Introduction

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Ever since its inception in 1971, the *Journal of Molecular Evolution* has been an important venue for promoting research on the origin of life. This special issue, devoted entirely to the topic, pays homage to Emile Zuckerkandl's pioneering interest in the subject, and to the Journal's role in promoting and legitimizing this field. Perhaps no journal has done more to provide proof of the universality of life, one of the landmark intellectual achievements of modern molecular biology. Early contributions to the subject published in the Journal ranged in subject from prebiotic to Martian chemistry, from theories on the origin of life to the origin of the universal genetic code. In recent years, there has been a shift from investigations in prebiotic chemistry towards elucidating vestiges of ancient molecular processes that speak to the transition to the DNA world, to features of LUCA, the last universal common ancestor, and to the coalescence of the modern genome. Fortunately for us, evolution is fond of hanging on to ancient molecules and processes, testimony to the fact that many of them were perfected early, and have remained embedded in complex biological systems with finely tuned interacting parts. Thus, for example, ribozymes may be viewed as functionally retained vestiges of an ancient RNA world, providing us with a unique time-window to peer far back into our biological past. The same may be true for introns and their role in the formation of the modern genic

repertoire, although this possibility remains an interestingly contentious issue. For many other features of early life, however, natural selection and stochastic processes have mercilessly obliterated the evolutionary intermediates that could provide clues about how modern life emerged — the genetic code being the poster-child for this situation. But even the universal genetic code retains clues about mechanisms and pressures by which the process to produce the final code proceeded, and this has led to remarkable recent progress in understanding how the extant code emerged.

This issue contains papers on a spectrum of topics of current interest to aficionados of the origins of modern life. Some of the papers review a specific topic — the origin and role of introns or the structure of the genetic code — and provide a current update on thinking about unresolved issues. Others are original contributions to a subject. In reading over these papers, we believe we have achieved our goal to create an issue of the Journal that highlights the intellectual breadth and health of the origin-of-life field. Indeed, the breadth of topics covered in this issue makes it all but impossible to present a rational summary of them that relates one to another. Rather, we hope you read and enjoy them all and form your own taxonomy of connections. Within them are certain to lay new veins for future exploration.

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