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0521781701 - The Poverty of the Linnaean Hierarchy: A Philosophical Study of Biological Taxonomy

Marc Ereshefsky

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## The Poverty of the Linnaean Hierarchy

The question of whether biologists should continue to use the Linnaean hierarchy is a hotly debated issue. Invented before the introduction of evolutionary theory, Linnaeus's system of classifying organisms is based on outdated theoretical assumptions and is thought to be unable to provide accurate biological classifications.

Marc Ereshefsky argues that biologists should abandon the Linnaean system and adopt an alternative that is more in line with evolutionary theory. He traces the evolution of the Linnaean hierarchy from its introduction to the present. Ereshefsky illustrates how the continued use of this system hampers our ability to classify the organic world, and then he goes on to make specific recommendations for a post-Linnaean method of classification.

Accessible to a wide range of readers by providing introductory chapters to the philosophy of classification and biological taxonomy, the book will interest both scholars and students of biology and the philosophy of science.

Marc Ereshefsky is Associate Professor of Philosophy at the University of Calgary.

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Biological Taxonomy

MARC ERESHEFSKY

*University of Calgary*



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## Preface

It is not surprising that biologists and philosophers wonder about the nature of species. At first glance we feel assured that we know what we are talking about when it comes to species, but when we take a closer look, matters get more complicated and less obvious. I started my research on species first as a graduate student with Elliott Sober and then as a post-doctorate fellow with David Hull. Both taught me how metaphysics applied to biology can be a satisfying and rewarding form of philosophy.

Shortly after my graduate studies, I started thinking more generally about the nature of species. Instead of worrying about their proper biological description or their ontological status, I started to wonder about their role in evolutionary theory. Experts told me that species are units of evolution. I looked at that notion and found its meaning ambiguous and often vague. Perhaps a better understanding of the distinction between species and other types of taxa (genera, families, and so forth) would help. The deeper I dug, the more problems appeared – the distinctions among those types of taxa were far from clear. Soon it became apparent that the entire Linnaean hierarchy of categorical ranks had dubious theoretical underpinnings. What about the procedures we use for naming taxa, since they stem from Linnaeus's system of classification as well? Again, problems began to surface. The more closely I looked at our current system of classification, the more skeptical I became of its ability to represent the organic world. This book summarizes my investigation of the Linnaean system. It shows why I believe the Linnaean system's days are numbered.

Many people helped me write this book. My views on biology and classification have been shaped by numerous conversations and correspondences. For those, I thank David Baumslag, Kevin de Queiroz,

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I received help from many other folks. Bruce Collins and Barrett Wolski were research assistants early on in this project. Gwen Seznec and Robyn Wainner at Cambridge University Press suffered through my naïve questions concerning publishing. My home department – the Department of Philosophy at the University of Calgary – has been a warm and encouraging environment for doing philosophy. The University of Calgary provided me with time to write, first in the form of a sabbatical leave and later as a fellow at the Calgary Humanities Institute. Further funding for research on this project was provided by the National Science Foundation, the Isaak Walton Killam Memorial Fund, and the Center for Philosophy of Science at the University of Pittsburgh.

Some of the material used in this book has been published elsewhere. I thank Robert Sokal and Peter Sneath for letting me reprint their diagram “A Flow Chart of Numerical Taxonomy” from *Principles of Numerical Taxonomy*. The University of Illinois Press granted permission to use Figures 6 and 18 of Willi Hennig’s *Phylogenetic Systematics*. Kluwer Academic Publishers allowed me to use portions of my “The Evolution of the Linnaean Hierarchy,” *Biology and Philosophy* 12/4 (1997). The frontispiece of Linnaeus’s *Hortus Cliffortianus* reproduced in the introduction to this text appears courtesy of the Hunt Institute for Botanical Documentation, Carnegie-Mellon University, Pittsburgh.

Finally, I would like to thank Ayala and Josh for keeping me happy and sane during the five years that I worked on this book. As always, Ayala’s support and encouragement kept me going. Last, I would like to thank my parents, Philip and Rachel. This book is for them.