Physical Processes in the Solar System

Errata

August 20, 2004

This list of errata includes all the significant errors found so far in the text. Small typographical errors that should not lead to serious confusion have been omitted.

A few of these errors were corrected when the text was reprinted in 2004, but most are found in all copies of the book.

Please send any further errors that you notice to planets@corcaroli.astro.uwo.ca. Thanks!

Chapter 1

- On p. 4 and p. 8, in both cases in the first paragraph of the right column, it is stated that Table A.1 contains information about asteroids. This is not correct; the information is now collected in Table 6.1. (Thanks to Prof. C. Scarfe, Univ. of Victoria, for noticing this error.)

Chapter 2

- On p. 46, in the third paragraph of the "Gases" section, the weight of one cubic m of air should be 1.22 kg, not 0.64 kg. The density of air is thus just a bit more than 1/1000 of the density of water. Furthermore, in this paragraph it would be more correct to replace "weight" with "mass" throughout. (Thanks to Prof. W. Romanishin, Univ. of Oklahoma, and Prof. C. Scarfe.)
- Figure 2.5 on p. 50 lacks the labels (fusion, vaporization, etc) mentioned in the text below the figure. The Web figure now has these labels added. (Thanks to Prof. C. Scarfe.)

Chapter 3

- On p. 74, the third equation in the group in the first column should read

$$^{18}\mathrm{O} + {}^{4}\mathrm{He} \rightarrow {}^{22}\mathrm{Ne}.$$

  (Thanks to Prof. C. Scarfe.)

Chapter 4

- Eq. (4.15), p. 108, should read

$$g_{\mathrm{n}} = 2\pi\sigma G z \int_0^\infty \frac{s\,ds}{(s^2+z^2)^{3/2}}.$$

  The 3/2 power of the denominator is missing in the text.
- In problem 4.7, p. 112, the last part should be (e) instead of a second (d).

Chapter 5

- On p. 138, 8 lines from the bottom of the left column, the text should say that one eV = 1.602×10^{-19} J.

- In Problem 5.6, line 16, you are told to assume that $C_{\rm v} = 3k$ per atom. This topic is discussed in Chapter 6. What this instruction means is that you should assume that the internal (thermal) energy of the meteoroid material is given by the expression

$$E_{\rm internal} = 3kT/\mu m_{\rm u},$$

  where μ is the atomic weight of iron (Table 2.2).

Chapter 6

- On p. 165, in the first exercise in Sec. 6.6, assume that the density of the larger asteroid is 2000 kg m^{-3} (rather than 2 kg m^{-3}). (Thanks to Prof. C. Scarfe.)

- On p. 166, the quantity $f_{\rm ref}$ of Equation 6.4 is the same as the quantity $f_{\rm v}$ of Equation 6.6 and the second exercise just below that equation. (Thanks to Prof. C. Scarfe.)

- On p. 168, in the last six lines above the Exercise, three different expressions are given for $c_{\rm v}$. After each it is stated that this is specific heat per atom. This is incorrect, these are specific heats per kg.

- In Problem 6.6, pp. 171-2, the (b) should be moved from its present place to immediately after "(in asteroids per km^3)", so that the estimate of typical separation becomes part (b). Also in this problem, four lines from the bottom, use the distance estimate from part (d), not from part (b).

Chapter 7

- Eq. (7.9), p. 196, should read

$$\begin{aligned} Z &= (1/6)\, p_{\rm v}\, (3/kTM)^{1/2} \\ &= \left(\frac{1}{12kTM}\right)^{1/2} p_{\rm o} \exp(\frac{L}{R_{\rm g}T_{\rm o}} - \frac{L}{R_{\rm g}T}). \end{aligned}$$

  The numerical value in the denominator of the square root on the second line should be 12, not 2.

- At the end of Problem 7.1, p. 201, add the sentence "Ignore the effects of the planet's own gravity."

- In Problem 7.3, p. 202, the "(b)" 10 lines from the bottom should be "(c)", and the "(c)" three lines from the bottom should be "(d)".

Chapter 8

- On p 208, 9 text lines from the bottom of the first column, the surface of the Earth's core is at 3480 km from the centre of the planet.

Chapter 9

- In Problem 9.1, p. 262, the expression for the original mass should be $(M_\oplus + m)$, not $(M_\odot + m)$

Chapter 10

- On p. 266, in the second paragraph of the right column, Io is a moon of Jupiter, not of Saturn. (Thanks to Prof. C. Scarfe.)
- On p.267, in the last paragraph of the left column, Mt McKinley is in Alaska. (Thanks to Prof. C. Scarfe.)
- On p. 281, in the last paragraph of the first column, the variation in solar heating of the Earth is given as 3%. In fact, from perihelion to aphelion the total variation is almost 6%. (Thanks to Prof. C. Scarfe.)
- In Problem 10.1, p. 293, assume that a suitable mean temperature T for this problem is 270 K.
- In Problem 10.4, p. 294, you will need the value of c_p for CO_2. This quantity varies with temperature. A suitable average value for this problem would be about 900 J K^{-1} kg^{-1}.

Chapter 11

- In Figure 11.7 on p. 304, the left end of the horizontal axis should be labelled "1" rather than "0". (Thanks to Prof. W. Romanishin.)
- In the paragraph at the top of the right column on p. 310, the second last sentence should read: "Most of the large moons apparently contain anywhere from 35% to 85% ice by mass."
- On p. 311, the third and fourth sentences of the fourth paragraph should read: " Europa has a density of about 3000 kg m^{-3}, and is thus primarily composed of rock and perhaps some iron, but ice probably makes up roughly 5% of the total mass of the moon. The other two moons have densities a little below 2000 kg m^{-3}, and probably are made up of about 70% rock and 30% ice."
- On p. 332, the last three sentences of the paragraph at the bottom of the right column should read: "The planet therefore has a composition, assuming as usual a mix of rock and ice, which is around 70 – 75% rock. This proportion is one of the largest values found among the moons of Saturn, Uranus, and Neptune, which have anywhere from 10% to 70% rock; only Titan and Triton have similarly large rock fractions. Charon is found to have a mean density only a little less than that of Pluto, about 1800 kg m^{-3}, so its proportion of rock is similar to that of Pluto."
- In the Exercise that starts at the bottom of p. 333 and continues onto p. 334, Eq. (11.1) is incorrect. It should read

$$\overline{\rho} = \frac{1}{f_1/\rho_1 + f_2/\rho_2}.$$

Appendix A

- In Table A.2, the rotation periods given in the seventh column are sidereal periods (as seen from a nearby star). The Earth's sidereal rotation period is 0.997 d, not 1.00 d.
- In Table A.3, the data for Neptune's moon Sycorax should be: orbital radius= 12213($\times 10^3$) km or 478 planetary radii; sidereal orbital period = 1284 d; satellite radius $\approx$ 80 km. (Thanks to Prof. C. Scarfe.)