

Forces in opposing corners

Richard Law

The Niche in Competition and Evolution. By Wallace Arthur. Wiley: 1987. Pp.175. £22.50, \$47.50.

THE niche is a powerful metaphor in ecology. Widely used as an architectural term, it was adapted for use in an abstract figurative sense to describe the position occupied by a person, and adapted again by ecologists to describe the role of an organism in the natural community in which the organism lives. The trouble is that because the niche was originally no more than a rather vague metaphor, ecologists have found it difficult to define, difficult to measure and even more difficult to decide whether it matters in the organization of nature.

Ten years ago, there was a consensus that interspecific competition prevented species with similar niches from living together, and that the niche played a central part in sorting the natural world into groups of compatible species. But with theoretical developments and the accumulation of further evidence from the field, this view has come under serious attack.

Wallace Arthur, who has thought more about the issues involved than most biologists, describes his own individualistic views on the role of the niche in competition and evolution in this book. First, he is a strong advocate of the experimental analysis of competition, in which populations of two species are placed in arenas and left to 'fight' for a limited supply of food. It is under these closely controlled conditions that we are most likely to see exactly what it is that enables some species-pairs to coexist, when others do not. Secondly, his leaning towards competition as a force in evolution has caused him to highlight the parallels between ecologists' interests in coexistence of species on the one hand, and geneticists' interests in the coexistence of genes within populations on the other.

This dual emphasis is strongly in evidence in the three main sections into which the book is divided. Arthur begins with an analysis of the conditions under which one species (or a gene) is replaced by another, amalgamating some basic theory with data from experimental and natural populations.

The core of the book is the section in which he describes how competition can lead to equilibria, enabling species (or genes) to coexist indefinitely. Grappling with the problem of testing whether differences in niches are responsible for coexistence, the author comes up with some

useful ideas for experimental design. His discussion of the semantic knots emanating from Gause's competitive exclusion principle, and his own resolution of the problem, also makes interesting reading.

In the final section, Arthur moves into some of the more speculative areas of competition that are currently under debate. His conclusion about the kind of structure which competition imposes on guilds of species — that their niches have to differ by more than some (variable) lower limit — is reasonable, but it is certainly not going to be easy to test. Surprisingly, he also concludes that coevolution of competing species occurs, in spite of the almost complete absence of strong supporting evidence from niche studies.

The Niche in Competition and Evolution is very much one person's viewpoint, and it should not be read as a general appraisal of the subject. Its personal style may not be to the taste of some readers, but the author is quite candid about the point at which his opinions take over from the information provided. This is a book that provokes thought and sometimes disension — and it is none the worse for doing so. □

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Soviet development

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Cytogenetics of Mammalian Embryonic Development. By A.P. Dyban and V.S. Baranov. Clarendon: 1987. Pp.362. £35, \$75.

READING the preface to this book, one cannot fail to sympathize with the reasons why these two eminent Soviet scientists have gone to the trouble of translating and updating the Russian edition of their monograph, published in 1978. They draw attention to the fact that, to keep abreast of the world literature, most of which is published in English, our Soviet colleagues have of necessity to be multilingual, though for convenience most of their own findings appear in the appropriate Soviet journals. Unfortunately, most Western scientists peruse the Soviet journals very rarely, and even then only in translation. As is evident from the briefest perusal of the book, much excellent and original work in experimental embryology has simply passed unnoticed (by Western scientists) into the Soviet literature.

This is an unsatisfactory state of affairs, and it can only be hoped that now attention has been focused on the



Deep breathing — the first portable respirometer, designed by Zuntz and co-workers in 1906. The open-circuit apparatus made possible the long-term measurement of energy expenditure during a range of activities. The equipment consisted of a mask with manually-operated taps, a dry gasmeter and a mercury tonometer for collection of expired air samples, and was the forerunner of the Max Planck respirometer. The picture is taken from *Animal and Human Calorimetry* by J. A. McLean and G. Tobin, a survey of the theory and techniques of calorimetry as applied to the study of energy metabolism in humans and animals. The book is just published by Cambridge University Press and costs £37.50, \$69.50.