It was not possible in all cases to assign unambiguously a Burgers vector to the dislocations since the geometry of the crystals allowed only a limited number of reflections to be recorded.

Stacking faults

One of the crystals showed bands and fringes in addition to contrast from dislocations. These are in the form of growth horizons due to an impurity effect. The bands which are of uniform contrast represent planar faults parallel to (001). The fringe patterns are of overlapping faults making an angle with (001). This faulting is probably associated with changes in the tetragonality of pentaerythritol.

LOW-ANGLE X-RAY STUDY OF STRIATED MUSCLE EXTRACTED IN A MEDIUM OF LOW IONIC STRENGTH

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The actin and myosin filaments of vertebrate striated muscle are arranged in overlapping hexagonal arrays. The filaments are parallel to the muscle fiber axis and low-angle equatorial reflections corresponding to the 100 and 110 planes of the hexagonal lattice can be observed. Electron microscope studies have shown that the filaments form repeating units, known as sarcomeres, arranged along the length of the muscle fibers [2]. It has been found, both in living and in glycerinated muscle, that the dimensions of the hexagonal lattice vary as a function of sarcomere length [1].

Two components of the sarcomere, the M and the Z lines, can be removed by extracting thin bundles of glycerinated muscle in media of low ionic strength [3]. In the present work, a series of low-angle X-ray photographs were taken during the extraction of glycerinated rabbits psoas muscle fibers in 2 mM tris buffer at pH 7.6 and in 2nM KCl. Photographs were taken with a Frank's low-angle camera using an Elliott rotating-anode tube. Sarcomere length was measured before every X-ray picture with a laser beam.

It was found that there was practically no change in the lattice dimensions during the first 50-70 hr of extraction, but that after this period there was a rapid increase of about 150% in the 100 and 110 spacing. Electron microscope control experiments showed that by this time most of the M line had been extracted, but that the Z line had not changed. The expansion stopped after a further 40 hours and no further change in the lattice occurred even after 350 hr of extraction. It is known that by this time the Z line would also have been removed [3]. The enormous increase in lattice dimensions was accompanied by only a relatively small (about 20%) decrease in sarcomere length. The experiments were performed on muscles with initial sarcomere lengths between 2.2μ and 4.3μ.

This result, in contrast to the behavior of unextracted muscle, suggests that the M line plays an important role in holding together the actin-myosin lattice.

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STRUCTURE OF TETRAOXADECALIN

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The crystal and molecular structure of 1,4,5,8-tetraoxadecalin ($C_6H_{10}O_4$) (TOD) was determined from three-dimensional integrated precession data. The aim of this study was to establish the molecular configuration of TOD; the *trans* configuration was proposed on the basis of a two-dimensional study of the $HgCl_2$-TOD adduct [2] while the interpretation of NMR spectra [1] led to a proposal of the *cis* configuration for the compound.

The structure of TOD (space group C2/c or Cc, the former adopted on the basis of intensity statistics) was solved by direct methods which were assisted by packing considerations. The anisotropic, full-matrix, least-squares refinement of the structure led to an agreement factor $R_{hkl} = 0.071$.

The molecular structure of TOD is that of *cis* 1,4,5,8-tetraoxadecalin. Both rings adopt the chair conformation and are related by a *molecular* two-fold axis of symmetry.

The tightly packed layer-like structure, with the layers parallel to (100), may account for the rigidity of TOD which is indicated by the thermal motion analysis. This was not expected since in solution both enanthiomorphs exist in equilibrium and the isolated molecules must therefore be highly flexible.

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X-RAY ANALYSIS OF A TROPANE-LIKE DERIVATIVE

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The structure determination of 8-phenyl-8-methyl-8-phosphonium-bicyclo-[3.2.1]octan-3-one iodide ($C_{14}H_{18}OPI$) (PAMI) was undertaken in order to establish its proposed analogy to the tropanic system. Of interest was also the structure of the novel heteroatomic [3.2.1] bicyclic nucleus.

The study was based on three-dimensional integrated precession data which were corrected for absorption. The structure of PAMI (space group Pbca) was solved by the heavy atom method and by subsequent F_o and ΔF