THURSDAY, MAY 25, 1893.

REASON versus INSTINCT.

The Intelligence of Animals. By Charles William Purnell, Barrister-at-Law. (Christchurch and Dunedin, N.Z.: Whitcombe and Tombs, Limited, 1893.)

THIS little work has been written, the author states, in order to awaken public interest in the daily lives of the numerous animals which surround us, and to enforce the view that they are not mere lumps of animated clay, but creatures quickened by the fire of intelligence, and mentally as well as physically our brethren. The facts and arguments of modern writers on the subject have been condensed, and the results presented in a way calculated to interest the average reader, but always from the somewhat peculiar standpoint of the author. In his own words:—"The object of this work is, first, to prove that, among animals instinct, as distinguished from intelligence, is non-existent, that, in fact, it is a mere name; and, secondly, that the intelligence of the higher animals is essentially the same as our own."

After giving the definition of instinct from several writers, he proceeds to discuss the "Origin of Instincts," and he attributes it to hereditary habit, apparently unaware that the hereditary transmission of habits is either doubted or actually denied by a large number of naturalists. And he does not seem quite clear himself as to the meaning attached to the term, and to the necessity of excluding in any particular case in which it is alleged to exist, the possible influence of imitation, of physical or mental idiosyncrasies which are admittedly hereditary, and of natural or artificial selection. He considers handwriting to be sometimes hereditary, but does not apparently see that both imitation and inherited muscular or nervous peculiarities are almost sure to be present; while in the case of trained dogs and horses whose acquired habits are supposed to be hereditary, he clearly perceives that selection comes in, since he says:—"We know precisely how these habits have been acquired. The dogs and horses have been taught them by slow degrees; the animals displaying most aptitude for their acquisition have been carefully selected as breeders, until, finally, the habit has grown into the animal's mental constitution, and is perpetuated from parent to offspring." Further on, he tells us that when the beaver builds a lodge or constructs a dam, it does so by virtue of the inherited experiences of its forefathers. Of this there is no evidence whatever, while we are told that there is evidence of increased skill with age; so that instruction by, and imitation of, the older animals, with progressive improvement through experience, will account for all the facts.

A considerable portion of the work is occupied by facts and arguments directed against the doctrine that the actions of animals emanate from blind instinct, a doctrine which Mr. Purnell seems to think is almost universally held. When speaking of animals exhibiting joy, grief, love, hatred, pride, shame, revenge, or jealousy, he adds that we cannot conceive of an automaton being thus moved. And, after describing the dances of gnats and other insects, and the amusements of ants, he again declares that he cannot believe that these are "mindless beings no more responsible for their actions than the piston of a steam engine." Similar remarks are repeated again and again, as if the doctrine of the automatism of animals, instead of a philosopher's paradox, was the common belief of the educated world.

The author fully adopts the view that animals possess an æsthetic sense, admiring beauty of form and colour for its own sake; and he appears to be quite unaware that all the facts he adduces are explicable on the theory that the varied ornaments which we admire as being beautiful in themselves, may be to animals mere signs of the presence of desirable objects. Throughout his chapter on this subject he repeatedly states as facts, that animals *do* love beauty; that what delights our eyes delights their eyes also; that they admire the beauty of their fellow's brilliant colours; and as an indication that this is so, he urges that the colours of all animals form "harmonious combinations." The colours may be gaudy or odd, but they "harmonise well together," and "a true and perfect harmony does actually prevail in the colours of animals." This is often asserted, but how can it be proved? Do the glaring colours of the blue and yellow macaw form a harmonious combination? Or those of many of the barbets or chatterers? The colours, contemplated individually, are beautiful, owing to their purity and the delicacy of the glossy surface on which they are exhibited, often presenting the lustre of silk or satin, or the soft texture of velvet, while the rounded contours and delicate gradations of tint are also pleasing. But to assert that the combinations of colours are always, or even usually harmonious, in the sense in which we use the term as applied to combinations in a lady's dress or in the decorations of a room, seems to me to be completely opposed to the facts.

Notwithstanding these slight drawbacks, the work is full of interest. Almost every aspect of the subject is touched upon, and the writer often displays much originality in his discussions. We find very interesting chapters on the amusements of animals, on their individuality of character, on the education of their young, and on their language; and if he had confined his statement as to reason *versus* instinct, to the case of the higher animals, we might have been inclined to acknowledge that his view is the correct one. He does not, however, attempt to show how the theory of reason will apply to the acts of the larvæ of many insects, which seek special stations and construct special habitations for the pupæ, or of the perfect insects which lay up food for their young with the most admirable foresight and precautions. For these cases he falls back on hereditary habit; but it is difficult to see how this differs from the instinct which at the outset he denies the existence of.

Among the most original portions of the book is the chapter "On the Aspect which Man presents to the Lower Animals," and that on "The Animal View of the World." These are not so purely speculative as would appear at first sight, and some very good reasons are advanced for the conclusions arrived at. Mr. Purnell holds very strong views as to the rights of animals. He

maintains that we are not justified in destroying them without adequate reasons. "The struggle for existence may force us to kill them for food or for our own self preservation; but the mere sportsman, and still less, he who destroys animals simply in order to display his skill in shooting, can show no moral sanction for his acts." And after a strong protest against cruelty to animals, he adds:—"Fortunately for us, the memory of the unutterable wrongs which dumb animals have sustained at man's hands cannot have been transmitted by them from generation to generation, or assuredly the entire Animal Kingdom would rise up in fierce rebellion against the common oppressor!"

On the whole, the book is very pleasingly and clearly written; it is divided into a number of short chapters each treating some well-defined aspect of the question; it contains examples of the best and most instructive facts illustrative of animal intelligence, and it is pervaded by a feeling of sympathy for the whole of animated nature. It is a pity that it is not issued in a more attractive form, the paper covers being hardly suited for such a book; but it is nevertheless well adapted as an introduction to the study of the subject, and will be especially interesting to those who think highly of the intelligence as opposed to the mere instincts of animals, and who are not afraid to recognise that even in their mental faculties and emotions the lower animals have much in common with ourselves.

ALFRED R. WALLACE.

OUR BOOK SHELF.

The Principles of Agriculture. By G. Fletcher. (Derby: The Central Educational Company, Ld.)

THIS little book is essentially a note-book of lectures given by the author, at the instance of the Technical Education Committee of the Derbyshire County Council, to schoolmasters and others intending to become teachers of agriculture. The syllabus covers the ground usually gone over in such a course, the arrangement of subjects being somewhat similar to that adopted by Fream in his well-known "Elements." The book contains, in a small space, a good deal of information, and, at the same time, indicates points with which the student should make himself acquainted, but which could not be given in detail in a work of this kind. It seems to be carefully written, and, on the whole, very free from errors; it will, no doubt, be a useful guide both to teachers and students of agriculture.

Au Bord de la Mer: Géologie, Faune, et Flore des Côtes de France. Par le Dr. E. L. Trouessart. (Paris: J. B. Baillière et Fils, 1893.)

IT often happens that people who go to the seaside for a holiday would be glad, if they could, to learn something about the scientific meaning of the objects by which they are surrounded. They have neither time nor inclination for the study of elaborate works, and as a rule there is not much to be gained by the perusal of local guide-books. Persons of this class in France will find exactly what they want in the present volume. The author gives first a sketch of the geology of the French coasts from Dunkirk to Biarritz, then deals with such marine plants as are likely to interest the reader, and finally presents an account of marine animals. The style is clear and unpretending, and the text is illustrated with no fewer than 149 figures.

LETTERS TO THE EDITOR.

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Mr. H. O. Forbes's Discoveries in the Chatham Islands.

IN a recent letter in NATURE (vol. xlviii. p. 27), under the above heading, Mr. Wallace has done me the honour to make some observations on the conclusions I have arrived at on other discoveries I have made in the Chatham Islands, and on the evidence adduced in my paper read before the Royal Geographical Society on March 12 last, *i.e.*, that an Antarctic continent—which I may name Antipodea—is necessary to explain the distribution of life in the southern hemisphere. Mr. Wallace says, "It is this tremendous hypothesis which appears to me to be not only quite unnecessary to explain the facts, but also to be inadequate to explain them. If one thing more than another is clear, it is that these comparatively small flightless birds were developed, as such, in or near to the islands where they are now found, since they could not possibly have arisen on any extensive land inhabited by carnivorous mammals and reptiles, and, if introduced into such a country could not long survive." If by this Mr. Wallace means that only the flightlessness of these birds, apart from their general structure as members of the genus *Aphanapteryx*, arose in or near the islands where they now are, he still leaves the, to me, greater difficulty unexplained how two so closely related species of the same genus should have arisen in regions separated by nearly one half of the circumference of the globe. For it has to be remembered that *Aphanapteryx* belongs to the *Ocydromine* group of the Rails, which is quite unknown in the northern hemisphere, and, therefore, to have reached "Lemuria" (the ancient land of which Madagascar, Mauritius, Bourbon, Rodriguez, and the Seychelles, are the fragments) the genus must have arisen independently in both regions where its species are now found, or it spread from one or the other centre, or from some common land *by flight*. Mr. Wallace has himself pointed out that to explain the presence of the flightless *Notornis* and *Ocydromus* in two groups of islands in the New Zealand region requires a land connection, for it has been hitherto considered an axiom of geographical distribution that the regions inhabited by the same genus or species have been continuous, or have been, at all events, such as to afford possibilities of migration from one to another. If *Aphanapteryx* could have spread from the Chatham Islands to Mauritius by flight, surely *Notornis* and *Ocydromus* did not require a land connection to reach from New Zealand to the nearer outlying islands, for they may equally have lost the use of their wings only after they reached their present homes.

When Mr. Wallace asserts that these birds "could not possibly have arisen on any extensive land inhabited by carnivorous mammals and reptiles," he affirms what does not really appear to me to carry with it conviction without more proof. Rails belong to a family of birds that have become of world-wide distribution, not improbably because of the habits of its members enabling them to escape destruction. They are better runners than flyers; they are water and marsh-loving birds, many of them living in reed and rush brakes, and the dense vegetation surrounding marshes, amid which pursuit is difficult or impossible. I was much struck when in the Chatham Islands by observing how the habits of the small *Ortygometra tabuensis* protected it The upland districts of Wharekauri are covered by a very dense rush-like vegetation—the *terahina* of the natives—in which this little Rail lives. We hunted over acres and acres of country with the aid of a dog well trained to pursue and catch this species, but only after two days did we succeed in securing a specimen. We could see that the dog disturbed plenty of birds, but so rapidly could they make their way through the *terahina* that they all escaped, for they never took to flight. The *Cabalus modestus* is a nocturnal bird hiding securely in hollow trees and grass thickets all day. *Notornis* inhabited, and perhaps still inhabits, the dense scrub of the south-western portion of New Zealand, and could have there escaped the severest persecution of carnivorous animals and reptiles. But even if *Aphanapteryx* had been subjected to the incessant and successful attacks of such enemies, its extinction, whether early or late, would de-