

could, in principle, fold into 8n conformations.’

47. Yockey, H.P., *J. Theor. Biol.* **46**: 369, 1974; p. 381.
48. One sees how quickly the proportion drops with increasing polypeptide length, n, by taking the log of the ratio:  $\text{proportion} = 10^{n(\log 0.0164 - \log 0.0984)}$   
 $= 10^{-0.778n}$
49. Yockey, H.P., *J. Theor. Biol.* **67**:377, 1977.
50. Yockey, H.P., *J. Theor. Biol.*, **67**:345, 1977; see p. 361.
51. Grantham, R., *Science*, **185**:862, 1974.
52. Pennisi, Ref. 9, p.254.
53. Lodish *et al.*, Ref. 5, p. 9.
54. ‘Earth’, <seds.lpl.arizona.edu/nineplanets/nineplanets/earth.html>.
55. Musgrave, I., Lies, damned lies, statistics, and probability of abiogenesis calculations, <www.talkorigins.org/faqs/abioprob.html>.
56. Personal communication from Professor Scott Minnich, email from 17 March 2001.
57. Scherer, S. and Loewe, L., Evolution als Schöpfung? in: Weingartner, P. (Ed.), *Ein Streitgespräch zwischen Philosophen, Theologen und Naturwissenschaftlern*, Verlag W. Kohlhammer, Stuttgart; Berlin; Köln: Köhlhammer, pp. 160–186, 2001.
- The authors were made aware of the above essay just prior to the submission of this paper. It contains many valuable probability calculations performed independently and unknown to us. It is reassuring that although they worked with different assumptions, virtually identical numbers resulted. For example, they calculated the maximum number of cells which could have lived in **4 billion years** as **10<sup>46</sup>** whereas we estimated for **1 billion years**, **2 x 10<sup>45</sup>** :
- From Appendix 3:  $(5 \times 10^{13})(4 \times 10^{20})(1 \times 10^{11}) = 2 \times 10^{45}$ .
58. Yockey, Ref. 9, p. 301.
59. In bacteria the mutation rate per nucleotide has been estimated to be between 0.1 and 10 per billion transcriptions.<sup>60,61</sup> For organisms other than bacteria, the mutation rate is between 0.01 and 1 per billion.<sup>62</sup> References found in: Spetner, L., *Not by Chance! Shattering the Modern Theory of Evolution*, The Judaica Press, Inc., Chapter 4, 1998.
60. Fersht, A.R., *Proceedings of the Royal Society (London)*, **B 212**:351–379, 1981.
61. Drake, J.W., *Annual Reviews of Genetics*, **25**, 125–146, 1991.
62. Grosse, F., Krauss, G., Knill-Jones, J.W. and Fersht, A.R., *Advances in Experimental Medicine and Biology*, **179**:535–540, 1984.
63. Yockey, Ref. 9, p. 250.
64. Hampsey, D.M., Das, G. and Sherman, F., *J. Biological Chemistry* **261**:3259, 1986.
65. Hampsey, D.M., Das, G. and Sherman, F., *FEBS Letters* **231**:275, 1988.
66. Yockey, Ref. 9, p. 162.
67. Yockey, Ref. 9, p. 250.

**Royal Truman** has bachelor’s degrees in chemistry and in computer science from State University of New York; an MBA from the University of Michigan; and a Ph.D. in organic chemistry from Michigan State University. He works for BASF in Germany.

**Michael Heisig** completed his State Exam (which corresponds to a Masters of Science) in food science from the University of Karlsruhe and doctorate in molecular biology

from the University of Freiburg. He currently works at the University of Heidelberg, Germany.

## Atheist admission

... Francis H.C. Crick, co-originator of the structure of DNA, put the argument more specifically: the chances that the long polymer molecules that vitally sustain all living things, both proteins and DNA, could have been assembled by random processes from the chemical units of which they are made are so small as to be negligible ... .

John Maddox  
*What Remains to be Discovered*  
 The Free Press  
 New York, p. 131, 1998.