from internal evidence and are not therefore strictly comparable.

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Electron Microscopy and Radioautography as Coupled Techniques in Tracer Experiments

CONSIDERABLE progress has already been made towards high resolution in radioautography, and good results have been obtained by various workers with the Ilford peeling film technique of Pelc[1], the *NTB* stripping method of Boyd[2] and the 'wet-process' system of Gomberg[3]. Lately, I have shown[4] that, by using thick layers of nuclear emulsions (300μ), and avoiding background effects by placing the specimens in a coal mine at a depth of 600 metres[5], it is possible to follow the β-particle tracks to their origin and obtain a one-micron resolution.

Films of the sensitive emulsion may be made thin enough to allow observation in the electron microscope, thus adding greatly to the resolution. The process is as follows. Microscope slides, specially selected for freedom from radioactive contamination, were covered with a layer of collodion or 'Formvar'. In the experiment described here, the specimens were nuclei extracted from tumour tissues and labelled *in vitro* with cobalt-60 (β-ray, 0·3 MeV.). They were placed on the collodion and covered with a thin layer of Ilford *G5* nuclear emulsion, obtained by melting the gel at 55° C., as in the usual procedure, and diluting it with water to the proper consistency. The slides, after drying, were placed for exposure in a thick-walled lead box. As a proportion only of the β-particles are likely to be emitted in the plane of the sensitive layer, the necessary exposures are longer than in the thick-layer method previously employed.

The slides were developed in Ilford *P.Q.* Universal developer, cleared in hypo within 20 sec. and fixed for 2 min. After washing, the double layer of collodion-gelatine was lifted from the slides without difficulty and mounted in the electron microscope. The accompanying electron micrograph (Fig. 1) shows the tracks emitted by four single nuclei at a magnification of 2,000 (reduced from the original magnification of 6,000).

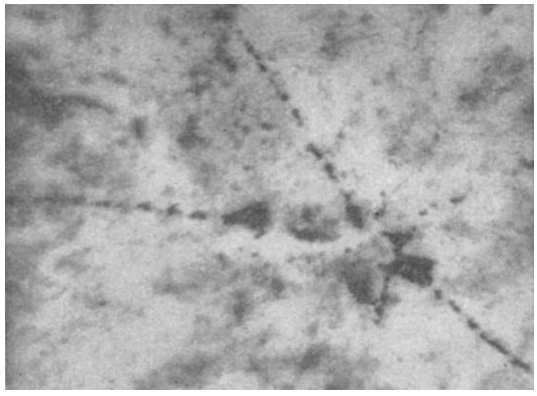

Fig. 1. Electron micrograph of β-ray tracks emitted by tumour nuclei labelled with radioactive cobalt-60. × 2,000

This new technique, successful for the particles of cobalt-60, of energy 0·3 MeV., is likely to be of great value in the case of the soft radiation of carbon-14, as the grains of the tracks are close enough to allow a very high magnification.

So far the method has been applied to isolated cells and cell nuclei, but it is hoped to extend it to ultra-thin tissue sections.

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Zinc-deficiency of *Hevea brasiliensis* as a Predisposing Factor to *Oidium* Infection

INFECTION of the *Hevea* rubber tree by *Oidium heveae* is common in Malaya but is not regarded as a major pathological problem; in Ceylon, however, the fungus can produce serious loss of crop yields and the problem is of economic importance[1]. *Oidium heveae* is most prominent in Malaya at the time of refoliation after 'wintering' of the trees, when it may cause a secondary leaf-fall. It is only at this time that *Oidium* is found on leaves exposed to full sun. Throughout the year it may be found on young plants but only when these are shaded, and then never sufficiently seriously to cause defoliation. A small number of poorly developed colonies of *Oidium heveae* are usual on the leaves of plants grown in our plant-house[2] as the glass and framework of the house provide light shade. During the study of the micronutrient-deficiency symptoms of *Hevea brasiliensis* grown in sand culture within this house, a striking relationship between the susceptibility to severe *Oidium heveae* attack and the zinc status of the plants was noticed. This relationship was not noted for the copper- or molybdenum-deficient plants grown simultaneously and in the same environmental conditions as the zinc-deficient plants. Our observations were thus made on plants grown under glass and were derived from one experiment only; the results, however, were so well marked that their significance should be quickly tested and evaluated in countries where *Oidium heveae* attack is of major concern.

'Selfed' seeds of clone Tjirandji 1 were sown in sand which had been rigorously purified by boiling with hydrochloric – oxalic acid mixture, and which was contained in 'Pyrex' glass vessels. Two types of nutrient, all nitrate nitrogen or part nitrate- part ammonium-nitrogen, were supplied to the seedlings;