tween various biological processes. The result of this exercise is the appreciation that biological systems that exist today are extraordinarily complex, consisting of interlocking components that can function only in a mutually dependent manner. Armed with our current knowledge about the molecular architecture of living beings, we can go back to the initial question as to how it all started. In the author's view, the explanation given in terms of chemical evolution is far from satisfactory. After leading us through a garden path initially, the theory leads us to an insurmountable cliff-face.

The major problem with the chemical evolutionary theory, according to the author, is the fact that it fails to explain the interdependent nature of the different components of the living system. The basic molecular processes such as DNA replication, transcription, and translation are multicomponent systems that are closely tied to each other. It is almost unimaginable that they evolved independently and came together in a miraculous fashion.

The major problem with the chemical evolutionary theory, according to the author, is the fact that it fails to explain the interdependent nature of the different components of the living system. The basic molecular processes such as DNA replication, transcription, and translation are multicomponent systems that are closely tied to each other. It is almost unimaginable that they evolved independently and came together in a miraculous fashion. It is also equally unlikely that they evolved simultaneously. The problem is similar to building an arch without a scaffolding. The stones of an arch cannot be assembled one at a time without a support as the whole structure will collapse. Similarly, in the absence of a 'scaffold', the interlocking components of the biological system cannot evolve independently. But then, where is the supporting structure? This argument is a bit weak as it applies not only to the molecular aspect of evolution, but also to biological evolution. Therefore, by the same argument, the transformation of a single cell to a complex organism with interacting components is not likely to happen in the absence of a scaffold.

The disparity between the available experimental evidence for the synthesis of organic molecules in the prebiotic soup under harsh geological conditions and the complexity of the final products of evolution, according to the author, is simply too vast and takes a giant leap of imagination to go from one to the other. The organic synthesis of DNA, RNA, and proteins involves dehydration and their synthesis in an aqueous environment is next to impossible in the absence of catalysts. Thus it is difficult to picture the direct evolution of the entire ensemble of biopolymers and the biochemical cycles. These arguments are presented lucidly in the following chapters.

In the absence of the direct evolution of organic biopolymers from the prebiotic soup, what other

possibilities can one consider? The author suggests the clue provided by the rope. The fibres that make the rope need not run through the entire length of the rope as long as they can be interconnected. The same way, newer organisms carrying more efficient genes can be generated sequentially like the fibres of the rope. The rope symbolises the continuum of life forms as they gradually evolved, one giving way to another as new genes were created replacing old ones. (Strangely, ropes found at the scene of crime gave valuable clues to Sherlock Holmes also. At least in two cases, they helped him in the identification of the criminal.)

But then where is the scaffolding? Where are the catalysts? Where are the secluded chambers where the primitive information molecules that were evolving could be isolated from the vagaries of the environment? The way the author reads the clues, the answers have to come from inorganic rather than organic molecules. Crystals can be the primitive carriers of information. With their ability for self assembly, they can be reproduced relatively easily. With their layers of closely stacked atoms, they can offer a matrix for chemical reactions, thus playing the role of a primitive catalyst. With polarised surfaces, they can also act as a primitive biomembrane. The primary organisms based on minerals could gradually lead to the formation of secondary organisms based on organic chemicals. Because of their inherent efficiency, they could gradually replace the primary organisms in a genetic takeover. The scaffolding was probably destroyed in the course of time.

The book is thoroughly readable, as it promotes a healthy irreverence to many closely held beliefs of molecular evolutionists.

What could be the inorganic molecule that is best suited for such a challenging task ? Well, like any reviewer of detective stories, I do not want to name the 'culprit'. The author's choice is quite original and plausible. However, one gets the feeling of an anticlimax at the end of the book. Expecting an ending similar to the logical manner in which Sherlock Holmes would summarise his case, one is presented with the flair of Hercule Poirot who is known to present his culprits dramatically without sharing with the reader the evidence that led him to his remarkable results. But despite this limitation, the book is thoroughly readable, as it promotes a healthy irreverence to many closely held beliefs of molecular evolutionists. In a culture like ours which takes the printed word as the gospel truth, questioning of "holy cows" is definitely recommended. As Holmes would say, "The game is afoot, Watson!"

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