lithographic limestone showing the impression or actual bones of the nearly entire skeleton; from the Kimeridgian of Solenhofen, Bavaria. Only an obscure impression of the skull is preserved. *Purchased*, 1862.

Genus **ARDEOSAURUS**, Meyer<sup>3</sup>.

Distinguished from *Homœosaurus* by the limbs being shorter in proportion to the length of the body, and apparently by the arrangement of the first row of tarsals.

**Ardeosaurus brevipes**, Meyer<sup>4</sup>.

Syn. *Homœosaurus brevipes*, Meyer<sup>5</sup>.

The type species; of small size.

*Hab.* Europe (Germany).

<sup>1</sup> Neues Jahrb. 1847, p. 182.—*Homosaurus*.

<sup>2</sup> Loc. cit.

<sup>3</sup> Fauna der Vorwelt—Rept. Lith. Schief. p. 106 (1860).

<sup>5</sup> Loc. cit.

<sup>4</sup> Neues Jahrb. 1855, p. 335.—*Homœosaurus*.

**38006.** Cast of a slab of limestone, showing the nearly entire skeleton. The original is the type, and was obtained in 1854 from the Kimeridgian of Workerstzell, near Eichstätt, Bavaria. It is described and figured by Meyer in the 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pp. 106–108, pl. xii. figs. 4, 5. *Purchased*, 1864.

Genus **SAPHEOSAURUS**, Meyer<sup>1</sup>.

Syn. *Piocormus*, Wagner<sup>2</sup>.

Skull longer and narrower than in *Homaeosaurus*, with proportionately smaller orbits. Twenty-two to twenty-six presacral vertebræ, and usually 42 caudals. Meyer suggests that the anterior caudals had no transverse processes. The species attain a much larger size than those of *Homaeosaurus*.

**Sapheosaurus laticeps** (Wagner<sup>3</sup>).

Syn. *Piocormus laticeps*, Wagner<sup>4</sup>.

Differs from the typical *S. thiollierei*, Meyer<sup>5</sup>, by its greatly inferior size, the presence of 26 instead of 22 presacral vertebræ, and in the relative length of the limbs.

*Hab.* Europe (France and Germany).

**39354.** Cast of a slab of lithographic limestone, showing the nearly entire skeleton. The original is the type, and was obtained from the Kimeridgian of Cirin (Rhone), France. It is figured by Wagner in the 'Abh. k.-bay. Ak. Wiss.' vol. vi. pt. 3, pl. xvii.; and also by Meyer in his 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. xiii. figs. 2, 3.

*Purchased*, 1865.

Genus **APHELOSAURUS**, Gervais<sup>6</sup>.

Skull unknown. Provisionally referred by its founder to the present group; from which, however, it may prove distinct. The phalangeals are of the normal number.

<sup>1</sup> Neues Jahrb. 1850, p. 196.

<sup>2</sup> Abh. k.-bay. Ak. Wiss. vol. vi. pt. 3, p. 664 (1852).

<sup>3</sup> Loc. cit.—*Piocormus*.

<sup>4</sup> Loc. cit.

<sup>5</sup> See 'Fauna der Vorwelt—Rept. Lith. Schiefer,' p. 108.

<sup>6</sup> Comptes Rendus, vol. xlvi. p. 193 (1859).

**Aphelosaurus lutevensis**, Gervais<sup>1</sup>.

The type and only species. About equal in size to *Sapheosaurus thiollierei*.

*Hab.* Europe (France).

- 49658.** Cast of a slab of shale, showing the trunk and limbs of the left side. The original is the type, and was obtained from the Upper Permian of Lodève (Hérault), France. It is figured by Gervais in his 'Zoologie et Paléontologie Françaises,' 2nd ed. pl. lxxxiv. fig. 1.

*Presented by the Paris Museum of Natural History.*

## Family PLEUROSAURIDÆ.

Body greatly elongated, with not less than some fifty presacral vertebrae in the type genus. Skull long and narrow, with the facial portion beak-like, and the nares forming long narrow slits. The skull has a distinct postorbital bar; and the digits of the pes are reduced to four, the number of phalangeals in the fifth being three, in place of the normal four.

This family in addition to the type genus includes *Acrosaurus* and *Anguisaurus*, Meyer<sup>2</sup>, but it does not appear certain that these are really distinct. The skull of *Acrosaurus* closely resembles that of the following specimen, although belonging to a much smaller animal. Both *Acrosaurus* and *Anguisaurus* have the tail greatly elongated.

Although there is nearly as much difference in the number of presacral vertebrae in the different genera of the *Anguidæ* (Lacer-tilia) as there is between *Homœosaurus* and *Pleurosaurus*, yet the great difference in the cranial structure of the two latter appears to be of more than merely generic value.

Genus **PLEUROSAURUS**, Meyer<sup>3</sup>.

The type genus.

**Pleurosaurus goldfussi**, Meyer<sup>4</sup>.

The type species. Length of skull 0,010; about 50 presacral vertebrae; length of tail unknown.

*Hab.* Europe (Germany).

<sup>1</sup> *Loc. cit.*

<sup>2</sup> See Meyer, Fauna der Vorwelt—Rept. Lith. Schiefer, pl. xii. figs. 6–10, and pl. xiv. fig. 2; and Palæontographica, vol. vii. p. 231.

<sup>3</sup> Nova Acta Ac. Cæs. Leop.-Car. vol. xv. pt. 2, p. 194 (1831).

<sup>4</sup> *Loc. cit.*

**37008.** Slab of lithographic limestone, showing the skeleton with the exception of the greater portion of the tail; from the Kimeridgian of Solenhofen, Bavaria. The dorsal surface is shown. The skull is much crushed; and the right ramus of the mandible is thrust up so as to exhibit its dentition. The pectoral limbs are well preserved; but the pelvic girdle and limbs have been broken up by a fracture through the sacral region. This specimen agrees so well with the type example (including the hinder portion of the trunk, the left hind limb, and the anterior moiety of the tail) figured by Meyer in his 'Fauna der Vorwelt—Rept. Lith. Schiefer,' pl. xiv. fig. 1, that there can be but little hesitation in referring it to that form; the short phalangeals of the pes being, although heaped in a confused mass, clearly apparent in the present specimen. It is, however, very difficult to see how the specimen differs from the imperfect skeleton of *Anguisaurus* represented in fig. 2 of the same plate. Meyer, indeed, states that the anterior caudal vertebræ of the latter are more slender than those of *Pleurosaurus*; but the different position in which these vertebræ are placed in the type specimens and their damaged condition in that of the last-named genus, renders any deductions drawn from this part of the skeleton very unreliable. The skull resembles very closely that of the type specimen of the small *Acrosaurus fischmanni* figured by Meyer, *op. cit.* pl. xii. fig. 6; but has a length of 0,010. The lower teeth are acrodont; and have low, compressed, lancet-shaped crowns, which are widely separated from one another, and may have had longitudinally expanded bases like those of *Acrosaurus* (*op. cit.* figs. 7-8).

*Häberlein Collection. Purchased, 1862.*

### Family TELERPETIDÆ.

In the type genus, according to Huxley, no postorbital bar in the skull; tusk-like teeth in the premaxilla and mandible; and only two phalangeals in the fifth digit of the pes. Huxley restores the skull with only one temporal arcade; and abdominal ribs have not been observed. The serial position is provisional.

Genus **TELERPETON**, Mantell<sup>1</sup>.

The type genus.

**Telerpeton elginense**, Mantell<sup>2</sup>.

The type species. Length of skull about 0,043.

*Hab.* Europe (England).

- R. 28244.** Cast of a slab of sandstone, showing the greater part of the skeleton, with the exception of the skull. The original was obtained from the Keuper (Upper Trias) of Morayshire. It is preserved in the Museum at Elgin, and is figured by Mantell in the 'Quart. Journ. Geol. Soc.' vol. viii. pl. iv. Another specimen, in which the impression of the skull is preserved, is described and figured by Huxley in vol. xxiii. pp. 77–84 of the same serial.

*Presented by Dr. G. A. Mantell, 1852.*

Genus **SAUROSTERNUM**, Huxley<sup>3</sup>.

*Syn. Batrachosaurus*, Owen<sup>4</sup> (*ex* Bain, MS.).

Very imperfectly known; but regarded by its founder as being probably allied to *Telerpeton*, and therefore provisionally placed in the same family. It has been referred by Owen<sup>4</sup> to the Labyrinthodontia.

**Saurosternum baini**, Huxley<sup>5</sup>.

The type species.

*Hab.* South Africa.

- R. 1234.** A split slab of rock showing the impression of the skeleton, (*Fig.*) without the skull; from the Karoo system of the Sniewberg Range, South Africa. The type. Described and figured by Huxley in the 'Geol. Mag.' ser. 1, vol. v. p. 201, pl. xi.

*Presented by A. G. Bain, Esq.*

- R. 1235.** Fragment of rock showing the imperfect skull, the cervical vertebræ, and the interclavicle; from the Sniewberg.

<sup>1</sup> Quart. Journ. Geol. Soc. vol. viii. p. 100 (1852).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Geol. Mag. ser. 1, vol. v. p. 201 (1868).—Amended.

<sup>4</sup> Cat. Foss. Rept. S. Africa, p. 69 (1876).

<sup>5</sup> *Loc. cit.*

Described and figured by Owen in his 'Cat. Foss. Rept. S. Africa,' p. 69 (No. S. A. 121), pl. lxx, fig. 3.

*Presented by A. G. Bain, Esq.*

**47093.** Slab of rock containing part of a larger skeleton, referred by Owen to the present form ; from the Sniewberg.

*Same history.*

### Suborder *SPHENODONTINA.*

Premaxillæ forming a more or less deflected beak ; the longitudinal series of palatine teeth separated by a groove (into which the hinder mandibular teeth are received) from those of the maxilla (figs. 68, 69). Ribs with uncinate processes.

### Family RHYNCHOSAURIDÆ.

Nares undivided ; no teeth in the premaxillary beak or opposing portion of the mandible, which were probably sheathed in horn ; extremities of the premaxillæ received between diverging extremities of mandible ; frequently more than a single row of palatine teeth. Intercentra at least frequently absent.

### Genus **RHYNCHOSAURUS**, Owen<sup>1</sup>.

Skull of moderate width, with relatively large orbit and infratemporal fossa ; dentary border of palato-maxilla but slightly convex, and external border only slightly concave and inner slightly convex. Not more than a single row of maxillary, or than two rows of palatine teeth. Mandibular symphysis relatively short, with short and obtuse rostral processes ; and rami with but slight posterior divergence. Mandibular teeth either wanting or very minute. All the vertebrae amphicoelous. Manus of moderate length.

### **Rhynchosaurus articeps**, Owen<sup>2</sup>.

The type species. Estimated length from snout to sacrum 0,280 ; length of skull 0,080.

*Hab.* Europe (England).

<sup>1</sup> Trans. Camb. Phil. Soc. vol. vii. p. 355 (1842).

<sup>2</sup> Loc. cit.

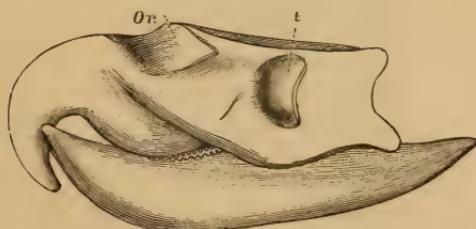
The following specimens were obtained from the Keuper (Upper Trias) of Grinsill, Warwickshire, and, unless it is stated to the contrary, were presented by Robert Gardner (jun.), Esq., 1886.

- R. 1236. The cranium, imperfect posteriorly, with the symphysis (Fig.) and greater portion of the left ramus of the mandible. Described and figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xlivi. p. 689, pl. xxvii. fig. 1, and woodcuts figs. 2 & 5. Presented by Rev. J. De La Touche, 1886.
- R. 1237. Fragment of rock, exhibiting the palatal aspect of the skull.
- R. 1238. A slab, showing a considerable portion of the skeleton of (Fig.) the same individual as No. R. 1236. The right pes is figured by Huxley, *op. cit.* pl. xxvii. fig. 5.
- R. 1239. The two sides of a split slab of stone, showing a considerable portion of the skeleton. Described by Huxley, *op. cit.* p. 690, pl. xxvii. figs. 2-4. This specimen probably belongs to the same individual as the skull No. R. 1237.
- R. 1240. Two fragments of rock, showing part of the caudal region.
- R. 1241. Fragment of rock with an imperfect limb.

Genus **HYPEROADAPEDON**, Huxley<sup>1</sup>.

Skull very short and wide, with relatively small orbit and supratemporal fossæ, of which the former is directed upwardly; dentary border of palato-maxilla highly convex, and external border concave and inner convex. Posterior maxillary and palatine teeth arranged

Fig. 67.



*Hyperodapedon gordoni*.—Diagrammatic view of the left lateral aspect of the skull; reduced. *Or*, orbit; *t*, infratemporal fossa. (After Huxley.)

in more than two longitudinal rows. Mandibular symphysis long, with elongated rostral processes; and the rami widely divergent

<sup>1</sup> Quart. Journ. Geol. Soc. vol. xv. p. 435 (1859).

posteriorly. Mandibular teeth anteriorly forming a closed palisade, but posteriorly distinct and conical. Cervical vertebræ more or less opisthocœlous in type species. Manus very short.

**Hyperodapedon gordoni**, Huxley<sup>1</sup>.

The type species. The number of rows of palatine teeth exceeding those of the maxilla (fig. 68); upper teeth with subcylindrical crowns. Cervical vertebrae opisthocœlous. Length estimated to exceed 2,000; length of skull 0,160, width of do. 0,210.

*Hab.* Europe (England).

- R. 699. A split slab of sandstone, containing the nearly entire skeleton; from the Keuper of Lossiemouth near Elgin. Described and figured by Huxley in the 'Quart. Journ. Geol. Soc.' vol. xlivi. pp. 675 *et seq.* pl. xxvi., woodcuts 1 and 4. The former woodcut is reproduced in fig. 67, and a view of the right palato-maxilla given in fig. 68.

*Presented by Rev. Dr. G. Gordon, 1886.*

Fig. 68.



*Hyperodapedon gordoni*.—Oral surface of the right palato-maxilla from the Trias of Elgin.  $\frac{1}{4}$ .

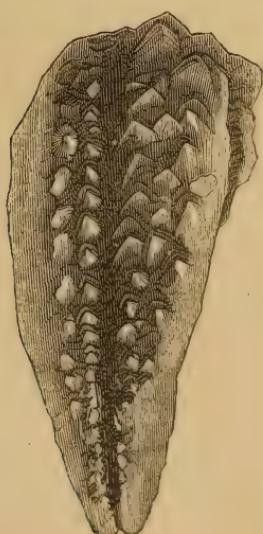
R. 330. A specimen which is apparently the rostral extremity of the (Fig.) left premaxilla of *Hyperodapedon*; from the Upper Trias of High Peake, near Sidmouth, Devonshire. This specimen is figured by Metcalfe in the 'Quart. Journ. Geol. Soc.' vol. xl. p. 260, woodcut 2, without determination; and is noticed by A. Smith Woodward in vol. xliv. p. 163, of the same serial, where it is suggested that it may belong to the present form. It agrees closely in general characters with the corresponding part of the skull of the preceding specimen, but is relatively narrower.

*Presented by H. J. Carter, Esq., 1884.*

***Hyperodapedon huxleyi*, Lydekker<sup>1</sup>.**

Known only by detached fragments. About double the size of *H. gordoni*. The number of rows of maxillary teeth exceeding those of the palatine (fig. 69); crowns of upper teeth forming triangular

Fig. 69.



*Hyperodapedon huxleyi*.—Oral surface of the right palato-maxilla;  
from the Maleri stage of Central India. {.

pyramids. If any of the vertebræ figured by the writer in pl. v. of the under-mentioned work and provisionally referred to this form really belong to it (and there is a very strong presumption that they

<sup>1</sup> Rec. Geol. Surv. Ind. vol. xiv. p. 177 (1881).

do), they indicate its wide difference from the type species. The bones of the pectoral and pelvic girdles and pectoral limb represented in pl. iv. of the same memoir are probably Crocodilian (*vide supra*, p. 130).

*Hab.* India.

*The following specimens were obtained either from the typical Maleri stage of the Gondwanas, or from the probably equivalent beds of Tiki in South Rewah. Maleri is situated near Sironcha in the Central Provinces; while South Rewah is in Central India. Similar specimens are figured by the writer in the 'Palaeontologia Indica' (Mem. Geol. Surv. Ind.), ser. 4, vol. i. pt. 5, pls. i. & ii. (1885). All were presented by the Director of the Geological Survey of India, 1886.*

- R. 579. The imperfect right palato-maxilla, with the crowns of the teeth broken off, belonging to a very large individual; from Tiki. Somewhat smaller than the specimen figured by the writer, *op. cit.* pl. i. figs. 1 & 2.
- R. 579 a. Hinder part of the right palato-maxilla, with the oral lamina of the maxilla split off; from Maleri. This specimen is nearly as large as the preceding.
- R. 579 b. Fragment of the hinder part of a large right palato-maxilla; from Maleri. The groove is well shown, and the maxillary teeth are very large.
- R. 579 c. Hinder part of the right palato-maxilla, with the teeth broken but unworn; from Tiki.
- R. 579 d. Fragment of the right maxilla of a large individual; from Maleri.
- R. 579 e. Hinder portion of the left palatine, with the teeth somewhat worn; from Maleri.
- R. 579 f. Part of a palato-maxilla; from Maleri.
- R. 579 h. Hinder part of the right maxilla of a large individual; from Maleri.
- R. 579 i. The imperfect left palato-maxilla of a small individual; from Tiki.
- R. 579 j. Part of a small right palato-maxilla, with the groove very deeply worn; from Maleri.
- R. 579 k. The imperfect anterior extremity of the right palato-maxilla; from Maleri.

- R. 579 l. Fragment of the right palato-maxilla of a young individual, with the teeth in an unworn condition; from Maleri. The triangular crowns of the teeth are well shown.
- R. 579 m. The anterior extremity of the left palato-maxilla; from Maleri.
- R. 579 n. Fragment of a damaged right palato-maxilla; from Maleri.
- R. 579 o. Fragment of the dentary bone of the right ramus of the mandible; from Maleri. Three lateral teeth on the inner surface are shown.
- R. 579 p. Fragment of a dentary bone; from Maleri.

### Order PROTEROSAURIA.

In the one genus constituting this group the skull is very imperfectly known, but appears to have been of an elongated triangular form with a closed palate, and teeth on the palatine, pterygoid, and vomer. It is suggested that the nares were approximated to the orbit; and the teeth of the jaws appear to be ankylosed to the bone, but have cavities beneath them. Cervical vertebræ much elongated and apparently opisthocœlous; postcervicals amphicœlous; posterior caudals with divided neural spines. Abdominal ribs present; but apparently no intercentra or uncinate processes. Pectoral arch and both limbs approximating more or less closely to the Rhynchocephalian type; pectoral limb considerably shorter than pelvic; according to Baur two centralia in carpus, and one centrale in the tarsus; feet pentedactylate.

This group is regarded by Seeley ('Phil. Trans.' 1887, pp. 187-213) as of ordinal value; but is included by Baur in the Rhynchocephalia. The former proposal is merely provisionally followed in this work.

### Family PROTEROSAURIDÆ.

The family characters are not yet distinguished from the ordinal.

#### Genus **PROTEROSAURUS**, Meyer<sup>1</sup>.

The only named genus<sup>2</sup>.

<sup>1</sup> Isis, 1830, p. 518.—Amended from *Protorosaurus*.

<sup>2</sup> Seeley, Phil. Trans. 1887, p. 204, suggests that *Proterosaurus meyeri* may indicate a distinct genus.

**Proterosaurus speneri**, Meyer<sup>1</sup>.

The type species. Estimated to have attained a length of from five to seven feet. Two vertebræ in sacrum.

*Hab.* Europe (Germany).

**R. 1242.** Cast of a slab of shale, showing the middle region of the skeleton and an entire pectoral limb. The original was obtained from the Kupferschiefer (Upper Permian) of Heidelberg near Schweina in Thuringia, and is preserved in the Museum of the Academy of Freiberg. It is described and figured by Geinitz in ‘Die Versteinerungen des deutschen Zechsteingebirges,’ p. 3, pl. i. (1848), and by von Meyer in his ‘Fauna der Vorwelt—Saurier aus dem Kupferschiefer,’ p. 11, pl. ii. ; and is also noticed by Seeley in the ‘Phil. Trans.’ 1887, p. 203, where it is provisionally referred to the present species, although the suggestion is made that it may prove distinct. *Purchased*, 1887.

**42760.** A split slab of shale, showing part of the vertebral column of the trunk; from the Upper Permian of Thuringia. The vertebrae agree very closely in size with those of the skeleton figured by von Meyer, *op. cit.* pl. ix.

*Van Breda Collection.* *Purchased*, 1871.

## ORDINAL POSITION UNCERTAIN.

**Genus ATOPOSAURUS**, Meyer<sup>2</sup>.

Body and limbs lacertiform. Vertebræ amphicoelous. Manus of Rhynchocephalian type; but only four digits in the pes, of which the phalangeals number 2, 3, 4, 4. Tibia and fibula, and radius and ulna respectively in close apposition; proximal carpals elongated like those of the Crocodilia. Mandibular symphysis long; dentition said to resemble that of the *Geckonidae*. No trace of scutes or scales.

**Atoposaurus oberndorferi**, Meyer<sup>3</sup>.

Of small size. Distinguished from the typical *A. jourdani*, Meyer, by the shorter vertebral centra, the longer and more slender ischium

<sup>1</sup> ‘Palæologiea,’ p. 109 (1832).

<sup>2</sup> Neues Jahrb. 1850, p. 198.

<sup>3</sup> *Loc. cit.*

and limbs, and the relative proportions of the first and second segments of the latter.

*Hab.* Europe (Germany).

- 39356.** Cast of a slab of lithographic limestone, showing the greater part of the skeleton. The original was obtained from the Kimeridgian (Upper Jurassic) of Kelheim, Bavaria, and is the type. It is described and figured by Meyer in his 'Fauna der Vorwelt—Rept. Lith. Schiefer,' p. 114, pl. xii. fig. 2. *Purchased*, 1868.



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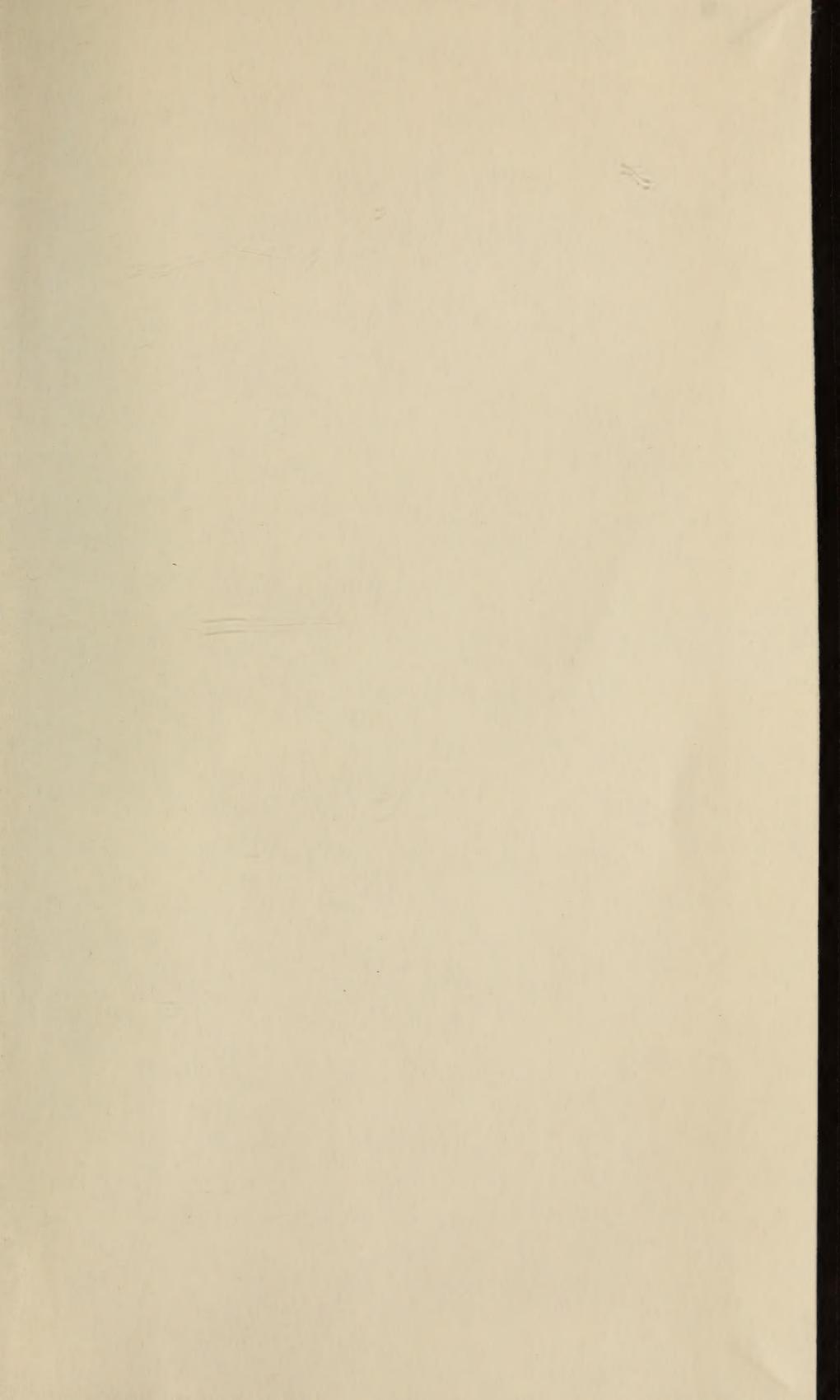
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