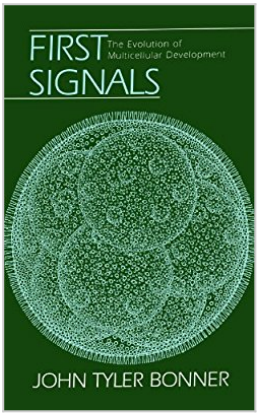

First Signals: The Evolution of Multicellular Development.

By John Tyler Bonner

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The enormous recent success of molecular developmental biology has yielded a vast amount of new information on the details of development. So much so that we risk losing sight of the underlying principles that apply to all development. To cut through this thicket, John Tyler Bonner ponders a moment in evolution when development was at its most basic--the moment when signaling between cells began. Although multicellularity arose numerous times, most of those events happened many millions of years ago. Many of the details of development that we see today, even in simple organisms, accrued over a long evolutionary timeline, and the initial events are obscured. The relatively uncomplicated and easy-to-grow cellular slime molds offer a unique opportunity to analyze development at a primitive stage and perhaps gain insight into how early multicellular development might have started.

Through slime molds, Bonner seeks a picture of the first elements of communication between cells. He asks what we have learned by looking at their developmental biology, including recent advances in our molecular understanding of the process. He then asks what is the most elementary way that polarity and pattern formation can be achieved. To find the answer, he uses models, including mathematical ones, to generate insights into how cell-to-cell cooperation might have originated. Students and scholars in the blossoming field of the evolution of development, as well as evolutionary biologists generally, will be interested in what Bonner has to say about the origins of multicellular development--and thus of the astounding biological complexity we now observe--and how best to study it.

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Editorial Review

Review
"As with all of Bonner's books, the writing is crisp and clear, even elegant, in the apparent effortless simplicity in which he describes very complex issues . . . Bonner again combines an appreciation and deep understanding of the past with a vision of and for the future."**--Brian K. Hall,** ***Evolution and Development***

"Insightful aphorisms have been a . . . feature of John Tyler Bonner's writing . . . Half a century later, it's a delight to find him . . . in fine form."**--Bernard Dixon,** ***New Scientist***

From the Inside Flap
"Bonner offers a route to understanding the evolution of development in multicellular organisms. The route is really an old one, based on comparative methods, but Bonner shows how it is still relevant to solving some of the most fundamental and difficult problems in biology, in particular the origin of multicellularity. His proposal comes at a time when the field of evolutionary developmental biology is really taking off, and many young researchers are just beginning to formulate their conceptual and experimental approaches. Thus, the timing of the book couldn't be better." (Daniel M. McShea, Duke University)

"Bonner does an amazing job demonstrating how nonmolecular approaches can still provide fresh insights into an important set of questions in modern biology. The message that a holistic approach to understanding complex biological problems has real value is in danger of being lost in today's molecular-centric world, and Bonner does his readers a genuine service by pointing out alternatives to the reductionist approach that dominates biology today. Further, Bonner has a delightful and engaging style of exposition. Readers acquainted with his previous books will look forward to hearing more about odd organisms that illustrate important biological principles." (Gregory Wray, Duke University)

From the Back Cover

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