Reasoning About Luck: probability and its uses in physics

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Errata and Addenda

Note: Thanks are due to several kind readers for communicating a number of the errors listed below.

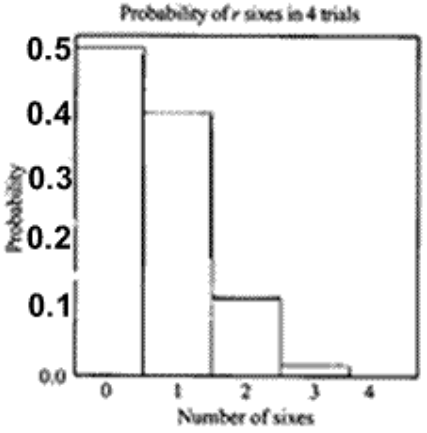
Errata

Page 21

The last sentence of the solution to Problem 6 should read: *"For a less obviously correct, and thus more controversial, use of this kind of reasoning, see solved problem (2) at the end of Chapter 8."*

Page 24

Plot in the lower left corner of Fig. 3.1 is mislabeled. The corrected version appears here:



Page 40

The third full sentence should read: *"Misconceptions about conceptions…"*

Page 65

In Eq. (5.8), in the last term within the square brackets, replace $\left(\frac{x}{N}\right)^2$ with $\left(\frac{x}{N}\right)^3$.

Page 73

The formula at the end of the second paragraph should read:

$\mu_N = N\mu_1$ and $\sigma_N = \sqrt{N}\sigma_1$

Page 101

The solution, number (ii), second sentence should read: *"This proves that a restoring force linear in the vertical displacement x gives rise to…"*

Page 107

The first full paragraph, beginning at the fourth sentence, should read: *"A collision with a perfectly smooth and rigid wall will conserve the component of velocity parallel to the wall, and will also not change the kinetic energy – and thus the speed – of the molecule.*
As Fig. 7-1 shows, the component of velocity perpendicular to the wall must thus be exactly reversed"

Page 109

The third full sentence should read: "*If we wish we may write the average density of molecules as the total number of molecules, call it N,* ***divided by*** *the volume of the container, call it V.*"

Page 113
The end of the last sentence in the first paragraph should read: *"…the universal ratio in question is **1.3661** to 4 decimal place accuracy."*
In turn, Figure 7.4, vertical axis label should read "1.3661"

Page 115
The first full paragraph, first sentence, should read: *"It is worth emphasizing that the formula (7.13) only gives the average **total** energy per particle for a dilute gas of structureless molecules."*

Page 128
In the second line of Eq. (8.11), the sign of the second term is incorrect. This line should read:
$= -(x+\Delta x)\,\mathrm{In}\,(x+\Delta x) + x\ \mathrm{In}\ x$

Page 132
The paragraph before Figure 8.18, third sentence should read:
"As before, let p_i^0 *for i = 1, 2, …I be the distribution that maximizes the entropy, and let* Δp_i *be small deviations."*

Page 176
First paragraph, third sentence, at end should read: *"…making an unlikely event overwhelmingly unlikely, and the time reversal paradox academic."*

Page 189
First full paragraph, eighth sentence should read: *"The second important consideration in that discussion – that in the approach to equilibrium the overwhelming majority of trajectories are not entropy reducing – is not present in systems of a few particles."*

Page 190
First paragraph, last sentence should read: *"Here we consider an idealization of such a game of chance for which an instructive calculation is possible."*

Page 199
First paragraph, fifth sentence should read: *"Equivalently, we may write* $\theta = 2\pi\alpha$ *where* α *is a number between 0 and 1. To summarize, by writing* $n = \sin^2(2\pi\alpha)$ *…"*

Page 203
Number (4) should read*: "…but requiring it to show only 5 figures, and then starting from 0.14159, explicitly entered in this form."*

Page 207
Fig. 12.1 should show small apertures at A and B.

Page 219
Note at bottom of page should read: *"See solved problem (6)."*

Addenda

[for experts]

(1) If I had it to do again, I would point out that the Gibbs paradox contained in Eq. (8.50)---the fact that the entropy S is not N times a function of (N/V)---is resolved by subtracting the logarithm of N! to account for the indistinguishability of classical particles.

(2) That the entropy in Fig. 8.4 goes to zero at T goes to zero offers a missed opportunity to mention the Third Law of statistical thermodynamics.

(3) An expanded and elaborated version of Chapter 10 appears in Vinay Ambegaokar and Aashish Clerk, 'Entropy and Time,' American Journal of Physics **67**, 1068 (1999).