can always be easily reduced when they are fluorescent in aqueous solution, and Dr. Weber did not fail to confirm this. The reason simply is that the photo-reduction is identical with the elementary process of quenching of fluorescence. The dyestuff molecule in the excited state (F^*) which possesses an unoccupied electronic level (due to the excitation of one electron to a higher level) can take up an electron from a reducing (quenching) substance (into this level) according to the process :

$$F^* + Fe^{++} \rightarrow F^- + Fe^{+++}; \quad F^- + H^+ \rightarrow FH$$

(reduced dyestuff).

In this way the excitation energy in effect increases the electron affinity of the dyestuff molecule (F). When there is no fluorescence, there are no excited dyestuff molecules of an appreciable life-time, and consequently no photo-reduction can take place.

The photo-reduction is not quite so simple in the case of chlorophyll and other fluorescent substances which give non-fluorescent aqueous solutions, and where it is necessary to use a suitable mixture of solvents (for example, aqueous methyl alcohol), in which the ferrous salt is sufficiently soluble and also the dyestuff (chlorophyll) is capable of fluorescence.

Further details are given in a paper[6] which has recently appeared, and an additional paper on the same subject will be published shortly.

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[1] K. Weber, NATURE, **137**, 870 (1936).
[2] J. Weiss, NATURE, **136**, 794 (1935).
[3] K. Weber, *Naturwiss.*, **23**, 486 (1935).
[4] J. Weiss and H. Fishgold, NATURE, **137**, 71 (1936).
[5] J. Weiss, *Naturwiss.*, **23**, 610 (1935).
[6] J. Weiss and H. Fishgold, *Z. phys. Chem.*, B, **32**, 135 (1936).

The Mysterious Number 137

THIS is stated in NATURE of May 23, p. 877, to be more accurately 137·2. Now 1371288 is the natural number similar to the mantissa of its logarithm. How will this fact interact with the formulæ of origin ?

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Points from Foregoing Letters

To explain the elastic properties of viscid fluid threads, Sir Joseph Larmor imagines their molecules to be shaped like dumb-bells, interacting by forces between their ends, so that when two rows lie in parallel there is a position of equilibrium when the ends are opposite each other, and an elastic reaction comes into play which allows of a large range of reversible extension.

Crystalline pepsin is inactivated at a rate inversely proportional to the fifth power of the hydrogen ion concentration, between pH 6·2 and 6·45. This behaviour, Dr. J. Steinhardt considers, suggests the presence of an unstable pepsin ion, formed by the dissociation of five acidic groups with dissociation constants near $1·7 \times 10^{-7}$.

From the reaction shown by regenerated tails of tadpoles and pieces of *Euplanaria* with sodium nitroprusside, N. S. R. Maloeuf concludes that the nitroprusside colour test is specific for the oxido-reduction enzyme glutathione, when applied to normal living tissues and when ammonium hydroxide is used as the alkali. Heat must not be applied, since it liberates free −SH radicals from protein, which then give a colour with the nitroprusside and invalidate the test both for glutathione and cystein.

F. Bergel and A. R. Todd discuss the possible structural formulæ of aneurin (vitamin B_1) and its oxidation product, thiochrome. Certain synthetic compounds show a fluorescence similar to that of thiochrome, and their known structure supports the formula suggested by Makino and Imai, and modified by Williams.

The formation of a radioactive isotope of iron by irradiation of cobalt with neutrons is reported by Prof. E. B. Andersen. The new isotope is probably iron of mass 59, and shows an activity decaying with a period of nearly 72 hours.

Dr. H. S. W. Massey and R. A. Buckingham calculate the values of the van der Waals' interatomic constant from observations by Rosin and Rabi on the collision of rare gas atoms (helium, neon and argon) with alkali atoms, observed by the molecular ray method. The authors compare the values with those derived from the polarizabilities of the atoms, and conclude that the free path method will prove convenient for the determination of van der Waals' forces.

An investigation by A. R. Hogg of bursts of cosmic radiation of estimated size 35–1800 rays suggests that the rays responsible for producing these bursts occur relatively infrequently, but that each ray has a fairly high probability of producing a burst. This probability varies with the barometric pressure.

Instances are quoted by B. R. Speicher to show that hybrid queen bees produce equal numbers of impaternate drones with dominant and with recessive characters. Hence he concludes that the impaternate drones in bees and wasps (sub-order Apocrita) are 'haploid', that is, they have the basic number of chromosome number in their nuclei, and are not 'diploid' as recently suggested in the case of male impaternate saw-flies (sub-order Symphyta).

The formation, in rabbits' serum, of 'antibodies' specific for the Y-chromosome of the male fruit-fly, after injection of a gruel of the insects, is indicated by experiments carried out by Dr. S. G. Levit, S. G. Ginsburg, V. S. Kalinin and R. G. Feinberg. An antibody when formed in the serum of living animals after the injection of an 'antigen' (in this case, extract of fruit-flies) 'fixes' the 'complement', a ferment which, in conjunction with an 'amboceptor', hinders the break-up of red blood cells and of bacteria.

A simple arrangement for the direct projection on a screen of microscopic slides showing the internal structure of chromosomes is described by Dr. C. D. Darlington and H. C. Osterstock.

J. P. T. Burchell reports the finding, in Stone Court Valley, of a 'floor' containing stone implements, including 'raclettes', at the base of the Sunk Channel, cut in Late Pleistocene times. The artefacts show features analogous to those observed among the 'eoliths' (earliest stone implements of tertiary age).