

BOOK REVIEW

A review of *Mutants: on genetic variety and the human body* by A. M. Leroi

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Mutants: On Genetic Variety and the Human Body. Leroi, A. M. 2003. Viking, New York. xv + 431 pp., with illustrations. Hardcover \$25.95. ISBN 0-670-03110-0.

In the middle ages, mapmakers portrayed the distant parts of the world, the *terra incognita*, as populated with all sorts of mutant creatures. This bestiary included people with one central foot, eyes in their stomachs, and the like. That was fantasy (it turned out), but through history many bizarre variants of normal human form and function have been documented. Since at least the sixteenth century to the present, a series of human bestiaries have been published. Bizarre and real, yet unexplained. That is changing.

I have not been to a circus in years, but thought that side shows were a thing of the past. Whether or not that is so, *Mutants* will keep any gawker happy. This book is a tour through a collection of real occurrences and explains recent genetic advances that have begun to turn these anomalies into *terra cognita*. The book is smoothly written and will be an interesting, if not particularly informative, book for readers of *Evolution & Development* who already know these things. I am less sanguine about its suitability for less savvy readers, because the book can give a rather oversimplified view of the genetic terrain. Things are more complicated and not as well known as sometimes portrayed, a price often paid by authors in attempts to popularize.

Armand Leroi has the scientific credentials as well as literary ones. He has an active professional background in developmental biology and has contributed work in various relevant areas, including studies of development in *Caenorhabditis elegans* and various other topics, including aspects of growth and scale.

This book provides a breezy survey of the history, arts, mythology, and culture dealing with human monsters. To me this contextual material is the most interesting, but general readers may have no knowledge of modern development genetics and they will gain from that as well. But despite the subtitle, there is a bit of a $2+2=5$ popular-science stretch. For example, it is not likely (or at least not demonstrated) that conjoined twins, the first subject to be treated, are the result of mutation, even if *Noggin* and cell adhesion molecules are expressed early in embryonic differentiation.

The author moves from the wrong number of bodies to the wrong number of parts, by considering homeotic change and the genetic basis of strange mutants such as holoprosencephaly (cyclopia), a failure of separation in the midline that in at least some cases is due to *Hedgehog* mutations. Other causes and the failure of some experimental mutations to generate the expected results are mentioned, but I think rather muted in service to a simple storyline. Leroi describes digital and limb anomalies from classic times to the present scientific literature and then moves on to genetic and congenital anomalies of bone formation and to hormonal relationships with stature and body form. Of course, no circus is complete without a bit of sexual titillation, so (speaking of form) we are presented a catalog of genital anomalies and the determinants, normal and abnormal, of sexual dimorphism. Moving to the next tent, we find ectodermal variants and curiosities of skin, hair, and nipples.

The book turns from freaks of form to freaks of survival with a discourse on the genetics of aging and long life. Perhaps thus driven to a more reflective mood, the author provides a cogent epilogue. He eschews the routine temptation to prognosticate the likely wonders of cloning and genetic engineering. Instead, he provides a brief but well-done statement

of the unknown—things he says at least *he* would like to know. His musings then shift to “human diversity,” mainly meaning the *normal* variation in the traits by which human races are typically defined. This is an important chapter because we have known for a century that not all mutants are freakish, and it is equally important that the juxtaposition of a discussion of race in a book about freakery is carefully handled, and that is the case here, where clearly no such connection is implied. Instead, the politics and possible genetics of normal variation in traits like skin color and skull form are discussed. In the context of a final discussion of beauty and its genetic causes, the author finishes with the statement that most mutations probably have little effect, partly because so many are recessive in nature.

The short shrift given to real genetics in favor of smooth verbiage is a sign of the times in popular-science books. The danger is to give a too-superficial too-simplified view of science and the real nature of genetic knowledge. This can have the side effect of paving the way for science hype, unrealistic expectations, and a less-than-critical acceptance of expensive research initiatives. For this reason I personally would rather have seen less $2+2 = 5$ and more “might be roughly” instead of

“=,” stressing the gaps in knowledge and why they are there. Despite qualifiers here and there, and his desire not to engage in Futurama, the author seems rather uncritical about the power of DNA-chip prognoses of an individual’s health future.

I have to add a bit of prudery. All the examples are well and interestingly illustrated. But there are no black bands across the eyes in this book, and there is a danger that a Parade of the Strange, not diluted by scientific figures about the underlying processes—not even a *Hox* diagram—might subtly contribute to the superficial tastelessness of our times. This was clearly not the author’s intent, and the pictures are almost all familiar and previously published, but these were after all real feeling people and the problem with side shows is that it makes objects of people.

I doubt many will share my sensibilities on this point, and despite my caveats this is a highly interesting book, a very good read well suited to its audience. At least in general terms the science is there, and by bringing modern genetic concepts to bear, we are led to understand the important absolving fact that while serious mutants may have been harshly treated by the Fates, they have not been cursed by God for anything they have done.