A Curious Physiological Phenomenon.

IN Prof. Graham Brown's comments in *NATURE* of December 22 last on the letter with the above title, he points out that "the peculiarity of the present movement is that it is in the same direction as the original one." In this it resembles the sensory phenomena of positive optical after-images. Now these are periodically repeated after fairly strong stimulation, and it seemed worth while to look for such repetition in the present case. This is easily found, merely by increasing the time during which the hand is pressed against the wall up to about a minute until the whole arm feels tired. The rise and fall described occurs as usual; after a brief pause the arm again rises somewhat less vigorously, and a third much weaker rise may follow. This succession of movements does not always occur. In fact, in my own case even the first rise occasionally fails for no apparent reason.

I have found these repeated movements in the cases of colleagues who were not informed in any way what to expect. I am not familiar with the physiological theory of fatigue, but to a physicist these alternations of rest and activity inevitably suggest the accumulation and discharge of potential energy. I do not know if physiologists can find place for a (? cerebral) mechanism by which a thwarted stimulus can store up "strain" energy of appropriate kind, which after a brief interval is discharged by fulfilling its particular motor or sensory function. Further accumulation and discharge might follow, something after the fashion of the successive residual charges and discharges of a Leyden jar.

If this be so, positive visual after-images may have a similar origin. As is well known, the intensity of sensations only increases by equal increments when the exciting stimuli increase by equal ratios; thus strong stimuli fail, so to speak, to produce their full effect; there is inhibition and perhaps a storing of "strain" energy. Afterwards liberated, may this give rise in the sensory case to after-images, or with motor mechanisms to these involuntary muscular movements?

It may be added that the phenomenon can be produced in the leg by standing on one foot and pressing the outer side of the other against a wall, then allowing the leg to fall to the vertical with the foot still clear of the ground; after a short pause the leg rises laterally again. Or if the lower leg is drawn back so that its calf (or Achilles tendon) presses upwards and backwards against the edge of a heavy chair, and is then allowed to fall, the knee involuntarily flexes again after a very brief interval. In this case there is (with me, at any rate) a strong tendency for the pressure against the chair to cause acute cramp in the biceps muscle of the thigh.

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Structures and Habits Associated with Courtship.

MR. JULIAN HUXLEY's letter in *NATURE* of December 29 last upon the habits of courtship brings to notice some of the recently ascertained facts. From these he concludes that the conspicuous colours, patterns, and forms made use of in these displays and ceremonies resemble copulatory organs in being subservient to efficiency in securing union of the gametes, and that, therefore, the problem of their evolutionary origin is much simplified and similar to adaptive characters in general.

However, the argument that because they are thus

used they are therefore adaptations for the purpose of producing sexual excitement is not justified. It may well be that each animal for display makes use of a bright coloration or conspicuous structure of which the evolutionary origin is governed by some other factor. The dog uses its hind limb to scratch its back, but who would say that back-scratching controls its evolutionary origin?

The fact that polygamy is especially associated with brilliant males, whilst in polyandry females are usually the more highly coloured sex, clearly shows that some other factor governs the evolutionary origin of these secondary sexual differences.

A few other antagonistic facts may be mentioned. In birds it is the rule for the sexes to be similar when they both take part in the rearing of the young, as in the partridge; whereas when the male takes no part, as in ducks, secondary sexual differences are common.

In relatively unpalatable animals the sexes are usually similar, whereas it is in palatable animals that the greatest secondary sexual differences are to be found. Butterflies and birds especially exhibit this distribution.

In predatory animals it is the rule for the sexes to be alike. Instances of differences in coloration between young and adults exactly similar to the secondary sexual differences are widely distributed in birds. Further special difficulties arise in the case of insects, in view of their low visual acuity and poor colour perception which probably precludes the female from ever seeing the colour and pattern of the male. Further, the study of their courtship shows that scent and motion (which tends to conceal colour and pattern) are the means chiefly used to promote sexual excitement.

It is generally agreed that destructive criticism should be accompanied by some alternative explanation, but columns for correspondence do not permit of lengthy expositions. I would, however, offer the explanation that the distribution of secondary sexual colorations is related to the vision of prey and preyed-upon and the necessity especially to protect the female even at the expense of the male. This thesis is fully expanded in J. C. Mottram's "Controlled Natural Selection" (Longmans, Green and Co., 1914).

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Spontaneous Ignition of Peaty Soils.

I OBSERVE in *NATURE* of August 25 last (p. 811), which has just reached me, a letter by Mr. E. A. Martin entitled "The Generation of Heath Fires," in which the spontaneous ignition of peaty soils brought about by exposure to the direct rays of the sun is mentioned.

It may be of interest to remark that in this part of the world such examples of ignition of peaty soils are quite common when the soils, in addition to being exposed to the heat of the sun, are brought into a condition of extreme drought.

In certain parts of Cachar and Sylhet, where the conformation of the land is that of a series of rounded hillocks with intervening depressions, the depressions are filled with peaty deposits, often of considerable depth, known locally as "bheels." These bheels have been formed in the usual manner by the continued growth of vegetation in a place where water accumulates, and in the ordinary course of events are always waterlogged.