the values obtained were 226, 245, 249, and 237; when i is expressed in volts and t in hundredths of a second.

It has also been shown that addition of sodium salts increases the sensitivity, and it seems clear that this effect is produced by bringing the emulsion closer to the inversion point. In these circumstances the required increase in concentration of ions for excitation will be less.

In summary and conclusion, it may be said that the hypothesis that the plasmatic layer of the living cell is a water-in-oil emulsion close to its inversion point correlates and gives relatively simple physical explanations to the following diverse phenomena:

Effects of antagonistic ions and narcotics on permeability.

Effects of electric currents on permeability.

The Nernst theory of excitation.

The effect of calcium on excitability of nerve and muscle.

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Photosensitised Decomposition of Ozone.

DURING the last twelve months we have been working on the photodecomposition of ozone sensitised for visible and long-wave ultra-violet light by the addition of chlorine. A detailed analysis of the somewhat complex pressure changes which occur on insolating or on cutting off the light from a mixture of these gases kept at constant volume, combined with quantum efficiency measurements under various conditions, caused us to suspect the formation, during the course of the reaction, of small amounts of an intermediate compound, and this view has been strikingly confirmed by some recent observations.

The first was that the transmission for the mercury 365 $\mu\mu$ line of an ozone-chlorine mixture containing low concentrations of chlorine increases appreciably during the early stages of the reaction.

The second was that, using sulphuric-acid dried gases, a distinct mist is formed in the gaseous mixture on insolation. Further experiments have shown that this mist is less pronounced under more stringent conditions of drying, and that the resulting trace of liquid, when dissolved in water, (*a*) gives a positive chloride reaction with silver nitrate solution after boiling with ferrous sulphate and sulphuric acid (both the original solution and the reagents were free from chloride), and (*b*) gives potassium perchlorate, recognised by its characteristic crystalline form, on treatment with a drop of concentrated potassium chloride solution, and also gives a positive crystalline perchlorate reaction with brucine.

Finally, we have shown that, if chlorine dioxide, dried by phosphorus pentoxide, is mixed with dry ozone, a red liquid is produced. On admitting moist air, an immediate mist is observed and the liquid is hydrolysed with formation of chloric and perchloric acids.

These observations are consistent with the view that, during the reaction, the following processes take place: (i) Production of Cl atoms by light; (ii) formation of ClO_3 groups by union of Cl atoms and O_3 molecules; (iii) a short chain reaction, probably terminated by adsorption of intermediate atoms or groups on the walls; (iv) union of a certain number of ClO_3 groups to form the chlorine hexoxide of Bodenstein, Harteck, and Padelt (1925), this immediately hydrating in presence of traces of moisture to form chloric and perchloric acids; (v) formation from Cl atoms and O_2 molecules of ClO_2 molecules, these reacting with O_3 molecules to give ClO_3 groups and O_2 molecules.

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An Absolute Method of Measuring High Frequency Currents.

UNTIL recently the measurement of currents at radio-frequencies has depended on the assumption that the instruments used did not alter their calibration with frequency, and every endeavour was made to satisfy this condition. The method largely adopted comprised the use of sufficiently thin conductors so that freedom from skin effect could be obtained. While this naturally limited the magnitude of the currents which could be employed satisfactorily, transformer and condenser methods have been used by D. W. Dye and P. R. Coursey respectively at medium radio-frequencies, for the conversion of large currents into those which could more conveniently be measured directly. More recently, E. B. Moullin has developed an instrument the operation of which depends upon the attraction of two parallel wires carrying the same current. While this instrument would appear to be satisfactory as an absolute method of measurement, it has been considered desirable to develop another method based upon a different principle in order to place the very important subject of radio-frequency current measurement on secure foundations.

Before his departure for America in April last, Mr. R. M. Wilmotte had developed at the National Physical Laboratory a method of current measurement the principle of which is similar to his method for measuring the high frequency resistance of standard inductive coils (R. M. Wilmotte, "On the Construction of a Standard High-frequency Inductive Resistance and its Measurements by Thermal Measurement", *Proc. Roy. Soc.*, vol. 109, pp. 508-522; 1925). The coils were made of mercury in glass, and the expansion of the mercury when a known radio-frequency current was passed through it for a known time could be compared with a similar expansion produced by direct current. The method for measuring current is the inverse of this. An unknown current is passed through a known resistance made of mercury, and it is then required to find the direct current which produces the same expansion of the mercury. The simplest form of resistance which can be accurately calculated at any frequency is a straight circular conductor surrounded by a concentric metal shield. In order to keep the cooling constants as steady as possible, this shield is kept in contact with ice. The column of mercury is connected to a capillary tube in which the rate of expansion of the mercury can be observed.

As previous experience had shown, the time taken for the mercury to reach a steady thermal state is too long for practical use, and it is preferable to make the measurement by observing the time, with a stop-watch, which the mercury column takes in expanding through a given length of the capillary tube. In order to secure accuracy and consistency in the readings, a number of precautions have to be taken in the construction and use of the apparatus. For example, it is desirable that the glass tube containing the mercury column should have as thin walls as possible in order that the glass may be sensibly at the same temperature as the mercury. It has also been found necessary to dry the air between the glass and the