The Problem of the Month
August 2021

Imagine a cube with each edge being of length 1, i.e. a unit cube. Circum-
scribe this cube with a sphere. That is to say, draw the smallest sphere that
contains this cube. Now, circumscribe the sphere with a cube. In other
words, place the sphere (with the unit cube inside) inside the smallest cubic
box that could contain it. (See the picture below.) Find the volume of the
region contained inside the larger circumscribing cube that is **not** contained
inside the sphere. Put another way, if the sphere were solid, how much air
would there be inside the circumscribing box?