In conclusion, I may add that I have carefully examined a very extensive series of thin sections of the four types of Carboniferous Corals which Mr. Thomson speaks of as "the four species of *Alveolites*," and I have failed to find in a single instance any indication of any of the phenomena above mentioned as caused by the presence of mural pores. I have therefore no doubt that the corallites in these four types possessed imperforate walls; while the general structural features which they present render it certain that they are truly referable to the genus *Chatetes*, Fischer.

IV.—NOTES ON TERTIARY LACERTILIA AND OPHIDIA.

By R. LYDEKKER, B.A., F.G.S., etc.

A RECENT examination of the remains of Tertiary Lacertilia and Ophidia preserved in the British Museum having brought to light some new facts in regard to distribution, and also indicating the necessity of revision of certain determinations of other authors, I have thought it advisable to communicate the result of my observations in a collective form.

Iguana.—In his description of the vertebrates of the Quercy Phosphorites Dr. Filhol¹ describes and figures two fragments of the jaws of a small Lizard which he refers to the American genus *Iguana*, under the name of *Iguana europeana*, although in the description of the plate² they are mentioned as *Proiguana*. Among the Hastings collection from the Upper Eocene (Oligocene) of Hordwell in Hampshire I find several vertebræ (No. 32840, A) of a small Lizard, which show the minute zygosphenes characteristic of the *Iguanas*, and agree in all other respects with the vertebræ of existing forms. I have, therefore, no hesitation in referring these specimens to the *Iguanidæ*; and since (as I shall again have occasion to mention) at least a certain proportion of the Hordwell and Quercy Squamata appear specifically identical, I think it is not impossible that these specimens may belong to *I. europeana*. With regard, however, to the reference of this species to the genus *Iguana*, it will, of course, be necessary to use that term in a much wider sense than in recent herpetology, where it is restricted to two species; but if the type European form be eventually found decidedly different, the name *Proiguana* might be adopted. The occurrence of such an essentially American type in the European Tertiary is paralleled by the occurrence in the Eningen beds of the genus *Chelydra* among the Chelonians; and also of *Latonia* among the Ecaudata, which is closely allied to, if not identical with, the Brazilian *Ceratophrys*.

Placosaurus.—In his "Zoologie et Paléontologie Françaises," 2nd ed. p. 260, pl. lxiv. fig. 2, the late Prof. P. Gervais described and figured part of the cranium of a Lizard from the Upper Eocene (Lower Oligocene) of Vacluse under the name of *Placosaurus rugosus*; of which the most characteristic feature is the presence of an armour of sculptured polygonal dermal scutes on the upper surface. Many years later the same writer in his "Zoologie et Paléontologie

¹ Ann. Sci. Géol. vol. viii. p. 267.

² *Op. cit.* p. 338.

Générales," sér. 2, p. 60, gave a woodcut of the cranial scutes of another Lizard from the approximately equivalent Phosphorites of Quercy under the name of *Varanus margariticeps*, making, however, no reference whatever to *Placosaurus*. Now if the type specimens of these two forms be compared together, there cannot, I think, be much hesitation in acknowledging their generic identity; while it is perfectly clear from the presence of dermal scutes that they have nothing whatever to do with the *Varanidæ*. At a still later period Dr. Filhol¹ described and figured from the Quercy Phosphorites an imperfect dentary bone under the name of *Palæovaranus cayluxi*, and suggested that it might be the same as the so-called *Varanus margariticeps*; but since this specimen appears to belong to a true *Varanus*, it will be perfectly distinct from the latter. In the collection of the British Museum I find, however, a number of vertebræ belonging to Lizards of medium dimensions, from Quercy (No. R. 428), and also others of similar type from Hordwell (No. 32840), which agree most nearly with those of certain existing genera of *Anguidæ*, and appear decidedly distinct from those of the *Varanidæ*, although there is a great general resemblance between the vertebræ of the two families. This would lead to the conclusion that since *Placosaurus* agrees with the *Anguidæ* in the presence of dermal scutes, the vertebræ in question belong to the Quercy species of that genus. I find, moreover, a dentary bone of a Lizard from Quercy (No. R. 377) agreeing very closely with the dentary of the existing genera *Diploglossus* and *Ophisaurus*; and the presumption is therefore very strong indeed that this specimen is likewise referable to the Quercy *Placosaurus*. It appears, however, to be indistinguishable from a fragmentary dentary from Quercy figured by Dr. Filhol in pl. xxvi. fig. 425 of the work cited under the name of *Plestiodon* (= *Eumeces*) *cadurcensis*; that genus belonging to the family *Scincidæ*. That the present specimen is, however, not a Scincoid is decisively shown by the absence of the descending ridge from the coronoid on the outer aspect of the posterior extremity of the dentary, which forms such a characteristic feature in that family. Finally, on comparison of a Quercy femur (No. R. 387) with the similar specimen figured by Dr. Filhol (*op. cit.* pl. xxvi. figs. 445-446) under the name of *Palæovaranus*, I find a marked resemblance to the femur of the Anguoid genus *Diploglossus* and a wide difference from that of *Varanus*.

The foregoing evidence tends therefore to show that all the above-mentioned specimens are in all probability referable to the genus *Placosaurus*; which accordingly appears to have been a member of the *Anguidæ* provided with well-developed limbs. There is no evidence to show whether the Quercy form is really distinct from the typical Vacluse *P. rugosus*; but for the present it may perhaps be advisable to retain the specific name *margariticeps*, of which *Plestiodon cadurcensis* appears to be a synonym. The Hordwell form may belong to either the Vacluse or the Quercy representative of the genus, if these be distinct. And I may add that the North American

¹ *Op. cit.* p. 268, pl. xxvi. fig. 434 (1877).

Eocene genera *Saniva*, Leidy, and *Glyptosaurus*, Marsh, are in all probability closely related to *Placosaurus*.

Paleryx and *Palæopython*.—The genus *Paleryx* was founded in 1850 by Sir R. Owen¹ on the vertebræ of a comparatively large snake from the Hordwell Beds, which was regarded as nearly allied to the existing genus *Eryx*. In 1880 M. Rochebrune² described and figured certain Ophidian vertebræ from the Quercy Phosphorites under the new generic title of *Palæopython*; identifying one species with *Python cadurensis* of Dr. Filhol,³ and naming a second species *Palæopython Filholi*. On comparing vertebræ from Quercy in the Museum (No. R. 428, A) which are indistinguishable from the specimen figured by Rochebrune as *Palæopython cadurensis* with the type vertebra of *Paleryx rhombifer* (No. 25259), I find that the two cannot be even specifically distinguished. Similarly I find that smaller vertebræ from Quercy (No. R. 428, D) agree precisely with the types (No. 25261) of the Hordwell *Paleryx depressus*, Owen; and I believe that these are in all probability specifically identical with slightly larger Quercy vertebræ (No. R. 428, C), agreeing with the type of *Palæopython Filholi*, Rochebrune. It appears, therefore, that the genus *Palæopython* is identical with *Paleryx*, and should accordingly be abolished; but I agree with M. Rochebrune in regarding the vertebræ to which this name was applied as indicating a Snake very closely allied to *Python*, and clearly referable to the same family.

Palæophis.—The vertebræ of huge Serpents from the London and Bracklesham Clays, described by Sir Richard Owen in the memoir above cited as *Palæophis*, were regarded by him as allied to the marine *Hydrophidæ*. Other vertebræ of similar structure were subsequently obtained from marine Eocene beds in North America, and described by Prof. Marsh under the name of *Titanophis* (*Dinophis*), although regarded by Prof. Cope as generically indistinguishable from *Palæophis*. Both these writers suggested that these Serpents were more nearly allied to the *Pythonidæ* than to the *Hydrophidæ*; and in the memoir which I have already quoted M. Rochebrune came to the conclusion that they should be included in the *Pythonidæ*. If, however, the vertebræ of *Palæophis* be compared with those of *Python*, it will be seen that they differ by their much taller neural spine, by the lower position and different contour of the costal articulation, by the much less prominent zygapophyses, by the more developed hæmal carina, as well as in several minor features; and it would thus appear that on osteological grounds alone the reference to the *Pythonidæ* cannot be maintained. This inference is, however, supported by other considerations. Thus the existing *Pythons* are confined to the Old World and Australia; and, although they can and do swim well in freshwaters, they are essentially land snakes. Judging, however, from the strata in which *Palæophis* and *Titanophis* occur, there is a very strong presumption, as Sir R. Owen and Prof. Marsh have pointed out, that

¹ Reptilia of London Clay (Mon. Pal. Soc.), pt. 3, p. 67.

² Nouv. Archiv. d. Muséum, ser. 2, vol. iii. p. 277, pl. xix.

³ Ann. Sci. Géol. vol. viii. p. 270 (1877).

these Serpents were of marine habits; and the occurrences of closely allied, if not generically identical, forms on both sides of the Atlantic tends to confirm this view. In addition, therefore, to the osteological differences between *Palæophis* and the *Pythonidæ*, we have in all probability to add the difference of marine against terrestrial habits; and these two differences appear to me to leave little doubt as to the right of the former genus to represent a distinct family type—the *Palæophidæ*. There is, unfortunately, no skeleton of *Hydrophis* accessible to me for comparison with *Palæophis*, but since M. Rochebrune states that the vertebræ of the former are widely different from those of the latter, I think, for the present at any rate, it will be advisable to retain the *Palæophidæ* among the true Colubriiformes, where they may be placed after the *Pythonidæ* and allied families.

In conclusion I may observe that figures of some of the specimens I have here mentioned will be given in the British Museum Catalogue of Fossil Reptilia and Amphibia, where attention will be somewhat more fully directed to the question of the specific identity of some of the forms to which I have alluded.

V.—ON THE EFFECT OF CONTINENTAL LANDS IN ALTERING THE LEVEL OF THE ADJOINING OCEANS.¹

By Professor EDWARD HULL, LL.D., F.R.S.,
Director of the Geological Survey of Ireland.

THE effect of the attraction of continental land upon the oceanic waters adjoining seems to have been very much overlooked by British physical geographers. That some slight effect arises in the direction of elevating the surface of the ocean in proximity to the coast is generally admitted, but the amount of rise is considered to be small, perhaps insignificant. The prevalence of these views was attributed by the author to the widespread influence of Lyell's hypothesis of the uniformity of the ocean-surface all over the globe.

The author's attention had been called to the subject by the perusal of the works of the German geographers Suess² and Fischer,³ especially the latter; and he had received great assistance in his investigations from Professor G. G. Stokes, M.P., Pres.R.S., and from the Rev. Maxwell H. Close, F.G.S., which assistance he gratefully acknowledges.

In attempting to determine the relative levels of the ocean-surface along the margins of continents as compared with those of mid-oceanic islands, the German authors above quoted had based their results on observations of the length of the second's pendulum. Many years ago (1849) Stokes had shown that the force of gravity must be greater in such islands than on continental stations,⁴ and

¹ The paper will probably be published *in extenso* in the Scientific Transactions of the Royal Dublin Society (1888).

² Suess, *Das Antlitz der Erde* (1887).

³ Fischer, *Untersuchungen über die Gestalt der Erde* (1886).

⁴ Stokes, *Cambridge Philosophical Transactions*, vol. viii. pp. 672-695.