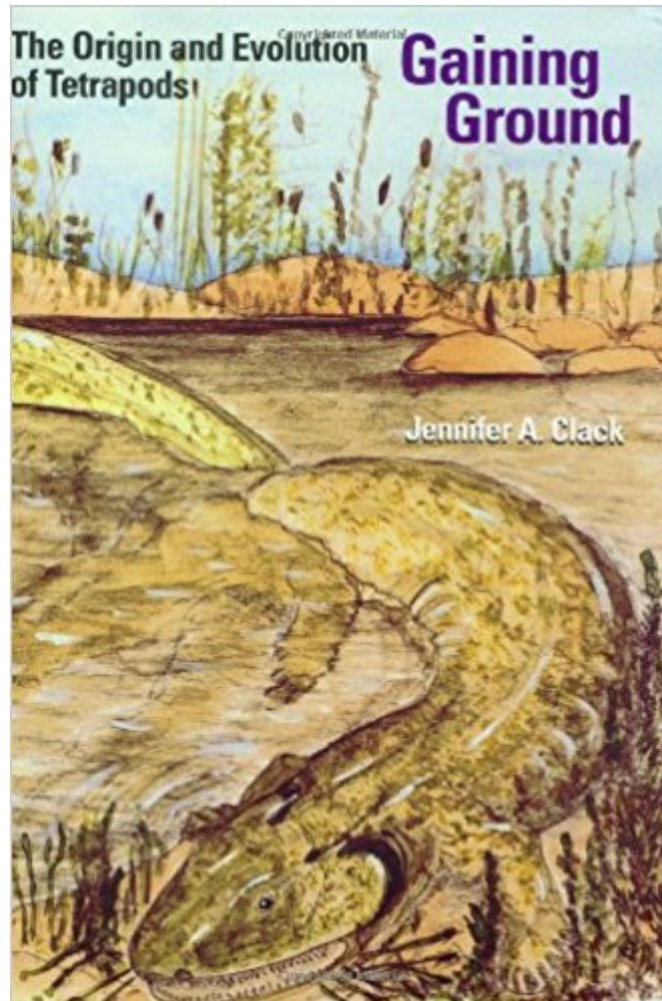


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Gaining Ground: The Origin And Early Evolution Of Tetrapods



Synopsis

Around 370 million years ago, a distant relative of a modern lungfish began the most exciting adventure the world had ever seen: it emerged from the water and laid claim to the land. Over the next 70 million years, this tentative beachhead became a worldwide colonization by an ever-increasing variety of four-limbed life. These first "tetrapods" are the ancestors of all vertebrate life on land. *Gaining Ground* tells the rich and complex story of their emergence and evolution. Beginning with their closest relatives, the lobe-finned fishes such as lungfishes and coelacanths, Jennifer A. Clack defines the characteristics of tetrapods, describing their anatomy and explaining how they are related to other vertebrates. Clack looks at the Devonian environment in which tetrapods evolved, describes the known species, and explores the order and timing of anatomical changes that occurred during the fish-to-tetrapod transition. She reports that older ideas about the transition are being overturned by recent discoveries and new ideas about evolutionary change. Following the story through the Carboniferous period, she shows how the evolution of terrestrial characters occurred several times, convergently, among different groups.

Book Information

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Customer Reviews

... along with some ribs, vertebrae and shoulder bones. But it's the skull that captures the most attention. The multitude of variations that occurred as animals moved in delicate steps from water onto land that make the story most interesting. And Jenny Clack's story of our four-legged forebears is a wondrous tale. Ever since Charles Darwin explained the nature of life's evolution, the question

of how sea creatures moved to the land has been an enigma. Consider the many issues involved: walking, breathing air instead of filtering water, hearing in air instead of water, how to feed - and where, and protecting eggs. Clack shows how these topics were addressed by slow, incremental changes in body plan, with changes in one area integrated with those in another. Walking on land meant not only building bones strong enough to support the body, but muscles to drive them. The humerus, the single bone in your upper arm, not only had to be stronger, it had to have joints for a new form of movement. A stride is far different from the flapping of a fin, so the paddling fin had to change. Clack discounts the older, simpler views that the "lobe-finned" fish just developed better "legs". Moving from the sea requires more than just crawling up the beach. There had to be an intermediate step. Clack finds that step in brackish lagoons and shallow, meandering rivers. There, the new four-legged creatures learned to walk on silty soils and learn to mix air and water breathing methods. It was a reinforcing cycle as the change in surroundings developed new capacities. Diet went from fish to insects. No longer able to simply swallow prey as fish do, tetrapods began feeding on insects and their own smaller cousins.

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