

from the same formation. Three new species fall to Huxley's *Acanthopholis*, one of the Dinosaurs. *Macrosaurus* is a new Dinosaur. Four new species are added to the Ichthyosaurs. There is a new species of Crocodile; seven new Plesiosaurs; three new Stenosaurs. A new Chelonian genus (*Rhinochelys*) involves one of Owen's *Chelonas*, and has sixteen species besides; and *Trachydermochelys* is another new genus from this exceedingly rich deposit of the remains of Mesozoic life.

A new *Iguanodon* (*Phillipsii*) from the Wealden is indicated. A new *Pterodactylus* and four new species of *Pleurosternon* are added from Purbeck. The Kimmeridge Clay yields a new terrestrial reptile (*Gigantosaurus megalonyx*), two new Ichthyosaurs, a new Dakosaur, two new Plesiosaurs, and a new Chelonian (*Enaliichelys*); and pages 102–105 are devoted to a critical examination of some vertebræ from the Kimmeridge Clay, that lead Mr. Seeley to refer Owen's *Plesiosaurus brachyspondylus* and *Pl. brachydeirus* both to *Pliosaurus*. Lastly, the new genus *Cryptosaurus* and some new species of Ichthyosaur, Pliosaur, Plesiosaur, and Stenosaur come from the Oxford Clay.

Great care has been taken in the preparation and production of this valuable catalogue*. The Prefatory Note by the reverend Woodwardian Curator and Professor shows his hearty earnestness in his work,—the pleasurable reminiscences of his collecting-days and fellow workers in years gone by,—his no less cordial appreciation of the researches and labours of the younger men who come and go with the tides of university life,—and his warm recognition of Mr. Seeley's zealous and patient study, some of the results of which are so conspicuously shown in this well-arranged and richly suggestive catalogue.

Professor Sedgwick intimates that other catalogues are in progress, and among them a more detailed catalogue of the Reptilian remains. It is by such adjuncts that a museum is made of value to students; and already the Woodwardian Professor has made great progress to this end, both with the catalogue before us and the magnificent work by himself and M'Coy on the British Palæozoic Fossils in the Cambridge Museum, published in 1852.

Mémoire sur les Ascobolus. Par M. E. BOUDIER. (Annales des Sciences Naturelles, cinquième série, tome x. 1868.)

M. Boudier has published an interesting account of the genus *Ascobolus* in the 'Annales des Sciences Naturelles' for 1868. It is the first time that that genus has been treated monographically, with the accompaniment of carefully drawn coloured figures, as well of the plants as seen by the unassisted eye, and slightly magnified, as of their fructification viewed under the higher powers of the microscope. M. Boudier traces the history of the genus from the

* By printer's error, probably, *procalous* and *procalian* are misspelt at pages 45 and 80.

time when Persoon described three species down to that when MM. Crouan added fourteen to those then known, in a paper in the 'Annales des Sciences' for 1857, and more recently five others in their 'Florulo du Finisterre;' and Dr. Nylander carried on the number to forty-six in his 'Observationes circa *Pezizas Fennice*.' The *Ascoboli*, as is well known, derive their name from the fact of their projecting their asci above the surface of the hymenium at the time when the sporidia approach maturity. M. Boudier retains this character as common to several genera into which he divides the *Ascoboli* as hitherto constituted; he then proceeds to trace their development from an early period, describing the young conceptacles, their asci, and paraphyses, and, lastly, the sporidia. He attributes the projection of their asci above the hymenial surface to the action of endosmose, by which they absorb fluid from the surrounding medium, and from their elasticity are able to retain the accumulated liquid for some time, becoming gradually distended; the space where they originally grew becomes at length too narrow for their increased bulk, and they are pushed up on the shoulders of the younger asci. They then eject their sporidia through a circular or subtriangular operculum at their summit. Being relieved of their contents, they again contract and partly resume their former position. Describing the sporidia of the genus *Ascobolus*, M. Boudier says that, when mature, they acquire an epispore of a waxy (not membranaceous) consistence, as is shown by the effect of friction between two glasses, when the epispore breaks up into a mass of shapeless granules. We would call attention here to the structure of the epispore of *Ascobolus immersus*, P., or *A. macrosporus*, Cr., as shown in the 'Annals of Natural History,' ser. 3. vol. xv. pl. 17. fig. 33g*, where the epispore, being carefully removed, not crushed and broken up, exhibits a resemblance to cellular tissue. M. Boudier considers the veins or rugulosities, that are so remarkable a feature in the sporidia of *Ascobolus*, to be clefts or depressions caused by the shrinking of the epispore, but thinks them of little value for specific distinction, from their variability in the same species.

The account given of the sporidia, in their various phases, is complete and full of interest. In endeavouring to follow up the mode of their germination, M. Boudier observed only the mycelioid threads usual in other Fungi, but was unable to verify the fact asserted by M. Coëmans, viz. that the threads give origin to conidia of two sorts—one in the form of a *Torula*, the other of a *Penicillium*. *Penicillium glaucum* did, indeed, appear amongst his crops of *Ascoboli*, but he states it to be of extraneous origin. And where plants so mysterious as Fungi in the mode of their reproduction are in question, great care and repeated observation are necessary before facts such as those alluded to ought to be admitted. Nor was M.

* M. Boudier does not appear to have seen the paper by Messrs. Berkeley and Broome, in the 'Annals of Natural History' for April and May 1865, in which some species of *Ascobolus* are described that are omitted in his list.

Boudier more fortunate in his endeavours to confirm the views of M. Voronin (Abhandlungen der Senckenbergischen naturforschenden Gesellschaft, 1865, pp. 333, 334); but he saw the organs named "scolécites" by M. Tulasne (Ann. Sci. Nat. sér. 5. vol. vi. p. 211-220). He considers that the fertilization of the *Ascoboli* is still involved in much obscurity.

In arranging his materials systematically, he regards the *Ascoboli* as a division of the *Pezizæ* characterized by asci furnished with round or subtriangular opercula projecting above the hymenium when nearly mature, and sporidia clothed with a waxy, coloured epispore—or hyaline, and then having a membranaceous one, not granular within nor filled with oil-globules. He divides the old genus *Ascobolus* into two principal sections, consisting of the true, and the spurious or pezizoid species, deriving his characters from the organs of fructification:—the genuine, with coloured sporidia and projecting asci; the spurious, having hyaline sporidia and asci generally little exerted, and consequently an hymenial surface only slightly papillate. These two sections are distributed into six genera, viz. *Angelina*, *Ascobolus*, *Saccobolus*, *Thecotheus*, *Ryparobius*, and *Ascophanus*. The first contains only *Ascobolus conglomeratus*, Schwein. The last five are distinguished by the shape and position of the paraphyses and asci, and the nature and arrangement of the sporidia. The characters essential to the group M. Boudier considers to be an hymenium papillate with projecting, coloured, or hyaline asci, which open by an apical, round or subtriangular operculum, and sporidia rimose, with a coloured epispore, or with a membranaceous one, and then hyaline, not granular within, with a single nucleus, and without oil-globules. The author is thus compelled to exclude certain species, as *Ascobolus pulcherrimus*, Cr., *Ascobolus Crouani*, Cooke, and others. *A. Crouani*, Cooke, is referred to the section *Humaria* of the *Pezizæ*, on account of the globules present in the sporidia; but a reference to the figure of the fruit in vol. xxiv. of the 'Linnean Transactions,' p. 495, pl. 51, shows that the globules in question become eventually reticulations, or, at least, that they are not visible in the mature state of the sporidia. Nor is it very evident wherein *Ascobolus testaceus*, Wallr., differs from *Ascophanus carneus*, Boud. pl. 12. fig. 38. The genus *Ascobolus* is restricted to those species with much-exserted asci, conspicuous for their dark tips (from the colour of the sporidia) above the rest of the hymenium, opening by a round and umbonate operculum, and enclosing eight longitudinally rimose, free sporidia, which are either naked or adherent laterally to a membrane, or each enclosed separately and then subaggregate or easily separating, and paraphyses slender and longer than the asci.

The following species are included:—*Ascobolus lignatilis*, A. & S., *A. Crouani*, Boud. (the name having been given to *A. miniatus*, Cr., by Mr. Cooke, it adds to the confusion to have it again applied to another species); *A. denudatus*, Fr.; *A. viridis*, Currey; *A. furfuraceus*, P.; *A. vinosus*, Berk.; *A. cubensis*, B. & C.; *A. aruginæus*, Fr.; *A. glaber*, P. (this species has occurred to us on rabbits' dung

only—a habitat not recorded by M. Boudier; his plant seems nevertheless to be identical with our own. Unfortunately, M. Boudier does not give measurements of the sporidia, neglecting Dr. Nylander's advice in his treatise on the Pezizæ of Finmark, and thus depriving botanists of one valuable means of identification); *A. Leveillei*, Boud.; *A. porphyrosporus*, Fr. (is this species really distinct from *A. immersus*, P.? The description by Fries accords in many respects with that of *A. macrosporus*, Cr., or *A. immersus*, P.).

The genus *Saccobolus* has an hymenium dotted with black granules—the tips of the asci, which are less exerted than in *Ascobolus*. The paraphyses are equal in length to the asci. Asci short, subquadrate above and subcuneate below; operculum subtriangular, without an umbo. Sporidia eight, having a smooth or slightly and transversely rimose epispore, enclosed in a common membrane. The following species are included:—*Saccobolus Kerverni*, Boud.; *S. violascens*, Boud.; *S. neglectus*, Boud. (this species is very near if not identical with *Ascobolus depauperatus*, B. & Br., Ann. Nat. Hist. ser. 3. vol. xv. p. 448, t. 14. fig. 6); *S. globulifer*, Boud.

The following *Ascoboli* of various authors are not incorporated in M. Boudier's genera, from want of clearness in their characters:—*A. sphericus*, Preuss.; *A. Daldinianus*, De Not.; *A. rufo-pallidus*, Karst.; *A. lapponicus*, Karst. The *Ascoboli spurii* of M. Boudier follow. *Thecotheius*, having an erumpent hymenium, rough with crystalline prominences (the tips of the much-exserted asci), filled with hyaline sporidia; *Thecotheius Pelletieri*, Boud., the only species. *Ryparobius* has a very minute receptacle, few paraphyses, and large many-spored asci, opening by a large convex operculum not much exerted: *Ryparobius brunneus*, Boud., *R. Cookei*, Boud., *R. felinus*, Boud., *R. dubius*, Boud., and *R. myriosporus*, Boud., constitute the species of this genus. The genus *Ascophanus* follows, with an hymenium papillate with crystals from the slightly exerted asci, equalling the paraphyses in length, and enclosing eight, or in one species sixteen, ovate-oblong, hyaline sporidia. The species are:—*Ascophanus minutissimus*, Boud.; *A. Coëmansii*, Boud., which seems not to differ from *Ascobolus microsporus*, B. & Br. l. c. p. 449, except in the colour of the mature sporidia; (we may observe that *Ascobolus pilosus*, Boud., or *A. ciliatus* of some writers, has sporidia of a dark violet-colour when mature, which M. Boudier does not appear to have noticed, as it would exclude it from his genus *Ascophanus*;) *A. granuliformis*, Boud.; *A. argenteus*, Boud.; *A. vicinus*, Boud.; *A. ochraceus*, Boud.; *A. sexdecemsporus*, Boud.; *A. aurora*, Boud.; *A. cinereus*, Boud.; *A. carneus*, Boud., which comes very near to *Ascobolus testaceus*, Wall.; *A. saccharinus*, Boud.; *A. difformis*, Boud., synonymous with *Ascobolus testaceus*, Karst., and possibly identical, M. Boudier thinks, with *Ascobolus saccharinus*, Currey; *A. papillatus*, Boud.; *A. ciliatus*, Boud.; and *A. pilosus*, Boud. Among spurious and doubtful *Ascoboli* is placed *A. miniatus*, Preuss. And excluded species follow, viz.:—*A. pulcherrimus*, Cr., doubtfully referred to *Peziza subhirsuta* or *P. stercorca*; *A. insignis*, Cr., referred to the same group of Pezizæ; *A. Persoonii*, Cr., re-

ferred to *Peziza*, section *Humaria*; *A. Crechqueraultii*, Cr., also placed in *Humaria*; *A. Crouani*, Cooke, placed in the same section on account of its granular sporidia, but which, as indicated above, is only the immature condition, and, from its reticulated sporidia, should probably be placed in a new genus; *A. Guernisaci*, Cr., not placed, but excluded from *Ascoboli* on account of its non-prominent asci, &c.; *A. Brassicæ*, Cr., repndiated, owing to its granular sporidia, although they are violet-coloured; *A. microscopicus*, Cr., not placed; *A. coccineus*, Cr., referred, in part, to *Peziza convexula*, P.; *A. Leveillei*, Cr., a doubtful *Ryparobius*. *Peziza cunicularia*, Boud., will hereafter, as the author thinks, constitute a new genus. *Ascobolus trifolii*, Bivona, is united with *Phacidium*. *A. atrovirens*, Nees, is *Peziza atrovirens*, P. *A. Burcardia*, Martius, is *Bulgaria globosa*. *A. coronatus*, Schum., is *Phacidium coronatum*, Fr. *A. inquinans*, Nees, is *Bulgaria inquinans*, Fr. *A. rhizophorus*, Spr., is *Rhizina levigata*, Fr. *A. sarcoides*, Nees, is *Bulgaria sarcoides*, Fr. *A. testaceus*, Wallr., is *Peziza testacea*, Moug. *A. vitis*, Wallr., is *Peziza albo-violascens*, A. & S., and also *Cyphella Curreyi*, B. & Br.

Of the genus *Ascobolus*, as limited by M. Boudier, we have two new species, *A. Crouani*, Boud., and *A. Leveillei*, Boud.; of *Saccobolus* three—*S. violaceus*, Bond., *S. neglectus*, Boud., and *S. globulifer*, Bond.; of *Ryparobius* three—*R. brunneus*, Boud., *R. felinus*, Boud., and *R. dubius*, Boud.; of *Ascophanus* two—*A. minutissimus*, Boud., and *A. vicinus*, Boud.: in all, ten new species, which, added to those included by various authors in the old genus *Ascobolus*, bring up the number of species to forty-three, besides nine belonging to other genera, of some of which the true position has not yet been determined.

M. Boudier's figures are very faithful, so far as we are acquainted with the species described, and are carefully and artistically executed; and the whole paper is essential to all who wish to become acquainted with these plants. It is to be regretted that the author has not availed himself of the characters offered by the micrometer; we would notwithstanding recommend all those who take up mycology to procure the treatise without delay.

MISCELLANEOUS.

On the Genus Asterostoma, belonging to the Family Echinocorydæ.
By M. G. COTTEAU.

AMONG the very interesting fossils from the island of Cuba sent to Paris for the Exhibition of 1867, by MM. Fernandez de Castro and Jimeno Francisco of Matanzas, there were two species of Echinida belonging to the genus *Asterostoma*, Agassiz. These Echinida, which are very remarkable for their form and the totality of their characters, thanks to the kindness of M. Jimeno, to whom they belonged, now form part of my collection; and I have been able, by examining