

LETTERS TO THE EDITOR

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Automatism of Animals and Men

I WAS surprised to see by Mr. Wallace's letter of last week that he and I had understood Prof. Huxley's address in senses entirely different. I understood Prof. Huxley to mean that not only the reflex action of animals, but also all the conscious, so-called voluntary actions of men—those, for example, that we perform for the first time and, as we say, with a conscious end in view—are purely automatic; that is, that consciousness, while it accompanies the workings of the animal machine, never stands in a causal relation to any movement whatever; that no movement ever was the result of a state of consciousness, that every movement is the result of physical antecedents which, being present, the movement must of necessity follow, and that in this physical chain there is no break whatever. Years ago I saw no escape from this conclusion, and I have repeatedly made explicit statements of it in the pages of this journal and elsewhere. I was therefore gratified to find Prof. Huxley agreeing with the doctrine; and that the British public should be so little startled by his announcement of an opinion which has seemed absurd to almost everyone to whom I have attempted to expound it, struck me as rather curious. But the explanation is easy, if a man of such fine and cultured intellect as Mr. Wallace could so completely miss the meaning of Prof. Huxley's discourse.

DOUGLAS A. SPALDING

The Edible Frog

YOUR correspondent Mr. Miller (vol. x. p. 483), will find, in Cooke's "British Reptiles," p. 103, accounts of other endeavours to naturalise *Rana esculenta*. About ten years ago I imported a basket full from the Parisian fish-market, where they can easily be obtained, and turned them out into a pond at Woburn Abbey, in Bedfordshire. They thrived and multiplied there; but our summers are seldom hot enough to enable the tadpole to attain his full development before the cold autumnal nights set in. Last week, for example, I forwarded to Prof. Huxley a living tadpole of *R. esculenta*, born in Bedfordshire, who will scarcely complete his evolution before the winter, though his hind legs are fully developed. I have several summers, however, observed a plentiful supply of young *esculenta*, and I believe that in our climate the young will pass the winter as tadpoles, and complete their transformation in the following spring. But this would require more accurate observation before I can affirm it with certainty. During the past summer I imported from Berlin a fresh supply of 200 exceedingly fine specimens, as my French frogs had been reduced in numbers after the frequent visits of a heron. *R. esculenta* is easily imported in the spring, and will travel many days packed in damp moss. These frogs are easily preserved, being more aquatic in their habits than our *R. temporaria*, who roam through the woods and meadows in search of food when the breeding season is over, while the edible frog remains on the banks of his native pond, into which he plunges, describing a graceful curve, at the slightest approach of danger. They have been introduced into Ireland quite lately, from France, by the Earl of Granard, at Castle Forbes; with what success I am unable yet to say. In the spring any number can be easily obtained from the Parisian market, or the aquarium shop of M. Carbonier, 20, Quai du Louvre, Paris; or from the keeper of the reptiles in the Jardin des Plantes, who always has a plentiful supply to feed his snakes.

The laboratories of our lecturers on physiology are supplied from Leipzig, annually, with living *R. esculenta*, and Mr. Miller can easily obtain the address of the dealers who export them.

Oct. 26

ARTHUR RUSSELL

Colour in Flowers not due to Insects

FROM Mr. F. T. Mott's letter, in your last issue (p. 503), I can hardly imagine him to be acquainted with the literature of the subject on which he writes. The difficulties he suggests, though great, are, I think, not unanswerable.

1. Cultivation seldom greatly affects the size or colour of the first cultivated individual. In the cases in which it does so, Mr. Darwin considers the origin of the variation to be due, as

suggested by Knight, to change, or excess in food ("Origin of Species," chap. i.) Where the variation is at first slight and slowly intensified, this is the result of artificial selection.

2. When we consider the exhausting character of the reproductive process, we may perhaps think that the abortion of the sexual organs by the multiplication of phyllæ is the result of weakness; but a high state of cultivation, or any excess of food, predisposes to the degradation of organs, the excessive growth of parenchyma, rapid growth, and disease. Organs are also absorbed by heat or by frost. As to the perpetuation of such forms, Mr. Darwin instances ("Origin of Species," chap. viii.) some varieties of the annual stock which produce both double sterile and single fertile seedlings, justly comparable to the fertile and neuter forms of social insects.

3. The "abortive flowers" of such umbellate and capitulate inflorescences as the Guelder Rose, Hydrangea, and Centaurea, where not effected by artificial selection, act as a lure to the central fertile florets, as shown by Dr. Ogle (*Popular Science Review*, April 1870), originated according to the law of balance of growth.

4. The beauty of fruits "serves merely as a guide to birds and beasts, in order that the fruit may be devoured and the manured seeds disseminated" ("Origin of Species," chap. vi.)

5. "We meet very commonly with gaily-coloured chemical products, essentially connected with the normal processes of development, and originating from venomous infection by insects, or from decomposition. These colours appear to be merely an accidental quality of the chemical products . . . natural selection is without any influence as to colours, unless animals are attracted or repelled by them" (Hermann Müller: *NATURE*, vol. ix., p. 460). Mimicry has been recorded in fungi (*NATURE*, vol. vii. p. 55). Mr. Mott's letter indicates the fallacious opinions that mere beauty or variety are objects in nature, and that the Darwinian hypothesis deals with the origin of variations.

G. S. BOULGER

Harrow Road, W., Oct. 26

ABLER pens than mine will probably reply to Mr. Mott's letter in *NATURE*, vol. x. p. 503; but if not, may I be permitted to point out that the facts therein adduced, as not harmonising with the theory that colour in flowers has been assumed for the purpose of attracting insects, are capable of explanation.

1. *Cultivated flowers*.—The greater size and brilliancy of colour attained by these is not due to cultivation alone, but to selection practised by the cultivator. He chooses his seeds from the plants that bear the largest and best coloured flowers, and thus, directly and intentionally, performs the very work that in a state of nature is carried out, indirectly and unconsciously, by the insect fertiliser.

2. *Double flowers* are only accidental, and not permanent, in a state of nature. The cultivator has succeeded in producing and preserving them by giving a preference to, and propagating from, those plants which bear flowers with a tendency to become double. Here also intentional selection by the gardener has taken the place of natural selection by the insect.

3. The *abortive flowers* of the Guelder Rose and Hydrangea, as they grow naturally, are confined to the outer part of the corymbs, and serve the same purpose as the ray of Compositæ (which in some species consists of neuter florets) and the highly coloured floral bracts of some plants, viz., to attract insects to the fertile flowers they surround. The garden forms of *Viburnum* and *Hydrangea*, the corymbs of which are composed entirely or nearly so of sterile flowers, are, like double flowers, the result of intentional selection by the cultivator.

4. The brilliant colours of many succulent fruits have resulted from their superior attractiveness, not indeed to insects for the purpose of fertilisation, but to birds and other fruit-eating animals for the purpose of dissemination, as has been well described by Prof. Hildebrand. The occurrence of brilliant colours in the vegetable kingdom, independently of the agency of insects, as on fruits, galls, fungi, and lichens, is no more irreconcilable with the theory that the colour of flowers has been brought about by that agency, than is the occurrence of bright colours on insects themselves and other members of the animal kingdom, or the vivid colour of many mineral substances.

Newton-le-Willows, Oct. 26

THOMAS COMBER

Migration of Birds

I HAVE waited for some time to see if anyone would ask Prof. Newton or Mr. Tegetmeier, on what evidence the latter gentle-