

of ice, may all be supposed capable of checking the escape of the gas. However, we have first to verify the fact. On the appearance of Mr. Harding's letter, I wrote to the Hon. W. H. Gosling, of Bermuda, a gentleman well known for his interest in matters of scientific inquiry, and begged him to investigate the story. His reply is before me, dated November 4:—

"On Saturday, October 31, I visited the spot where the balloon was alleged to have been seen. I am convinced of the fact. The place is a high hill east of the lighthouse. The two women were accidentally out in a field near where they live. Mrs. Bassett saw the object in the sky, high up, many times higher than the light. It seemed to her under the clouds. She knew nothing of balloons, and thought a whirlwind had raised some nets from the sea, as it appeared to her an object from which nets were suspended. She fancied she saw the corks of the net hanging at the bottom." (Mr. Gosling here remarks, "No doubt the basket, or the remains of it, of the former account, with chains, were the suggestion of her husband, who did not see it.") "She called her neighbour, and they both watched its course out over the sea, south, until it disappeared from view, which would not take long, as a brisk north wind was blowing. No one else seems to have seen it, nor would these, had not one of them accidentally looked up.

"I cannot hear of any balloon having been sent up in America, but on September 17, three weeks later, a balloon impaled itself on a church steeple in Chicago, U.S. The basket contained some torn clothing, and a branch of oak, as if it had come in contact with trees. The wind here on the three succeeding days was east, south-east, south. I suppose you know of the report of the missing balloon from Paris, in July, seen afterwards in the Bay of Biscay, going west."

So far Mr. Gosling, who incloses an intelligent letter from Mr. Robert T. Bassett, husband of the first witness, giving some compass bearings.

The *Monthly Weather Review* of the United States for September, which has not yet reached England, may perhaps throw light on the probability of an object seen floating in the air over Bermuda on August 27, whether arrived from Europe or not, being transported to Chicago by September 17. The coincidence is remarkable, but I know nothing of this incident beyond Mr. Gosling's mention of it. High winds with heavy rains prevailed in the South Atlantic and East Gulf States of the American Union on August 31, and the centre of a cyclone travelling in a north-easterly direction was then off the coast of South Carolina. A balloon drifting south from Bermuda on August 27 would be caught in the south-east quadrant of such a cyclone; and if it kept afloat long enough would, in a few days, be landed in a north-westerly and then in a northerly direction. The conditions of the question oblige me to assume that it is not a physical impossibility for a balloon, with very little weight attached, to drift about for weeks; but the singularity of the occurrence calls for every investigation, and should you admit this long communication, I hope that further evidence may be procurable from Chicago.

J. H. LEFROY

Par Station, Cornwall, November 23

"Evolution without Natural Selection"

BELIEVING as I do that the words of a reviewer should be final, it is with no small amount of hesitation that I pen the following few remarks on the review of my little work entitled "Evolution without Natural Selection," which appeared in *NATURE* of November 12 (p. 26). The curious way in which my book has been misunderstood, and my consequent endeavour to put matters in a clear and impartial light, must be my apology for taking up your valuable space. In the first place, Mr. Romanes finds fault with the title of my book; but why, it is hard to conjecture. I venture to assert that nine-tenths of the matter it contains attempt to illustrate the operation of evolution without any natural selective process, as any impartial reader must admit; consequently, I absolutely deny that I only reserved a few odds and ends of small detail which I ascribed to other agencies. I might also state that I had a reason, and I think a very good one, in confining my remarks exclusively to birds. Had I elected to cover a wider area, I could have shown that these "odds and ends," as Mr. Romanes somewhat contemptuously calls them, do not by any means exclusively apply to birds, but to species in every other department of natural history. Mr. Romanes goes on to say that "It is the very essence of the Darwinian hypothesis that it only seeks to explain the apparently

purposive variations, or variations of an adaptive kind; and, therefore, if any variations are taken to be non-adaptive, *ex hypothesi* they cannot have been due to natural selection." Precisely. And it was the immense amount of what I may call non-purposive variation which forms the line of demarcation between such vast numbers of species that I have attempted to explain by other agencies when natural selection utterly fails to do so. I most emphatically deny that I ever said, or even inferred, that these variations are "for the most part rare," as Mr. Romanes leads the reader of his review to suppose. All naturalists who are in the habit of working through large series of specimens are well aware of the immense number of species whose claim to rank as such is based upon their slight variation from a dominant type. It took me five years' hard work amongst tens of thousands of specimens to arrive at the conclusions expressed in my little book; and, in my opinion, no naturalist is qualified to write on these subjects without serving such an apprenticeship. That is why, as a specialist, I confined myself to birds alone for my examples. In the face of the array of important facts which I endeavoured to chronicle, it seems strange for a naturalist of such standing as Mr. Romanes to state that these facts "may be freely presented to the anti-Darwinians." Why "anti-Darwinians," Mr. Romanes? No one but an evolutionist (and most evolutionists are surely Darwinians) would attach any importance to these "trivial variations," and consequent intergradation of specific forms. Mr. Romanes is careful to point out how Darwin himself admits that if these trivial specific characters are "really of no considerable importance in the struggle for life, they could not be modified or formed through natural selection." Now probably it is no exaggeration to say that at least one-third of the known recognised species absolutely rest on these "trivial specific characters." If they have not been evolved by natural selection, I maintain that other and as equally potent agents as natural selection have been at work. The object of my little book was to try and explain them.

A word as to the *cause* of variation. No one who understands anything at all about the theory of natural selection ever supposes that it is an original cause of variation. Mr. Romanes cannot have read my essay very closely, for had he done so he would have seen that I drew the reader's attention to this fact (*conf.* p. 49). The *cause* of variation is quite another question, and one which after all did not materially concern my treatment of the subject. Nevertheless, I alluded to the use and disuse of organs as a direct cause of variation. I would also wish to point out that Mr. Romanes is entirely in error in saying that I "everywhere speak of isolation as the *cause* of minute specific characters." All I endeavoured to show was that isolation can preserve a non-beneficial variation when it has arisen, just as much and effectually as natural selection can preserve a beneficial variation.

Did space permit, I would like to say a few words on climatic variation, and the probable times at which natural selection is most active in the evolution of species; on both which subjects Mr. Romanes unconsciously misrepresents me. My reviewer has nothing whatever to say on my treatment of sexual selection; the use and disuse of organs, inter-crossing, the local distribution of specialised forms, polar centres as points of dispersal, &c.

Mr. Romanes seems to think that my little book was written in an anti-Darwinian spirit. Nothing of the sort. On my last page but one I said, "Let it be clearly understood that not one single syllable in the foregoing pages has been written antagonistic to Darwin's theory of Natural Selection. All I have done has been to attempt to explain certain phenomena which the Darwinian hypothesis can never do, and which its supporters ought never to have attempted to make it explain." If I have not made my meaning plain, and thus left myself open to misunderstanding, it will be a source of great regret. Science and simplicity should be synonymous. In the French edition, shortly to be published, which is now being translated by Dr. Varigny, of Paris, I hope to make a few corrections and additions, which I trust may possibly render me less liable to be misrepresented in future.

CHARLES DIXON

London, November 21

I FREELY admit that the impression left upon my mind after reading Mr. Dixon's essay was the same as that which was first conveyed by its title—viz. that the author supposed his work to