2.17.21

Transitional Forms Demonstrate Incremental Transformations

As scientists continue to uncover transitional forms through fossil discovery, Darwin’s theory describing evolution as a gradual, incremental process is further supported. In 2006, when the fossil of the Tiktaalik was discovered in the Canadian Arctic, its flat head indicated it was a transitional form between a fish and a terrestrial animal. The fossil still had fins like a fish, but the flat head was a trait more akin to terrestrial tetrapods. In addition, the Tiktaalik also differed from other fish fossils because it had two missing bones in the region surrounding its head. This meant the animal had a neck and flexibility of motion for the first time (Shubin 2009.) When skull dimensions of the Tiktaalik were studied in 2014, scientists also found the size of the animal’s eye sockets to be larger than those of earlier fish fossils but smaller than the sockets of early land animals, indicating that selection of larger eyes accompanied the transition from water to land (MacIver 2017.) The unique features of this transitional fossil, when compared to the existing fossil record, help scientists see how the transition from water-living to land-living happened not all at once but through smaller steps.

Through close inspection of transitional fossils, scientists can observe how the rise of small, morphological changes accumulate and contribute to the formation of new categories of animals. The physical markers of the transitional fossils are key to these inspections, as they provide visual imagery and allow insight into what traits were selected for over time. It is important to remember that transitional fossils like the Tiktaalik act as pieces in the larger evolutionary puzzle, showing scientists how natural selection works gradually to link together all living things.

Works Cited

Bergstrom CT, Dugatkin LA. 2016. Evolution. 2nd ed. New York (NY): W. W. Norton & Company. Chapter 2, Early Evolutionary Ideas and Darwin’s Insight; p. 29-60.

MacIver MA, Schmitz L, Mugan U, Murphey TD, Mobley CD. Massive increase in visual range preceded the origin of terrestrial vertebrates. Proceedings of the National Academy of Sciences. 2017;114(12):E2375–E2384. doi:10.1073/pnas.1615563114

Shubin, N. 2009. Your Inner Fish. 1st ed. New York (NY): Vintage Books. Chapter 1, Finding Your Inner Fish; p. 3-27.