would be attended by a charging up of the plate. Ultimately equilibrium of the ions in the solution would exist under the electric field due to the *charge on the plate*, and the field due to the *separated charges of opposite signs in the solutions*.

A difference of potential would accordingly exist between the interior of the metal plate and the remote side of the solution. The differential equations of this potential can be formed and are given in the paper. It is also proposed that the e.m.f. of a cell arises entirely in the foregoing manner. Various consequences that follow from this proposition are pointed out and discussed.

If the difference of potential of the *separated charges* in the solution is small in comparison with that due to the *charge on the plate*, as may occasionally be the case, we would be dealing with a case covered by Nernst's solution pressure theory of the e.m.f. of a cell. It appears therefore that the theory proposed by the author would explain the "mechanism" of Nernst's solution pressure in those cases where his theory is applicable. And in the cases where it cannot be applied without difficulties being introduced, as for example happens when the nature of each electrode is different from that of the deposit obtained on it on allowing an electric current to flow through the system, the theory proposed simply explains the e.m.f., and besides explains the change in the e.m.f. caused by the polarization of the electrodes.

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QUANTUM THEORY OF PHOTOGRAPHIC EXPOSURE.

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THE author assumes that the light impinging upon the photographic plate consists, either in part or entirely, of discrete light quanta, and that the necessary and sufficient condition for a silver halide grain to be "affected" by light, *i.e.*, to be made developable, is that it should be fully hit by and absorb a light quantum. The question is thus reduced to a problem in probabilities. For moderate numbers of grains and of light quanta the number of silver halide grains affected is represented by a harmonic series, which for large numbers of the former leads to an exponential formula, valid for each size (area)-class of grains separately. The exponent is proportional to the size of the grain and, for light quanta of non-negligible section, is a function of the wave-length showing a maximum. *Ceteris paribus*, the "speed" of a photographic plate is thus shown to increase with the size of the grain; at the same time the maximum sensibility shifts towards the red end of the spectrum. The available photographic data seem to corroborate characteristically some of the consequences of the theory. Other consequences, with all their quantitative details, are being subjected to special sensitometric, microscopic, and spectrophotometric tests now in progress in the Eastman Laboratory. Three sets of exposures gave a striking agreement with the formula.