Difficulty of Long-Wave Transmission in Summer

THADÉE PECZALSKI has developed a theory of sub-electrons[1] which explains the absorption of electromagnetic waves by charged small particles. The result, it seems to me, can be found intuitively, so to say, by considering Langevin's formula for the energy of radiation of an electromagnetic wave when a particle of mass M carrying a charge e collides with a gas molecule of mass m. The energy ε is given by

$$\varepsilon = \frac{2}{3}\frac{e}{c}\int_{t_1}^{t_2} \Gamma^2 \, dt$$

This function Γ is regular, that is, uniform and continuous in the interval of integration. A function of this type translates into the language of function theory the principle of conservation of momentum and energy. The arguments of the function undergo transformations that maintain a certain invariance of the function due to the quadratic form of the integrand. Here the asymptotic method[2] may be utilised, as we are concerned with a periodical phenomenon. The function expressing the kinetic energy has been shown by Peczalski to be

$$\varepsilon_1 = \frac{2}{3}\frac{e}{c}\,(eF)\,t\,\triangle t,$$

where F is the external field, $\triangle t$ the period between two successive impacts of a molecule and a charged particle. An asymptotic series will approach a limit; in this case the limit will be $\bar{\varepsilon} \rightarrow RT/N$ with the well-known meanings of R, T and N. The Planck formula of radiation

$$\bar{\varepsilon} = h\nu \,/\, (e^{KN.h\nu/RT} - 1)$$

shows that ν should be very small, that is, the radiant waves must be very long. The small particles carrying charges will be absorbing energy like resonators (Peczalski's result).

In summer conditions, when the sun is shining, photoelectric processes will produce electrons and sub-electrons which collide with the molecules of air and act as resonators absorbing the energy of long electromagnetic waves.

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[1] *C.R.*, July 4, 1927.
[2] NATURE, **134**, 216, Aug. 11, 1934. A misprint occurring there may be corrected: for $\psi \sim e^{\lambda s} - \left(v_0 + \frac{v_1}{\lambda} + \quad . \quad . \quad . \quad . \right)$ read $\psi \sim e^{\lambda s}\left(v_0 + \frac{v_1}{\lambda} + \quad . \quad . \quad . \quad . \right)$.

Physico-Chemical Test for Mitogenetic (Gurwitsch) Rays

UNTIL now, there has been only one physical method for detecting Gurwitsch rays, namely, with the Geiger-Müller electron counter. Using this method, some workers[1] have got positive results, whilst other investigators[2] have not been able to confirm them. The method needs complicated apparatus which is difficult to manage.

Therefore I have tried a simpler method to test for the existence of the so-called mitogenetic rays, without using biological objects. Inorganic colloidal solutions—charged either negatively or positively, and made unstable by the addition of neutral salts—flocculate more rapidly when influenced by mitogenetic rays. The duration of irradiation is very important to get good effects. At first I used colloidal solutions of iron hydroxide, the turbidity of which had been produced by potassium chloride solution of a fixed concentration, and which afterwards were exposed to the influence of Gurwitsch rays. The increase of turbidity after a certain time indicated the presence of the mitogenetic rays; the turbidity was measured with an electrical nephelometer. Afterwards it was found that better and more regular effects can be obtained by using gold sol. The gold sol, which should be clear and red, was prepared with hydrogen peroxide. The change of colour of the irradiated samples in comparison with the non-irradiated ones can be perceived sometimes macroscopically. Measurements of the turbidity in an electrical nephelometer have, however, proved more convenient and more reliable.

As sources of radiation, comparatively slow chemical actions (sodium chloride dissolving in water, urea-urease) and human blood were used. The result of one experiment is given below. The gold sol was in Petri dishes, covered by dishes of quartz, and exposed for two minutes to crystals of sodium chloride in water. Measurements made with the nephelometer:

	Control	Induced
4 min. after the end of irradiation	80	96
7 ,, ,, ,, ,, ,, ,,	82	103

The same without irradiation, both as controls:

3 min. after the end of the experiment	80	80
6 ,, ,, ,, ,, ,, ,, ,,	82	85

Full details will be communicated elsewhere.

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[1] Rajewski, "10 Jahre Forschung auf physikalisch-medizinisch. Grenzgebiete", 1931. Frank and Rodionow, *Naturwissen.*; 1931. Siebert and Seffert, *Naturwiss.*; 1933. Ruyssen, *Natuurwetenschap. Tijdschrift*, No. 6; 1934, has not yet finished his investigations. Barth, *Arch. Sci. Biol. Lenin.*, **35**, 1934.
[2] Seyfert, Dissertation, Tübingen, 1932. Locher, *Phys. Rev.*, 1932. Lorenz, Public Health Reports, Washington, 1933, and *J. Gen. Physiol.*, **17**, No. VI; 1934. Schreiber and Friedrich, *Biochem. Z.*, 1930. Gray and Ouellet, *Proc. Roy. Soc.*, B, 1933.

Reduction of Traffic Noise

THE report in NATURE of October 20, p. 633, of a discussion on this subject at the recent meeting of the British Association at Aberdeen encourages the hope that the attention of competent minds directed to the reduction of sound in motor traffic may have practical results.

Nevertheless those who, like myself, knew London sixty years ago, may remember that its streets were far noisier then than they are now. At that time they were all either paved with stone or laid with macadam; all vehicles ran upon metal tyres and were drawn by iron-shod horses. The result in rumbling and clatter was far in excess of what we complain about now.

HERBERT MAXWELL.

Monreith.