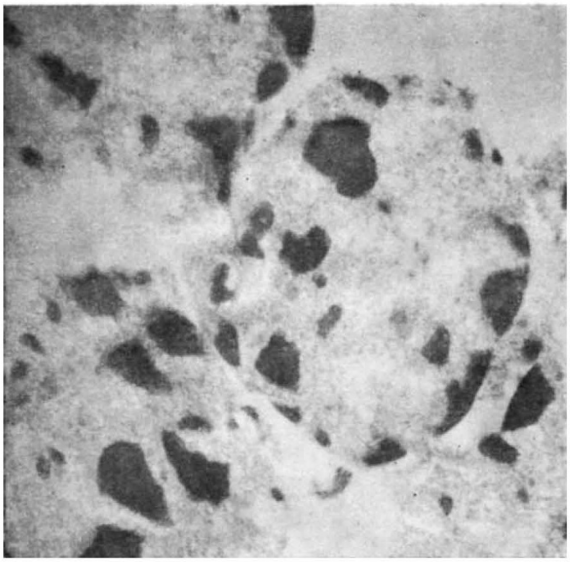

Fig. 1. Swollen nuclei displaying condensed masses of repressed chromatin and extended microfibrils of active chromatin. (×11,250)

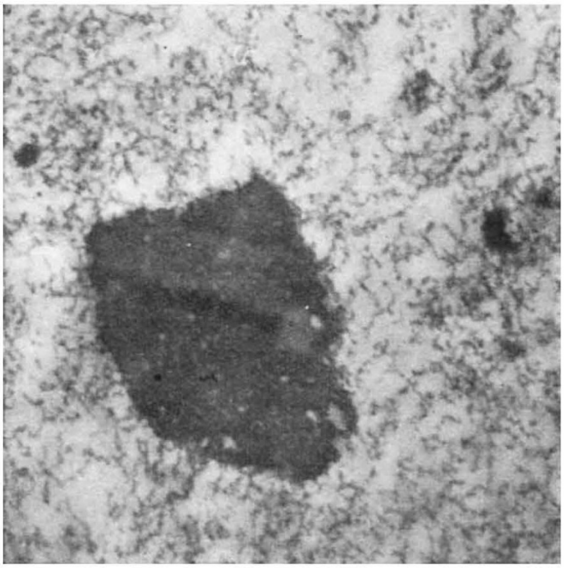

Fig. 2. Detail of swollen nucleus displaying the structural continuity of active microfibrils with repressed masses of chromatin. (×30,000)

1), while the extended microfibrils of active chromatin are dispersed between the masses within the interior of the nucleus (Fig. 1). Higher magnifications reveal the active chromatin microfibrils to be of 100 Å diameter (Fig. 2), and these microfibrils can be traced for up to 1·0μ of their length (Fig. 2). These extended microfibrils of active chromatin are seen to be structurally continuous with a dense reticulum of fibres within the condensed masses of repressed chromatin (Fig. 2). The zone of transition between the extended microfibrils and the condensed masses is sharp, occurring within less than 100 Å of the length of the microfibrils.

The molecular basis of these structural transitions may lie in the excess of such polyanions as phosphoproteins, RNA, and phospholipids recently found within extended active chromatin as compared to condensed repressed chromatin[11]. These chromatin polyanions can function as de-repressors of RNA synthesis within repressed chromatin by antagonizing the electrostatic interaction between the deoxyribonucleic acid (DNA) and the polycationic repressor histones of repressed chromatin[11].

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MATHEMATICS

Unified Relativity and Quantum Theory

A MATHEMATICAL model has been constructed which reconciles the series of relativity, electro-magnetism and quantum mechanics. It is a deterministic theory, and avoids the rather mystical appeal to fundamental indeterminism which is so prevalent in interpretations of quantum effects.

The 6-vector concomitant of a real basic spinor distribution, which satisfies the fundamental differential equation curl $W = 0$, represents precisely the electromagnetic field of light waves. The purpose behind this investigation was to express the general electromagnetic field as a concomitant of a spinor distribution. The following steps become necessary. First, the spinors are made complex. It is then necessary to interpret the phase as a periodic fifth dimension, as in Kaluzo's unified theory of gravitation and electromagnetism, and to assume a topological singularity, which is later identified with spin. The Kaluza theory is then incorporated in the model, the curvature invariants being determined by the concomitants of the spinor.

To extend the differential equation curl $W = 0$ to 5 dimensions, the complex nature of the spinors must be reintroduced, since spinors in 5-space of signature 3 must be complex. The differential equation led to wave packets without singularities, which can be interpreted as particles. Dirac's relativistic electron equations follow, the 'negative energy' terms corresponding to waves propagated in the reverse direction round the fifth dimensional cylinder. Stationary orbits and the energy frequency rules for spectra follow.

The final model consists of a 5-dimensional space–time with a distribution of spinors which satisfy the fundamental differential equation. The curvature components of the space–time are determined by the concomitants of the spinors. This model would seem to yield all the principal quantum effects and equations, which fit in with the gravitational and electromagnetic effects via the Kaluza model.

The interaction of two particles corresponding to spinor waves $W = W_1 + W_2$ is through the effects on the geometry which depend on concomitants of the form:

$$\overset{\simeq}{W}\psi W = \overset{\simeq}{W}_1\psi W_1 + \overset{\simeq}{W}_2\psi W_1 + \overset{\simeq}{W}_1\psi W_2 + \overset{\simeq}{W}_2\psi W_2$$

This introduces naturally the interaction terms of the form $W_1\psi W_2$ so frequently used in quantum mechanics.

A paper on space–time distributions of spinors has been submitted to the Royal Society for publication.

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