The series of spectra reproduced, while confirming Menzies and Mills' results for the liquid air temperature, reveals numerous other interesting facts. The spectrum becomes diffuse and faint when the crystal is heated up above room temperature. *Per contra*, when the crystal is cooled down, the spectrum brightens and also sharpens remarkably, exhibiting even above the so-called λ-point transition (243° T.), a group of three fairly well-defined Raman shifts of 92, 141 and 170 cm.$^{-1}$ respectively, with indications of two fainter ones at 107 and 195 cm.$^{-1}$. These persist far below the λ-point transition, becoming at the same time quite sharp and showing a progressive shift in their position with falling temperature. A remarkable change in their relative intensities also occurs at the same time. At liquid air temperatures, a new line with a frequency shift of 278 cm.$^{-1}$ unmistakably makes its appearance. This is quite sharp but faint.

There can be little doubt that the features seen in the spectra reproduced arise from oscillations of the lattice in which the NH_4 groups may be considered to move as single units and that, with the exception of the 278 cm.$^{-1}$ line, they represent the first-order vibration frequencies of the lattice. The observed discrete character of the spectrum and the sharpening of the lines with falling temperature are both in accord with the fundamental ideas regarding the vibration spectra of crystal lattices put forward by Sir C. V. Raman[3] and are, therefore, experimental evidence of his theory. That the vibration frequencies in this case are Raman-active in the first order, instead of being inactive as in the metallic halides, is evidently a consequence of the NH_4 group possessing only tetrahedral symmetry as compared with the octahedral symmetry of the metallic ions.

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Electron Microscope Investigation of the Action of Salt Solutions on Myosin

In previous work it was shown that the thiocyanate anion (0·05 mol. solution of sodium thiocyanate), which produces monsters with large notochord and hyper-evocation in Amphibia embryos[1], also induces a decrease in viscosity of solutions containing euglobulin *b* [2]. On the other hand, lithium chloride induces an increase in viscosity of these solutions, at a concentration (0·14 mol.) which produces monsters with reduced notochord and hypo-evocation. A similar effect has been found for the viscosity of solutions containing fibrillar particles (myosin, sodium thymonucleinate)[3]. In order to find what kinds of modifications were induced by the various salts in the myosin solutions, an investigation with the electron microscope was undertaken.

Rabbit myosin, prepared according to the methods previously used, was dissolved in a 1-mol. solution of potassium chloride, to which was added : (*a*) nothing ; (*b*) sufficient of a 1-mol. solution of potassium thiocyanate (or iodide) to bring the concentration of thiocyanate (or iodide) to 0·5 mol. ; (*c*) sufficient of a 1-mol. solution of lithium chloride to bring the concentration of lithium salt to 0·14 mol. After twelve hours at 0° C., these solutions were examined by means of the electron microscope, on preparations fixed and stained for one minute with 0·1 per cent phospho-tungstic acid, according to the method of Hall, Jakus and Schmitt[4].

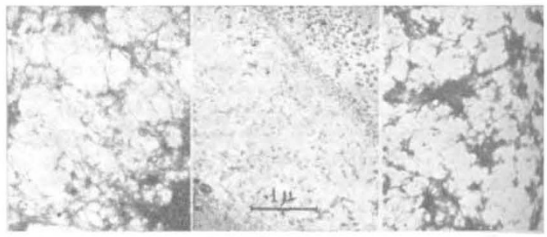

Fig. 1 Fig. 2 Fig. 3

Preparations of myosin dissolved in potassium chloride alone (*a*) show clearly a fibrillar structure (Fig. 1) ; those treated according to (*b*) show the loss, sometimes even total, of the fibrillar structure (Fig. 2) ; those treated according to (*c*) show clearly a fibrillar structure. This is in full agreement with the finding of a lower viscosity of the myosin solutions after addition of potassium thiocyanate (or iodide)[3], and of loss of flow birefringence in myosin solutions when treated with these salts[5]. It is also in agreement with the finding of a higher viscosity of myosin solutions by addition of lithium chloride (up to a final concentration of 0·25 mol. [3]) and of flow birefringence of myosin solutions in lithium chloride[5].

It is difficult, now, to establish the relations between our findings and those of Jakus and Hall[6] on solutions of Szent-Györgyi's water-soluble myosin. The filaments of this myosin, by increase of the concentration of potassium chloride in the solvent, are transformed into a granular background and, if the salt concentration is then lowered, the myosin re-aggregates : our myosin is Weber and Edsall's myosin, that is, distinct from water-soluble myosin.

The present researches show that the effect of the thiocyanate anion on a fibrillar protein such as myosin, as shown by the electron microscope, is quite different from that of lithium chloride, in agreement with what could be expected from our viscosimetric researches[2,3].

I am grateful to Prof. D. Marotta, general director of the Istituto Superiore di Sanità, Prof. G. C. Trabacchi, director of the Physics Department, who supervised the work done with the electron microscope, which was constructed by him, and to Prof. D. Bocciarelli, who took the photographs.

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July 31.

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