



Preface

This book is intended for the reflective, open-minded reader who would appreciate a simplified discussion of recent evolutionary-genetic findings. Human beings, like all other species on earth, are biological products of evolutionary processes, and as such are physical expressions of genes, the "genetic gods." Genes and the mechanistic evolutionary forces that have sculpted them thus assume many of the roles in human affairs traditionally reserved for supernatural deities. Some may find this argument blasphemous or sacrilegious; others may find it prosaic. Such contradictory responses reflect the paradoxical state of philosophical affairs, in which religious revelation and scientific rationalism uncomfortably coexist as powerful but opposing means of knowing.

During the development of an individual, genes influence not only bodily features at microscopic and macroscopic levels and the metabolic and physiologic conditions underlying medical health, but also the more ethereal aspects of human nature, including emotions, psychologies, personalities, and even ethical and religious predilections. These genetic influences often are indirect, mediated and modulated by diverse social and cultural experiences, and manifest through genetically based cognitive abilities unique to our species. Even the most sacrosanct of human affairs, sexual reproduction and death, are products of evolutionary processes, firmly ensconced in our genes.

The sciences of evolutionary biology and genetics, with roots little more than a century deep, have blossomed in recent decades to provide mechanistic understandings of human conditions that until recently had been within the exclusive purview of mythology, theology, and religion. Yet most people remain either bliss-

fully ignorant of these discoveries or openly hostile to their implications. As a practicing evolutionary biologist, I live in two worlds. I work in a university setting surrounded by the astonishing pieces of laboratory equipment and biochemical tools of molecular genetics, and by reams of computer output on DNA sequences and evolutionary-genetic simulations. My colleagues and graduate students take for granted that natural forces have shaped the biological objects of our studies (in my case, mostly fishes, reptiles, and birds), and research grants fund us to work out the genetic mechanisms and processes by which these evolutionary outcomes have been achieved. Yet when I return home to read the local newspaper, I find editorials lashing out against evolutionary biology in the name of religion, and reports of school boards mandating equal time for creationism in the science classroom. On TV and radio, evangelists prohibit any departure from the word of God as they hear it. Almost as disturbing are the technocrats or laboratory researchers who naively proclaim that science and technology alone can provide certain salvation from humanity's ills and all the world's problems.

This is a book about causation in biology. It makes no pretense to wrestle seriously with the theistic ramifications of evolution from the perspectives of religious philosophers or theologians, who also have dealt with such issues extensively.¹ However, a clearer understanding of recent empirical findings in human molecular genetics and conceptual advances in evolutionary-genetic theory may increase communication between the social and the natural sciences, and between theology and evolutionary biology. I hope to diminish the hostility between these differing epistemological approaches, which at their best do share a goal of attempting to understand human nature.

Beyond these immediate aims, I hope to resolve a central issue in my own life: how to reconcile the intellectual demands and pleasures of critical scientific thought with the sense of purpose and fulfillment that a rich spiritual life can provide. I subscribe to the proposition that scientific rationalism is the surest route to objective understanding available to mortal humans, but I hold no illusions that the pursuit of objective reality is necessarily satisfying. This book champions science as the preferred path of rational

inquiry, but it makes no definitive claims regarding either the ethical or the pragmatic value of rational objectivity itself.

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