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SIR,

Dielectric measurements on Antarctic snow at 3,000 Mc./sec.

During the University of Michigan's Ross Ice Shelf survey expedition 1962–63, I had the opportunity of making some measurements of the coefficient of refraction, the dielectric constant and the loss factor of snow from the surface to a depth of 3 m. at a frequency of about 3,000 Mc./sec.

In order to measure the coefficient of refraction, the transit time of a 3,000 Mc./sec. wave below the snow surface was measured over distances of between 50 m. and 1,000 m. The results of these measurements have been checked by measurements of the dielectric constant and the loss factor of snow samples placed in the propagation space in a cavity resonator. Density, structure and temperature of the snow samples have also been measured.

A preliminary interpretation, taking account of temperature, shows that the dielectric constant increases from 1·6 to 1·9 with the depth and snow density, and also reveals a clear variability of wave propagation caused by ice layers in the snow. It seems possible to modify the measuring method so that it may be used to determine snow density, to locate ice layers, and to give quantitative measurements of snow drift (the amount of snow being transported in a given cross-section). I hope it will be possible to continue these experiments during further expeditions.

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