

allow the reader to judge whether or not the unusual proposals are backed by a deep critical evaluation of the scientific literature. Nevertheless, since the origin of life is a very speculative field, I believe that unor-

thodox presentations such as Folsome's are on the whole more profitable than mere repetitions of the traditional discourse.

Jacques Ninio

### *Approches Moléculaires de l'Evolution*

by J. Ninio

Masson; Barcelona, Milan, New York, Paris, 1979

132 pages. 98.00 FFr

This book has a number of highly positive aspects and a very irritating one: undue aggressiveness.

In a small volume, it gives a vivid and original view of a subject described adequately by the title and more explicitly in the 'warning note' (chapter 1): 'Je discuterai donc de l'évolution dans la nouvelle perspective, aussi loin qu'on peut le faire aujourd'hui, pour ce qui est de la logique moléculaire du vivant. Nous voulons savoir avant tout pourquoi le code existe, à travers quels tâtonnements l'organisation cellulaire, maintenant bien rodée, a pu se mettre en place'.

After a short outline of the chemistry of life, the author discusses what one can and what one cannot extract from comparisons between protein or RNA sequences (chapters 3 and 5). These two sections sandwich an interesting chapter on the tertiary structure of proteins. Chapter 6 (Réplication et bricolage génétique) seemed more superficial to me (but perhaps, is it because I know this field better?). Chapter 7 is a fascinating discussion on populations and the next four chapters deal with the origin of life, and especially of the genetic code. This is the core of the book; it is full of interesting ideas, as are the last four chapters, which deal with evolution beyond the level of the code.

The most typical example of the bitterness of the author is found on pages 86–90. Is it a good argument against the ideas of Manfred Eigen and other eminent physicists, to first call him 'un certain M. Eigen' (and only later concede that he and Prigogine have received — and deserved — the Nobel Prize)? In order to

describe Eigen's ideas, the author imagines the example of evolution — guided by God — from an initial sequence CHUNIMBORZOU towards 'l'archétype parfait MANFREDARAFAT'. What is dangerous in this kind of sport is that mockery masks the lack of objectivity of the description. What is given here as 'une tentative malheureuse d'Eigen et Schuster' is presented in the original paper as 'a little computer game'; and the purpose of the game is not to show that in the presence of a selective advantage one will tend towards a given sequence, but rather to figure in what range of values of two parameters one might expect this evolution to take place.

I advise everybody (not only molecular biologists) to read this little book. It is written without unnecessary technical words, it questions a number of accepted ideas, it induces people to think and even when one disagrees, it is always interesting. Except for some printing mistakes and the virtual absence of subjunctives, I found few material errors. (For instance, on p.51. People who suffer from sickle-cell anaemia do not produce a mutated haemoglobin  $\beta'$  *in addition to normal haemoglobin  $\beta$* ; they are homozygous and produce *only* the abnormal  $\beta$  chain. The heterozygotes produce both chains, but they are not ill; as the author himself mentions, they have a selective advantage against malaria, which by the way, is not caused by a virus. And the disease is more characteristic of certain black populations than of the middle East.)

R. Thomas