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**Reflection of sound from a forest: comparison of experimental
data to scattering theory**

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Reflection of sound by a forest has been investigated by means of measurements near Thun in Switzerland. Sound pulses were generated at 50 and 150 m from the forest, and reflected sound was recorded at distances of 100, 200 and 300 m from the forest. By comparison with numerical calculations of reflection of sound from a hard wall, using a parabolic-equation model for sound propagation in an atmosphere with wind and temperature as recorded during the measurements, the attenuation of sound waves upon reflection at the forest was determined. It was found that the reflection attenuation decreases from about 20 dB at low frequency to about 10 dB at high frequency. The experimental results for the reflection attenuation are compared with results of a theoretical model for scattering of spherical sound waves by a single row of cylinders. The model employs an effective spacing between the cylinders, to account for trees that are not at the edge of the forest, i.e. inside the forest. The model results are in good agreement with the experimental results. The comparison indicates that the effective spacing decreases with decreasing frequency, as low-frequency waves penetrate deeper into a forest than high-frequency waves do.