with a low-power microscope as bright scintillations on the phosphor, with diameters of about 40 microns. For an average scintillation the photon density at the phosphor thus exceeds 10^{11} photons cm.$^{-2}$, and since a photon density of 10^{8} photons cm.$^{-2}$ is sufficient to give a detectable image on a very fast photographic emulsion[6], it is to be expected that the scintillations can be photographed with relatively inefficient optical coupling between the phosphor and the emulsion.

We have been able to take such photographs (Fig. 2) on Kodak Tri-*X* film, using a pair of 50 mm. *f*/2 lenses front-to-front to give unity magnification. The exposure time for each photograph was 0·5 sec. Fig. 2*a* was taken with the tube in the dark at room temperature, and shows the scintillations due to dark emission from the photocathode. The rate of background scintillation is $\sim 6 \times 10^{3}$ cm.$^{-2}$ sec.$^{-1}$. The corresponding cathode dark current, if each electron emitted gives rise to a scintillation, is $\sim 10^{-15}$ amp. cm.$^{-2}$, which is a reasonable value for an antimony–cæsium cathode. For Figs. 2*b*, *c*, *d* and *e*, the image of a resolution test object was projected on to the photocathode with successively increased levels of illumination. The test object was a fan of 15 black-and-white line-pairs. In Fig. 2*b* the illumination is so low that the photo-emission is only of the same order as the dark emission, and the object is detectable only as a local increase in the scintillation density. Increases in illumination lead to the object becoming barely recognizable (Fig. 2*c*), and clearly so (Figs. 2*d*, *e*). The limiting resolution is about 15 line-pairs per mm., and is determined largely by the diameters of the scintillations.

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W. L. Wilcock
D. L. Emberson
B. Weekley

Department of Physics,
Instrument Technology Section,
Imperial College, London, S.W.7.

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Ultrasonic Velocities in Aqueous Solutions of Cadmium Iodide and Mercuric Chloride

In the course of a systematic study of the ultrasonic behaviour of aqueous solutions of inorganic salts, I have come across two cases (mercuric chloride and cadmium iodide) which behave in a peculiar manner. Preliminary measurements on the velocity of ultrasonic waves in aqueous solutions of the above salts have been made using a variable path interferometer working at 750 kc./sec. An accuracy of 0·15 per cent is obtained. The results are presented graphically in Fig. 1.

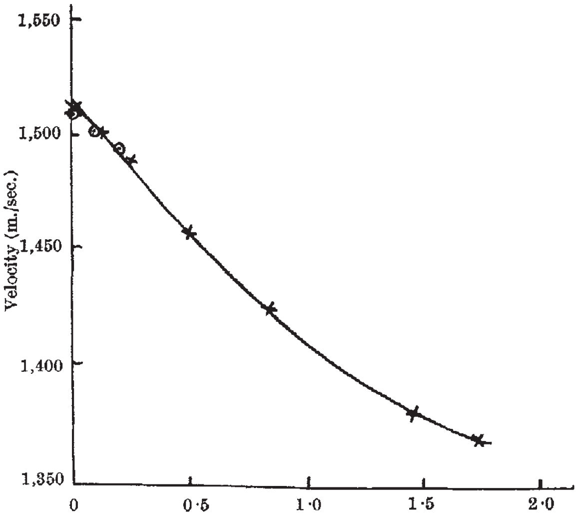

Fig. 1. ×, cadmium iodide ; ○, mercuric chloride

In contrast with the normal behaviour of electrolytes, ultrasonic velocities of these solutions decrease with increasing concentration. Cadmium iodide registers a large decrease. Ultrasonic velocity at a concentration of 1·75 *M* is 1,369 m./sec., resulting in a lowering of 140 m./sec. from the value for pure water. Mercuric chloride shows a relatively smaller change, the velocity in its 0·25 *M* solution being 1,489 m./sec.—a lowering of 18 m./sec. Even though the ultrasonic velocities decrease with increasing concentration, the adiabatic compressibility decreases with increase of concentration. Full details of this investigation will be published shortly.

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S. V. Subrahmanyam

Department of Physics,
Sri Venkateswara University,
Tirupati, India. Nov. 21.

A Sidewall Friction Effect during Soil Consolidation

In the course of investigating the consolidation properties of a sensitive marine clay, a variety of consolidation test procedures has been used. Some followed normal incremental loading procedure, but with widely varying increment ratios. Other tests employed continuous loading techniques either by straining the specimen at a constant rate or by applying load at a constant rate.

When the specimens were oven dried after test, an unusual phenomenon was observed. Specimens that had been subjected to incremental loading revealed a dark ring of soil at mid-height around the perimeter. During the drying this ring of soil appeared to shrink more than the rest of the specimen ; it often fell away leaving a spool-shaped specimen as shown in Fig. 1. The phenomenon was never observed on specimens subjected to continuous loading.

In a paper[1] which describes this work more fully, it is reasoned that the differential shrinkage in specimens loaded in increments is a manifestation of unequal stress distribution across the specimen and that sidewall friction between specimen and enclosing ring is the primary cause of the non-uniformity. Reference to probable effective stresses through incrementally loaded specimens suggests that unequal consolidation will occur, but that in continuous