lents of Pacaguara names from the documents. The final appendix transcribes an 1804 document which refers to Pacaguaras and other groups.

In a book that crosses the disciplines of anthropology and history, there are bound to be minor errors such as the authors' misidentification of the Bolivian explorer José Agustín Palacios as prefect of the Department of Beni on page 56 (he was actually governor of the Province of Mojos). Nevertheless, this in no way detracts from the value of the book. Villar, Córdoba, and Combès clearly know and care about the modern Chacobo people. *La reducción imposible* demonstrates their interest in moving beyond the "ethnographic present" of their fieldwork to reconstruct the complete history of the people they study. Their relationships with the Chacobos and knowledge of their language have given them insights that a historian would be unlikely to have. The resulting ethnohistory provides a glimpse of both cultural continuity and change. It gives us, as much as is possible, an inside interpretation of the Southern Panoans, an understudied and poorly-understood indigenous people. And although the Chacobos only appear in documentary records in 1845, the authors prove that the same people have occupied the land for at least 400 years under different names, thus providing the Chacobos with an even stronger claim to their own territory.

Gary Van Valen

Vinicius, Lucio: Modular Evolution. How Natural Selection Produces Biological Complexity. Cambridge: Cambridge University Press, 2010. 235 pp. ISBN 978-0-521-42964-1. Price: £ 60.00

This is a book after my own heart in that it concerns the big questions in evolutionary theory. It may be of interest to evolutionary theorists and philosophers of such as well as to social scientists. The latter are likely to be particularly interested in the critical analysis of recent research on cooperation among humans in chapter 6, and in the views concerning behaviour and culture presented in chapter 7.

There is something of a gap between the grand claim made about progress in evolution, even in restoring the hierarchical view of life that Lovejoy called "the great chain of being" with humans at the top, on the one hand, and the quite conservative view taken of most substantive issues, on the other. Hence genetics, development, behaviour, and culture, including language, are "modular", i.e., particulate or discrete; speciation is pretty much exclusively allopatric; the comparative molecular genetics of development shows evolution to have been gradual; the key characteristic of multicellular life cycles is the development of a germ-disposable soma differentiation; the function of sex is to acquire beneficial mutations or to get rid of deleterious ones; males foist the cost of reproduction onto females who make the best of a bad job; eusocial colonies are not super-units, and cooperation in evolution is always attributable to either kin selection or "selfish cooperation." Much of this strikes me as harkening back to a simpler time when we thought we understood almost everything. For example, who can today think of the gene as particulate in structure and function given genetic recombination which ignores functional boundaries, the existence of trans- as well as cis-acting controls on gene expression, and all the cutting and pasting that goes on at many points from transcription to posttranslation?

The theoretical target of the book is the evolution of complexity which can be understood, according to the author, by means of making dynamic Schrödinger's principle of "order from order," by which I understand Vinicius to mean the existence of biological information and that subsequent forms of order evolve from previous ones. More specifically, Vinicius agrees with an element (but not the main element) of each of Maynard-Smith and Szathmáry's major transitions, Jablonka and Lamb's four dimensions of evolution, Barbieri's organic codes, and Dawkins extended phenotypes. Along with Maynard-Smith and Szathmáry, he understands major transitions in evolution as increasing complexity but not by the emergence of new aggregate units. He thinks that levels of selection – individuals, families (kin groups), groups, species, etc., – should not be confounded with levels of organization or complexity – cells, eukaryotic cells, multicellular organisms, etc. – which is an important point. At the same time, it was a large part of Maynard-Smith and Szathmáry's genius to recognize that perhaps the concept of "multiple levels of selection" only makes sense in the context of the latter – or as a minimum, that the latter are particularly worth investigating from that point of view as being possibly based on similar principles. Along with Jablonka and Lamb, he believes that the origin of brains and behaviour should be included as a major transition – but not their emphasis on Lamarckian processes. Along with Barbieri, he believes in the existence of a number of biological "codes" – but not so many as the former claims. Along with Dawkins, he uses the expression "extended phenotype" but with a different meaning – namely, something like extended out into the phenotype of the organism rather than necessarily to artifacts or the phenotypes of other individuals. From that combination he derives an ontological hierarchy of levels of organizational complexity rather than of aggregates which evolve by "modularity transfer." Disposable phenotypes become modular information carriers, themselves coding for disposable phenotypes so that not only do genes code for proteins but regulatory proteins do so for somatic cells in multicellular development, neural cells and activity do so for learned behaviours, and language does so for human cultural traits. The thesis incidentally is beautifully illustrated on the cover by the lego sculpture artist Nathan Sawaya's "Yellow" showing a yellow lego man pulling his chest open and all of the modular bricks spilling out.

Vinicius gives most substantive attention to multicellular development (two chapters) mainly on the regulation of gene expression and the evolution of senescence. If he had paid as much attention to traditional developmental biology as to pattern formation in the molecular genetics of *Drosophila*, he might have come up with a different conclusion about individual phenotypes – namely, that their development is achieved by a largely self-contained or encapsulated evolutionary process itself (also compat-

ible with the evolution of life histories among the former). This point of view has achieved much traction with respect to individual learning and features of the adaptive immune response and may eventually structure our understanding of multicellular development itself. Transplantation of parts experiments historically showed that both the ancestral history of cell lineages and their current local environment matter in what develops, cell death and differential proliferation is a normal part of multicellular development, and conflict in the form of cancer and autoimmunity is far from having been completely banished.

The theme of two other substantive chapters is rather negative – sex is a major transition in complexity that never happened because it always existed and animal societies are an incomplete transition. Brains-behaviour and language-culture are treated much more cursorily in the concluding chapter. Here I don't think that Vinicius can have his cake and eat it too with respect to culture. On the one hand, he emphasizes that all of his levels of complexity are ultimately "extended phenotypes" of the genetic. On the other hand, he claims that culture in historic societies is not biological (and incidentally denies without elaboration that it evolves because cultural innovation is "Lamarckian and goal-directed"). For something to be a phenotype, extended or not, one evolved by natural selection, there must be additive genetic variance for it. If it is so, then the trait is indeed biological. On the other hand, if it is not, then it is not a phenotype, or at least an adaptive one in the biological sense. A different view of culture is becoming common. While the capacity for social learning, language and, therefore, culture has its roots in biology, like viruses in this one respect, it long ago escaped those roots in the sense that it has come to coevolve alongside and in interaction with the biological.

As in any work of this scope, it is inevitably marred by errors or at least confusions. Lateral gene transfer in prokaryotes is not normally viewed as "sex" because it is lateral, unidirectional, and partial rather than an "exchange" or an "interchange" which implies bidirectionality and Maynard Smith certainly knew the difference. The concept of cultural group selection is attributed to Gintis et. al. from 2001 when it goes back to Boyd and Richerson in 1985. The view that prokaryotes do not have a development – a life cycle – albeit lacking a nucleus and mitotic apparatus, one different from that of eukaryotes, is certainly debatable. A variety of different modes of reproduction are known in prokaryotes including binary fission, budding, endo- and exospore formation, etc., which give rise to descriptions of different life cycles. The American Society for Microbiology sponsors meetings on prokaryotic development. I do not understand whether, and if so why, the author intends to imply on p. 79 that prokaryotic DNA is not replicated semiconservatively. (Some of the most definitive proof of semiconservativism comes from experiments on e-Coli.) The history of the concept of a two-fold cost of sex in eukaryotes is too long and complicated to go into detail here but if Vinicius intends to link it to sexual competition and selection as he seems to at least in part, it might best be defined as the cost to one, the other, or both genders (or kinds of gender-functioning in hermaphrodites), of sexual competition in the other – i.e., it is neither exclusively attributable to males nor is it necessarily absent in hermaphrodites as opposed to gonochoristic/dioecious species as claimed.

While not persuasive to me on most issues, I enjoyed reading the author's unique views and believe others might as well. A value of a good book lies in the kind of new knowledge that it prompts the reader to seek. After reading Vinicius, I intend, for example, to look further into Barbieri's "semantic biology" to learn what justification there may or may not be for viewing biological phenomena beyond that between codons and amino acids and between cooperatively communicating individuals as "codes."

Marion Blute

Wavell, Barbara: Arts and Crafts of Micronesia. Trading with Tradition. Honolulu: Bess Press, 2010. 156 pp. ISBN 978-157306-3098. Preis: € 50.00

Das vorliegende Buch erweckt schon deshalb Aufmerksamkeit, weil zur ozeanischen Großregion Mikronesien nur verhältnismäßig wenige Bücher erscheinen. Das betrifft sowohl den deutsch- als auch den englischsprachigen Raum. Schon allein aus diesem Grund ist man gespannt, auf welche Themen und Bereiche hier ein Schwerpunkt gelegt wird. Es geht in dem Werk um die Darstellung der materiellen Kultur einer Region, die von manchen innerhalb Ozeaniens zumindest teilweise als peripher bezeichnet wird. Das stimmt zwar nur teilweise und es muss genauer hinterfragt werden, wie hier Abgelegenheit definiert wird. Aber schon im Klappentext des Buches wird genau mit diesem Argument gespielt, indem darauf hingewiesen wird, dass es sich hier um "… material culture of some of the world's most remote islands …" handelt. Das ist überspitzt formuliert. Um welche Region handelt es sich also. Eine Karte auf der ersten und letzten Innenseite gibt darüber Aufschluss, dass hier die Marianen- und Palau-Inseln im Westen Mikronesiens liegend gemeint sind, gefolgt von den querliegenden Inseln der Karolinen, die sich heute in Yap, Chuuk, Pohnpei und Kosrae gliedern, im Osten gefolgt von den Marshall Inseln und den südöstlich davon befindlichen Gilbert Inseln. Zahlreiche kleinere Inseln, die sich keiner der genannten großen Inselgruppen zurechnen lassen, gehören ebenso zur Großregion, so z. B. Nauru oder die als sogenannte "polynesische Outlier" bezeichneten Atolle, wie beispielsweise Kapingamarangi.

Bereits beim ersten Durchblättern des Buches fällt auf, dass die abgebildeten Gegenstände der materiellen Kultur nicht übermäßig alt sein können. Und tatsächlich stellt sich schnell heraus, dass die hier abgebildeten Objekte zu einem Gutteil aus der Sammlung der Autorin Barbara Wavell stammen, die seit dem Jahr 1975 in Mikronesien Kunstgegenstände (art) gesammelt hat. Dabei ist interessant, dass die Autorin selbst ihre gesammelten Objekte alle als Kunstobjekte definiert, und nicht beispielsweise ihre Funktionalität als Bezeichnungskriterium herausstreicht. Es handelt sich also um Gegenstände der Gegenwart und jüngsten Vergangenheit und nicht um eine Bestandsaufnahme früherer Zeiten, wie es bei der Aufar-