such I found to be actually the case on the slopes of Keeling Atoll, where Captain Fitzroy's soundings were taken. Few, in fact, who have read the work of the young naturalist of the *Beagle*, can sufficiently realize how scanty were the data on which the fundamental inference of the theory of subsidence was based; and I may safely add that few must be the scientific questions that have been settled on a scantier basis of observation than that relating to the depths at which reef-corals grow.

With regard to the sections exhibiting the submarine profile of the reef of Masamarhu Island, I was first at a loss to understand why their character should be advanced as favouring the idea of a movement of subsidence, since, when they first appeared in *NATURE* (vol. xxxvi. p. 413), I regarded them as favouring Mr. Murray's views. However, it soon appeared that this opinion was based on our inextensive acquaintance with the habits of corals, especially with the limiting causes of their extension in depth. The "ditches" shown in these sections I look upon as indicating the formation of barrier-reefs at considerable depths, and as giving remarkable support to my views on the origin of these reefs. In the paper above quoted I have been led by the observations of Agassiz in the Florida seas, and by my own in the Solomon Islands, to the conclusion that the main determining condition of the depth in which reef-corals thrive is to be found in the injurious effect on coral growth of the sand and sediment produced by the breakers, and that the distribution of these materials is dependent on the angle of the seaward submarine slope and on other less important circumstances.

It follows from this that in those localities where the submarine slope is moderate, a barrier-reef will form beyond the belt of detritus derived from the shore-reef inside it. But when the slope is fairly steep, as in the case of Keeling Atoll, the reef *débris* will cover an area of much less horizontal extent, and, as at these islands, an off-lying line of coral shoals will spring up at a distance only of 150 or 200 yards from the inner reef. Should, however, the slope be precipitous, as at Masamarhu Island, the reef *débris* will extend to considerable depths; and beyond the area thus covered with sand and gravel, a line of reef will in the course of time grow upwards, giving rise to the so-called "ditches" of the sections.

Reefs of all classes, as I hold, have a two-fold mode of growth seawards. There is first the advancement of the outer edge of a reef on its own talus, as dwelt upon by Mr. Murray. In the second place, they grow seaward by a reclaiming process, whether they be fringing, barrier, or circular reefs. The distribution of the sand and *débris*, guided by the angle of the submarine slope, determines, as above shown, this second mode of growth, which may result, as at Keeling Atoll, in a line of adjacent coral banks that ultimately reclaim a new strip and add it to the width of the reef, or a more distant barrier reef may appear at the surface, the lagoon of which silts up and is choked with coral in the course of ages, or, as at Masamarhu Island, there may occur a deeply-submerged barrier-reef that can be discovered only by methodical soundings.

Let us take the instance of Keeling Atoll to illustrate the present condition of this controversy. In a series of papers on this celebrated atoll, that I am preparing for the Royal Scottish Geographical Society, I have pointed out the direct evidence of subsidence adduced in its case by Mr. Darwin is, according to Mr. G. C. Ross, its present proprietor, founded in error. In truth, Mr. H. O. Forbes, during his visit in 1878, observed evidence leading in his opinion towards a movement of upheaval. In default, then, of direct evidence, we have to look for the indirect proofs to certain *a priori* considerations, based on a few soundings that appeared to demonstrate once and for all the limit of depth of the reef-coral zone, a subject concerning which we still have very incomplete data. Then we are transported across the Indian Ocean to the 90-fathom reef of Socotra, the origin of which, for the reason just stated, is hidden in mystery. Afterwards, appeal is made to the thickness of reef limestones in Cuba and in the Sandwich Islands, limestones which, it is alleged, could only have been formed during subsidence, notwithstanding that their exact nature has not yet been determined, and in spite of the circumstance that reefs can attain a considerable thickness, as Mr. Murray rightly holds, solely by their outward growth.

If a visitor from another planet, having thus far followed the discussion, were to inquire in an apologetic manner whether, instead of going to the other hemisphere for evidence we had methodically endeavoured to investigate the problem on the

spot, by patiently studying the complex agencies at work on this atoll, by carefully inquiring into the changes of the past, and by interpreting through their aid the processes of the present, we should be obliged to answer: "Scarcely at all. A theory advanced on the very threshold of such an investigation explained so well our limited knowledge by a movement of subsidence, that it is only of late years that doubts have arisen and that a new theory has been advanced opening up the lines of research to which you refer." H. B. GUPPY.

"Bambangala."

I SHALL be glad if you will allow me to call the attention of those who visit the Congo Free State to the curious antelope called "*Bambangala*," which is spoken of by Captain Bateman in his "*The First Ascent of the Kasai*," lately published by Messrs. George Philip and Son. Captain Bateman describes it as being "in size as large as a mule; of a bright chestnut colour, striped with creamy white, much in the manner of a zebra, on the back and sides, and dappled on the neck and flanks."

From the form of the horns shown in the figure (which by the kind permission of Messrs. George Philip and Son, is here reproduced from Captain Bateman's book), it would appear that this antelope must belong to the genus *Tragelaphus*, but probably to a new species.

I should be very glad to examine specimens of the head and horns of this antelope, in case any of your correspondents in the Congo should meet with it, or to have some further information on the subject from those who have visited that region.

P. L. SCLATER.

Zoological Society of London, 3 Hanover Square,
London, W., May 7.

Inclusion of the Foot in the Abdominal Cavity of a Duckling.

A DUCKLING, four days old, sent from Eastry in Kent, hatched on April 25, 1889, presented the above curious abnormality. The right lower extremity was normal in every respect; the left appeared on superficial examination to be absent. An incision made through the skin over the left flank at once disclosed the left limb, the joints being flexed to their utmost extent, and the thigh adducted, so that it lay in contact with the abdominal muscles of the left side; at the tibio-tarsal joint the limb passed through the wall of the abdomen, a few millimetres above the symphysis pubis. A portion of the yolk-sac protruded at the aperture by which the foot penetrated the abdominal wall. Opening the abdomen showed the remainder of the yolk-sac, its connection with the ileum, and the left foot lying upon the surface of the intestines. This included foot was fully developed, having a complete web, and being covered with scales. An adhesion existed between the outer surface of the yolk-sac and the left leg in the region of its tibio-tarsal joint, and there were also adhesions of the sac to the skin of the abdomen,