flora, as in the former, by reckoning up how many are absent, how many present, out of each hundred or section.

Chapter VIII. is devoted to a detailed account of the altitudes reached by the several species: first upon the Grampians; secondly, upon the mountains of the North of England (Lakes and Yorkshire). A few of the upper limits attained in other less explored districts are added, as a kind of supplement to or check upon the two former lists. The upper and lower limits of the plants are both given, and the names succeed each other in a descending series. The desirableness of a careful survey of the heights attained in Wales is very justly insisted upon; and we must urge that duty as no unworthy undertaking for a strong-limbed and energetic botanist who would do his science some service, and turn his knowledge of species to account.

In Chapter IX. the Orders are contrasted,—first, according to their prevalence among British plants in Europe, and in the world; secondly, as they occur in the west and east, in the south, middle, and north of Britain; and thirdly, according to their proportion in the three stages or zones of elevation.

In Chapter X. the author gives us the general results or recapitulation of his labours. It is in accordance with Mr. Watson's dislike of general remarks, that he is himself especially diffident and cautious in suggesting conclusions. If it may be said, with some truth, that the fourth volume of the 'Cybele' does not offer many new solutions of the grand problems of geographical botany, it should be remembered that such was not the professed object of its author. But, as regards the distinctive features of the flora of Britain, there is in the concluding chapter a mass of most interesting information, of which, however, space will not here permit a sufficiently extended notice. We must reserve the analysis and discussion of this part of the subject for a future occasion.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

January 11, 1860.—Dr. Gray, F.R.S., V.P., in the Chair.

Description of a New Species of Cuscus (C. ornatus) from the Island of Batchian. By Dr. John Edward Gray, F.R.S., V.P.Z.S., Pres. Ent. Soc., etc.

Mr. Wallace has sent to the British Museum a series of Mammalia collected in the Island of Batchian in the year 1859.

The most interesting specimen is a new species of the genus *Cuscus*, belonging to the section of the genus which has the inner surface of the ears bald. It may be thus described:—

Cuscus ornatus.

Male pale golden-brown; back rather darker, with small irregular white spots; crown and back with a narrow longitudinal blackish

streak, which is darker on the back, black on the crown, and indistinct on the nape; beneath rather paler, with a broad white longitudinal streak near the middle of the chest and front of the abdomen; ears produced beyond the fur, naked internally; the skull with a very deep concavity between the orbits.

Hab. Batchian.

This species is most like *Cuscus orientalis*; but in that animal the male is pure white. It differs entirely from *C. celebensis* (from Celebes) in the general colour of the fur, and in having a distinct streak on the head and back, somewhat like the streak on the back of the female *C. orientalis*, but narrower and darker.

It differs from all the other species in the nakedness of the inner surface of the ears.

The white streak on the chest and belly is not exactly in the middle of those parts; and there is a square white spot on the upper part of the right fore leg, not found on the other legs.

This animal may possibly be the coloured male of *C. orientalis*; but all the known males of that species are pure white. Can albinism be the usual, and this coloured male the unusual, characteristic of that species?

The skull of Mr. Wallace's animal from Batchian agrees in general character with the skull of *C. orientalis* (sent to the Museum as *Cuscus Quoyii* from the Moluccas), but is yet sufficiently unlike to render it very doubtful if it be not a distinct species. It is smaller; the impression on the crown is deeper and furnished with a much more decidedly raised edge, which is extended behind on the central line to the occiput; and there is a notch or ridge at the upper front angle of the orbit, not to be found on the skull of *C. orientalis*.

Some of the converts to the theory of the mutation of species may think that this animal is an instance in point; but such a hypothesis derives no support from the observations I have made.

All the difficulties here started arise from the imperfect material which the specimen affords for arriving at any definite opinion on the subject; and I believe that this is the explanation of nine-tenths, or I may say ninety-nine in a hundred, of the cases on which the theory is attempted to be established. This is not to be wondered at when we consider how very few are the animals, even of our own country, and more especially of exotic species and genera, whose history and anatomy have been properly studied. Most naturalists are of necessity in the habit of describing species from the few specimens which are brought from abroad in a more or less perfect state, without being acquainted with the changes which the animal undergoes in growing from its birth to maturity, and without the slightest indication of its habits and manners. Now, we know from experience amongst the British birds (such for example as the Rook and the Crow, and the species of the Willow Wrens), that if we were called on to describe them from such materials we might make great mistakes. A mere examination of stuffed specimens might well lead to doubts as to their distinctness as species, but this could never be the case if we had seen them alive in their native haunts, and

observed the extreme differences which exist in their habits, food, note, &c.

Judging from analogy, it is fair to believe that many of the species, even among the larger and best-known vertebrated animals, which are now considered doubtful, and sometimes only regarded as slight varieties, if properly observed and described, would prove to be quite distinct; and if this be the case with the larger animals, what must it be with the smaller articulated and molluscous or radiated animals, which are very rarely described, except from specimens in one condition, often indeed from some isolated part of the animal, as its shell or coral, as it is found in a museum? I cannot but think that until we have better materials to work from, it is rather rash to theorize on so important a question as the stability or mutability of species.

As regards the animal now before us, instead of knowing its history in all its states, and having a full account of its habits and manners (and I cannot conceive that any species is well established without all these particulars), we have only a skin with its separated skull, and that of one sex, of a genus in which the sexes sometimes differ greatly in external appearance, and of which the species are very imperfectly known.

Thus, for example, the section of the genus to which this specimen is referable contains at present two species,—one long known, and of which perhaps there are not more than twenty-five or thirty specimens in all the museums in Europe. The males in all these cases are pure white, and the females reddish with a narrow dorsal streak.

Last year I described a second species from a male, a female, and a young specimen in the British Museum, in which both sexes are ashy-grey without any dorsal streaks, and which has not been observed in any other collection. Now I have described a third from a single adult male, which is bright reddish-yellow varied with white spots, having a very distinct narrow dorsal stripe. I have every reason to believe that this is a good and distinct species, but without stronger evidence I can hardly say that it is so, particularly as I have no knowledge of the female. Moreover, all the males of the species most nearly allied to it in the different museums are pure white, a colour which is very rare in the animal kingdom, except when it arises from a state of albinism; and the eyes of this animal are represented in the published figures as red, as if it were an albino; and this male specimen has a distinct dorsal streak, which is the character that distinguishes the female of *C. orientalis* from the other species of the genus. I am therefore induced to inquire, can the males which we have hitherto had have been albinos? and is this the naturally-coloured male of that species? And though I ask the question in order to induce other naturalists further to examine the subject, I am myself inclined to regard *C. ornatus* as a distinct species. Whether this be the case or not, I do not think that this specimen affords any ground for believing that the three species of the genus were derived from a common origin, and have gradually separated themselves from each other, more especially as they all seem to be

organized on very much the same plan, and are confined to a very limited space or group of islands on the earth's surface.

Description of a Soft Tortoise (Aspidochelys Livingstonii) from the Zambesi, sent to the British Museum by Dr. Livingstone. By Dr. John Edward Gray, F.R.S., V.P.Z.S., Pres. Ent. Soc., etc.

The British Museum has lately received from Dr. Livingtone the dorsal and sternal shields of a large fluviatile Soft Tortoise from the country near the Zambesi. It was accompanied by the skull of a fœtal African Elephant, and some other bones of that animal.

Some years ago I received through the Earl of Derby a Soft Tortoise from the River Gambia, which differed from the genus *Emyda*, to which it was allied, in having no bones on the hinder part of the margin of the dorsal shield. I therefore proposed to establish for it a new genus.

When I described this genus I called it *Cyclanorbis*, but received a note from Dr. Peters, before the account of this genus was printed, in which he informed me that he had found near Mozambique, on the River Zambesi, a Tortoise which was called *Casi*, which wanted these bones on the hinder part of the margin of the dorsal shield, and which he had proposed to call *Cyclanosteus frenatus*, on account of certain black streaks on the head. I obliterated my name, and adopted that which my friend Dr. Peters had suggested, and described the one I had received from the Gambia under the name of *Cyclanosteus Petersii* (Proc. Zool. Soc. 1853; Ann. & Mag. N. H. 1855, xv. 69; Catalogue of Shielded Reptiles in the British Museum, 64, t. 29).

The animal from the Zambesi which we have received from Dr. Livingstone agrees with the animal from the Gambia in wanting the bones in the hinder part of the margin of the dorsal shield; but it differs so essentially in the structure of the sternum that it is necessary that another genus should be established for its reception. Now, it may be the *Casi* of the natives, but unfortunately Dr. Livingstone has not sent its native name, and it may be the *Cyclanosteus frenatus* of Dr. Peters; but I cannot find any description of that animal. It is not noticed, nor any other Tortoise, in the review of the Amphibia collected during his Travels, which Dr. Peters published in the 'Monatsberichte der Berliner Academie,' 1854, p. 614, and which is reprinted in Wiegmann's Arch. 1855, p. 43. Under these circumstances, as I applied Dr. Peters' name *Cyclanosteus* to the animal from the Gambia, and first gave the character to that genus derived from that species, and, as my description of that genus appears to be the only one that has been published, I think that the name *Cyclanosteus* must be retained for the Gambian Tortoise, although probably Dr. Peters in his note intended it to refer to the Mosambique form. If I do so, the reference to Dr. Peters' MS. must be erased from my account of the animal in the papers