but rather to direct attention to the difficulty of any hypothesis which postulates a one-to-one relationship between genes and proteins. It is true, as suggested by Dr. Dounce, that there is no need to assume that genes act directly as templates; we can assume instead that genes synthesize ribonucleic acid templates and that these control protein synthesis. If, however, there were a specific gene for each ribonucleic acid template and a specific ribonucleic acid template for each protein, we should still have a one-to-one relationship between genes and proteins. It is particularly upon this concept of a one-to-one relationship between genes and proteins that we wished to cast doubt.

With regard to Dr. Dounce's second point, the correlation between rates of nucleic acid template synthesis and protein synthesis, we agree that it is not necessary to assume a direct proportionality between the two. It should be remembered, however, that much of the evidence for a relationship between nucleic acid synthesis and protein synthesis is based on experimental observations showing that under most conditions the two run closely parallel to one another. It seems to us illogical to accept this indirect evidence as support for the idea of participation of nucleic acids in protein synthesis, if, as suggested by Dr. Dounce, the theory does not in any case require a relationship between the rates of nucleic acid and protein synthesis.

T. S. Work
P. N. Campbell
National Institute for Medical Research,
Mill Hill, London, N.W.7.

Origin of Striations in Discharges

Alternate dark and bright regions are a common feature of the positive column of a glow discharge in most gases. Such striations may be stationary or moving and the column will be uniform or striated depending upon the gas pressure, the current density and the radius of the tube. The existence of striations has been known for more than a century, but the mechanism of their appearance or absence is still obscure.

Stationary striations are generally attributed to some regularity which produces repetitions of the Faraday dark space. As a result of experiments, Donahue and Dieke[1] conclude that moving striations are due to regions of positive and negative space charge which travel towards the electrodes, and they suggest that the process is initiated by the accumulation of electrons in the negative glow region. On the other hand, Loeb[2] has suggested that the striations may be associated with plasma oscillations.

In the positive column of a discharge the electron and ion densities are substantially equal (that is, form a plasma), and under such conditions the charges may vibrate under the influence of the electrostatic forces. For electrons the frequency of oscillation has been calculated, with simplifying assumptions, to be 8,980 $n^{1/2}$ c./s., where n is the charge density, and frequencies of this order (for example, about 10^9 c./s.) have been observed[3]. If an electrical wave of sufficiently short length is propagated through the plasma and a standing wave set up, then striations may be accounted for by the positions of the nodes and antinodes. This mechanism would also account for moving striations, for the position of the standing wave system will depend upon the phase change on reflexion of the incident wave at the head of the column, and if the electron density there changes the striations will move. A sufficiently rapid movement will give rise to an apparently uniform column.

On this view of the mechanism the striations have their origin in the plasma itself, whereas on the other theories the effect is due to cathode phenomena. In order to investigate the matter, it is desirable to make observations under the simplest possible conditions. This may be done by using high-frequency excitation, so that the plasma is obtained in an isolated state. Due to the alternation of the field, there is no unidirectional loss of electrons (as in a D.C. discharge) so that secondary electron production is unnecessary and the cathode fall is absent. The conditions in the high-frequency glow are then similar to those in the D.C. positive column and the discharge is maintained at a low voltage. The high-frequency field is usually applied by means of sleeve electrodes wrapped on the outside of the tube, and stationary striations aligned along the axis of the tube and in the direction of the field have been observed in a number of gases[4]. Gale[5] has recently described striations obtained by placing a long discharge tube between the wires of a Lecher system. High-frequency glows were observed over regions corresponding to the voltage antinodes, and the striations in these glows were aligned along the axis of the tube, that is, at right angles to the field. Thus it appears that the direction of alignment of the striations is determined by the geometry of the plasma (that is, the shape of the tube) rather than by the direction of the exciting field. Any effect due to the electrodes may be eliminated if the electrodeless form of discharge is observed. In this case the electric field is induced by an alternating magnetic field and the glow is obtained in the form of a ring, and is, in effect, a plasma of infinite length. Striations in this form of glow have been described by Sir J. J. Thomson[6]. The bright and dark portions were radial, but were unsteady and flickered rapidly.

Thus the evidence presented by the occurrence and alignment of striations in high-frequency glows shows that they are a property of the plasma itself rather than due to a cathode mechanism, and supports the view that they may be due to a standing wave system associated with oscillations of the charges constituting the plasma.

G. D. Morgan
Department of Physics,
University College of North Wales,
Bangor.
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High-frequency Papyrography of Salts

A method termed 'high-frequency papyrography', by which chemical substances and, in particular, electrolytes may be readily detected, has already been reported[1]. The process involves the movement of the papergram between the plates of a condenser in a tuned-grid-type high-frequency circuit, when large changes in the grid current are observed.