It will be seen that the results for deuterium oxide are consistently higher than the values for water, and that a minimum value is shown at about 41° C.

These values, which were announced at the Blackpool meeting of the British Association, are preliminary in character, and may be subject to small corrections.

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Effect of Large Centrifugal Forces on *Paramecium*

THE effect of subjecting *Paramecium* to large centrifugal forces has been investigated and has given some encouraging results.

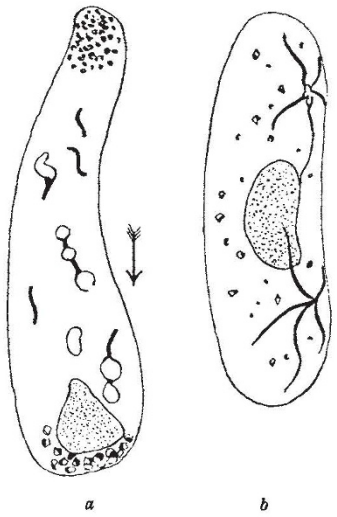

FIG. 1. (*a*) Centrifuged, (*b*) control *Paramecium*. The arrow indicates the direction of the force.

Fig. 1 illustrates the effects produced. The animal becomes elongated. The nucleus and crystals are moved to the centrifugal side, the excretory mechanism is fragmented, the canals being torn away from the pore and enlarging to form vacuoles. In addition, there is a collection of small granules visible after the Golgi methods, both osmic acid and silver. These granules are moved towards the centripetal pole, and it is thought that they may be Golgi bodies of a rudimentary type.

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Diffraction of Light by Ultra-sonic Waves

WE have recently given a theory of the diffraction of light by ultra-sonic waves, which is quite general and leads to numerical results for the diffracted intensities[1]. In this paper, we considered normal incidence only; we have now calculated some diffraction patterns at oblique incidence. We found these in good agreement with the experimental results of Parthasarathy[2].

Parthasarathy apparently explains the observed asymmetry of the diffraction pattern by the "characteristic reflection" of light on the ultra-sonic wave, although we know from the theory of diffraction of X-rays in crystals that this reflection is simply a consequence of the equations of propagation. In fact, even for X-rays, as Ewald has shown[3], Bragg's angle of reflection is not sharp, but spreads out over a region which covers a few seconds of arc, and our theory shows that for ultra-sonic and light waves this region is much larger and may cover as much as a few degrees.

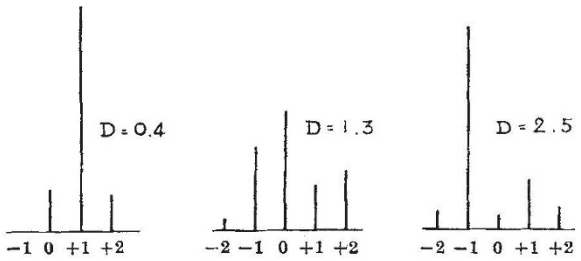

FIG. 1. Intensity of the diffracted light in the various orders for three different values of the thickness d of the ultra-sonic beam. The light is incident obliquely in the direction of the + 1 order, the 0 order being on the normal to the direction of the ultra-sonic wave. d is connected to the pure number D which appears in the figures through the relation $D = \frac{\pi}{\Lambda^2}\lambda d$, λ and Λ being the wave-lengths of the light and of the sound waves respectively.

The three diagrams reproduced (Fig. 1) show the calculated intensities in the different orders of diffraction for different thicknesses of the beam of ultra-sonic waves. The angle of incidence and the intensity of the ultra-sonic waves have been kept constant. One sees clearly that the repartition of intensity among the different orders is a function of the thickness of the ultra-sonic beam. The reason for this is that the intensity of a wave diffracted in Laue fashion is a quasi-periodic function of the thickness of the diffracting medium (corresponding to the *Pendellösung* of Ewald for X-rays).

Our diagrams exhibit the asymmetry which is the main feature of Parthasarathy's photographs. It is, of course, impossible to obtain more than qualitative agreement, without precise information about the intensity and breadth of the ultra-sonic beam.

The geometrical representation of Ewald allows an interpretation of the equivalent Brillouin theory, which clarifies greatly the apparent mathematical complexity of the latter. In fact, one can reason out very simply the exact solution of the problem of diffraction, and this seems much easier than trying to solve it approximately, as N. S. Nagendra Nath has done in a recent paper[4].

The complete report of our investigation will appear shortly in the *Helvetica Physica Acta*.

I wish to thank Prof. Weigle for his valuable advice in this work.

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