rather rapid and bewildering change consequent on advances in positive knowledge. Absorption spectra, the properties of colloids, ionisation and the nature of ions, the nature and source of osmotic pressure, and the relations of isotopes are all subjects of supreme interest, many of which have assumed a totally new form, or have even been recognised only within the last twenty years. The chemical student of the future will need to be a fairly good mathematician if he hopes to follow all that is going on in these several directions. Fortunately there are other large fields of work still open in which this is not an essential condition and where great successes continue to be scored, especially in constitutional and synthetic organic chemistry and its applications to problems in physiology, animal and vegetable. These are all dealt with under appropriate heads in this volume of reports.

*Heredity.* By Prof. J. Arthur Thomson. Third edition. (The Progressive Science Series.) Pp. xvi+627. (London: John Murray, 1919.) Price 15*s.* net.

THE first edition of Prof. Thomson's "Heredity," which appeared in 1908, was reviewed at some length in NATURE (vol. lxxviii., pp. 361–63). The book quickly became established as an introduction—at once trustworthy, impartial, and comprehensive—to the many problems that are presented to students of inheritance, and a second edition with some additions and revisions was published in 1912. The third edition is now before us, and the author has taken the opportunity of directing the reader's attention to some of the important advances that have been made by investigators during the last seven years. The size of the book has not been increased from the second edition, so that room for additions has been found by condensing the type-setting on certain pages; this involves a brevity of treatment disappointing to those who would have valued Prof. Thomson's judicious criticism of several recent theories. For example, the studies by T. H. Morgan and his fellow-workers on the inheritance of linked factors in the fruit-flies (Drosophila), and W. E. Castle's work on the relation between heredity and selection in hooded rats, are barely mentioned.

A short list of some important books and papers of the last few years has been added to the bibliography, but the subject and general indexes appear to have escaped a revision which would have greatly increased their value. The paragraph on "Militarism" in the concluding chapter has been rewritten in the light of the experiences of the last five years, and the author emphasises Dr. Chalmers Mitchell's contention that "the struggle for existence as propounded by Charles Darwin and as it can be followed in Nature has no resemblance with human warfare." Again, as one turns the pages of Prof. Thomson's familiar volume, one realises how the study of biology, wisely applied, may become an aid rather than a rival to that of "the humanities." G. H. C.

## LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

### A Photoelectric Theory of Colour Vision.

REFERRING to his letter under the above heading on p. 74 of NATURE of September 25, I perceive that Prof. Joly has had ideas similar to mine about an electric stimulation of the terminals of the optic nerve through bombardment of corpuscles flung off under the stimulus of ordinary light.

My argument is strengthened by reflecting that this utilisation of atomic energy, emitted in *quanta* under the stimulation of accumulated almost infinitesimal vibrations of the right frequency, can account for the extreme sensitiveness of the eye and of the sensitive pigments known very low down in the scale of animal life. The great variation of brightness permissible, between wide limits, without much differential physiological result is also natural on this view; so is the fatigue of colour-sensation by temporary exhaustion of a specific potentially radio-active material, until renewed by living tissue.

I should suppose that on this trigger-like basis the eye can form very little estimate of absolute brightness inside the limits above spoken of, though the ear, having no explosive mechanism, might be able to form a scale of loudness. In the main, photometric observations must be comparative.

A pathological condition of the retina, when flashes are perceived without objective stimulus, may be accounted for by overinstability of material and consequent spontaneous emission of corpuscles.

The experiments which Prof. Joly began to try seem to have been just in the general direction which I wished to encourage some young physiological physicist to pursue, only he must be prepared to design or adjust his electrical detecting instrument for extreme sensitiveness. A frog's nerve-muscle preparation could scarcely be responsive without something analogous to rods and cones, or something like an electric organ, and without access to unsheathed terminals. If a mechanical electroscope is employed it must have minute capacity; a silvered quartz filament, with a minimum of attachments, in the field of a microscope may be suggested.

OLIVER LODGE.

### Reversed Pleochroic Haloes.

IN a paper on "The Genesis of Pleochroic Haloes" (Phil. Trans. R.S., vol. ccxvii.) by J. Joly, a theory is advanced accounting for certain structural features of the halo on the assumption that reversal of the halo-image is possible, and may take place under conditions defined in the paper. In support of this a drawing of a halo is given in which an evident inversion or change from positive to negative has occurred, the inner region being light, the outer dark.

Recently, in examining the brown mica extracted from a granite, we have found quite a large number of these negative haloes. All internal features are gone, solarised out of existence; the wide outer band alone remains. They resemble negatives of a much-exposed halo. Their dimensions shows that they possess uranium-charged nuclei. When the nucleus is *very* minute there is no sign of reversal; the halo is normal.

It is possible that the frequency of reversal in this