Lucien Bonaparte, puts it next to the West African *Buphagæ*. Now the *Buphagæ* are certainly dull birds, while *Scissirostrum* is described in the "Malay Archipelago" as "almost entirely of a slaty colour, with yellow bill and feet, but the feathers of the rump and upper tail-coverts each terminate in a rigid glossy pencil or tuft of a vivid crimson" (i. 430). I wrote with this passage of Mr. Wallace's under my eyes, and refer in a footnote to his volume for the vivid crimson. I did not say the bird was brilliant, I merely noticed the colour of its tail and beak. The case really stands thus: If *Scissirostrum* was differentiated from a generic ancestor generally resembling *Buphaga*, we have to inquire, why did it develop these ornamental adjuncts? and my answer is, because while *Buphaga* pecks the parasites of the backs of mammals, *Scissirostrum* feeds off "grains and fruits."

2. "Santarem, of which it is said 'the pastures are destitute of flowers, and also of animal life, with the exception of a few small plain-coloured birds,' is one of the richest localities for flowering shrubs in South America." Now, this passage to which Mr. Wallace takes exception is not mine, but is a textual quotation from Mr. Bates ("Naturalist on the Amazons," p. 183). It is given in inverted commas in my text, with reference to the original in a footnote. I was, of course, aware that the Brazilian woods generally were full of brilliant birds, and that "the butterflies in the adjacent forests were gorgeous in the extreme." What I wished to point out was that in particular spots like these meadows, where the general aspect of the flora was not bright, the purely local fauna was likewise dull. We may find great varieties in this respect nearer home in a meadow, an adjacent warren, and a moor or swamp behind it. Moreover, the passage was professedly quoted, simply as showing the general impression left upon my mind by reading various books of travel. May I add a sentence from a private letter of Mr. Darwin's, which helps out the same view on a larger scale? "The contrast," he says, "in the colour of the birds in Patagonia" (where he had just noticed "the sombre aspect of nature"), "and on the bright green flower decked plains of La Plata is very striking."

3. About a certain squirrel, described in the "Malay Archipelago" as having a tail "ringed with gray, yellow, and brown," and as looking "exceedingly pretty," Mr. Wallace now says it "is one of the dullest of the group," while he did not "say a word about its feeding on 'bright-coloured fruits.'" But he *did* say that it would eat "any fruit" (i. 192), and I presume, therefore, that it sometimes eats "bright-coloured food."

4. "So far from the colours of caterpillars being 'mostly protective,' every entomologist knows that a large number of caterpillars in every part of the world are conspicuously coloured." True; but Mr. Wallace himself was the first to suggest that these conspicuous colours were themselves protective by giving warning of inedibility; and I am at a loss to understand what he means by thus going back upon his own words. I took my statement from Sir John Lubbock's lecture "On Certain Relations between Plants and Insects," pp. 23–24, where this fact of universal protective colouring in larvæ is very clearly brought out.

5. "Again, the ground-feeding pheasant family are passed over as containing only one brilliant bird, the peacock, whereas it abounds in species of the most gorgeous colour." But my words are very different from this—"Even among the pheasants themselves," I say on p. 176, "many species are far from brilliant; and when we come to compare the whole family with that of the parrots or the humming-birds, we shall find that the peacock alone can fairly come into competition with the typical fruit-eaters and flower-feeders." Mr. Wallace goes on to mention (amongst others) the "Impeyan pheasant of the Himalayas," and "the intensely-brilliant fire-backed pheasants of the Malay countries," as among the most brightly-coloured species. Any one would suppose from his review that I had totally overlooked these cases; but in the very same paragraph with the sentence which Mr. Wallace blames the following passage occurs:—"The forests of the Himalayas and the Malay Archipelago, with their great brilliant fruits and flowers, and their exquisite insects, form the haunts of the most beautiful species of pheasants" (p. 177). As a matter of fact, before writing that paragraph I had carefully compared all the living *phasianidæ* in the Zoological Gardens, and all the preserved specimens in the British and Oxford Muesums; and I feel sure that any one who does the same will agree with me that the peacock alone can be placed in the very first rank of brilliant colouration.

6. How much the subjective element enters into these questions may be seen from the following remark of Mr. Wallace:—"The tigers, the zebras, the beautifully-marked antelopes, and the spotted deer and giraffes, *which are really among the most brightly-coloured of all mammals*, are passed over as less beautifully coloured than the squirrels and monkeys." Now I confess myself simply astounded at the statement that the zebra, of all animals in the world, is brightly coloured—a creature without a tinge of anything but creamy white and black about its body. Quite apart from the nature of food or surroundings, I call a panda a brightly-coloured mammal; or a mandrill; or a Rhesus monkey; or a Canadian chipmonk; but certainly not a tiger, a zebra, or a giraffe, none of which has a single tinge of scarlet, blue, green, or bright yellow.

No one who knows anything of Mr. Wallace could for one moment imagine him capable of intentionally misrepresenting the humblest opponent in the smallest particular; and I owe him many thanks for much kind and appreciative criticism both on this and several previous occasions. Yet I cannot help thinking that in these instances, and others with which I will not burden your space, he has unconsciously permitted mere differences of opinion unduly to assume the appearance of positive errors in fact.

GRANT ALLEN

Remarks by the Reviewer

1. *Scissirostrum Pagei* is universally placed in the starling family. Its affinity to *Buphaga* is very doubtful, while its *crimson-tipped tail-coverts* are very different from "*a tail of vivid crimson*" which Mr. Allen gives it (p. 184).

2. I object altogether to founding theories on chance expressions of travellers. It is curious, that in my "Travels on the Amazon" (p. 157) I refer to these same Santarem pastures as follows:—"There were some boggy meadows here, more like those of Europe than one often sees so near the equator, on which were growing pretty, small *Melastomas* and other flowers. The paths and campos were covered with flowering myrtles, tall *Melastomas*, and numbers of passion-flowers, convolvuluses, and bignonias." These open meadows and campos really exhibited more conspicuous flowers than the woods and forests which swarmed with brilliant butterflies and birds.

3. I referred to the squirrel, because it was the only example given by Mr. Allen which I could at the moment test.

4. My argument is, that the colours of caterpillars are often as varied, as vivid, and as beautifully arranged as in birds and winged insects. This is not necessary for protection by *conspicuousness*, for which purpose any tint contrasted with foliage, such as black, or white, or ringed with black-and-white, would have sufficed.

5. The "pheasant" question I leave, as Mr. Allen has placed it, for the consideration of naturalists.

6. Here it seems to me Mr. Allen is himself changing his ground. His main argument is that the æsthetic tastes of the higher animals are the same as ours, yet he objects to the elegantly-marked and intensely-contrasted zebra and tiger being called "brightly-coloured." Surely they are more beautiful than the mandrill or the Rhesus; while among animals *white* is as much a colour as among flowers.

ALFRED R. WALLACE

Nitric Acid Batteries

I INCLOSE the results of some experiments I have lately made to ascertain if the cost of working the nitric acid batteries of Grove and Bunsen could be reduced. I find that the nitric acid can be replaced by a mixture of half nitric and half dilute sulphuric. And the latter gives a higher force for nearly three hours. The experiments were made with a large-surface voltameter, and the gases were collected during one minute every half-hour; four pint-size cells were used. The experiments were repeated, and every care taken to avoid any error. I have also used the mixed acids very successfully with twenty-eight cells for the electric light. I presume the increased power is due to the internal resistance of the battery being slightly lowered by the addition of the dilute sulphuric acid in the porous cell. I may add that the fumes were much less than when nitric acid alone is used.

JOHN HENRY KNIGHT

Farnham, April 19

The Black Rat

IN regard to the distribubution of the black rat (*Mus rattus*), your correspondent may be glad to know that this animal, spread