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Genetic and Cultural Evolution of Cooperation. Edited by *Peter Hammerstein*. Cambridge, Mass.: The MIT Press, 2003, 485 pp. \$45.00, hardcover.

Evolution by natural selection is by definition a competitive and discriminatory process. Yet the mere existence of cells, organisms, and communities is testament to the role of cooperation in the organization of complex systems. Cooperation at any level requires means for solving classic free-rider problems, which can otherwise erode the stability of higher-level organizations. The generality of free-riding and problems of collective action is a unifying approach for the biologists, anthropologists, economists and psychologists who contribute to this volume edited by evolutionary biologist Peter Hammerstein. Their noble aim is to “elucidate the mechanisms and processes beyond kin selection that promote the emergence of cooperation in systems that range from molecules to societies”.

William Hamilton’s notion of kin selection and Robert Trivers’ reciprocal altruism have been the main theoretical engines of sociobiology for over thirty years, and have helped explain a wide variety of social phenomena in many animal taxa. There are limits, however, to their direct explanatory power. To address important gaps, draw parallels across disciplines, and highlight relevant themes and controversies, the 90th Dahlem Workshop convened in Berlin in June 2002. This volume is a collection of twenty-three background papers and summary reports, organized into four categorical, albeit somewhat overlapping, sections: cognition and emotion, mutualism and markets, cellular cooperation, and human societies. The chapters are mostly summaries of research perspectives, problems, or questions, and so are perfectly suited to attract a wide interdisciplinary readership. Motivated readers and specialists can refer to the original publications listed in the references.

The set of papers in the first and last sections are of obvious direct interest to anthropologists. Some memorable contributions include a brave and illuminating discussion of the functional design of emotions (Fessler and Haley), depression and bargaining (Hagen), lack of obvious reciprocity in close human friendships (Silk), and norms and culture (Young; Richerson et al.). Several papers attempt to explain how cooperation can be so common in both small-scale and large contemporary human societies, highlighting “strong” reciprocity, pro-social preferences, and increased susceptibility to norm internalization (Fehr and Henrich; Bowles and Gintis), the role of genetic and cultural group selection in shaping ‘tribal instincts’ and pro-social behavior (Richerson et al.), and the value of symbolic communication via human language for coordination, and reduce costs of monitoring and punishing norm violators (Smith). These chapters extend discussions of dyadic interactions in attempting to explain large group-wide interactions. As may be expected in attempting to cover such wide scope, no hard conclusions are offered. Although perhaps more questions are raised than answered, they are framed in an organized and sophisticated manner which should help set the stage for future investigations from diverse disciplines.

The section on mutualisms focuses primarily on inter-specific associations. The chapters by Bowles and Hammerstein, and Bshary and Nöe, illustrate how bargaining dynamics and market theory can help improve understanding of many mutualisms, which have been

traditionally viewed as fairly straightforward and unchanging, due to an assumed lack of any temptation to cheat or free-ride by all involved parties. These and other chapters in this section re-evaluate classic cleaner fish-client and ant-lycaenid mutualisms, showing how supply and demand affect relative bargaining power among actors. Bergstrom and Lachmann extend this logic to examine how surplus benefits should be distributed across mutualistic species that vary in their rates of reproduction. These chapters nicely illustrate how economics can shape the form and dynamic character of social relationships, which is often missed by a traditional focus on evolutionarily stable strategies in biology and equilibria in economics. It is a surprising disappointment that bargaining and market theory are confined to this section of the book, and are not directly applied to examine the complexities of social relationships in humans.

The chapters on the evolution of multicellularity (Szathmary and Wolpert; Michod) and mitochondrial symbionts (Blackstone and Kirkwood) are some of the most technical in the book, but also very illuminating. The summary chapter is very useful for outlining a general framework for understanding intra-organismal levels of organization, and is therefore perhaps best read before the chapters in this section. Just as social institutions frame the costs and benefits of different behaviors in human societies, cellular processes like meiosis and programmed cell death, and the existence of immune systems help reduce conflict within bodies by renegade cells, genes, and mutant alleles. My only complaint is that there was little attempt to integrate this section with the rest of the book.

Overall, the chapters are testament that an evolutionary perspective on cooperation (or anything) is a misnomer; there are many ways in which evolutionary processes can guide and shape preferences, psychological mechanisms, norms, behaviors, and institutions. The chapters in this book sketch out many hypotheses and predictions, offer organized (albeit sometimes repetitive) syntheses, with informed speculation which should spark interest into the exciting new directions of research on cooperation.