Gaining Ground

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'The journey our ancestors made from the sea to dry land is one of the greatest transformations in the history of life, and "Gaining Ground" documents it magnificently. This should come as no surprise, since Jennifer Clack has been revolutionizing our understanding of this crucial evolutionary episode for years now. In "Gaining Ground" she decodes a wonderful tale encrypted in fossils, genes, and flesh' - Carl Zimmer, author of "At the Water's Edge". Around 370 million years ago, a distant relative of a modern lungfish began a most extraordinary adventure: It emerged from the sea and laid claim to the land. Over the next 70 million years, this tentative beachhead had become a worldwide colonization by an ever-increasing variety of four-limbed life. These first 'tetrapods' are the ancestors of all vertebrate life on land. This book tells the rich and complex story of their emergence and evolution. Beginning with their closest relatives, the lobe-fin fishes such as lungfishes and coelacanths, Jennifer A. Clack defines what a tetrapod is, describes their anatomy, and explains how they are related to other vertebrates. She looks at the Devonian environment in which they evolved, describes the known species, and explores the order and timing of anatomical changes that occurred during the fish-to-tetrapod transition. Clack explains how 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. Jennifer A. Clack is Reader in Vertebrate Palaeontology and Senior Assistant Curator, University Museum of Zoology, Cambridge, and author of numerous papers on Devonian and Carboniferous life. A shorter version of "Gaining Ground" was published in Japanese in 2000. 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 sea and lay claim to the land. Over the next 70 million years, this tentative beachhead had become of worldwide colonisation by any ever-increasing variety of four-limbed life. These first 'tetrapods' are the ancestors of all vertebrate life on land. This book tells the story of their emergence and evolution. The book looks at the closest relatives of tetrapods - the lobefin fishes, both extinct and living forms (like lungfishes and coelacanths. It defines what a tetrapod is, describes their anatomy, and explains how they are related to other vertebrates. It then looks at the Devonian environment in which early tetrapods and their fish contemporaries evolved. There are chapters describing the known Devonian tetrapods, their discovery, and their environments. Taking the actual fossils of tetrapod-like fish and fish-like tetrapods, it explores the order and timing of anatomical changes that occurred during the fish to tetrapod transition, including physiological and sensory changes. The book explains how older ideas about the transition are being overturned by recent discoveries and new ideas about evolutionary change. It then follows the story from the origin of limbs, digits, and other key anatomical features to the graduate acquisition of terrestrial adaptations. It describes the different groups of early tetrapods as they diversified during the Carboniferous period, and shows how the evolution of terrestrial characters occurred several times, convergently, among different groups.

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