CORRECTIONS AND CLARIFICIATIONS

to be made in the first printing of *Seismic Wave Theory*

1. Page 38, eq. (1.139a), and page 110, Exercise 25: Often, the Heaviside step function $H(t)$ is defined as 0 for $t < 0$, 1/2 for $t = 0$, and 1 for $t > 0$.
2. Page 168, in the line immediately preceding Equation (4.32), "(Equation 2.45)" should be "(Equation 2.41)"
3. Page 169, on the second line after Equation (4.41), "$\omega \le \omega_{cn}$" should be "$\omega < \omega_{cn}$".
4. Page 170, in Figure 4.9(b), the curve for c_g for $n = 1$ should go to zero, i.e., touch the ω axis, exactly at $\omega = \omega_{c1}$. Currently, it is slightly to the right.
5. Page 197: Strictly speaking, in the integral in Equation (5.31), the lower limit p_0 should be replaced with $1/v_0$ i.e., $1/v(0)$. This is what actually appears in the source that (5.31) was taken from, i.e., the corresponding equation in Grant and West, 1965, page 139, and it is the correct limit. If the lower limit is p_0, then it is self-evident that $x(p_0) = 0$ because p_0 is the value of p at $x = 0$. The condition $x(p_0) = 0$ is used in the integration-by-parts (IBP) calculation that follows (5.31). When the lower limit is $1/v_0$, the condition $x(1/v_0) = 0$ is used in the IBP calculation. This is equivalent to stating that if $p = 1/v_0$, then $x = 0$, i.e., that $p_0 = 1/v_0$, which justifies using p_0 as the lower limit.
6. Page 198: This is related to item 4. The statement immediately following Equation (5.33), i.e., the statement "This equation also shows that $p(0) = 1/v(0)$, i.e., $p_0 = 1/v_0$, since $z_1 \to 0$ as $x_1 \to 0$.", applies in a straightforward way only to relatively simple velocity functions $v(z)$, such as the one in Figure 5.6. The statement is actually based on Figure 5.6. For more complicated velocity functions, e.g., those involving triplications, z_1 can increase as x_1 decreases. See, e.g., the fourth and fifth rays (counting from the top down) in Figure 5.7(a). Also, in Figure 5.21 (for Exercise 5.4), as z_1 decreases, x_1 does not change at all.
7. Page 298, eq. (9.10d): More generally, $n_1 = \pm \sin\theta$ and $n_3 = \pm \cos\theta$ where the signs of each depend on the direction of travel of the wave being considered.
8. Page 300: It should be clear that the square roots in equations (9.22) and (9.23) can be positive or negative, depending on the direction of travel of the wave and on the convention used for the polarization vector, i.e., $\overline{u}_1$ and $\overline{u}_3$ can be positive or negative. The signs should also be chosen so that the eigenvectors $\mathbf{u}$ for qP and qSV waves are orthogonal to each other (for the same values of n_1 and n_3). If the VTI anisotropy is weak enough, the signs can also be chosen with reference to the isotropic case. However, to avoid having to determine signs, the following formulas from previous steps in the derivation that led to (9.22) and (9.33) could be used:

$$\overline{\mathbf{u}} = \left(\frac{\sqrt{C}}{\sqrt{C + A^2}}\, , 0\, , \frac{-A}{\sqrt{C + A^2}} \right)^T = \left(\mathrm{sgn}(\sqrt{C})\sqrt{\frac{B}{A+B}}\, , 0\, , \mathrm{sgn}(-A)\sqrt{\frac{A}{A+B}} \right)^T \tag{2}$$

   where $\mathrm{sgn}(x) \equiv$ sign of x, where A, B and C are defined in equations (9.10f) and (9.10g), and where $C = AB$ (from eq. 9.10e) has been used to obtain the latter formula. Equations (9.22) and (9.23) are the same as the latter formula except with the sgn factors dropped and replaced by the above-mentioned stipulations on how signs should be chosen.
9. Page 311: In Exercise 5(a) at the back of chapter 9, "Equation (9.6a)" should read "Equation (9.6)".