

The postmodern biologist (cum psychologist)

Oyama, S. (2000) *Evolution's Eye*, Durham, NC: Duke University Press.

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In “Evolution’s Eye,” Susan Oyama promises to give us a better integration of evolution and development. What pours forth instead is a cascading torrent of aesthetic appreciation for developmental complexity, which, in crashing, kicks up a mist that fogs completely a proper understanding of population biology. The result: a misplaced demand that evolutionary theorists behave as if they were students of ontogeny.

Oyama says evolutionary theory is straitjacketed by such concepts as “trait transmission” (there are isolated traits with definable boundaries) and “developmental duality” (genes control development; environment is a receptacle). These make us disregard the interactive construction of traits in development, saddling us with visions of unitary traits appearing by genetic remote control. And we continue to do this “no matter how vociferously we declare the [nature/nurture] distinction to be obsolete.”

Oyama’s verdict is harsh:

This...ensures not only a degree of conceptual incoherence in our science, but also continued difficulty in synthesizing our knowledge of development with our understanding of evolution. Finally, our lack of clarity on these issues, because of their deep involvement in the old and tangled nature-nurture complex, encourages further confusion when scholars make pronouncements on the role of evolution in shaping our fundamental nature (Konner 1982; Midgley 1980; E.O. Wilson 1978).

Oyama “corrects” this allegedly dominant view¹ as follows: (1) traits do not result directly from genes—they are co-constructed with environments; (2) the “environment” is a different beast depending on which stage and aspect of development we are talking about (e.g. the cytoplasm, for some processes, the surrounding biota, for others, etc.); (3) any so-called “trait” is really a whole collection of them, as different environments end up constructing different things with the same genes; (4) environments are inherited too; (5) the “central dogma,” which says that all of the information that matters is in the DNA molecule, is wrong. (All of this, apparently, is new.)

The language and methods of evolutionists come in for much criticism. Oyama argues that “the conception of evolution as change in gene pools or genotypes is an exceedingly abstract one—and, more serious, an incomplete one” (p.28). It is a mistake, she says, “to place phenotypic form, or any kind of ‘representation’ of that form, in those genes. It amounts to an attempt to explain a dynamic multilevel phenomenon by a lower level entity.” She deplores “the population geneticists’ habit of taking genes out of

¹ Notice that the references are not recent. This problem is general to the book. Oyama seems to have found few offending references beyond the early 1980s. Shouldn’t a polemic include the latest work?

organisms and placing them into mathematically manageable ‘pools,’ concentrating on the countable while taking for granted the processes that generate and regenerate these countable things” (p.69-70).

It would indeed be “exceedingly abstract” and “incomplete” for a student of development to say something like “this gene constructed this trait,” but Oyama is criticizing *population biologists*. This is a bit like faulting a sociologist of the restaurant business for neither growing corn nor being an accomplished chef. Evolutionists take development for granted because they have to. Their business is explaining statistical historical trajectories, and adding ontogenetic complexity to each cycle in their models is neither mathematically possible nor in principle helpful. As Dawkins (1989:281-282) explained, when an evolutionist talks about a gene ‘for’ something this hardly means that the gene—all by itself—produces the trait. As a new mutation, the gene introduces a change into a complex ontogenetic process, and the new trait is its downstream developmental consequence. Remove the gene, and you get a different developmental trajectory, so the trait does not manifest itself. From the point of view of selection, then, keeping *that gene* or not in the population is the difference between keeping *that trait* or not in the population. Nobody denies that an entire orchestra of complex inputs and feedback processes are necessary for any trait, but population biologists are interested in how selection changes the distribution of traits by changing the distribution of genes.²

I agree with Oyama that DNA may not be where all the relevant information is. Cytoplasmic mechanisms reassemble DNA many times to produce many different proteins from the same strip, so the inheritance of cytoplasmic genes is important. Evolutionary modelers, however, are usually talking neither about real genes, nor about DNA. They just build relatively simple models of how given selective processes will affect the distribution of heritable phenotypes (allelism is about the only feature typically preserved from real genetic processes). They will receive the news that the relevant genetic information is not all in DNA with a shrug and carry on as before.

Oyama informs us that the environment—not just the genes—causes changes in the phenotype (p.78-79), and accuses neo-Darwinists of using the concept of “norm of reaction” to reduce all phenotypic changes to the “potential” of the genes (p.55). This betrays indifference for what evolutionists seek to explain: *adaptive equilibria*. A population is statistically at rest when the present range of environmental conditions do not cause changes in the distribution of genes. So evolutionists distinguish between environmental effects eliciting variable but already selected-for phenotypic responses—a “norm of reaction”—from those which introduce new selective pressures causing a new equilibrial distribution of genes.

Oyama’s misunderstanding of the questions and tools of evolutionists extends to Darwinian models of culture.

A major step in the opening out of crucial concepts is the reconsideration of the notion of transmission. Accounts of gene-culture coevolution (Boyd &

² Evolutionists do take into account “phylogenetic constraints” such that point B is only reachable by making incremental modifications to the developmental processes at point A. But this hardly requires including elaborate developmental processes in the evolutionary models.

Richerson 1985; Durham 1979; Lumsden & Wilson 1981) use the model of trait transmission for culture as well as for biology, seeking to remedy the shortcomings of purely genetic theories. By adding a second transmission channel, however, they also continue the dualistic tradition that ensures those shortcomings. (p.69)

Mature human psychologies do indeed result from a complex co-construction between genes and environments. Developmentalists should study such interactions. But once again Oyama directs her criticism towards population theorists, and again misses the point.

From the *populationist*—but not developmental—perspective one can and should defend a nature/nurture dualism. Here ‘nature’ is our *innate psychology*—that is, mental adaptations that our genes ontogenetically construct in exquisite and tangled tandem with normal human environments. ‘Nurture’ is *acquired psychology*—that is, ‘stuff’ in our brains that is picked up with our social learning mechanisms and with little particular bias as to its *content*. This dichotomy is useful because it allows us analytically to distinguish between (1) psychological structures that are either universally invariant, or else vary with local ecological conditions (*nature*: norms of reaction), and (2) psychological structures that vary from population to population because they are subject to historical social-learning processes which are independent of local ecology and relatively unconstrained by content (*culture*). An example of nature here is the innate language acquisition mechanisms that allow human infants to learn any language. An example of culture would be the spread of linguistic innovations in historical times scales—a process responsible not only for the immense variety of languages, but also for their transformations over time. Since in the latter case the spread of new ‘memes’ does not require the spread of new genes, we need to keep track of the two inheritance processes separately. Of course, we do not ignore their interactions (certain genes will select for particular memes, and meta-populationally and intergenerationally stable memes will select for particular genes³), but in order to model their interactions we need to keep separate the things that interact.

Oyama’s book steadily tends towards psychological and cultural questions. Psychologists (including evolutionary psychologists), she says, do not distinguish heritability from canalization; insist that species-typical traits must be invariant or rigid; believe that ‘innate’ equals ‘present at birth’; simplistically baptize all sorts of things as ‘innate’ or ‘biological’; and uphold a cynical view of humans as narrowly self-interested as if this followed from having an evolutionary perspective; etc. Some of these criticisms may be deserved, but they are piecemeal—everything does not hang on this supposedly perverse and systemic “dualism” that Oyama wishes to root out from biological thought.

In the earlier chapters, her charges that evolutionary genetics is “exceedingly abstract” and “incomplete” have the postmodernist flavor of finding fault with *explanation* (which perforce simplifies a complex and noisy reality to its main causes). Such leanings are clearer towards the end, when her discussion of humans becomes political rather than scientific. She says that biological approaches are supposedly nasty

³ In fact, everybody believes these days that the evolution of language *had* to be a series of such Baldwinian feedback loops.

and fascistic, whereas platitudes of developmental ‘complexity’ that vaguely affirm everything and explain nothing come in for high praise. Her favorite biologists, the anti-sociobiologists Richard Lewontin and the late Stephen Jay Gould, who understand nothing of psychology and less about culture, are also the ones giddily quoted by postmodernists whenever they wish to rail against “genetic determinism,” whatever that means.

One quotation pithily captures this bias: “War,” says Oyama, “is about politics, diplomacy, economics. It is about historical continuity and change in relations among people, not about brain centers, testosterone levels, or rough and tumble play” (p.141). In other words, the last place to look for an understanding of politics, diplomacy, economics, historical continuity, and relations among people...is the human brain!

‘Development’—through the vehicle of a self-denying psychologist—has given postmodernism its bridgehead in biology.

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