With *Metal and Flesh*, Ollivier Dyens wants to explore what he calls "the emergence of a cultural biology." By this phrase, he means at least two things: both the apparent need to extend commonly-accepted definitions of such putatively biological terms as "life" to a variety of phenomena, systems, and entities not normally thought to be living, as well as the supposedly ever-increasing interpenetration of cultural products and artifacts with living things, both human and otherwise. These ideas are certainly evocative and challenging; unfortunately, the book has little enlightening to say on the subject.

*Metal and Flesh* is a slim book, but aims at a large range of ideas and claims. Indeed, its bold scope—a survey of apparent sea-changes in the understanding of the idea of life against the background of twentieth century cultural productions—is a large part of the problem. The desire to address such large themes often results in generalizations without adequate support and overly quick treatments of complex ideas. Part of the problem here comes down to style. In his introductory notes, Dyens writes that the "ideas presented in this book do not follow a rigid linear narrative as tradition would have it, but are rather to be read as a series of loosely connected thoughts revolving around... two central themes" (3). At the same time, however, he aims to "prove" various claims about the intersection of biology and culture. This is difficult; without straightforward argumentation, it is much harder to claim proof. Of course, it is possible to address ideas seriously without following "traditional" modes of reasoning, and an elliptical style is not necessarily the mark of poor ideas. One can think of Wittgenstein's *Philosophical Investigations*, for instance, a widely admired work despite its unconventional style. In the case of Wittgenstein, however, it is well known that he spent much time organizing and re-organizing the various segments of his work, hoping by process of juxtaposition and ordering to convey something of his thought. *Metal and Flesh*, for its part, reads as if insufficient care was given to the process of organizing ideas, and much of it reads as if it were a series of off-the-cuff observations, with little attention given over to thematic and ideological coherence.

Dyens offers the reader a collection of cultural readings ranging from modern film to cyberpunk fiction to chaos theory. His central and novel idea is that "culture," by which he seems to mean anything that can be considered a manifestation of intelligence, forms its own biosphere, in the sense that modern technological and social forms interconnect a wide range of entities, which ought to be seen as "living" within a shared environment. Life, in the sense used here, is broadly defined to include any systematic use of representations. The range of such living things is wide indeed, for "[e]very system, whether biological, planetary, meteorological, or ecological must reproduce and use representations in order to survive and become more complex" (6). Such a claim, I think, shows a primary problem with this work. The definition of "life" here is so broad as to encompass nearly anything one might imagine. While this is in fact a central thesis of *Metal and Flesh*, it is based on a use of "representation," which is so wide-ranging as to be nearly empty.

An example is in the treatment of viruses, a central idea in the book. As described in the second chapter of the book, viruses must be considered as living beings, not only because of their ability to replicate and spread, but because they "manipulate representations," in the sense that they adapt to their environment, changing form to counter antiviral defenses, and to spread to new types of hosts (46). Thus, a "representation" in this sense is simply any change in structure,
whether that structure be neural or simply physical, and so "intelligence" comes down to any change in reaction to the environment. This sort of easy move from metaphor to factual claim characterizes much of the intellectual style at work here. It is certainly interesting, say, that scientists have used the mathematics of complex systems to analyze not only brain function but weather patterns. Still, this no more makes weather patterns an instance of intelligent behavior than does the usefulness of basic planar geometry in the construction of both doghouses and suspension bridges make the first suitable in the role of the second. Surface similarities between theories and ideas may seem intriguing, but real understanding comes as much from seeing where our notions cannot be applied as from seeing where they can.

Too often, Metal and Flesh suffers from this failure to distinguish potentially interesting metaphors from factual claims of identity, or uses the former as the basis for sudden leaps of reasoning to the latter. Thus, from the fact that modern plastic surgery can produce the simulacrum of physical traits originally desirable perhaps as signals of reproductive fitness, we move to the claim that "Pamela Anderson... is no longer a human being" (21). The use of the language of viruses to deal with the phenomenon of malicious computer programs engenders the claim that "cyberspace [is] conscious and intelligent" (29). A potentially interesting line of thought about the difficulty of distinguishing digitally-generated imagery from photographs of real subjects becomes an argument that when the image of a person is rendered digitally, he no longer belongs to organic reality" (86).

Interesting and challenging ideas pop up throughout the book. It is certainly worth thinking about how biotechnology will influence our sense of identity, say, or about how the modern interpenetration of human cultures with one another, and with the natural world, affects the epidemiology of disease. Metal and Flesh moves too quickly over these (and many other) issues, however, satisfying itself with rather too-quick claims about how human beings have become "cyborgs," or about how viruses serve as the central form of communication in the modern age. The role of technology in human life is an important topic, and has always been so since the advent of speech led to the rapid evolution of mankind millennia ago. This book mentions such challenging ideas, but their real development is neglected. In the end, a reader interested in the idea of the role of technology (and viruses) in human culture would be better served by a book such as Jared Diamond's recent Guns, Germs, and Steel.

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