

## TWO-WAY ADAPTORS

SIR - V. Bauchau<sup>1</sup> referred to the contribution of Dover<sup>2</sup> dismissing Dawkin's claim for universal Darwinism<sup>3</sup>.

As to the fact that laws may deal with very general statements rather than with precise predictions on a system's detailed development, I agree with Bauchau completely. Whether, however, evolution by selection is such a universal law, as he called it, will depend on the units of selection he may have in mind. If one goes high enough in the general hierarchy of organisms, then, of course, evolution is zero-sum-game between winners and losers. But as soon as forms of cooperation and function sharing come up, one can no longer separate the losers from the winners, that is, from those who have been selected<sup>4</sup>.

Another point is that it is not compelling to say that the (social, organic or physical) environment will exclusively define the conditions to which the organism has to adapt in order to survive. One can also say that organisms through their own evolution have defined the criteria to be met by the environment, and that in all cases where the environment is not appropriately adapted, the organism will try to modify the environment according to these criteria by means of acting in the wider sense (including emigration). Then, as Waddington<sup>5</sup> said, the organism will select the environment rather than the reverse. In Darwinian parlance, a species will die out (and be replaced by others) if its members and the environment are ill-matched. Yet the same can happen also to a special environment itself if it is occupied by species which developed tools to modify their surroundings. One may well continue to speak in terms of conditions to which organisms have to adapt and to use the notion of selection accordingly, but then it has to be made clear that, to a great extent, organisms themselves have brought about these conditions as well as they can modify them.

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4. Diettrich, O. Evol. Cogn <sup>2</sup>, 163-188 (1992)
5. Waddington, C. H. Nature <sup>182</sup>, 1634-1638 (1959)