$$a_x = \tfrac{1}{2}\left[\psi_1\frac{\partial\psi_2}{\partial x} - \psi_2\frac{\partial\psi_1}{\partial x}\right], \ . \ . \ . \ \phi = -\frac{1}{2c}\left[\psi_1\frac{\partial\psi_2}{\partial t} - \psi_2\frac{\partial\psi_1}{\partial t}\right],$$

the results verify Lorentz's equation

$$\frac{\partial a_x}{\partial x} + \frac{\partial a_y}{\partial y} + \frac{\partial a_z}{\partial z} + \frac{1}{c}\frac{\partial\phi}{\partial t} = 0.$$

We thus obtain for the fields **E** and **H** the expressions

$$\mathbf{E} = -k \text{ grad. } \frac{1}{r}(1 + \cos 4\pi\nu_0 t), \quad \mathbf{H} = 0,$$

that is, the characteristic values of a pole of charge k.

With this new aspect of the theory, though on one hand the two functions ψ_1 and ψ_2 have no longer the properties of ψ and $\bar{\psi}$, on the other there is the advantage of correlating wave mechanics with Maxwell's theory. We may note that, using the above proceeding, it is possible to introduce the spinning electron into this theory. To do so, it should be observed that two quantities ψ_1 and ψ_2 are sufficient, according to Bateman and de Broglie, to produce the electromagnetic field; let us see if it is not better to introduce two four vectors, the components of which would be

$$\psi_{1x} = \frac{A_x}{r}\cos 2\pi\nu_0 t, \ . \ . \ . \ \psi_{1l} = \frac{A_l}{r}\cos 2\pi\nu_0 t,$$

$$\psi_{2x} = B_x \sin 2\pi\nu_0 t, \ . \ . \ . \ \psi_{2l} = B_l \sin 2\pi\nu_0 t \ (l = ct).$$

By this four vector we form a single four vector U such as

$$U_i = \tfrac{1}{2}\left[\psi_{1i}\frac{\partial\psi_{2i}}{\partial l} - \psi_{2i}\frac{\partial\psi_{1i}}{\partial l}\right] = \frac{\pi\nu_0}{c}\frac{A_iB_i}{r},$$

or putting

$$U_x = \frac{m_x}{r} = \frac{\pi\nu_0}{c}\frac{A_xB_x}{r}, \ . \ . \ . \ U_l = \frac{q}{r} = \frac{\pi\nu_0}{c}\frac{A_lB_l}{r},$$

we find that the three special components of the four vector U form a vector $\mathbf{m}/r$, while the fourth component is q/r.

If we now put

$$\mathbf{a} = \text{curl } \frac{\mathbf{m}}{r}, \quad \phi = \frac{q}{r},$$

it follows easily that

$$\frac{\partial a_x}{\partial x} + \frac{\partial a_y}{\partial y} + \frac{\partial a_z}{\partial z} + \frac{1}{c}\frac{\partial\phi}{\partial t} = 0,$$

and the expressions of the electrical and magnetic fields are

$$\mathbf{E} = -\text{grad. } \phi = -q \text{ grad. } \frac{1}{r},$$

$$\mathbf{H} = \text{curl } \mathbf{a} = \text{curl}\left[\mathbf{m}, \text{grad. } \frac{1}{r}\right];$$

that is, the field produced by a spinning charge q which is equivalent for the magnetic field to a magnetic dipol **m**.

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Photochemical Decomposition of Hydrogen Iodide.

THE mechanism proposed by Warburg (*Sitz. der preuss. Akad. der Wiss.*, 300; 1918) for the photochemical decomposition of hydrogen iodide, namely:

$$\begin{aligned} &(1)\ HI + h\nu = H + I \\ &(2)\ H + HI = H_2 + I \\ &(3)\ I + I = I_2, \end{aligned}$$

has been generally accepted for a long time but has not received experimental confirmation. Warburg obtained a quantum efficiency of two and showed thermodynamically that reaction (2) was the only secondary reaction possible. Reaction chains cannot be set up in view of the non-occurrence of the highly endothermic reaction,

$$I + HI = I_2 + H,$$

which thus interrupts the chain.

Still another interpretation is possible, namely, that discussed by Stern and Volmer (*Z. Wiss. Phot.*, 19, 275; 1920), which leads to the same result of two molecules decomposing for each quantum absorbed. Here an activated molecule in colliding with a normal molecule brings about the decomposition of both.

$$(1)\ HI + h\nu = HI' \qquad (2)\ HI' + HI = H_2 + I_2.$$

Until now no observation admits of a decision between these two possibilities, since Warburg worked at rather high pressures.

The writer purposed studying the quantum efficiencies at pressures sufficiently low so that a molecule of hydrogen iodide activated by absorbed radiation cannot make a collision with another molecule before its mean free life, namely, 10^{-7} sec. has terminated or before it decomposes of its own accord. In the former case, if reversion takes place, that is, if collisions are a necessary requisite for decomposition, one should expect the quantum efficiency to be very small, of the order 100 to 200 quanta absorbed per molecule decomposing. In the latter case, if it decomposes in a single act, the quantum efficiency should still remain two as at high pressures. The results are markedly different, and it should be easy to distinguish between these alternatives.

Using the 2080 Å.U. and 2530 Å.U. bands of the condensed zinc spark and working at pressure of hydrogen iodide of the order of 0·1 mm. mercury, well below the critical collision frequency pressure, the writer has found the quantum efficiency to be in the neighbourhood of two. The reaction was studied in its initial stages to avoid secondary absorption by iodine set free. The amount of decomposition was ascertained by freezing out all the hydrogen iodide and iodine, and measuring the hydrogen with a calibrated bifilar quartz manometer described by Coolidge (*J. Am. Chem. Soc.*, 45, 1637; 1923).

Thus Warburg's mechanism is substantiated experimentally. Further, this is the first time it has been proved that a polar molecule may dissociate in a single elementary act, thus affording a possible explanation of the continuous absorption spectrum of hydrogen iodide found recently by Tingey and Gerke (*J. Am. Chem. Soc.*, 48, 1838; 1926), and Bonhoeffer and Steiner (*Z. Phys. Chem.*, 122, 287; 1926).

The work is being continued and a more complete account will be published shortly.

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The Tomb of Laplace.

To those interested in the records and memorials of men of science, Paris, no less than London, presents a most attractive field for exploration. The Sorbonne, the Natural History Museum, the Observatory, the schools, the streets, the squares, and the churches abound with statues and monuments, while here and there can be traced the footsteps of such as Pascal, Lavoisier, and Pasteur. No spot, however, recalls such a wealth of historic associations as that of the famous Père Lachaise cemetery, where, to mention only those famed in science, lie Delambre, Arago, Bichat, Cuvier, Charles, Brongniart, St. Hilaire, Comte, Chasles, and a score more. It was here also Laplace was buried, and his funeral discourses were pronounced by Daru, Biot, and Poisson. Over his