

## **ELEPHANT SEAL VISION**

Those big eyes occasionally staring at you from the beach may not look extraordinary but they are one of the remarkable features of this unique animal. Among the adaptations made by elephant seals are the following:

- Northern elephant seals eyes adapt from bright daylight as experienced on the surface of the ocean to light at the limit of their sensitivity in 4-6 minutes while our eyes adapt to only ten percent of that range of sensitivity in about 25 minutes. Clearly, rapid accommodation is necessary if the elephant seal is to forage at maximum effectiveness.
- The seal's cornea is flatter than that of land mammals allowing it to better see on land as well as in the water. Usually, the cornea's ability to focus differs depending upon whether one is in an air or a water environment. But the elephant seal's flatter cornea reduces the importance of focusing at the cornea surface; its interior lens accomplishes almost all the focusing.
- There is a highly reflective layer behind the elephant seal retina like that of cats and nocturnal animals on land, thus increasing the light sensitivity of the eye.
- The elephant seal pupil can vary in area 400 fold as compared to approximately 20 fold for humans, facilitating adjustment to a wider range of light intensity.
- Elephant seals have relatively few cones, and hence limited color vision, but a very large number of the more sensitive rods allowing them to see better in the dark depths of the ocean. Their sensitivity to light is ten times as great as that of humans and three times as great as that of the California sea lion.
- The color of maximum visual sensitivity for elephant seals is farther into the blue than for all but a few deep diving whales, reflecting the fact that blue light penetrates the ocean water better than other colors. That color of maximum sensitivity is also close to the color of bioluminescence of many (yummy) creatures living at the foraging depths of the elephant seal.