considerable experimental difficulties, which so far have not been completely overcome. It appears, however, that one of the questions we had set ourselves can be answered, partially at any rate, from some data recently published by Richtmeyer (*Phys. Rev.*, July, 1921, p. 13), who has given the absorption curves of molybdenum and silver for homogeneous X-rays on both sides of their respective critical (κ) absorption frequencies, and for lead on the longer wave-length side. Data on lead have been previously given by Hull and Rice (*Phys. Rev.*, vol. 8, p. 326, 1916), who have also determined one point on the shorter wave-length side. The values of Richtmeyer for lead are proportionately higher than those of Hull and Rice, apparently indicating that the latter have inaccurately determined the thickness of their thin absorbing screen.

By plotting log (τ/ρ) against log λ, the double values of the mass absorption (fluorescent) coefficients of molybdenum and silver at their respective critical frequencies can be accurately determined. In the case of lead the accuracy of the upper value (for the shorter wave-length side) is governed by the accuracy of the single determination of Hull and Rice as corrected from the Richtmeyer data. The following results are obtained for the ratio of the values $\frac{(\tau/\rho)_{\nu_\kappa+\delta\nu}}{(\tau/\rho)_{\nu_\kappa-\delta\nu}}$ when ν_κ is the κ critical absorption frequency of an element and $\delta\nu$ is infinitely small.

Element	Lead	Silver	Molybdenum
$R=\frac{(\tau/\rho)_{\nu_\kappa+\delta\nu}}{(\tau/\rho)_{\nu_\kappa-\delta\nu}}$	3·5	6·76	7·06
Critical frequency ν_κ	$21{\cdot}58\times10^{18}$ sec^{-1}	$6{\cdot}186\times10^{18}$ sec^{-1}	$4{\cdot}854\times10^{18}$ sec^{-1}

The relation between R and the critical frequency is linear, and is expressed by the equation

$$R=0{\cdot}212\times10^{-18}(38{\cdot}1\times10^{18}-\nu_\kappa).$$

The relation between R and the atomic number has been tested, but it does not appear to be nearly as linear as the one given above. The data from which this generalisation has been made are admittedly incomplete, and the experiments are being continued in the hope of testing the extent of its validity.

W. EWART WILLIAMS.
B. L. WORSNOP.
Wheatstone Laboratory, King's College,
Strand, W.C.2, October 15.

The Film-photophone.

IT may be of interest to readers of the Note in NATURE of September 29, p. 161, to learn that the photo-electrical equipment of the "speaking-film" is quite new. It consists of an antimonite cell, and was constructed especially for this purpose by the present writer. A fragment of a single crystal of the mineral antimonite (found in Japan and Borneo) is connected to electrodes (of very large surface) in such a manner that air and humidity are excluded. An even flow of current is thus attained and the sudden, unexpected jerks which formerly destroyed the acoustic effect are avoided.

The photo-electrical properties of antimonite have been known for a comparatively short time. The discovery was made by F. M. Jaeger (of Zaandam) in 1907. The exceptionally high resistance of the first cells was at that time, before the advent of the amplifier, a serious obstacle to technical uses. In 1911 I succeeded in constructing a cell of lower resistance which enabled Prof. B. Glatzel in 1912 to demonstrate graphically by the oscillograph the surprising rapidity with which the antimonite adjusts itself to varying intensities of light.

That synthetic antimonite, made by melting together antimony and sulphur in suitable proportions, is sometimes very sensitive was shown by Olie and Kruyt in 1912.

The investigations of F. C. Brown seem to indicate that single crystals of selenium might also be used with advantage. But they are difficult to make, and the problem of affixing the electrodes is not yet solved. although solutions may be said to be in sight.

W. S. GRIPENBERG.
Helsingfors, Finland, October 13.

THE first two sentences in Dr. Gripenberg's letter are misleading in the sense that they suggest that the only photo-electrical equipment capable of being used with "speaking-films" is the antimonite cell. It is well known, of course, that other substances besides selenium respond to fluctuations of light intensity, and antimonite is, apparently, one of them. Another is the "thalofide cell," which has recently been advertised extensively, and was invented by T. W. Case. I believe I am correct in saying that the sensitive substance in this cell is thallium sulphide. The comparative merits of these various substances will, no doubt, ultimately decide which is best to use with speaking-films. For the present, at any rate, selenium has been by no means completely ousted—a fact which is made evident by its adoption and use in connection with the film-photophone of Mr. Bergland, to the efficient performance of which attention has been directed by the *Times* correspondent.

THE WRITER OF THE NOTE.

Rainfall Records at Rothamsted.

THE following rainfall figures from Rothamsted are worth noting. The records date back to 1852 for the large rain-gauge (1/1000 acre), but for the purpose of comparison the figures for the last fifty years are taken, since the three percolation gauges (also 1/1000 acre) were not built until 1870. They relate to the harvest-year, September 1–August 31:—

Harvest Year.

		Percolation		
	Rain. Inches.	Through 20-in. soil. Inches.	Through 40-in. soil. Inches.	Through 60-in. soil. Inches.
Average for last 50 years	29·500	14·834	15·482	14·659
September 1, 1920, to August 31, 1921...	16·282	6·921	7·161	6·812

For the past eight months (February 1–September 30) the figures are:—

1921	8·511	1·125	1·230	1·176
Average	18·239	6·525	6·910	6·528

The rainfall for the period September 1, 1920, to August 31, 1921, is the lowest since the records started in 1852, the previous lowest being 19·504 in. in 1897–98. The highest figures for the period are 41·048 in. in 1878–79.

W. D. CHRISTMAS.
Rothamsted Experimental Station,
Harpenden, October 27.