S. Tolansky for his interest and encouragement in this work. One of us (A. R. V.) wishes to express his thanks for the Imperial Chemical Industries Fellowship of the University of London, and to the University of Delhi for an extension of study leave.

Note added in proof. Since then, in addition to a step of unit height equal to 46·3 ± 0·8 A., we have measured steps which are odd-half integral multiples of the X-ray repeat unit.

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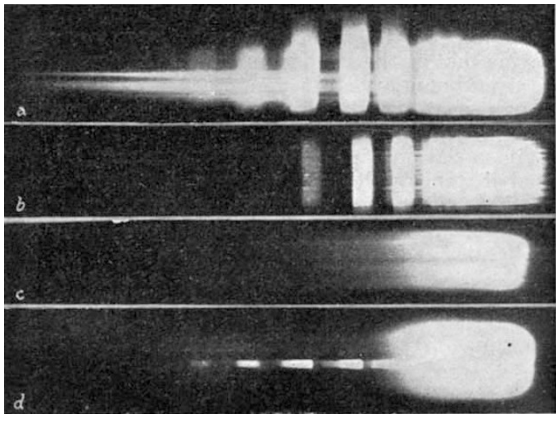
[1] Burton, W. K., Cabrera, N., and Frank, F. C., *Phil. Trans. Roy. Soc.*, A, **243**, 299 (1951).
[2] Müller, A., *Proc. Roy. Soc.*, A, **114**, 522 (1927).
[3] Tolansky, S., "Multiple Beam Interferometry of Surfaces and Films" (Oxf. Univ. Press, 1948).
[4] *Proc. Phys. Soc.* (in the press).

Radiation induced by Alpha-Particles in Thin Films

We have examined spectrographically the light emitted by thin films bombarded by α-particles[1]. The films were built up by evaporation on quartz slides to a thickness small compared with the range of the α-particles. The slides were mounted in front of the slit of a Hilger *f*/4 quartz spectrograph and exposed to a 25-mC. polonium source. Representative spectra, photographed on Eastman Kodak type II-0 spectroscopic plates, are shown in the accompanying photograph.

Spectrum (*a*) shows the continuum emitted by collodion extending, left to right, from about 230 mμ to about 470 mμ. The wave-length limits are set by the sensitivity of the photographic plate and not by the spectral energy distribution of the emitted light. Superimposed on the continuum are a number of bands which come from air molecules and from oxygen bound to the polonium[2]. At a slit-width of 0·2 mm. these bands are resolved into a series of lines listed in the accompanying table.

Spectrum (*b*) is obtained from a film of deoxyribonucleic acid of thickness corresponding to approximately 2 mgm./cm.². The film is transparent to the light from the polonium source, which again gives the characteristic superimposed bands. Spectrum (*c*) is from aluminium. Spectrum (*d*) comes from a thin film of gold (above) and a thin film of copper (below) separated by a narrow gap. Light from the polonium source can be seen through the gap on the quartz slide. It is clear, therefore, that films of collodion, deoxyribonucleic acid, aluminium, gold and copper, when bombarded by α-particles, emit radiation in a continuum from 230 to 470 mμ, the region of observation.



(*a*) Collodion; (*b*) deoxyribonucleic acid; (*c*) aluminium; (*d*) gold (above) and copper (below), separated by a narrow gap. Slit width, 2·5 mm. Exposure times, about 60 hr. for (*a*), (*b*) and (*d*), and 20 hr. for (*c*)

Light from Polonium in Air

Wave-length (mμ)	Rel. intensity	Wave-length (mμ)	Rel. intensity
298	5	355	4
300	5	359	2
313	5	376	4
314	4	382	4
326	3	392	4
330	5	402	6
336	5	408	6
338	1	430	6

Dee and Richards[3] irradiated thin films of water on a quartz slide and found that chemical reactions were induced in solutions placed beneath the quartz. The chemical reactions were ascribed to quanta emitted from the bombarded water. To investigate the nature of these quanta we immersed the polonium source in water and made an eleven-day exposure. No radiation other than the lines listed in the table was observed. The failure to find such additional radiation from the water implies that any quanta emitted by the water must lie at wave-lengths shorter than 230 mμ, and hence beyond the limits of detection of our system.

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[1] Richards, E. W. T., and Cole, J. F. L., *Nature*, **167**, 286 (1951).
[2] Ortner, G., and Salim, S., *Nature*, **169**, 1060 (1952).
[3] Dee, P. I., and Richards, E. W. T., *Nature*, **168**, 736 (1951).

Structural Skeleton in a Bituminous Coal

Our previous experiments on the rheological properties of coal, determining Young's modulus by a resonant frequency method[1], internal viscosity by measuring the vibrational decrement at audio-frequencies[2], and breaking-strength by measuring the stress applied for rupture for various durations of load[3], have shown that variations of these properties with ash concentration in coal expressed by volume parts are linear.

I have therefore suggested that in the caking coals ash particles 'solvate' coal molecules and form a micellar structure, as in the rubber–carbon black system. Although the proposed micellar structure is fundamentally different from that used by D. H.