phenomenon was also found for other waves being investigated in several distance ranges.

A similar oscillatory tendency of the amplitude curve for P-waves can be observed by detailed investigation of the seismic data of underground nuclear explosions published recently[8]; the number of observations in this case, however, is insufficient for detailed conclusions. In comparison with amplitude curves reported in this communication these observations seem to show regional influences due to the probably regional structure of the upper mantle[6,9]. The oscillations observed in this distance range are evidently connected with the surface field of waves diffracted at the asthenosphere low-velocity layer[10].

A more detailed account of this work will be published in the Gerlands Beiträge zur Geophysik.

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PHYSICS

Speed of the Superconducting-Normal Transition in Tin Films

We have carried out some experiments to study the rate at which resistance is restored in a superconducting tin film by the application of a magnetic field above the critical value. No direct experiment of this kind has previously been reported, although Woodford and Feucht[1], using a radiofrequency method, inferred that the transition in an evaporated film of an unspecified metal probably occurred in less than 10^{-9} sec. The question is of some importance both from a fundamental point of view and in determining the lower limit of the switching time of superconducting circuit devices such as the cryotron.

In our experiments, tin films with the characteristic 'dumb-bell' shape were evaporated on to glass slides, the central region of the films being approximately 1 cm. long, 100–400μ wide and 1000 Å. thick. The slides fitted closely into a small solenoid (1 cm. long $\times$ 0·3 cm. $\times$ 0·1 cm.) which produced a magnetic field of 29·5 œrsteds/amp. The solenoid had an inductance of 0·3 μH. and was fed through a 50 Ω coaxial cable with a rectangular current pulse which had a rise time of 10 mμsec., a length of 0·3 μsec. and a maximum amplitude of 2 amp. Experiments were normally carried out about 0·1 deg. K. below the transition temperature where the critical field was

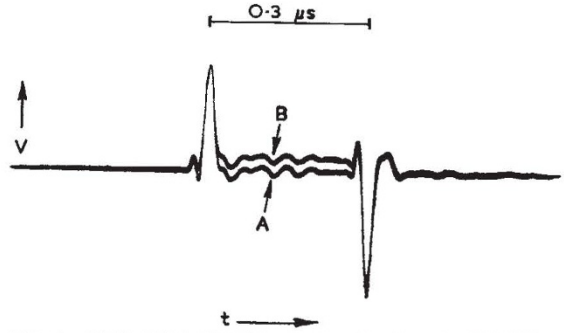

Fig. 1. Restoration of resistance in a tin film of width 250μ, thickness 1000 Å. and length 1 cm. Trace A, zero current through the film. Trace B, 1 m.amp. through the film

$\simeq$ 150 œrsteds. The pulsed field provided by the solenoid was superposed on a steady field supplied by an electromagnet. The restoration of resistance was observed by displaying on an oscilloscope, after suitable amplification, the potential difference across the film produced by a constant current, the value of this current being limited to $\sim$ 1 m.amp. by the Joule heating in the film while in the normal state. The normal resistance of the films was in the region of a few ohms so that the signals had an amplitude of a few millivolts.

Fig. 1 shows two superposed oscilloscope traces representing the potential difference across a typical film with and without a direct current through it. The positive and negative spikes are due to the inductive electromotive force which arises at the beginning and end of the field pulse. No delay is observable between the instant at which the pulsed magnetic field becomes constant and the restoration of resistance, and since the two traces are parallel there is no evidence of a progressive growth of resistance; there is also no evidence of any resistance remaining after the end of the pulse. This behaviour was independent of the amount by which the pulsed field exceeded the threshold value. From Fig. 1 we deduce that the transition from the superconducting to the normal state and vice versa takes place within the overall resolution of 15 mμsec., which implies that the relaxation time for the destruction of superconductivity is less than $\sim 10^{-8}$ sec. It would require a much more complicated apparatus to lower this limit significantly.

Acknowledgment is made to the Admiralty for permission to publish this communication.

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Strengths of Acid-etched Glass Rods

The low breaking strength of normal glasses is usually regarded as being due to surface imperfections, and previous workers, particularly Greene[1], have directed attention to the increase in strength which occurs when the glass surface is etched with hydrofluoric acid. By measuring the rate at which a