with its "instructional" alternative. These terms have, of course, been taken over entirely from immunology, where the triumph of selectionism was to help Edelman towards his Nobel prize. I am not sure that the imported metaphor does service to the brain any more than the molecular details of the N-CAMs help the general thesis. Yet Edelman goes a stage further, punning immunological (and neuronal) selection with darwinian natural selection. Time and again he exhorts us to "population thinking" about the brain, and equates the evolution of natural populations of organisms with processes of neural development. But although the terms evolution and development share a common etymological origin, ontogeny does not simply recapitulate phylogeny, and it is hard to see how the elision helps our understanding of brain mechanisms. Populations of neurons are not equivalent to populations of organisms. Neurons develop, migrate, sprout synapses and die but, unlike any other cell in the body, they do not reproduce. And they do not compete through the differential survival of better-fitted offspring in any conceivable darwinian sense. Indeed, as sociobiologists are so keen to insist, darwinian selection is based on the individual not the population, and group-selection thinking is thus anathema to it. What value then, other than poetic, can Edelman's insistence on his double metaphor of selection have in understanding brain processes?

As the central figure in the Rockefeller (and now Scripps)-based Neurosciences Institute, Edelman has presided for many years over some of the most richly rewarding discussions of theory and experiment in the neurosciences anywhere in the world. This experience is reflected in the sweep and ambition of his writing, his insistence on an evolutionary neuroscience that ranges from molecular to cognitive processes and his sceptical dismissal of both crudely reductionist and nonmaterialist philosophies. Such strengths should not be lightly dismissed. But substituting selectionist for instructional models of neural development and rejecting an information-processing model of how brains work, useful steps though they are, still fail to do justice to the brain as an active, dynamic, self-organizing system. Karl Popper has spoken of replacing what he sees as the "passive Darwinism" of sociobiology with an "active Darwinism" in which the actor, the organism, plays a part in the development of its own future. Edelman's selectionist metaphor in its passivity denies this possibility.

Edelman's earlier books, even for those who regarded them most highly, were seen as difficult and often opaquely written, as previous *Nature* reviewers have pointed out. *Bright Air, Brilliant Fire* is an endeavour to overcome this problem, and from its title derived from Empedocles onwards the author has clearly worked hard to do so. Yet in many places the text can be comprehensible only to those who have read the earlier books (as with the discussion of Darwin III, for instance). The book isn't helped, in my view, by the early chapters with their potted references (complete with photographs) to Descartes, Darwin and others, or by whatever editor suggested that the text would be lightened if, every few pages, the author inserted a bar-room joke or dubiously relevant anecdote. The faintly risible obscurity of the title's metaphor merely emphasizes the author's continuing problems in communicating accessibly. □

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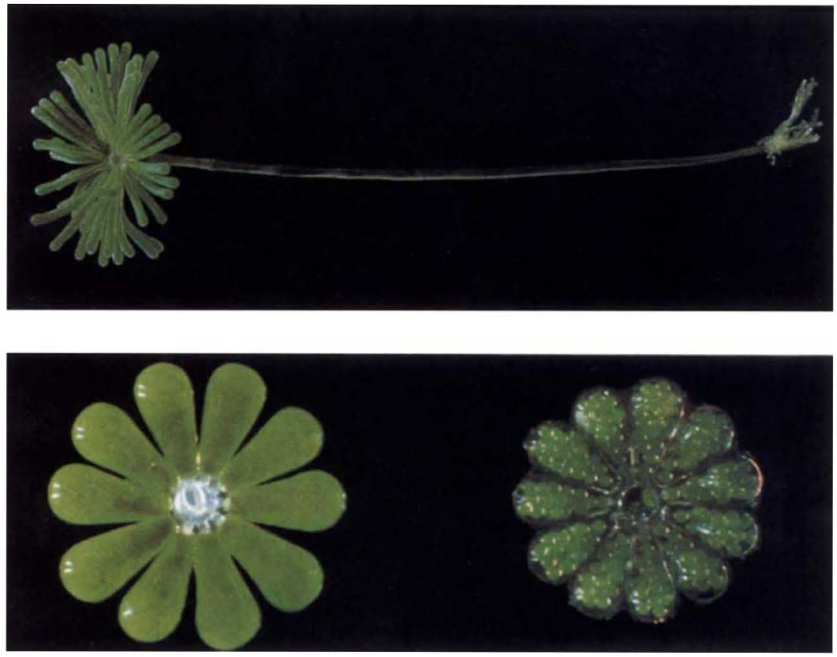
Capping it all with algae



DASYCLADALES are a remarkable order of unicellular green algae widely found in the shallow waters of tropical or subtropical shores. Cells of the genus *Acetabularia* (top, ×2.2) and the related genus *Polphysa* (bottom, ×20) can grow to lengths of up to 20 cm and develop perfect radial caps containing globular packets of gametes. These cells were heralded as ideal objects for cell biological research in the heyday of J. Hämmerling *et al.*, but few of today's students even know of their existence. Hopefully this will change with the publication of the astonishing *Dasycladales: An Illustrated Monograph of a Fascinating Algal Order*, from which these pictures are taken. The authors, Sigrid Berger and Matthias J. Kaever, have given such lavish and loving attention to the production of this book that the word 'perfect' keeps coming to mind. The comprehensive text on the structure, ecology, evolution, taxonomy and palaeontology of these organisms will be invaluable to the dedicated phycologist; but what makes the book unique is its rich collection of photographs. Sadly this does not include the striking immunofluorescence images of the actin and microtubule cytoskeletons of these cells (see, for example, D. Menzel and C. Eisner-Menzel, *Protoplasm* 157, 52; 1990). Nonetheless, the colour plates are technically and visually superb. They illustrate the extent to which the dasyclads have been indulging in an orgy of morphogenetic experimentation since at least the Cambrian era some 570 million years ago; the reader comes away with a whole new appreciation of what can be done with cell polarity, cell shape and genetic programming. This is a book that every biologist should purchase for a cherished nonscientific friend so that they can together share the fusion of nature and art that these creatures have perfected. Published by Georg Theime, Stuttgart / Oxford University Press, New York. Price DM 298, $175.

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