

An Optical Paradox.

THE paradox propounded by Mr. T. Smith in NATURE of Feb. 25 lays emphasis upon an important aspect of physical measurement and demands explanation. The considerations recorded in NATURE of April 7, in the letters of Dr. Campbell and Mr. Smith, leave the question unsettled, and I venture to give an explanation which would appear to be less forced and touches principally the process of reasoning.

The solution to the paradox seems to lie in a critical regard for the nature of the identity which is implied by equality. The sense datum upon which the experimenter ultimately depends is the direct perception of relative dissimilarity of the contributory sensations. In the absence of perceptible dissimilarity the derived judgment is arrived at, stating the equality of the two stimuli. At each successive observation the observer perceives the same appearance, and in effect asserts the absence of the sensation of what can be referred to as contrast. (Proceeding otherwise he might, as in other methods of photometry, estimate and compare degrees of contrast.)

Now it is elementary knowledge that in any calculus of reasoning a relation of equality subsists between given entities by virtue of the identity under certain conditions of certain essential properties stated in the definition of the equality. In the present case the statement of equality proceeds from the inferred identical similarity of the contributory sensations, this step in arriving at the final judgment of the observer being legitimate if it be premised that insensible increments in stimulus do not affect sensation. This would be granted unless it were proposed to modify arbitrarily the connotation of terms.

Although, however, the equality may be regarded as established by this means, it should be noted that no relation between the properties not involved in the identity is established. The step made in concluding that, physically regarded, such properties as, for example, the candle power are the same is thus not rigorously supported by the observational data, and in extending the relation to these properties in order to render their physical measurement possible a logical *non sequitur* is incurred. This is the fallacy which gives rise to the paradox.

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Lucretius's Anticipation of Mendelism.

IN his review of the new edition of Munro's translation of Lucretius, in NATURE for April 14, Prof. D'Arcy Thompson refers to the many scientific 'anticipations' that are to be found in that wonderful poem, which has fossilised, so to speak, some fragments of the lost world of ancient wisdom. I have never seen any mention made of a passage in the "De Rerum Natura" in which the three fundamental postulates of Mendelism are laid down as the rules of heredity, and I think it deserves to have attention directed to it.

The passage is in Book 4, ll. 1210 *et seq.*, and in the 1898 Cambridge edition of Munro's translation it runs as follows:

"Sometimes the children may spring up like their grandfathers and often resemble the forms of their grandfathers' fathers, because the parents often keep concealed in their bodies many atoms mixed in different ways, which, first proceeding from the original stock one father hands down to the next father, and then from these Venus produces forms after a manifold chance,

and repeats not only the features but the voices and hair of their forefathers."

The three italicised passages enunciate (*seriatim*)

- (a) The principle of recessive (and by implication, of course, of dominant) characters.
- (b) The constitution of the organism out of combinations of immutable unit characters.
- (c) The chance recombination of these in mating.

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Stellar Radiation and the Nature of the Universe.

THE difference between theory and practice is admirably illustrated by our solid, three-dimensional brain-minds theorising about fourth and other dimensions of space and 'matter,' and yet visualising a cyclic universe the radiations of which are related only to the superficies of matter! It seems that most of us are still unable to form actual conceptions of the *depths* of space as a condition different from the depth of a three-dimensional form of physical matter in space. Tyndall believed that the sum of Nature's energy is constant, and that "the utmost man can do in the pursuit of physical truth or in the applications of physical knowledge is to shift the constituents of the never-varying total . . . *the flux of power is eternally the same.*" Tyndall surely did not imply by this that "just as much matter is created as destroyed" (NATURE, April 28, p. 674). He seems to distinguish the constituents from the *flux* of power with which, say, a sixth-dimensional mind might be quite happy without our physical constituents.

We are in equal darkness regarding both the origin and destiny of radiation, stellar or otherwise. From what interiors of space or matter come the 'flux of power' or the rays investigated by physicists? Into what 'depths' do they disappear by transmutation, electro-magnetic exchange, quantum action, or by 'actions' unknown on this planet?

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April 28.

Prices of Periodical Scientific Publications.

THE letters of Dr. Bains Prashad and Mr. Wilfrid Bonser in NATURE (Mar. 31 and April 7) directing attention to the prices of certain German scientific periodicals, particularly those published by the firm of Julius Springer, Berlin, are very timely; for to many libraries the question whether they can afford to continue to purchase such periodicals must be a serious one. The Library Committee of this University has had the matter under consideration more than once in the course of the last year or two; for in view of the high cost of several of these periodicals, taken by the Library, the Committee has not infrequently been compelled to forego the purchase of important biological works. One is naturally reluctant to discontinue subscribing to periodicals of long standing and established reputation, but for many libraries and institutions with limited funds at their disposal for the purchase of biological books, this would seem to be the only way out of the difficulty. It is to be hoped that the present high charges for the journals in question will be speedily reduced.

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