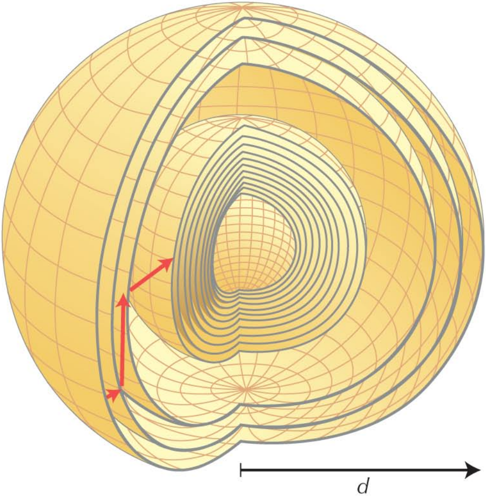

FIGURE 14.28. Fisher's argument that changes of small effect are most likely to contribute to adaptation. The optimal organism lies at the center of the diagram, and a population starts with all the individuals a distance *d* away, on the outer sphere. Thus, any change of more than a distance 2*d* must take the population further from the optimum, whereas small changes (<<*d*) are as likely to increase fitness as to decrease it. The *red arrows* show a sequence of evolutionary steps, in which random mutations that take the population toward the optimum are fixed by natural selection. The first successful mutation has magnitude $r = 0.137d$ and takes the population 8.7% of the way to the optimum (*first red line*, leading to the *second sphere*). The third successful mutation has the largest magnitude, 0.271*d*; it is followed by smaller steps that, on average, follow a geometric series (*inner spheres*). This simulation uses ten dimensions, although only three can be shown.

14.28, redrawn from Barton N.H. et al., *Nat. Rev. Genet.* **3:** 11–21, © 2002 Macmillan, www.nature.com.