It is also easy to prove the results by noting that the sagittal image heights describe object and image circles on rotation of the diagram about AC. The magnification of each element of the object circle so obtained is the same and equal to m_s. Thus the perimeters of the two circles being related by the sagittal magnification, so must their radii be similarly related.

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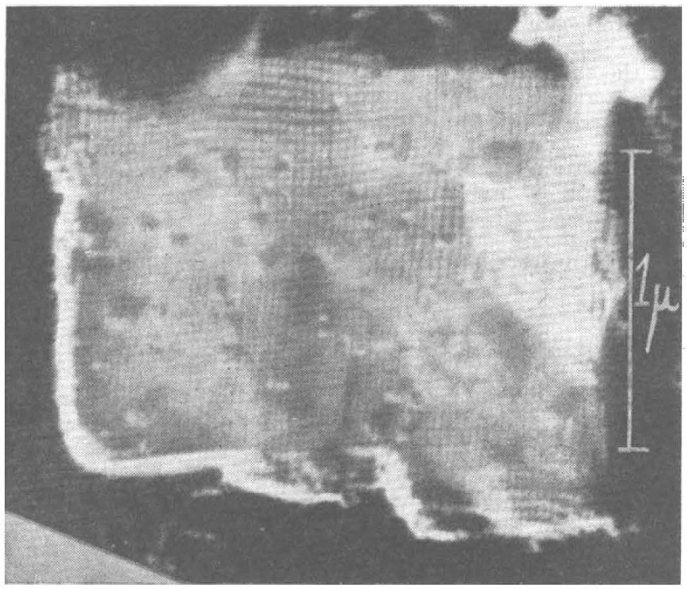
Electron Microscopy of Tobacco Necrosis Virus Crystals

Electron microscopy has shown the regular way in which the elementary particles, or molecules, of the southern bean mosaic virus are arranged in its crystals[1]. Not all crystallizable viruses are equally easy to examine in this fashion; but we have found that satisfactory photographs can be obtained of single crystals of a strain of the tobacco necrosis virus. They differ from the bean mosaic virus electron micrographs in a number of interesting and instructive ways.

The crystals were of microscopic size obtained from a purified solution of a newly isolated member of this group of viruses[2], prepared by high-speed centrifugation followed by salt precipitation. Replicas[3] of a dilute suspension of the crystals in half-saturated magnesium sulphate were made by spreading a small drop on a clean microscope slide, coating the dried spread with an obliquely evaporated gold film, reinforcing the gold with thin collodion and floating the combined film from the slide on to water for cutting and mounting on screens. The preparations in this form were given a final vertical deposit of a few angström units of beryllium to enhance their stability under the electron beam.

The molecular array over the face of a typical microcrystal of this necrosis virus can be seen in the accompanying reproduction. In the many fields examined, crystals have always been covered with a haze which probably is to be attributed to impurities remaining in the preparation. Though this interferes with photography at the highest magnifications, it does not obscure many features of the crystalline structure. The molecular net of nearly all the necrosis virus crystals that have been photographed suggest, as does the one shown here, a frayed piece of wire screening. The extensive irregularities of these nets have prevented very accurate determinations of interparticle distances. Nevertheless, measurements across 10–20 molecular rows in undisturbed regions indicate that the same particle separation, *c.* 275 A., prevails in both the vertical and the horizontal directions. In the bean mosaic crystals the separation is nearly 50 per cent greater in one direction than in the other. The rows of particles are approximately at right-angles, but the net is not strictly cubic. In the crystal illustrated here, its obtuse angle is *c.* 95°.

The photographs made thus far do not establish with certainty the way succeeding layers of particles overlie one another to build up a crystal. Most of the evidence points to the lattice being simple, though a body-centred arrangement cannot yet be excluded.



Electron micrograph showing the particle arrangement over the face of a single tobacco necrosis virus crystal. × *c.* 38,000

Many of the thinnest deposits probably were formed as the crystal suspension dried on the slide. Their particles, too, are in a square network. Regular arrangements having no more than a dozen or so particles on a side are also not uncommon. This ability of the necrosis virus to crystallize directly from solution should make it especially valuable for use in studies of the first steps in crystal formation.

The electron micrography of this virus is being continued; its results will be described in more detail elsewhere.

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[1] Price, W. C., and Wyckoff, R. W. G., *Nature*, **157**, 764 (1946).
[2] Markham, R., and Smith, Kenneth M., unpublished work.
[3] Williams, R. C., and Wyckoff, R. W. G., *Nature*, **156**, 68 (1945).

Alloxan Diabetes and the Kidney in the Rat

Jimenez-Diaz, Grande-Covian and De Oya[1] have reported recently that dogs in which the vessels of both kidneys were clamped prior to and for ten minutes following the intravenous injection of 100 mgm./kgm. of alloxan failed to develop either the hyperglycæmia or the uræmia of the controls in which the clamping was omitted. On the basis of this experiment they postulated the existence of some factor in the kidney with which the alloxan must come in contact before it can exert its full diabetogenic effect.

Alloxan is known to exert a specific toxic action on the beta cells of the islets in many species[2]. It was felt that should there be a chemical factor in the kidney necessary to mediate the toxic effect, it would