[3] P. W. Smith, Jr., J. Acoust. Soc. Am. **30**, 364 (1958).
[4] Lord Rayleigh, *Theory of Sound* (Dover Publications, Inc., New York, 1955), Vol. II, p. 19 (Sec. 246 of the 2nd ed.).
[5] M. Laplace, Ann. chim. et phys. Ser. II **3**, 238 (1816). (See particularly pp. 238–239.) A translation of the pertinent sentence is given in reference 3.

Reply to Comments of P. W. Smith, Jr.

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IN his comments on this subject, Smith has put emphasis on the special nature of the plane-wave solution in acoustic problems. It is perhaps unnecessary to defend the importance of the plane-wave solution in a linear theory.

Smith has, in our opinion, put too much value on the applicability of the Laplace notion of the "nearby body" as the reason for the isothermal behavior of the gas bubbles. The oscillations of the gas bubbles are not isothermal just because they are immersed in a medium (i.e., the liquid) of large heat capacity. This isothermal behavior is to be understood in terms of the model upon which the calculations are based. We have supposed that the gas bubbles are uniformly distributed and sufficiently small so that the mixture is approximately homogeneous and isotropic. An implication of a homogeneous mixture is that all the inhomogeneities should be smaller than the pertinent characteristic lengths of a continuous medium, such as the thermal diffusion length. The requirement that the thermal diffusion length is appreciably greater than the bubble size ensures the isothermal behavior of bubbles immersed in a liquid. This isothermal behavior follows without imposing any particular requirement on the heat capacity of the liquid. Within the limitation of the model, it is also incorrect that at high frequencies the bubbles may be considered to oscillate adiabatically. It may be of interest to remark that the speed of sound in the bubbly mixture is found to be essentially independent of frequency. This result is not surprising, since it is familiar that the sound-propagation speed in a liquid depends very little on frequency.