that in the absence of a second absorption the effect of the first quantum is transitory, the action being of the type

$$A + h\nu \rightleftharpoons A'$$
$$A' + h\nu \rightarrow A''.$$"

If we regard the first quantum as necessary to loosen the lattice (to overcome lattice energy) and the second to release the photoelectron from the halide ion, it will be seen that the considerations advanced may support Dr. Baker's theory of reciprocity failure.

It is hoped to publish the discussion of lattice energy at an early date, and the study of the inner photoelectric effect in relation to latent image formation somewhat later. S. E. SHEPPARD.

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Vision and Reality.

IF a philosopher may be permitted to take part in a discussion which seems to involve questions of scientific import alone, I would like to point out certain ideas which bear upon the problem of whether the eye has been so adapted as best to use the energy of sunlight. Sir John Parsons suggests (NATURE, Jan. 21, p. 94) that this conclusion is consistent with the fact that the brightest part of the spectrum (of the luminosity curve) coincides with the summit of the curve of radiant energy. But Mr. T. Smith (NATURE, Feb. 18, p. 242) presents another view—not inconsistent with the foregoing conception—in which vision is held to be so constituted as to bring out the sharpness of contours of bodies. This conclusion, while very important, does not seem to me to be especially novel. Prof. Eddington, in his "Stars and Atoms," also suggested that we have in the coincidence of the peak of the visibility curve with the peak of the curve of radiant energy an interesting case of evolutionary adaptation. But aside from these views, Bergson, it might be argued, had proposed something of the sort in his notion of the 'geometrising intellect.' This, at any rate, would be the case if the interpretation which the present writer puts on Bergson is the true one.

In presenting to my students in philosophy the 'problem of reality,' I have for several years employed the practice of pointing out the ways in which our knowledge of the external world is prejudiced by experiences to which our sense organs give rise. I have then always raised the question of how the world would appear if some of the limitations of our senses were overcome. More specifically, how would the world appear if our eyes were so constituted that we could see in the ultra-violet or the infra-red ends of the spectrum? If we could see in the infra-red end, bodies which are not in thermal equilibrium with their environments would then seem to be surrounded by a halo due to the heat rays which were being given off by the radiating bodies. In the same way, if we saw in the ultra-violet, all objects which give off these waves (for example, mercury) would be surrounded by a penumbra. This suggests the conclusion that the apparent sharpness of boundary of some objects is due to the structure of the human retina, that is, to the fact that vision is best in the yellow region of the spectrum.

This fact that sense experience (both in vision and in tactual experience, in so far as sight is 'anticipative touch' and tactual perceptions are synthesised with visual space) exaggerates the sharpness of contours, may be responsible for the sharp opposition between 'matter' and 'empty space.' The intellectual distinction between matter and energy may be a result of the fact that the eye, the organ of vision, is a direct outgrowth of the brain, the organ of thought. It is interesting to note that the 'quantum puzzle' is not being solved by making light corpuscular, but by making matter undulatory. In other words, perhaps the problems in some branches of science will be solved by unlearning some of the cerebral reactions or ideas which developed around sensory experience. Perhaps when we have become accustomed to Schrödinger's notion of substance as a set of wave-patterns, the idea of matter as something eternally and absolutely distinguished from energy-fields will be relegated to the science of mental palæontology as a fossil of human thought. OLIVER REISER.

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'Sports' and 'Reversion.'

THE note on Dr. C. J. Bond's Galton Lecture, which appeared in NATURE of Feb. 25, contains the following remarkable sentence (p. 292): "He [*i.e.* Dr. Bond] did not reflect, however, that 'sports,' although hereditary, must owe their origin to definite causes, and that the evidence before us justifies the belief that when these causes cease to operate the 'sport' ultimately reverts to the wild type."

It is, of course, true that sports must owe their origin to definite causes; but it is equally true that we know nothing whatever as to the nature of the causes underlying mutation. How, then, are we to know when such causes "cease to operate"? Further, it would be interesting to know what the evidence in favour of the 'reversion' of sports may be. *Chelidonium laciniatum* Miller, perhaps the best authenticated of mutants, has certainly not been observed to revert during the 338 years for which it has been known to science. The other mutants of known date of origin have shown a similar constancy. Indeed, it might be said to be characteristic of true seminal mutants that they do *not* revert.

If I am not mistaken, the only phenomenon which the geneticist would care to call 'reversion,' even by courtesy, is that exemplified by the appearance of a definite proportion of red-flowered plants among the segregates from a cross between an ivory-flowered snapdragon and a white-flowered snapdragon of a particular genetic constitution. In such a case the appearance of the supposedly ancestral type—in this instance the red-flowered plant—is a necessary consequence of the mating of particular gametes, and is quite independent of the incidence of environmental factors. MONTAGU DRUMMOND.

Botany Department,
University of Glasgow, Mar. 1.

THE comments on Dr. Bond's lecture to which Prof. Drummond refers, may be justified perhaps by zoological illustrations even if the botanists are unaware of any causes of mutation and have no evidence of reversion. For example, Müller has shown that when the eggs of normal specimens of Drosophila are subjected to X-ray radiation, they give rise to 'mutations' of the same kind as some of those which turn up in Morgan's cultures. Berndt, in discussing the 'fancy races' of goldfish, admits that the cause of the production of 'mutants' is aquarium conditions. In a word, the general cause of mutations may be described as 'germ-damage' due to bad environmental conditions acting at a critical period of growth. As to reversion, Morgan himself encountered this in some of his extreme mutants and described it as 'mutation backwards.' It can be seen any day in the London squares, where a considerable proportion of our escaped dovecote pigeons are rapidly returning to the ancestral form of *Columba livia*.

THE WRITER OF THE NOTES.