Climbing Mount Probable: Mutation as a Cause of Nonrandomness in Evolution.

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Abstract: The classic view of evolution as "shifting gene frequencies" in the Modern Synthesis literally means that evolution is a random process. I argue that this view is incorrect. Mutations are not equally likely to occur in genetic material, producing a nonrandomness that influences evolution. This effect is a result of properties of nucleic acid molecules, and it is illustrated by an algorithm for finding the most probable path of evolution. The algorithm utilizes methods of analysis that incorporate mutational effects, and it can be applied even in the absence of explicit models of selection. By applying methods of analysis that incorporate mutational effects and by considering the effects of nonrandomness, I demonstrate that the classic view of evolution as "shifting gene frequencies" is incorrect. The effects of nonrandomness may play a key role in the evolution of life on earth.

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