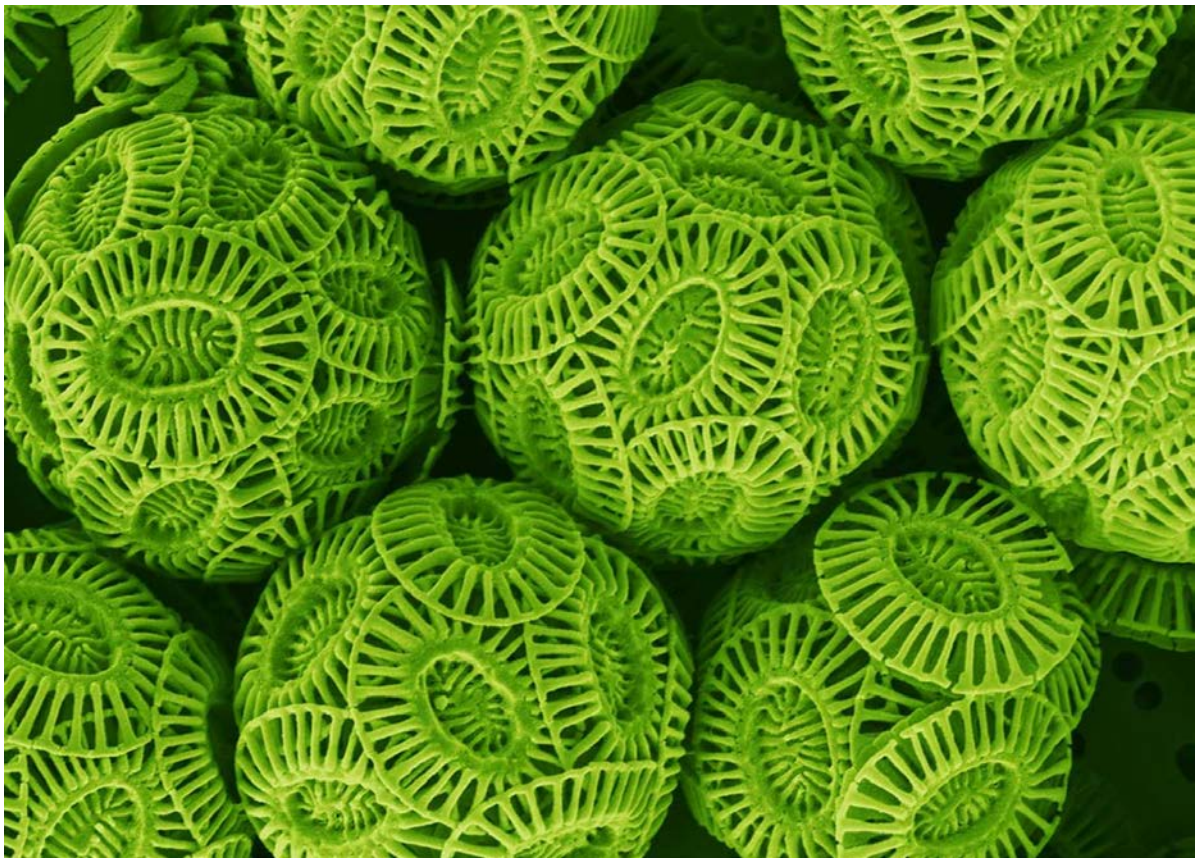
FIGURE 1

FIGURE 2



BACKGROUND INFORMATION

The White Cliffs of Dover (Figure 1) are a striking geological, ecological, historical, and cultural feature of the English coastline. Rising up to 350 ft (110 m) along 8 miles (13 km) of the English Channel, the cliffs are composed of chalk, which gives them their unique white color. Chalk is a sedimentary rock made of a substance called calcium carbonate ($CaCO_3$). This substance forms from the microscopic skeletons of phytoplankton, such as coccolithophores.

Coccolithophores, such as *Emiliania huxleyi* (Figure 2), are a type of microscopic algae often found at the base of marine food chains. Coccolithophores secrete calcium carbonate, which forms plates called coccoliths. These coccoliths cover the coccolithophores' surfaces in hard shells. When coccolithophores die, their shells sink to the seafloor and form chalky sediments. This process has been going on for millions of years and is responsible for the vast deposits of chalk around the world.

Emiliania huxleyi is named after Cesare Emiliani and Thomas Henry Huxley, who were among the first to discover the coccolithophores within seafloor sediment. In 1868, Huxley, a scientist and educator, gave a public lecture in Norwich, England, titled "On a Piece of Chalk." Huxley explained that the chalk he was using to write on the blackboard was made of the same material as Norwich's white bedrock: fossilized skeletons of coccolithophores.

Because coccolithophores live in shallow oceans, Huxley concluded that a shallow sea had once covered Norwich and left behind chalky bedrock. Even today, coccolithophores continue to provide evidence of environmental change over time. For example, coccolithophore species that are sensitive to seawater acidity are being used to track global trends in ocean acidification resulting from climate change.

Technical Details: The sample of *Emiliania huxleyi* shown in Figure 2 was collected in the English Channel. The coccolithophores were filtered from the seawater and then imaged with a scanning electron microscope at the Natural History Museum in London. The image was subsequently colorized using a computer. Each coccolithophore is approximately 4 micrometers in diameter, around half the size of a red blood cell.