

istical distributions including statistical mechanics and enjoy peaceful rest.

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1. *Theories of Probability*, by Jagit Singh, p. 257. *Sankhya*, April 1946, 7, Part 3.

A NOTE ON THREE NUMBERS IN A.P.

1. IN what follows A-G.P. stands for Arithmetico-Geometrical Progression, and I.R. for Indicator of Ratio of A-G.P., which means the common ratio of the component geometric series of A-G.P.

2. *Lemma*.—If a, b, c are in A.P., then $a, \frac{ab}{c}, \frac{a^2}{c}$ are also in A.P.

c, b, a are in A.P. (given).

Multiply each by the same number $\frac{a}{c}$ the result follows at once.

3. *Theorem*.—Any three numbers in A.P. are also A-G.P. having I.R. equal to the quotient obtained by dividing the third number by the first, provided neither the first nor the third number is zero.

Let the given numbers in A.P. be a, b, c , where $a \neq 0$ and $c \neq 0$.

These numbers can be written as

$$a, \frac{ab}{c} \left(\frac{c}{a}\right), \frac{a^2}{c} \left(\frac{c}{a}\right)^2, \quad (1)$$

which can be obtained by multiplying the corresponding terms of the following sets:

$$1, \frac{c}{a}, \left(\frac{c}{a}\right)^2, \quad (2)$$

$$a, \frac{ab}{c}, \frac{a^2}{c}. \quad (3)$$

Clearly (2) is a G.P., (3) is an A.P. (Lemma).

\therefore (1) is an A-G.P. having $\frac{c}{a}$ as I.R.

Hence the theorem.

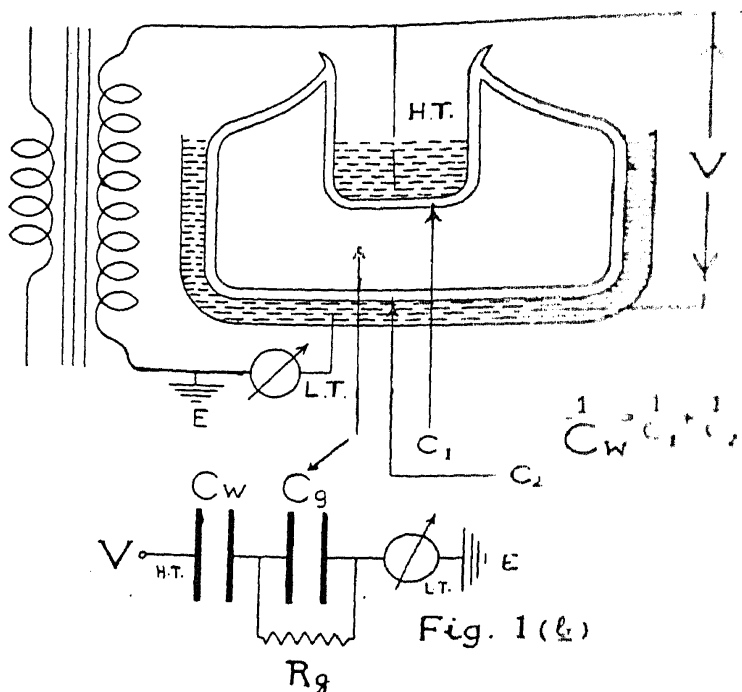
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December 7, 1946. ABDUR REHMAN NASIR.

**FURTHER CONSEQUENCES OF THE
"ACTIVATED LAYER" POSTULATE
IN THE MECHANISM OF THE
LIGHT-EFFECT**

§1. THAT the *light-effect* Δi , a reversible and (sensibly) instantaneous current-change, on irradiation from extreme red¹¹ to X-rays,^{11a} of chlorine and a number of other gases and vapours, is (so far) observed with semi- and full ozoniser discharges,^{1,2} suggests that a dielectric surface is necessary for its occurrence. The ozonizer (Fig. 1a) is equivalent to a compound condenser, consisting of three serial capacities: C_1 and C_2 are associated with the inner and outer electrode walls respectively; the annular space filled with the gas represents the third, C_g . As illustrated by the

generally low dielectric constants of gases, C_g is the smallest capacity; and is therefore, a chief determinant of i at a given potential V applied to the system.⁴ The combined capacity

Fig. 1(a)



due to the inner and outer annular walls may be denoted by C_w , defined by $\frac{1}{C_w} = \frac{1}{C_1} + \frac{1}{C_2}$. At the 'threshold potential' V_m ,^{3,4} the gas breaks down as a dielectric; the corresponding C_g may, therefore, be treated as a condenser shunted by an ohmic resistance, R_g ; this represents the inverse of conductivity produced in the gas due to ionisation by collision under field due to V .

§2. The instantaneous i in the circuit may be denoted to a good approximation by,

$$i = \frac{V}{jL\Delta f + \frac{1}{jC_w\Delta f} + \frac{1}{R_g + jC_g\Delta f}} \quad (i)$$

where Δf represents not only the frequency of the A.C. supply and its harmonics but also those produced under electrical discharge in the annular space due^{6,7,8,2} to V . The *light-effect* Δi is observed at constant V ; the corresponding circuitual inductance L does not change sensibly. It follows, therefore, from (i) that the production of, e.g., photo-diminution Δi implies an increase of R_g ; that is, decrease of the ohmic or the conduction current; or/and. decrease of either or both the capacities C_w and C_g , due to the annular walls and the excited gas, respectively.⁹ In a semi-ozoniser, the capacity C_1 is absent; it produces, however, a comparatively large $-\Delta i$ (as also $+\Delta i$ under appropriate conditions *vide infra* para 4). That a preponderatingly large photo-change, e.g., increase of R_g might mask a possible variation of either or both C_w and C_g in a sense opposite to that contemplated in the