

thorough acquaintance with all that has been written on his subject, as well as his intimate correspondence with the principal echinologists, is a sufficient guarantee that no important memoir (such as Wright's monograph) could have escaped him. Anyone who will take the trouble of turning to Cotteau's work (p. 111) will find, under *Pseudodiadema hemisphericum*, a notice of Dr. Wright's figure of the same species (so much superior, with many others, to Cotteau's?) and a reference to his description. Nor is this an isolated case. Throughout the work M. Cotteau discusses and criticises more or less the results of this very monograph, said to have been overlooked by him. The mistake Cotteau is accused of making of assigning to Desor instead of Agassiz the specific name of *Pseudodiadema hemisphericum* is entirely unfounded. Referring again to p. III., we find, as a synonym, *Diadema hemisphericum* Agass. M. Cotteau, like many continental and American writers, does not interpret the notation of species as is required by the laws of the British Association, but for that reason he should not be accused of committing mistakes which his own writings show him not to have committed. M. Cotteau, in common with others, looks upon nomenclature simply as a matter of registration; and when M. Desor transfers to *Pseudodiadema* the *Diadema hemisphericum* Agass., M. Cotteau writes, therefore, *Pseudodiadema hemisphericum* Desor, and not Agassiz; he may be wrong, according to the principles of the writer in NATURE, but he has not, either in this instance or in the other cases alluded to, committed a mistake through ignorance of the subject. A. AGASSIZ

#### Mr. Howorth on Darwinism

MR. HOWORTH sneers at "Survival of the Fittest" as an "identical expression" which "might have suggested itself even to a child," an axiom, in short, of which the truth cannot be disputed. This is satisfactory; but it is strange that he did not apply this axiom to his own theory, and see how they agreed together. He would probably admit, as another discovery "that might have suggested itself to a child," that as a rule the entire offspring of each animal or plant, except the one or two necessary to replace the parents, die before they produce offspring (this has never been denied since I put it prominently forward thirteen years ago). He would further admit, I have little doubt, that a great majority of animals and plants produce during their lifetime from ten to a thousand offspring, so that fifty will be a low average, but the exact number is of no importance. Forty-nine, therefore, of every fifty individuals born, die before reaching maturity; the fiftieth survives because it is "best fitted to survive," because it has conquered in the struggle for existence. Will Mr. Howorth also admit as self-evident, that this one survivor in fifty is healthy, vigorous, and well nourished, not sickly, weak, or half-starved? If he maintains that it is the latter, I shall ask him to prove it; if the former, then what becomes of his theory as an argument against Natural Selection? For, admitting as a possibility that his theory of the greater fecundity of the weak, &c., is true, how are these weak or sickly parents to provide for and bring up to maturity their offspring, and how are the offspring themselves (undoubtedly less vigorous than the offspring of strong and healthy parents) to maintain themselves? The one in fifty who survives to leave descendants will inevitably be the strong and healthy offspring of strong and healthy parents; the forty-nine who die will comprise the weaker and less healthy offspring of weak and sickly parents; so that, as Mr. Darwin and myself have long ago shown, the number of offspring produced is, in most cases, the least important of the factors in determining the continuance of a species.

I have thought it better to go thus into the heart of the question, rather than defend myself from the charge of dogmatism, for stating as a fact that the most vigorous plants and animals are the most fertile. I repeat the statement, however, referring to Mr. Darwin's observations, and especially to those in which he demonstrates by experiment that cross-breeding produces the most vigorous and luxuriant plants, which again produce by far the largest quantity of seed. The facts that wild animals and plants are, as a rule, healthy and vigorous, that the head of the herd is the strongest bull, and that weak and sickly carnivora are rarely found because they must inevitably starve to death, sufficiently refute Mr. Howorth's theory as against Natural Selection. If he can point to any district upon the earth where the animals and plants are in a state of chronic debility, disease, and starvation,

I may admit that there his theory holds good; but such a district has not yet come under my observation, or, as far as I am aware of, been recorded by any traveller.

I still maintain (Prof. Jowett's authority notwithstanding) that the phrase "Persistence of the Stronger" does not truly represent "Natural Selection" or the struggle for existence; and, though it may often be true, is not the whole truth. The arguments of Mr. Howorth from the history of savages will, I think, not have much weight, if we may take as an example his putting together as cause and effect the extinction of the Hottentots and their now obtaining enough to eat. ALFRED R. WALLACE

MR. ALFRED WALLACE directs attention to the gross error of supposing that "the struggle for existence means the persistence of the stronger," and correctly stigmatises this view of Mr. Howorth's "a pure misrepresentation."

It is, as Mr. Wallace remarks, very curious and even ludicrous, after all that has been said and written upon the matter, that anyone should fail to recognise the advantages to their possessor of "obscure colours," "cunning," "nauseousness," "bad odour," and other qualities superior to strength alone. The creature having these properties, at last brought to perfection through the operation of natural selection, acting through countless generations, will assuredly have the advantage in the battle of life over its less fortunate neighbours. It will survive in the struggle for existence. Having survived, is it not better that it should at once teach the world the law of its survival, and proclaim itself the fittest to survive, than that it should remain silent until those whom it has destroyed may rise from the dead and admit that their doom was deserved because they were not fit to live? LIONEL S. BEALE

MR. HOWORTH, it seems to me, has not chosen a very favourable time for so strongly maintaining the truth of Mr. Doubleday's theory, seeing that the recent census has shown that the population of England has increased not only with an increment absolutely greater than that shown by any previous census, but also—and this is still more important—with an increase proportionally greater than during the last decade. Yet never, surely, has luxury been so prevalent among us as during these last ten years. The evidence thus afforded will perhaps be deemed more conclusive than the argument of Mr. J. S. Mill, who invites those who may be inclined to accept Mr. Doubleday's opinions "to look through a volume of the Peerage, and observe the enormous families almost universal in that class; or call to mind the large families of the English clergy, and generally of the middle classes of England" ("Principles of Political Economy," bk. I, ch. x., note). Mr. Howorth, however, states that "the classes among us who team with children are not the well-to-do and the comfortable." If this statement were absolutely true, it would be of little service to Mr. Howorth, since it is in the classes referred to that prudential restraint acts with the greatest force, and the effects of this restraint, both direct and indirect, would have to be taken into account before his conclusion could be admitted. He further asserts that "a state of debility of the population induces fertility," since "where mortality is the greatest there is much the greatest fecundity." That births should be most numerous where the mortality is greatest, requires for its explanation no hypothesis respecting the fertilising power of debility. "The fact," says Malthus, "may be accounted for without resorting to so strange a supposition as that the fruitfulness of women should vary inversely as their health. . . . When a great mortality takes place, a proportional number of births immediately ensues, owing both to the greater number of yearly marriages from the increased demand for labour, and the greater fecundity of each marriage from being contracted at an earlier, and naturally more prolific, age" (vol. i., pp. 472, 473, 5th edit.). Man's reproductive power is always in civilised life more or less checked, and ready to be more or less exercised in proportion to the lessening by death of the restraining pressure.

THOMAS TYLER

MR. WALLACE, in replying to Mr. Howorth's objections to the theory of Natural Selection, points out that that gentleman first misrepresents Darwinism, and that having done so he does not employ the distorted doctrine as premisses to a further con-