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On the Aquatic Habits of Sauropods – An Antiquated Theory in Need of Revival?

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When sauropods were first discovered, they were thought to have been restricted to life in the water due to their immense size. This image of sauropods was dismissed in the 1950's when it was determined that the lungs would have been placed under massive amounts of pressure at these depths, rendering breathing nearly impossible (Kermack, 1951). However, these experiments failed to consider pneumaticity of sauropod vertebrae and were later dismissed. Sauropods possessed pneumatic features in all their presacral vertebrae, originally identified as weight-saving structures. These features kept the strength and integrity of the bone while dramatically reducing its weight. The postcranial skeletal pneumaticity is indicative of a physical relationship between the vertebral column and the pulmonary system. In particular, neosauropods show signs of air sacs in the lower back and hip regions (Wedel, 2003). A similar phenomenon is exhibited in modern birds. Other sauropods, by contrast, only possess such pneumatic features in the cervical vertebrae. The effects of a highly pneumatized skeleton on a sauropod's buoyancy were not considered until the 1970's. Henderson (2004) concluded in his study on sauropod buoyancy that it would be impossible for sauropods to walk in water deeper than chest-height, as their high calculated buoyancy would cause the animal to capsize. While Henderson (2004) and Kermack (1951) came to reasonable conclusions, perhaps the idea of semi-aquatic sauropods should not be ruled out. If this hypothesis were to be investigated further, there are several criteria scientists might consider. For instance, perhaps sauropods possessed reinforced peripheral airways that allowed their lungs to collapse when under higher pressures, similar to those in deep-diving whales and seals– something that is difficult to preserve in the fossil record. Additionally, if sauropods had a higher muscle mass than generally assumed, it would negatively affect the animals' buoyancy calculated in Henderson's (2004) experiments, helping to ballast the animal and prevent capsizing. These proposed adaptations are theoretical, and would not be preserved in the fossil record. Overall, the evidence painting sauropods as exclusively terrestrial animals is based on assumptions that perhaps should be reconsidered in light of some of these proposed adaptations.