Corrections to *Mechanics of the Cell* (2nd ed.)
24 November, 2018.

The following are typographical errors that have been identified.

Page	Line	Change
87	Eq. (3.63)	Symbol for **moment of inertia of cross section** should be $\mathcal{I}$, not I.
208	Eq. (6.37)	Left-hand side of the equation should be ΔS = , not S =.
299	Eq. (8.24)	Change "where $\Delta\mathbf{r} \equiv \mathbf{r}_1 - \mathbf{r}_2$." to "where $\Delta\mathbf{r} \equiv \mathbf{r}_1 - \mathbf{r}_2$ and $\Delta r = \lvert\Delta\mathbf{r}\rvert$."
334	3 from last	The reference to Problem 9.16 should be Problem 9.11.
364	Prob. 9.3	The reference to Problem 9.20(b) should be Problem 9.15(b); the reference to Eq. (8.38) should be Eq. (9.38).
366	Prob. 9.9	In line 3, c_L is incorrectly fixed at 1 M concentration. In fact, c_o is 1 M and c_L is variable.
369	Prob. 9.19	In part (b), $\boldsymbol{p}_{\mathbf{bound}} = \mathbf{1.2}$ should read $\boldsymbol{p}_{\mathbf{bound}} = \mathbf{1/2}$.
411	Prob. 10.18	The path described in part (iii) is rotated by 2π radians around the cylinder, not π radians as in part (ii).
450	Prob. 11.11	The reference to Fig. 11.11(b) should be Fig. 11.12(b).
	Prob. 11.13	The reference to Fig. 11.19 should be Fig. 11.20.
495	Prob. 12.13	The expressions in part (c) correspond to an exponential increase in volume, not an exponential increase in length. Also, $\Delta\beta = \beta - 2\beta_o$.
560	17	Symbol for **moment of inertia of cross section** should be $\mathcal{I}$, not $\mathcal{L}$.
580	35	Change reference James and Guth to James, H.M., and Guth, E. (1943). Theory of the elastic properties of rubber. J. Chem. Phys. 11, 455-481.

In addition to the typographical errors identified above, a number of changes in wording were made to the text during its translation into Japanese in 2018. I thank Hiroaki Suzuki for identifying problems and ambiguities in the original text.

On page 116 in Sec. 4.2.3, change

"A belt can be twisted fairly easily into the form displayed in Fig. 4.9(a): one end of the belt in the diagram has been twisted through two complete rotations about its long axis as shown by the alternating colors, one for each side of the belt. The semi-circular arrow in the diagram indicates the direction of the twist to form a right-handed spiral; large enough longitudinal forces are applied to the opposite ends of the belt to keep its axis straight."
to
"A belt can be twisted fairly easily into the form displayed in Fig. 4.9(a): imagine that the left-hand end of the belt is kept fixed while the right-hand end is rotated about the long axis of the belt; large enough longitudinal forces are applied to the opposite ends of the belt to keep its axis straight. In part (a), the right-hand end has been rotated by two complete turns in a counter-clockwise direction around the axis (indicated by the semi-circular arrow), as seen looking down the axis from the right-hand end. The result of the twist is a right-handed spiral, as shown by the alternating colors, one for each side of the belt."

On page 117 in Sec. 4.2.3, change the phrase in paragraph 2 from
"from the bottom to the top, in a right-handed spiral"
to
"from the left to the right, in a right-handed spiral"

On page 117 in Sec. 4.2.3, change the middle four sentences in paragraph 3 from
"If the ends of the beam or ribbon are linked to form a circle, the writhe may be found in a similar way. For illustration, several closed-loop configurations with their corresponding writhe are displayed in Fig. 4.10; all of the configurations are right-handed, but their left-handed counterparts can be found by taking their mirror images. Looking down the long axis of configuration (b) in the plane of the diagram, the plane of the loop does half a turn (counter-clockwise) as the path of the rod is followed from top to bottom, then another half as the path is followed back to the top, for a total writhe of +1. Similarly, in configuration (c), the plane executes one complete right-handed (counter-clockwise) turn on the way down, and a second one as the path returns to the top."
to
"Writhe can also be defined where the free ends of the beam or ribbon are joined to form a loop. Consider the three examples of closed loop configurations displayed in Fig. 4.10, in which the three-dimensional shape of the loop has been projected onto a two dimensional plane. The uppermost configuration is just a simple loop and has zero writhe. The other two configurations have crossovers, each of which change the writhe of the configuration by one unit. Whether Wr is increased or decreased at the crossover can be determined by assigning a direction to a path all the way around the loop; either direction can be chosen, as long as it is followed consistently. At a crossover point, place the thumb of your right hand along the direction of the loop and curl your figures about the beam or ribbon. If the direction of the path on the adjacent segment of the loop forming the crossover follows the direction of your fingers, $\Delta Wr = +1$, but if the direction of

the adjacent path opposes your fingers, $\Delta Wr = -1$. This right-hand rule is applied to each crossover point only once: be careful not to double-count. Thus, in Fig. 4.10, the middle configuration has $Wr = +1$ and the lowermost configuration has $Wr = +2$. Note that these two configurations have positive writhe, even though they superficially appear to be left-handed."

On page 205, change a sentence in the middle of Sec. 6.3.1 from
"After welding has occurred, there are n chain segments, each a random chain in its own right (having been cut from a larger random chain) with an end-to-end displacement $\mathbf{r}_{ee}$ obeying the conventional Gaussian probability distribution, Eq. (3.42)."
to
"As a result of welding, the linked network has n constituent chains, each a random chain in its own right (having been cut from a larger random chain) with an end-to-end displacement $\mathbf{r}_{ee}$ obeying the conventional Gaussian probability distribution, Eq. (3.42)."

On page 206, replace "chain segments" with "constituent chains" and replace "correct" with "required". Specifically, starting from the top of page 206:

From: As is apparent in Fig. 6.10(c), the chains possess a distribution of end-to-end displacement vectors...
To: As is apparent in Fig. 6.10(c), the constituent chains possess a distribution of end-to-end displacement vectors...

From: The probability that a given chain i has a particular displacement vector $\mathbf{r}_i = (x_i, y_i, z_i)$
To: The probability that a given constituent chain i has a particular displacement vector $\mathbf{r}_i = (x_i, y_i, z_i)$

From: To be a little more precise, the probability that the displacement of a chain lies in the range $\mathbf{r}_i$ to $\mathbf{r}_i + \Delta\mathbf{r}$ *after* deformation
To: To be a little more precise, the probability that the displacement of a constituent chain lies in the range $\mathbf{r}_i$ to $\mathbf{r}_i + \Delta\mathbf{r}$ *after* deformation

From: The actual number of chains n_i lying in this range of $\mathbf{r}_i$ is equal to the product of this probability and the total number of chains n in the system,
To: The actual number of constituent chains n_i lying in this range of $\mathbf{r}_i$ is equal to the product of this probability and the total number of constituent chains n in the system,

From: (a) the distribution of n individual segments must have the correct number of chains n_i for each range of $\mathbf{r}_i$, and
To: (a) the distribution of the network of n constituent chains must have values for the number of chains n_i in each range of $\mathbf{r}_i$, that are required by the specific configuration of the linked network

From: First, the number of chains available in the original configuration
To: First, the number of constituent chains available in the undeformed configuration

From: Second, the probability $\mathcal{p}_i$ that any one of these n_i chains has the correct $\mathbf{r}_i$ is
To: Second, the probability $\mathcal{p}_i$ that any one of these n_i constituent chains has the required $\mathbf{r}_i$ is

From: ...so that the probability of all n_i chains in this range have the correct $\mathbf{r}_i$ is $\mathcal{p}_i^{n(i)}$, ignoring permutations. For all n chains in the network, the total probability of the correct position involves the product of the individual terms, or $\Pi_i \, \mathcal{p}_i^{n(i)}$
To: ...so that the probability of all n_i chains in this range have the required $\mathbf{r}_i$ is $\mathcal{p}_i^{n(i)}$, ignoring permutations. For all n chains in the network, the total probability of the required positions involves the product of the individual terms, or $\Pi_i \, \mathcal{p}_i^{n(i)}$

On page 207, change the top paragraph [which immediately follows Eq. (6.31)] from
"Let's review the welding process before determining P_b. How many welds are there for n segments? Each weld links four chain segments; however, the number of welds is not $n/4$, but rather $n/2$, since each segment is defined by two welds (we neglect dangling chains; see Chapter XI of Flory, 1953, for a discussion of this approximation). The number of welding sites on the chains must be twice the number of welds, or n, because each weld involves two separate weld sites, usually on different chains. Thus, there are n segments, n welding sites and $n/2$ welds. Now, what is the probability of finding a welding site in the correct position with respect to neighboring chains? Starting with site number 1, the probability that one of the n-1 remaining welding sites lies within a volume δV of site number 1 is just $(n-1)\ \delta V / V$, where V is the volume of the entire network. After the first weld, two sites have been removed from the list of potential weld locations. For the second weld, the probability that one of the remaining $(n-3)$ welding sites lies within a volume δV of site number 3 is then $(n-3)\ \delta V / V$. We repeat this argument for all $n/2$ welds, to obtain

$$\mathcal{P}_b = (n-1)(n-3)(n-5)...1\ (\delta V / V)^{n/2}$$
$$\cong (n/2)!\ (2\ \delta V / V)^{n/2}. \qquad (6.32)$$

where we have used the approximation $(n/2 - 1/2)(n/2 - 3/2)...1/2 \cong (n/2)!$ In this expression, V is the deformed volume $\Lambda_x \Lambda_y \Lambda_z V_o$, where V_o is the original volume of the network."
to
"Let's review the welding process before determining $\mathcal{P}_b$. We started with a suite of unlinked random chains, and then welded many of those chains pairwise at specific welding sites to create a linked network with n constituent chains. Each weld links four constituent chains; however, the number of welds is not $n/4$, but rather $n/2$, because each constituent chain is defined by two welds, one at each end. We neglect dangling chains (see Chapter XI of Flory, 1953, for a discussion of this approximation). The number of welding sites on the original long chains from which the linked network was constructed must be twice the number of welds, or n, because each weld involves two separate welding sites, usually on different chains. Thus:
*on the original unlinked collection of chains there are n welding sites;
*when linked together these sites generate $n/2$ welds;
*the resulting linked network has n constituent chains.
Now, in the process of creating the linked network, what is the probability that a given welding site has an adjacent welding site on neighboring chains that lies within a volume δV surrounding it? Starting with site number 1, the probability that one of the n-1 remaining welding sites lies

within δV of site number 1 is just $(n-1)\ \delta V / V$, where V is the volume of the entire network. After the first weld, two sites have been removed from the list of potential weld locations. For the second weld, the probability that one of the remaining $(n-3)$ welding sites lies within a volume δV of site number 3 is then $(n-3)\ \delta V / V$. We repeat this argument for all $n/2$ welds, to obtain

$$\mathcal{P}_{\mathrm{b}} = (n-1)(n-3)(n-5)...1\ (\delta V / V)^{n/2}$$
$$\cong (n/2)!\ (2\ \delta V / V)^{n/2}. \qquad (6.32)$$

where we have used the approximation $(n/2 - 1/2)(n/2 - 3/2)...1/2 \cong (n/2)!$ In this expression, V is the deformed volume $\Lambda_x \Lambda_y \Lambda_z V_o$, where V_o is the original volume of the network."

Change sentences in the middle paragraph on p. 428 (the paragraph begins with "Also shown in Fig. 11.15...") from:
"In the diagram, the left leg detaches from the actin filament and then reattaches itself a little more than 70 nm to the right, a distance which is double the 36 nm separation between legs. This motion is not like a sideways or crab walk, where the left leg would only move up to the current location of the right leg, after which the right leg would move forward a similar distance."
to
"In Fig. 11.15, imagine that myosin V moves down a vertical actin filament lying to the left of the molecule. The top leg detaches from the actin filament and then reattaches itself a little more than 70 nm lower down, a distance that is double the 36 nm separation between legs. This motion is not like a sideways or crab walk, where the top leg would only move to the current location of the bottom leg, after which the bottom leg would move down a similar distance."