

ERNST MAYR
AS “THE DARWIN OF THE 20TH CENTURY”:
DEFINING A DISCIPLINE WHILE DEFENDING A FAITH

By

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by

Stewart Edward Kreitzer

This document is dedicated to
everyone who ever felt a desire
to get to the bottom of things.

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In this thesis, I contend that Ernst Mayr was in fact an extraordinarily prominent evolutionary biologist deserving the accolade of “The Darwin of the 20th Century.” His work was especially influential articulating practical scientific disciplinary boundaries for modern biology. Mayr’s legacy as both a scientist and as a historian of science is thus important. Furthermore, through studying Mayr’s long career one can get an intimate glimpse into the internal scientific culture of his era.

Unfortunately, he did not clearly articulate a distinction between his own philosophy of life and the pragmatic disciplinary guidelines he otherwise helped set for evolutionary biology. His legacy thus did not leave a clearly articulated philosophy distinguishing between science in practice and the personal philosophy of a practitioner. This one fault in Mayr’s legacy has set evolutionary biology in an unnecessarily awkward position from which to defend itself as an autonomous scientific discipline. Mayr’s

inability to clearly establish an internal distinction between “science” and “religion” unnecessarily left science open to criticism as a proselytizing faith.

CHAPTER 1 INTRODUCTION

Darwin's evolutionary cofounder, Alfred Russel Wallace, was still alive in 1905, the year Ernst Mayr was born in a small Bavarian town along the Austrian-Swiss border. Ernst was the second of three sons born to Helene and Otto Mayr, a local magistrate who shared, along with his family, a deep personal interest in the natural world. Ernst would recall how as a child, even "before I was ten years old I knew most of the local birds by sight, and by the time I was sixteen or seventeen not a call note or song was unknown to me."¹

As a young, keen-eyed naturalist, Mayr displayed a number of qualities similar to those of Darwin—for example, Darwin, his hero, also studied nature from a young age collecting beetles—instead of birdsongs. Throughout Mayr's life, affinities with Darwin persisted so much so that in his later years, frequently published was a quotation from *The New York Times* where Dr. Vassiliki B. Smocovitis proclaimed Mayr "the Darwin of the twentieth century, the defender of the faith."² And while Darwin is readily recognized as the greatest naturalist of the nineteenth century, Stephen Jay Gould claimed that Ernst Mayr was "the greatest living evolutionary biologist" of the current era.³ Biologist Jerry A. Coyne added, "Mayr and Darwin earned their fame for the same reason: each

¹ Ernst Mayr, "How I Became a Darwinian," in *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, ed. Ernst Mayr and William B. Provine (Cambridge, MA: Harvard University Press, 1980), 413.

² Carol Kaesuk Yoon, "Long Evolution of 'Darwin of 20th Century,'" *New York Times*, April 15, 1997.

³ Mark Feeney, "Renowned Biologist Ernst Mayr, 100, Dies," *Boston Globe*, February 5, 2005.

recognized the importance of earlier suggestions, worked out their consequences in detail, and showed how they were consistent with the known facts of biology.”⁴

Mayr worked relentlessly during his career, establishing the autonomy of biology as a science on par with the authority of chemistry and physics. But in contrast to those more exact sciences, biology is confronted with the messy phenomena of “life.” For example, Darwin sidestepped life’s origins when proclaiming in 1863, “it is mere rubbish, thinking at present of the origin of life.”⁵ After Darwin, while biological camps like the vitalists sought to explain a tangible élan vital, the reductionists exclusively preferred to view life in terms of chemical composition, thus relegating biology to a department of physics.⁶

In his own bid to define biology in autonomous terms, Mayr chose to promote a concept of organicism, including a doctrine of emergence, that defines the whole as greater than the parts. Mayr argued this option as follows:

Organicism has little to do with vitalism, except for the thesis that organisms are not simply inert matter. In other words, physicalism and vitalism are not the only two possible philosophies of biology: Organicism is a third option. If one wants to reject the autonomy of biology, it is no longer sufficient just to refute vitalism. Now it is necessary to prove that it is possible to reduce organicism to the Cartesian program, and no one has been able to do this.⁷

⁴ Jerry A. Coyne, “Ernst Mayr and the Origin of Species,” *Evolution* 48 (1994): 28.

⁵ Quoted in Thomas Gouge, “Evolutionism,” vol. 2 of *Dictionary of the History of Ideas*, ed. Philip P. Wiener (New York: Charles Schribner’s Sons, 1973), 187.

⁶ Francis Crick may well have exemplified reductionism with his statement: “the ultimate aim [of science] . . . is in fact to explain all biology in terms of physics and chemistry.” Francis Crick, *Of Molecules and Men* (Seattle: University of Washington Press, 1966), 10. Mayr defined vitalism as: “The belief that living organisms have a special vital force or vital substance that cannot be found in inert matter.” Ernst Mayr, *This is Biology: The Science of the Living World* (Cambridge, MA: Harvard University Press, 1998), 311.

⁷ Ernst Mayr, “The Autonomy of Biology: The Position of Biology Among the Sciences,” *The Quarterly Review of Biology* 71 (1996): 103.

Mayr added, “To sum up, organicism is best characterized by the dual belief in the importance of considering the organism as a whole, and at the same time the firm conviction that this wholeness is not to be considered something mysteriously closed to analysis but that it should be studied and analyzed by choosing the right level of analysis.”⁸ Thus the phenomenon of “life” does not directly correspond to the reduction of matter as innately studied in the disciplines of chemistry and physics.⁹

Mayr did an outstanding job articulating practical disciplinary boundaries for the biological sciences during a career that spanned much of the twentieth century. Chapter 2, “The Evolution of Ernst Mayr,” will examine relevant aspects of Ernst Mayr’s personal development and prominent career not only to afford insight into the life of this modern “Darwin,” but into the evolution of modern biology as well. This study will include references from a variety of selections culled from Mayr’s over 700 professional papers and twenty-five books, with significant interest given to Mayr’s “magisterial” 974-page *The Growth of Biological Thought*, published in 1982. Over the last few decades of his life Mayr engaged in numerous interviews which will be examined along with the published recollections and critiques of his work published by contemporary scientists, historians, and philosophers of science. Examining Mayr’s life will offer insight not only into the scientific context of his philosophy of biology, but also the psychological make-up that motivated his career.

⁸Ernst Mayr, *This is Biology: The Science of the Living World* (Cambridge, MA: The Belknap Press of Harvard University, 1997), 20.

⁹Walter Bock comments, “Organicism is central to the entire exploration of biology in this volume Mayr’s organicism actually includes organization, but more importantly it also encompasses the genetic program, evolutionary explanations and even certain functional explanations—a very broad view of what is unique to biology.” Walter J. Bock, “The Preeminent Value of Evolutionary Insight in Biological Science,” review of *This is Biology: The Science of the Living World*, by Ernst Mayr, *American Scientist* 86, no. 2 (1998): 186–87.

With the complexity of biology difficult to explain in terms of the chemical or physical sciences alone, dealing with the vast study of “life” also invites a variety of philosophical speculations. Thus Chapter 3, titled “Worldviews of the Evolutionary Synthesizers,” will examine some of Mayr’s prominent biological contemporaries who held rather divergent metaphysical views while successfully working to bring the science into the modern domain. In contrast, Mayr will be critiqued for at times appearing dogmatic with regards to the scientific utility of his own comparatively unquantifiable worldview.

Though in many respects Mayr’s influential legacy did provide a practical foundation for a working philosophy of modern biology, an overbearing manner when presenting personal philosophy as part and parcel of what he viewed as serious science set an unfortunate precedent. As a result, Chapter 4 will discuss “The Phyletic Fruit of Mayr’s Metaphysics,” where a number of the present difficulties facing evolutionary biology, specifically regarding its current cultural reception in America, will be discussed with reference to Mayr’s influential work.

While the bulk of Mayr’s legacy truly qualified him as a giant within the biological field, a veritable “Darwin of the Twentieth Century” — his “one major flaw” was his inability to articulate clearly a distinction between the practice of science as a methodology, and the utilization of a philosophical conviction in the pursuit of scientific inquiry. Though many of his beliefs did significantly lead towards establishing biology as an autonomous scientific discipline, he also left behind a legacy of a failure to distinguish Darwinian evolution as a scientific analysis of biological change over time, from a brand of Darwinism called “Evolutionary Humanism,” sometimes called

“Scientism,” where an unquantifiable mechanistic perspective is turned into a metaphysical paradigm in the name of science.¹⁰

¹⁰ Though Mayr was by no means alone indulging such propensities, his long, influential career, as well as his blunt honesty when expressing an opinion through his prolific writings and personal interviews, offers a uniquely valuable resource for study. Admittedly Mayr was hardly the mechanistic evangelist as compared to evolutionists like Julian Huxley, or later Richard Dawkins or Daniel Dennett. Still, Mayr’s prominence within the discipline, if only indirectly, contributed to an internal culture that facilitated the missionary zeal of others. While certainly any scientific endeavor (or for that matter, any human endeavor) inherently indulges a wide variety of philosophical perspectives, this paper argues that scientific credibility, particularly for a nonscientific public, will only be strengthened when extra care is taken to strike a transparent balance between a nonverifiable personal perspective and a scientific conclusion.

CHAPTER 2

THE EVOLUTION OF ERNST MAYR

“Born an Evolutionist”

Mayr’s parents were enthusiastic naturalists who enjoyed taking their three sons on weekend outings to the countryside, with Otto Mayr, his father, earning a local reputation as a “keenly interested amateur natural historian and paleontologist.”¹ Mayr recalled that his

parents were not churchgoing types, . . . [but] my father—even though he was a judge by profession—was an enthusiastic naturalist. On Sundays we would regularly go on excursions to collect ammonites in a limestone quarry, or to visit the location of some rare flowers, or to watch a heron colony.²

Historian Thomas Junker pointed out that Mayr’s background growing up “as part of the educated middle class, the *Bildungsbürgertum* . . . was of great importance.”³ Junker specifically identified Mayr’s as that of a German “mandarin,” a term Fritz Ringer defined as the “social class and cultural elite which owes its status primarily to educational qualifications, rather than to hereditary rights or wealth.”⁴ Mayr’s educational

¹ Walter J. Bock, “Ernst Mayr, Naturalists: His Contributions to Systemics and Evolution,” *Biology and Philosophy* 9 (1994): 269.

² Mayr, “How I Became a Darwinian,” 413.

³ Thomas Junker, “Factors Shaping Ernst Mayr’s Concepts in the History of Biology,” *Journal of the History of Biology* 29 (1994): 35.

⁴ Fritz K. Ringer, *The Decline of the German Mandarins: The German Academic Community 1890-1933* (Cambridge, Mass.: Harvard University Press, 1969), 5.

cultivation would thus have been “fully imbued with the *Bildung* ideal that was so central to the self-identification and life-goals of German intellectuals.”⁵

Junker also noted how “one of Mayr’s strongest characteristics was his ‘rebelliousness’ against authorities of all kinds.”⁶ He stated that Mayr’s birth order as second son may well have contributed to this propensity, pointing out that Mayr himself argued in support of Frank Sulloway’s thesis that later-borns are more likely to tend toward the unorthodox.⁷

In further analysis of Ernst’s childhood, Junker considered the influence of his father’s early death in 1917 when the boy was only thirteen years old.⁸ While such events would play a significant role in the psychological development of any teenager, Junker added that shortly after Otto’s death, “the political and social authorities in Germany partially collapsed during the revolution of 1918. He [Mayr] witnessed at this impressionable age how weak even powerful authorities can become over a short period of time.”⁹ Junker concludes that during this phase of the boy’s life, “One of the few spheres of social life remaining comparatively unshaken . . . was science.”¹⁰

⁵ Richard W. Burkhardt, “Ernst Mayr: Biologist-Historian.” *Biology & Philosophy* 9 (1994): 361.

⁶ Junker, 35.

⁷ Ernst Mayr, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge, MA: Harvard University Press, 1982), 5, 831–832. Sulloway fully articulated his arguments in *Born to Rebel: Birth Order, Family Dynamics, and Creative Lives* (New York: Pantheon Books, 1996).

⁸ Mayr offers an alternative analysis of his early psychology as follows: “The minute my father died my older brother felt it was his duty to become the father of the family. But this was the last thing I wanted—I wasn’t going to let him tell me what to do and what not to do. And, of course, I wanted to excel over him, so even though he was three years older I worked very hard as a student and even finished before him, earning my Ph.D. at the age of 21.” Michael Shermer and Frank J. Sulloway, “The Grand Old Man of Evolution: An Interview with Evolutionary Biologist Ernst Mayr,” *Skeptic* 8 (2000): 77.

⁹ Junker, 35.

¹⁰ Ibid.

After Otto Mayr's untimely passing, Helene moved with her three sons to Dresden, where Ernst continued his education at the Gymnasium, completing his exams in 1923. To celebrate his graduation Helene presented her son with the gift of a new pair of binoculars to encourage his enthusiasm for bird-watching. Shortly afterwards Mayr reported spotting a pair of rare red-crested pochards. This proved first sighting in Germany of these rare ducks in nearly eighty years. Though unable to locate them again for members of a local bird club, the birders helped Ernst contact Germany's leading ornithologist, Erwin Stresemann of the Natural History Museum in Berlin, who was impressed by Mayr's detailed field descriptions.

In 1993, during a session honoring Mayr's career at a Brandeis University symposium, a participant asked Mayr to recall the effects of his discovery of the pochards:

Well, at the time I was absolutely determined to study medicine. In fact, it was just before my first semester as a medical student, and I was expecting to become a medical doctor, as had been my godfather, my grandfather, his father, and his father. And there are now two nephews of mine who are medical doctors. It was and still is a family tradition. The importance of this duck was that it was of strictly ornithological significance. . . . However, at first nobody believed me. They said, "Oh, these . . . high school kids, they always come up with things that are just invention," and that criticism really annoyed me and that's why I wanted to get it really nailed down and establish that, by golly, yes, this kid Ernst Mayr did see a red-crested pochard. So I finally had to push my way all the way up to Stresemann to achieve this. Then when I fell into Stresemann's hands he was a very ambitious guy, and he said "Oh, I am going to get this kid into my field, and he is going to do great things for ornithology."¹¹

Stresemann invited Mayr to publish his observations along with a second paper describing the biogeographic breeding habits of the red-breasted flycatcher. Stresemann then further invited Mayr to work as a volunteer at the Berlin Museum in the ornithology

¹¹ Ernst Mayr, "Response to Walter Bock," *Biology & Philosophy* 9 (1994): 332.

collection while on a break from school. Mayr related, “It was as if someone had given me the key to heaven.”¹²

When questioned about his earlier attraction to Darwinian theory, Mayr apparently felt he lacked interest when claiming, “I have no recollection of when I first learned about evolution.”¹³ By contrast, he could distinctly remember his enthusiasm for reading Ernst Haeckel’s *Riddle of the Universe* (1899).¹⁴ As Mayr recalled, “In high school I read Haeckel’s *Welstrütsel* naively and avidly, not as a guide to evolutionary studies but to have ammunition in arguments about the Bible and religion!”¹⁵

Though Mayr expressed impatience with whatever he viewed as extraneous metaphysics, he declared during his 100th birthday celebration at Harvard: “I asked myself, when did I become an evolutionist? Ask yourself that question—it’s not so easy to answer. But I found out, my God, I always was an evolutionist. I didn’t become an evolutionist, I was born an evolutionist, you might say.”¹⁶

College and Early Career

In 1923 Ernst entered university as a medical student. As Mayr explained:

I chose Greifswald at the Baltic for my studies for no other reason than that, of all German universities, it was situated in the ornithologically most interesting area.

¹² Walter J. Bock, “Ernst Mayr, Naturalist: His Contributions to Systematics and Evolution,” *Biology & Philosophy* 9 (1994): 273.

¹³ Mayr, “How I Became a Darwinian,” 413.

¹⁴ John Beatty, “The Proximate/Ultimate Distinction in the Multiple Careers of Ernst Mayr,” *Biology & Philosophy* 9 (1994): 340.

¹⁵ Mayr, 413.

¹⁶ Steve Mirsky, Claudio Angelo and Marcelo Leite, “The Evolution of Ernst: Interview with Ernst Mayr,” Scientificamerican.com, July 06, 2004, <http://www.sciam.com/article.cfm?SID=mail&articleID=0004D8E1-178C-10EB-978C83414B7F012C>. This quotation was taken from the complete and unedited version of the interview available as a .pdf download from a link at this site.

Even though I was inscribed as a medical student, I was first and foremost an ornithologist. Anything that had to do with birds interested me, and if this included evolutionary phenomena, it was only coincidental to my ornithological interests.¹⁷

Mayr continued to visit Stresemann and volunteer at the Berlin Museum, working “on birds from tropical and other foreign countries.”¹⁸ In 1925, after passing the candidate of medicine exam, Ernst changed degrees from medicine to zoology primarily because of Stresemann’s persuasion and a promise to place him on an ornithological expedition to the tropics.¹⁹ Mayr subsequently recalled how “After I went to Berlin in February 1925, and switched to biology, I had exactly 16 months to complete my Ph.D. thesis and the obligatory course work. This tight schedule allowed for a minimum of thinking about such ‘extraneous’ matters as the mechanisms of evolution.”²⁰

Under Stresemann’s supervision Mayr produced a dissertation on the biogeographic spread of the serins finch. In analyzing his mentor’s personal views on Darwin, Mayr reported:

As progressive as Stresemann was in practicing population systematics and in his concepts of species and speciation, he was rather backward in his understanding of the mechanisms of evolution. He probably would have called himself an orthodox Darwinian, but he felt quite strongly that there were severe limits to the power of natural selection. . . . Stresemann expressed quite frequently his skepticism of the unlimited power of selection.²¹

Mayr felt that while researchers at the Zoological Institute at the University of Berlin appeared only nominally enthusiastic for investigating “evolutionary mechanism

¹⁷ Mayr, 413.

¹⁸ Bock, 273.

¹⁹ Ibid. Also, Claudia Driefus, “A Conversation with: Ernst Mayr; An Insatiably Curious Observer Looks Back on a Life in Evolution,” *New York Times*, April 16, 2002.

²⁰ Mayr, 413.

²¹ Ibid., 415.

or in the process of speciation . . . there was considerable interest in species and speciation among the curators of the Berlin Museum,” though primarily for taxonomic purposes.²²

In May 1926, at the age of twenty-one, Mayr completed his Ph.D. and took a position as an Assistant at the Berlin Museum. Through Stresemann, Mayr came in contact with the great bird collector, Lord Walter Rothschild, as well as other ornithological luminaries like Dr. Leonard C. Sanford, a trustee at the American Museum of Natural History (AMNH) and patron of its Ornithological Department. Soon, arrangements were made for Mayr “to lead two separate expeditions, the first to Dutch New Guinea for Rothschild for his museum in Tring and Sanford for the American Museum of Natural History, and the second to the former German Mandated New Guinea for the Berlin Museum.”²³ Mayr left in February 1928, and while exploring New Guinea joined a third expedition to the Solomon Islands that was in need of an ornithologist. Then, after two years of travel, Mayr finally returned to Berlin.

Mayr’s adventures in the South Seas were considered a success because of his exploration of a number of uncharted mountain ranges and his collecting a wide range of species on behalf of his sponsors. Jared Diamond, who as a teenager during the 1950s knew Mayr from his visits to his father’s home at Harvard, and who later (in 2001) co-authored with Mayr *The Birds of Northern Melanesia: Speciation, Ecology, & Biogeography*, wrote the following of these early expeditions:

Mayr succeeded beyond everyone’s expectations. Having [personally] re-explored six of those mountain ranges and islands between 1974 and 2004, under the less-

²² Ibid., 414.

²³ Bock, 275.

threatening conditions of the late twentieth century, I can testify that they are physically grueling even today. Mayr managed to amass comprehensive bird collections there from 1928 to 1930, despite the perils of diseases, capsized canoes, forced descents of waterfalls and periodic threats of natives to kill him.²⁴

Mayr himself recalled his South Seas adventures in a 2002 *New York Times* interview with Claudia Dreifus:

Dreifus: Dr. Diamond says he was there on a bird study trip recently and it nearly killed him. So tell us here: How did you do it?

Mayr: I've wondered myself. I was twenty-three years old when I went out there. And I tackled one job after the other for what I was not qualified. I had a self-confidence that was scandalous. I didn't appreciate all the possible dangers and things that could go wrong.

For instance, at the time, there was Dutch New Guinea and the Mandated Territory of New Guinea, known as Papua New Guinea. There was no transport connection between the two countries because the Netherlands and Australia didn't want to have anything to do with each other. So in order to go to the northern territory, you had to go to Java and then to Australia—at an enormous amount of money and a terrible amount of time.

And I said, "I'm going to just walk over there and take canoes or something like that." Every person said: "You can't do it. The natives are not friendly and you will have trouble getting canoes and you will definitely perish." I just didn't listen and I went ahead and I nearly did perish! But I finally talked my way through.²⁵

As the interview progressed, Mayr continued with his tale:

In 1929, I had long been in New Guinea, and was full of homesickness. But it turned out that the leader of a Pacific expedition for the American Museum of Natural History had just had a breakdown and they desperately needed a knowledgeable bird person to step in. So I went on that expedition, and that produced contacts in New York. I came to the American Museum in 1931.²⁶

²⁴ Jared Diamond, "Obituary: Ernst Mayr (1904–2005)," *Nature* 433 (2005): 700–701. Diamond also gives an elaborate account in his forward in Mayr's *What Evolution Is*. In 1953 Mayr joined the Harvard faculty where Diamond's father worked as a physician and haemoatologist.

²⁵ Claudia Dreifus, "A Conversation with: Ernst Mayr; An Insatiably Curious Observer Looks Back on a Life in Evolution," *New York Times*, April 16, 2002.

²⁶ Ibid.

John A. Moore offered another revealing and also very humorous story that Mayr personally related to him concerning some of his “Beaglesque” adventures while traversing the Guinean wilds. Moore begins by relating how Mayr possessed a wonderful sense of humor—even telling stories on himself, of which I will mention . . . one from a long time ago.

His most extensive fieldwork was collecting birds in the Southwest Pacific when a young man. He was the first white person to visit many places, where just keeping alive was a problem. One expedition found him in a remote area of New Guinea. Upon checking his almanac, he found that an eclipse of the moon was to occur in a week or so.

Thinking he could vastly increase his standing with the natives, he announced (through an interpreter), that in a few days the moon would go dark. This pronouncement produced no evidence of interest or concern. With each passing day, he repeated his prophecy with increasing vigor. No response. Finally the night of the eclipse arrived, but Ernst was alone in his interest and concern.

Finally, the moon did start to become dark and Ernst reached a crescendo: “The moon is getting dark!” The old chief put his arm around Ernst and said, “Don’t worry, my son, it will soon get light again.”²⁷

Despite the awkwardness of the situation, Mayr recalled in *Evolution and the Diversity of Life: Selected Essays* (1976), that his travels “had an impact on my thinking that cannot be exaggerated,” suggesting a comparable formative influence to that of Darwin’s own adventures while on the Beagle nearly ninety years previous.

After returning to Germany in 1930, he immediately began organizing the New Guinea collection for the Berlin museum. Meanwhile, at the AMNH in New York, Sanford and the museum’s patrons were becoming increasingly impatient with the slow integration of their own South Seas collection into the museum. Sanford subsequently solicited financing for a curator’s position to study and publish on the new collections,

²⁷ John A. Moore, “Some Personal Recollections of Ernst Mayr,” *Evolution* 48 (1994): 11.

resulting in Mayr receiving and accepting the appointment.²⁸ He arrived in New York in January 1931.

Walter Bock, a doctorate student of Mayr's at Harvard during the 1950s, explained of Mayr's demeanor upon arriving at the American museum, that he "reported to Dr. Chapman . . . [but] was accustomed to Germanic procedures in which the boss tells the underlings what to do." His supervisor, however, said that since Ernst had come with such high credentials, he should simply go at it and bring back a finished manuscript.²⁹

Another advantage Mayr may have felt transferring to New York was that it took him away from direct competition with his early mentor back on the continent, Erwin Stresemann. As Bock explained, "Stresemann was an excellent teacher, but he had all the typical characteristics of German professors, including that he knew everything better than everyone else, including his students."³⁰ According to Bock, if Mayr pursued his ornithological career in Europe it would have all but guaranteed an academic clash with Stresemann. And more fortuitously for the sciences, Mayr's leaving Europe afforded the young ornithologist an opportunity to sidestep the continent's unfolding political catastrophe.

Further opportunity appeared for Mayr when Lord Rothschild found himself quickly needed to raise a substantial amount of cash in response to a mysterious "titled lady" threatening him with blackmail.³¹ Rothschild contacted Sanford about selling his

²⁸ at \$2500 per year

²⁹ Bock, 276.

³⁰ Ibid., 280.

³¹ Steve Mirsky relates how on May 10, 2004, Harvard's Museum of Comparative Zoology held a "symposium/slightly premature-birthday bash" in Mayr's honor. Mirsky relates how Mayr, "nattily dressed and sporting a mischievous smile, expressed his 'tremendous gratitude to so many people who made my

famed collection to the American Museum, and the subsequent transfer of Rothschild's collection to New York not only generated for the museum the world's largest ornithological collection, but also created a permanent position for Mayr at the AMNH.

In 1993, Mayr recalled these events surrounding his hiring:

When I arrived in America I was firmly told that this was a purely temporary job. I was hired for one year with soft money, because the Whitney family [as patrons of the Solomon Island expedition] had to provide it annually, and this was after Dr. Sanford had twisted their elbow. However, I was very fortunate, after working like a beaver, to have it renewed for a second year, and I was very happy. And then, of course, it was just a time when Hitler raised his ugly head in Germany and I was terribly afraid that now I would have to go back. At that moment, fortunately for me, Lord Rothschild got into financial difficulties.³²

Historian Mark Barrow wrote the following of Mayr during his early days in the United States: "When he first arrived at the American Museum he knew no one, and while his colleagues in the bird department did their best to welcome him, they were all fifteen years or more his senior."³³ But Mayr "quickly made friends" with members of two local bird clubs, even being elected as an honorary member of the Bronx County Bird Club, though his German accent obviously revealed that he lacked in the usual membership qualification of being born in the Bronx.

As a member, Mayr consistently expressed concern that American ornithology should come up to the standards of a scientific discipline that he experienced in

life productive and enjoyable." Among those Mayr specifically wished to thank was "the woman in England who blackmailed Lord Walter Rothschild and drove him into bankruptcy," which forced the sale of his collection to the AMNH for Mayr to study. Steve Mirsky, "One Hundred Years of Magnitude: The Ever Lengthening Vitae, and Vita of Ernst Mayr," *Scientific American* 291, no. 2 (2004): 98. Apparently Rothschild was quite a colorful character known for, among other hobbies, riding about town in a carriage pulled by zebras.

³² Mayr, "Response to Walter Bock," 329.

³³ Mark V. Barrow, Jr., *A Passion for Birds: American Ornithology After Audubon* (Princeton, NJ: Princeton University Press, 1998), 194.

Germany.³⁴ As one member recalled, “Mayr was our age and invited on all our field trips. The heckling of this German foreigner was tremendous, but he gave *tit* for *tat*, and any modern picture of Dr. E. Mayr as a very formal person does not square with my memory of the 1930’s. He held his own.”³⁵

As Mayr himself recalled, “In those early years in New York when I was a stranger in a big city, it was the companionship and later friendship which I was offered in the [bird clubs] that was the most important thing in my life.”³⁶

The Emerging Synthesis

Mayr’s publications while at the AMNH naturally centered on his work as an avian systematist holding responsibilities for organizing the ornithology collection while cataloging the over quarter million specimens provided by the Rothschild collection.³⁷ It was also during this period that the ornithology department moved to the new Whitney Wing, where a number of Mayr’s exhibits remain on display. Mayr later took full responsibility for planning and constructing the “Biology of Birds” exhibit on the main floor.

According to Bock, Mayr’s various essays described “more new valid species of birds than any other living systematist.”³⁸ At the same time, they clearly show Mayr as someone “always interested in the theoretical explanations behind his empirical

³⁴ Ibid., 190-205.

³⁵ Joseph J. Hickey, “The Linnaean Society’s Interest in Ornithology,” in *Reminiscences by Members Collected on the Occasion of the Centennial of the Linnaean Society of New York* (New York: Linnaean Society, 1978), 4.

³⁶ Ernst Mayr, “Rousing the Society’s Interest,” in *Reminiscences by Members Collected on the Occasion of the Centennial of the Linnaean Society of New York* (New York: Linnaean Society, 1978), 2.

³⁷ Systematics is the study of the diversity of organisms.

³⁸ Bock, 284.

systematic work.”³⁹ Bock therefore proposed that, “without this extensive research experience in systematics and biogeography, there would not have been a *Systematics and the Origin of Species* or the later papers and books dealing with evolutionary theory, philosophy of science and history of biology.”⁴⁰

At the AMNH, Mayr befriended a number of associates with whom he conversed about Darwinian evolution. But Mayr reported that by far the most exciting influence came from reading Theodosius Dobzhansky’s 1933 essay on “the geographic variation in lady-beetles.” In Dobzhansky Mayr exclaimed he finally found, “a geneticist who understands us taxonomists!”⁴¹ Mayr added, “When Dobzhansky gave the Jesup lectures at Columbia University in 1936, it was an intellectual honeymoon for me.”⁴²

For Mayr, Dobzhansky’s *Genetics and the Origin of Species*, published in 1937, offered an analysis agreeing with his own evolving perspectives.⁴³ In considering the significance of their relationship, philosopher of science Michael Ruse stated: “In Dobzhansky and his writings—especially as these reflected Dobzhansky’s deep roots in the naturalistic tradition of his homeland—Mayr saw a kindred spirit.”⁴⁴

In 1940 Mayr published “Speciation Phenomena in Birds.” That essay, along with a talk given with the American botanist Edgar Anderson the following year as part of the Columbia University Jesup lecture series provided a basis for *Systematics and Origin of*

³⁹ Ibid., 285.

⁴⁰ Ibid., 284. Malcom Jay Kottler defines the term “systematics” as “the science of the diversity of life.”

⁴¹ Mayr, “How I Became a Darwinian,” 419.

⁴² Ibid.

⁴³ Both Dobzhansky and Mayr chose book titles harking back to Darwin’s groundbreaking work.

⁴⁴ Michael Ruse, “Booknotes,” *Biology & Philosophy* 9 (1994): 430.

Species from the Viewpoint of a Zoologist in 1942.⁴⁵ This work proved pivotal in his career as an emerging evolutionary biologist, and led him toward becoming a major “architect” in the synthesis of evolutionary theory. Though Mayr presented similar themes as those found in Julian Huxley’s *Evolution, The Modern Synthesis* (also published in 1942,) critics found Mayr’s book more accessible, being “smaller and easier to read.”⁴⁶

Among his goals for this work was to provide analysis for the origin of organic diversity from the perspective of a zoologist, while simultaneously arguing for the importance of systematics in the biological sciences.⁴⁷ Bock related that while some claimed that Mayr similarly intended to show how the principles of genetics were in harmony with systematics in an attempt to undermine the influence of Goldschmidt’s saltationist perspectives, Bock rather emphasized that “the real objective was to show that evolutionary biology consists of two fields, namely (a) phyletic evolution and the mechanics of adaptation and (b) speciation and the origin of organic diversity. . . . In writing *Systematics and the Origin of Species*, Mayr’s primary intent was to bring the ideas of organic diversity into the evolutionary synthesis.”⁴⁸

As a result, Mayr’s work came out wholeheartedly in support of synthesizing natural selection and genetic mutation as an empirical foundation for evolutionary theory.

⁴⁵ Mayr, 420. Also V. B. Smocovitis, “Anderson, Edgar,” *American National Biography Online* (Oxford University Press, 2000), <http://www.anb.org/>.

⁴⁶ J. R. Baker. “Julian Sorell Huxley, 22 June 1887 – 14 February 1975,” *Biographical Memoirs of Fellows of the Royal Society* 22 (1976): 225.

⁴⁷ Bock, 295.

⁴⁸ Ibid., 297. Mayr defines “saltationism” as “the belief that evolutionary change is the result of the sudden origin of a new kind of individual which becomes the progenitor of a new kind of organism.” Mayr, *This is Biology*, 310.

As Mayr wrote in the prologue to *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, a work that he co-edited with William Provine:

The term “evolutionary synthesis” was introduced by Julian Huxley in *Evolution: The Modern Synthesis* (1942) to designate the general acceptance of two conclusions: gradual evolution can be explained in terms of small genetic changes (“mutations”) and recombination, and the ordering of this genetic variation by natural selection; and the observed evolutionary phenomena, particularly macroevolutionary processes and speciation, can be explained in a manner that is consistent with known genetic mechanisms.⁴⁹

To which William Provine added his own analysis regarding the event’s significance:

The evolutionary synthesis is unquestionably an event of first-rank importance in the history of biology. Although Darwin’s theory of evolution by natural selection had been widely known since 1859, the consequences of the theory had generally not been incorporated deeply into most area of biological thought. With the evolutionary synthesis . . . evolutionary theory began to permeate almost all of biology with new meaning.⁵⁰

Provine continued by listing a number of complementary contributions similarly critical to the establishment of the modern synthetic theory of evolution. Among the notable were earlier publications of population genetics theorists like R. A. Fisher, J. B. S. Haldane, and especially Sewall Wright, significantly influenced Theodosius Dobzhansky’s work during the late 1930s. It was then Dobzhansky’s *Genetics* in particular that led to further development of the synthesis in the early 1940s by Mayr, Julian Huxley, and George Gaylord Simpson, and in the early 1950s, by G. Ledyard Stebbins.⁵¹ Concerning these events, Smocovitis wrote that from this point onward, “the

⁴⁹ Ernst Mayr, “Prologue: Some Thoughts on the History of the Evolutionary Synthesis,” in *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, ed. Ernst Mayr and William B. Provine (Cambridge, MA: Harvard University Press, 1980), 1.

⁵⁰ William B. Provine, “Epilogue,” in *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, ed. Ernst Mayr and William B. Provine (Cambridge, MA: Harvard University Press, 1980), 399.

⁵¹ Ibid., 400.

‘evolutionary synthesis,’ and the new discipline of ‘evolutionary biology,’ became an increasingly unifying influence in the biological sciences.”⁵²

Regarding Mayr’s growing influence in evolutionary studies after the publication of *Systematics and the Origin of Species*, Smocovitis stated that soon after, he began playing a prominent role as “historian, philosopher, organizer, and general promoter of evolutionary biology. So critical were these roles, that, taken as a whole, the best way to view Ernst Mayr is as a chief discipline builder (if not *the* chief discipline builder) of evolutionary biology.”⁵³ For example, Mayr began dedicating significant amounts of time to help found The Society for the Study of Evolution (SSE) in 1946. Mayr served both as the Society’s first secretary as well the first editor of the Society’s journal, *Evolution*, inaugurated in January 1947.⁵⁴ Overall, the founding of the Society signaled the emergence of “a new discipline with a self-aware community of individuals who identified themselves as ‘evolutionary biologists.’”⁵⁵

Smocovitis claimed that Mayr’s editorial policy was one geared toward solidifying the discipline by promoting “suitable manuscripts and excluding unsuitable ones. Mayr played a critical role by publishing papers that were not purely descriptive but rather reflected what he viewed as the dynamic new field of biology.”⁵⁶ Joseph Cain concurred,

⁵² Vassiliki Betty Smocovitis, “G. Ledyard Stebbins, Jr. and the Evolutionary Synthesis (1924–1950),” *American Journal of Botany* 84 (1997): 1625.

⁵³ Vassiliki Betty Smocovitis, “Disciplining Evolutionary Biology: Ernst Mayr and the Founding of the Society for the Study of Evolution and Evolution (1939–1950),” *Evolution* 48 (1994): 1.

⁵⁴ He later also served as president.

⁵⁵ Vassiliki Betty Smocovitis, “The 1959 Darwin Centennial Celebration in America,” *Osiris* 2nd Series Commemorative Practices in Science: Historical Perspectives on the Politics of Collective Memory 14 (1999): 279.

⁵⁶ Vassiliki Betty Smocovitis, “Disciplining Evolutionary Biology,” 6.

adding that “combined with his evolutionary *studies*, Mayr also had been a central *promoter* and *organizer* of evolutionary studies since the late 1930s. He . . . worked tirelessly to gain prominence for the subject.”⁵⁷

But in examining his overall influence in developing the “infrastructure of evolutionary studies,” Cain felt “what emerges is an image of Mayr aggressively seeking to implement *his* conception of a research community, wherein certain priorities held, certain theories prevailed, and a deliberate structure was put into place.”⁵⁸

As editor of *Evolution*, Mayr made every attempt to maintain strict standards of professionalism in order to present a balanced “first-class journal.” With that as a goal, Mayr regularly “rejected papers for being too ‘mystical’ or cosmological. And he was quick to return submissions that offered elementary accounts or seemed fringe.”⁵⁹ Cain reported, “Not surprisingly, Mayr was keen to approach authors whose research reinforced his own conclusions . . . [whereas] authors who disagreed . . . on theoretical points were guaranteed a critical reading.”⁶⁰

Throughout, “foremost in Mayr’s mind was to construct a unified science of evolution.”⁶¹ He was similarly instrumental in helping establish another important publication, *The Journal of the History of Biology*, during the late 1960s. When considering Mayr’s wide-ranging influence in developing a vision for evolutionary

⁵⁷ Joseph Cain, “Ernst Mayr as Community Architect: Launching the Society for the Study of Evolution and the Journal *Evolution*,” *Biology & Philosophy* 9 (1994): 388.

⁵⁸ Ibid.

⁵⁹ Ibid., 419.

⁶⁰ Ibid.

⁶¹ Smocovitis, 6.

biology, Smocovitis suggested, “Mayr’s more personal beliefs and qualities must be considered in any further analysis of his role in evolutionary biology.”⁶²

One could thus note a variety of parallels between Ernst Mayr’s developing role as a gatekeeper refereeing the emerging intellectual discipline of synthetic evolution with that of Charles Darwin’s network of influence during the Victorian Era.⁶³

Change and Celebration

After the launching of the SSE and its journal, *Evolution*, Mayr focused his attention on the opening of the Biology of Birds Hall (commemorated to Dr. Sanford) on the main floor of the Whitney Wing at the American Museum of Natural History. Bock reported that Mayr’s efforts suffered both from a limited budget and little assistance “because the other curators had a narrow and traditional concept of how avian biology should be shown.”⁶⁴ While for Mayr, the Berlin Museum’s “Biology of Animals” exhibits had set the standard, for his coworkers, “the display of albino and other aberrant plumages of birds was the proper way to interest the general public.”⁶⁵ Nonetheless, the exhibit opened on time in May 1948, though Bock reported that due to “stress and exhaustion,” Mayr unfortunately experienced “a serious physical and mental breakdown, from which he suffered for more than five years.”⁶⁶

⁶² Ibid., 7.

⁶³ In particular as portrayed by Janet Browne in *Charles Darwin: The Power of Place*. (New York: Alfred A. Knopf, 2002).

⁶⁴ Bock, 285.

⁶⁵ Ibid.

⁶⁶ Ibid.

While not much is specifically mentioned of this incident from the middle portion of his life, Mayr continued on at the AMNH until shortly after the death of Dr. Leonard Sanford, his American mentor who had been instrumental in bringing him to New York. Bock did report that through this period Mayr felt an increasing sense of frustration from a lack of opportunity (and subsequent challenge) of working with graduate students, though he did hold an adjunct position teaching at Columbia University and periodic visiting professorships elsewhere.⁶⁷ In any event, in 1953 Mayr felt reinvigorated moving to the Harvard Museum of Comparative Zoology as an Alexander Agassiz Professor of Zoology, especially since his interests “were drifting from systematics and biogeographic studies of birds to more purely evolutionary work.”⁶⁸ Mayr later went on to serve as the museum’s director.

Meanwhile, as the 1950s progressed, Mayr was also invited to serve on the Biology Council, “a deliberative body of the Division of Biology and Agriculture of the National Academy of Sciences—National Research Council.”⁶⁹ This group generally met on a monthly basis to chart “conceptual structure” and “intellectual order,” as well as to consider funding and the “recruitment of more superior students” in the biological sciences.⁷⁰ Mayr’s specific interest was in promoting the role of evolutionary biology in

⁶⁷ An article in *Science* quoted Mayr as saying he moved because “they offered me a job” and “I had graduate students the minute I got to Harvard.” Elizabeth Pennisi, “Museums that Made a Master,” *Science* 304 (2004): 37.

⁶⁸ Walter J. Bock, “Ernst Mayr at 100: A Life Inside and Outside of Ornithology,” *The Auk* 121 (2004): 644.

⁶⁹ Beatty, “The Proximate/Ultimate Distinction,” 349.

⁷⁰ R. W. Gerard, ed., *Concepts of Biology* (Washington D.C.: National Academy of Sciences—National Research Council, 1958), 104.

the sciences in the face of the rapid rise in both prestige and funding for molecular biology following the discovery of DNA in 1953.

In 1959, the most significant evolutionary event of the decade was held at the University of Chicago in celebration of the one hundredth anniversary of the publication of Darwin's *On the Origin of Species*. As an architect of evolutionary synthesis Mayr was invited as a participant, though he did not play a prominent role in the event's organization or festivities.

As Smocovitis explained concerning the significance of the centennial:

One critically important reason for the intensity and the number of 1959 Darwin celebrations has to do with the timing of the anniversary within the larger history of evolutionary biology. In the wake of the evolutionary synthesis of the 1930s and 1940s, the anniversary of 1959 . . . was perfectly timed to reassess the state of the art by the community of individuals that had worked to create a synthetic, unified science of evolution.⁷¹

The centennial was also the first prominent public demonstration championing evolution since the Scopes Trial in 1925, and was thus aimed at making a favorable impression while aspiring to convey the “synthetic theory and the restoration of Darwinism to American high school teachers.”⁷² In emphasizing that point, the title of one essay published during the '59 celebration proclaimed, “One Hundred Years without Darwinism Are Enough.”⁷³

While the late November Chicago celebrations were by far the most influential of the year's Darwinian events, many considered Julian Huxley's Convocation address,

⁷¹ Smocovitis, “The 1959 Darwin Centennial,” 278.

⁷² Vassiliki Betty Smocovitis, *Unifying Biology: The Evolutionary Synthesis and Evolutionary Biology* (Princeton, NJ: Princeton University Press, 1996), 23.

⁷³ Hermann J. Muller, “One Hundred Years without Darwinism Are Enough,” *School Science and Mathematics* 59 (1959), 304–16.

which he titled “The Evolutionary Vision” and delivered from the pulpit of the university’s chapel, an unfortunate faux pas. Characterized as a fire-and-brimstone sermon proclaiming the sagacity of secular humanism as presented in his popular book, *Religion without Revelation*, Huxley enthusiastically proclaimed his doctrine of evolutionary Darwinism as an alternate metaphysical paradigm destined to replace traditional Western religion. As but one example of a Huxleyan annunciation that Thanksgiving Day: “Evolutionary man can no longer take refuge from his loneliness in the arms of a divinized father-figure whom he has himself created.”⁷⁴

Smocovitis noted that shortly afterwards there began to appear a fresh barrage of antievolution literature, most notably John C. Whitcomb and Henry Morris’s *The Genesis Flood*.⁷⁵ In later reflections Morris noted that while the Scopes Trial embarrassed the creationist movement, “The Great Darwinian Centennial” with its “worship service” had a unifying effect in both galvanizing and bringing coherence to a fundamentalist response.⁷⁶ Edward J. Larson, Pulitzer Prize winning author of *Summer for the Gods: The Scopes Trial and America’s Continuing Debate over Science and Religion* (1997), noted that when “you go back to the 1950s and ’60s, you can find people reacting to Julian Huxley’s grand statements about the meaning of evolution.”⁷⁷

⁷⁴ Smocovitis, “The 1959 Darwin Centennial,” 303. Though Mayr openly allied his personal perspectives with those of Huxley, he did not share his missionary zeal. For whatever reason, Huxley felt his philosophical message an appropriate address to this highly publicized Darwinian conference, creating an awkward mix of his “religion” with science.

⁷⁵ John C. Whitcomb and Henry M. Morris, *The Genesis Flood* (Philadelphia: Presbyterian and Reformed Publishing Co., 1961).

⁷⁶ Smocovitis, 315.

⁷⁷ Quoted in Peter Dizikes, “Evolution War: In The Ongoing Struggle Between Evolution And Creationism, Says Philosopher Of Science Michael Ruse, Darwinians May Be Their Own Worst Enemy,” *Boston Globe*, May 1, 2005. Though Mayr openly allied his personal perspectives with those of Huxley, he did not share

Howard Kaye further added that it was “this aspect of the evolutionary synthesis—as a ‘scientific’ ground for a ‘progressive,’ humanistic worldview—[that] was popularized most prominently by Julian Huxley, whose ‘evolutionary humanism’ reached an international audience of millions and was incorporated into textbooks that helped inspire and train a generation of scientists.”⁷⁸ It was just this outlook as promoted by Huxley that Mayr viewed as his own, though he did not share Huxley’s missionary spirit.⁷⁹

While overall the participants at the Chicago celebrations felt enthused by the event’s success, some expressed unease with what they considered a “hardening of the synthesis.” For example, Thomas Goudge wrote of what he perceived as a rise of an “orthodox doctrine” that discouraged the expression of dissenting perspectives.⁸⁰

Linking these important centennial celebrations with Mayr’s evolving perspectives, Thomas Junker suggested, “The coincidence of the Darwin centennial, the triumph of the

his missionary zeal. For whatever reason, Huxley felt his philosophical message an appropriate address for this highly publicized Darwinian conference, creating an awkward mix of “religion” with the science.

⁷⁸ Howard L. Kaye, review of *Unifying Biology: The Evolutionary Synthesis and Evolutionary Biology*, by Vassiliki Betty Smocovitis, *The American Historical Review* 103 (1998): 858.

⁷⁹ In what could be seen as running a parallel course in contemporary debates, Phillip E. Johnson, the University of California law professor known for championing Intelligent Design, has similarly claimed that his response has been aimed at evolutionary biologist Richard Dawkin’s enthusiasm for public “declarations of atheism.” Peter Dizikes, “Evolution War,” *Boston Globe*, May 1, 2005. Similarly, Eugenie C. Scott, president of The National Center for Science Education, concurrently notes that “when scientists such as … Richard Dawkins present philosophical materialism as the inevitable outgrowth of science or evolution, … they reinforce the view encouraged by Morris and other antievolutionists” that evolutionary theory is inherently incompatible with traditional metaphysical paradigms. Eugenie C. Scott, “Antievolution and Creationism in the United States,” *Annual Review of Anthropology* 26 (1997): 272. Though Mayr did not promote a public campaign for metaphysical naturalism, he did write from a humanistic perspective in such essays as “The Origin of Human Ethics” in *Toward a New Philosophy of Biology* (1988), and in “Can Evolution Account for Ethics?” in *This is Biology* (1997).

⁸⁰ Thomas Goudge, “Darwin’s Heirs,” *The University of Toronto Quarterly* 30 (1961): 248. Stephen J. Gould also noted a “hardening” of the synthesis in his essay, “G. G. Simpson, Paleontology, and the Modern Synthesis,” in *The Evolutionary Synthesis*, ed. Mayr and Provine, 153–172.

modern synthesis, and the emergence of a controversy over the history and future of the evolutionary synthesis with the beginning of Mayr's interest in the history of biology is not accidental.”⁸¹ He added that Mayr's work after the Darwinian centennial showed “another typical feature of his historical approach: history is important, because it helps us to understand the persistence of certain controversies in biology.”⁸²

Or as Mayr put it directly in *The Growth of Biological Thought*: “Because the great controversies of the past often reach into modern science, many current arguments cannot be fully understood unless one understands their history.”⁸³

The Growth of a Legacy

At Harvard, Mayr completed a shift from his first love of avian systematics to a second phase dedicated to evolutionary biology. In 1963 he further solidified his status as an evolutionary biologist with the publication of *Animal Species and Evolution*, in which he also discussed the role of human beings within the ecosystem. Mayr also published *Principles of Systematic Zoology* at the end of the decade.

Among the major biological theories Mayr developed earlier in his career: the biological species concept, which defined species as interbreeding populations; peripatric speciation, arguing that divergence tends to rise in small geographically isolated populations; and distinguishing the term functional biology with its proximal causes

⁸¹ Junker, 41.

⁸² Ibid.

⁸³ Mayr, *The Growth of Biological Thought*, 1.

addressing the “how” questions, from evolutionary biology with its ultimate causes directed toward the “why.”⁸⁴

But it was after retiring in 1975 as an emeritus professor of zoology that Mayr embarked on a third and arguably the most influential phase of his career. This time Mayr shifted his focus from that of a “scientist” to that of a “historian and philosopher of science” with a focus on biological evolution. Commenting on the connection between his career transitions, Bock described that it was in Mayr’s earlier work that the “extensive empirical foundation essential for [his] theoretical work in evolutionary biology and subsequently in the philosophy and history of science” could be found.⁸⁵

As mentioned previously, in 1980, Mayr co-edited with William Provine a compilation of conference essays analyzing the historical significance of the synthesis. Coupled with his previous work, Mayr’s 1982 publication of *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*, even more firmly established his reputation as a preeminent historian and philosopher of the biological sciences. Though he continued to publish as a biologist with such works as a second edition of *Principles of Systematic Zoology* (with Peter D. Ashlock in 1991), and *The Birds of Northern Melanesia* (with Jared Diamond in 2001), the majority of his work after *The Growth of*

⁸⁴ An example of peripatric speciation could involve a small insect population living on rotting fruit by the ocean that gets washed away by a storm to an offshore island where they establish a new colony. Environmental pressures then favor qualities in this isolated colony that gradually differentiate its descendants from the mainland’s parent population to the point that the two colonies can no longer successfully interbreed. The changes in the new colony’s gene frequencies established by the “pioneers” floating to the island is called the founder effect, with the new population possessing less genetic variation as compared to the original mainland population. As for Mayr distinguishing functional biology from evolutionary biology—functional biology and proximal causation examine factors involving physiological qualities that facilitate specific behaviors or seasonal conditions that influence the release of reproductive hormones in the species, whereas ultimate causation examines evolutionary issues influencing the adaptive value of long-term environmental factors affecting reproductive success.

⁸⁵ Bock, “Mayr: Naturalist,” 317.

Biological Thought focused on the history and philosophy of science, with titles such as *Toward a New Philosophy of Biology* (1988), *One Long Argument: Charles Darwin and the Genesis of Modern Evolutionary Thought* (1991), *This is Biology: The Science of the Living World* (1997), *What Evolution Is* (2001), and his final book, *What Makes Biology Unique? Considerations on the Autonomy of a Scientific Discipline* (2004). Also continuing during this final period spanning three decades was his prolific output of essays, while additionally he began to make himself available for what became nearly a dozen published interviews.

Much of his subsequent work in history and the philosophy of science could be seen as developing further the themes laid out in *Growth of Biological Thought* (GBT). Published on the centenary of Darwin's death, GBT has been lauded as a "magisterial study ... widely credited with playing a major role in raising the biological sciences onto the same intellectual plane as more quantifiable scientific disciplines, such as physics and chemistry."⁸⁶

In the book's introductory chapters, Mayr lays out a variety of personal reflections with titles such as, "How to Write History of Biology," "The Place of Biology in the Sciences and its Conceptual Framework," and "The Changing Intellectual Milieu of Biology." The subsequent main section is divided into three further segments beginning with "The Diversity of Life," dealing with systematics. The middle and largest portion, "Evolution," is dedicated to the history of evolutionary theory, while the final part, "Variation and its Inheritance," offers a history of genetics.

Futumya writes of Mayr's opus:

⁸⁶ Mark Feeney, "Renowned Biologist Ernst Mayr, 100, Dies," *Boston Globe*, February 5, 2005. The *Boston Globe* ran this article with a photograph of Mayr on the front page of the main edition.

One cannot help standing in awe of the Germanic capacity for vast, all-embracing synthesis: consider the lifelong devotion of Goethe to *Faust* . . . It is perhaps in this tradition that Ernst Mayr's stands . . . with leitmotifs such as the failures of reductionism, the struggle of biology for independence from physics, and the liberation of populational thinking from the bonds of essentialism.⁸⁷

But there are other “Germanic” traditions that a reader might also notice in Mayr’s work, especially his rather authoritative tone. Though Mayr certainly gets to his point with cutting precision, stating that writing a history “should even be polemical,” he honestly admits that in his dealings with unresolved philosophical controversies, “I have described the opposing viewpoints in categorical, sometimes almost one-sided, terms in order to provoke a rejoinder, if such is justified. Because I hate beating around the bush, I have sometimes been called dogmatic.”⁸⁸ In denying this charge, Mayr prides himself in “having changed my mind on frequent occasions” while adding,

However, it is true that my tactic is to make sweeping categorical statements. Whether or not this is a fault, in the free world of the interchange of scientific ideas, is debatable. My own feeling is that it leads more quickly to the ultimate solution of scientific problems than a cautious sitting on the fence.⁸⁹

Though Mayr has a constructive point in feeling “greatly attracted by Hegel’s scheme of thesis-antithesis-synthesis,” it could be a tactic (at least when deployed with Mayr’s forceful hand) better suited for an experienced professional scientific/ academic audience than for a less-familiar public hardly adept at unweaving evolving theoretical (and often personal) perspectives from tested scientific doctrine.

For example, one of Mayr’s contemporaries who helped establish the new synthesis, G. G. Simpson, expressed in a *GBT* review that as he read

⁸⁷ Douglas J. Futuyma, review of *The Growth of Biological Thought*, by Ernst Mayr, *Science* 216 (1982): 842.

⁸⁸ Mayr, *The Growth of Biological Thought*, 9.

⁸⁹ *Ibid.*

the book's many hundreds of close-set pages it kept recurring to me.... This book is in an unconventional and highly unusual way an autobiography. In it Mayr is seeking out, cleverly and successfully, the roots of his own accomplishment and opinions. It is an intellectual, psychological, and conceptual autobiography.⁹⁰

Or in more direct terms, Mayr's history can sound excessively whiggish, as if describing the sciences marching supportively toward what becomes, coincidentally enough, his own analytical conclusions. For the uninitiated, the experience of a Mayrian intellectual blitzkrieg could feel overwhelming.

Concerning this tendency, David Hull wrote in a generous analysis, "As a contribution to secondary literature, *The Growth of Biological Thought* exhibits Mayr's own preferences a bit too obviously and pervasively, but Mayr's book is also a contribution to the *primary* literature. After all, Mayr himself is an actor in some of the stories he tells."⁹¹

In another comparatively caustic review, Ian Tattersall remarked:

To the extent that there is a vast body of fact to be dug out of the book, Mayr has indeed provided such a source. But it remains true that *The Growth of Biological Thought*, as history as opposed to a catalogue of facts, is an opinionated work by a practicing scientist with a very large axe to grind; students seeking an objective view would be well advised to approach it with caution. Of course, Mayr's opinions, as those of one of the formative influences of modern evolutionary biology, are not without interest, even compelling interest. But they should not be mistaken for balanced history.

So much for Mayr the historian. . . . Mayr is still an active scientist, and it would be altogether too much to expect him to be detached⁹²

⁹⁰ George Gaylord Simpson, "Autobiology," review of *The Growth of Biological Thought*, by Ernst Mayr, *The Quarterly Review of Biology* 57 (1982): 438.

⁹¹ David L. Hull, "Ernst Mayr's Influence on the History and Philosophy of Biology: A Personal Memoir," *Biology and Philosophy* 9 (1994): 381.

⁹² Ian Tattersall, "The Good, the Bad, and the Synthesis," *American Anthropologist* 86 (1984): 88.

It would hardly be surprising, then, if such truculent propensities were directed toward the cultural relationship between religion and science, they might serve to antagonize their often tenuous rapport.⁹³ But on the other hand, Mayr was also an enthusiastic antireductionist who expressed serious misgivings about an exclusively physicalist conception of life. For example, in *This is Biology*, Mayr wrote, “It is a little difficult to understand why the machine concept of organism could have had such long-lasting popularity. After all, no machine has ever built itself, replicated itself, programmed itself, or been able to procure its own energy. The similarity between an organism and a machine is exceedingly superficial.”⁹⁴ Thus Mayr, in promoting the empirical bona-fides of biology, continually had to negotiate between excessive materialistic reductionism and unverifiable metaphysical sentiments.

A Mayrian Paradigm

Mayr’s own “religion” tended toward an ethical brand of metaphysical atheism.⁹⁵ For example, in *GBT* he famously proclaimed, “Virtually all biologists are religious, in the deeper sense of this word, even though it may be a religion without revelation, as it was called by Julian Huxley.”⁹⁶ Then, interestingly enough, he added how “those who

⁹³ In the sense that Mayr could be intellectually combative when pursuing a point, and one point he tended to pursue was that he saw little relevance to traditional religion with regards to biology as an autonomous science. Not that there necessarily should be, within a strictly empirical discipline, but sometimes it is how a concept gets articulated that can make all the difference.

⁹⁴ Mayr, *This is Biology*, 4.

⁹⁵ Atheism could also be considered “metaphysical” when pondering that it eludes conclusive proof via empirical analysis. A response that “one day it will be” thus leaves its champion open to criticism for professing a faith.

⁹⁶ Mayr, *The Growth of Biological Thought*, 81. Mayr also writes in a letter dated from May 1, 1989 to John C. Greene, “when I read Huxley’s *Religion Without Revelation*, I found it on the whole quite congenial. I have always insisted that I have religion, perhaps a stronger religion than most church-going people, but it does not fall under the word religion in the vocabulary of most of those who belong to a particular

tried to replace a belief in God with a belief in man took the wrong path,” suggesting instead that it is better to uphold the improvement of humanity as an ethical ideal.

Historian John C. Greene suggested that Mayr, “like Huxley … looks to science, and especially to evolutionary biology, to loosen the grip of traditional religions and idealistic philosophies on modern thought and to provide a scientific basis for a new ethics, a new secular faith, and a new image of humans.”⁹⁷

Mayr certainly possessed some pointed sentiments towards Western religion, claiming in one of his last interviews that he thought plausible a psychological explanation suggesting that

if small children prior to the age of six are told the same things again and again and again, eventually they totally believe it. And people still very much have the belief in the Bible, that every word in the Bible is the ultimate truth. If this is told to small children often enough up to the age of six, that’s definitely the last word.⁹⁸

If only indoctrination were that easy! One awkward danger in deploying this argument is its double-edged quality: how, then, can any social or intellectual discipline be analyzed for having qualities that transcend the limitations of cultural conditioning? Science, religion, sports, basket-weaving—it would not matter what the topic—but the ability to appreciate the relevance of each discipline would be reduced to the contents of society’s prevailing childhood conditioning as it had been prescribed by adults who were

congregation.” In John C. Green, *Debating Darwin: Adventures of a Scholar* (Claremont, CA: Regina Books, 1999), 231–32.

⁹⁷ John C. Greene, “Science, Philosophy, and Metaphor in Ernst Mayr’s Writings,” *Journal of the History of Biology* 27 (1994): 312.

⁹⁸ Steve Mirsky, Claudio Angelo and Marcelo Leite, “The Evolution of Ernst: Interview with Ernst Mayr,” Scientificamerican.com, July 06, 2004, <http://www.sciam.com/article.cfm?SID=mail&articleID=0004D8E1-178C-10EB-978C83414B7F012C>. This quotation was taken from the complete and unedited version of the interview available as a .pdf download from this site.

themselves influenced by their own preschool conditioning. This might suggest that human beings would feel eternally disposed towards whatever their favorite cultural programming may have been, Ernst Mayr included.

Another pitfall in Mayr's thought process lay in his implying that any one of countless varieties of nonmaterial evolutionary metaphysics would be hardly more relevant than the one produced by a fundamental Bible-thumper. In other words, Mayr could at times leave an impression that the only intellectually relevant philosophical position is, coincidentally, his own. In a parallel scientific example of Mayr's general tendency toward simplification, Futuyma expressed, this time concerning a debate between Mayr and fellow leading biologists, "it cannot be gainsaid that Mayr has sometimes minimized or misunderstood the strength of opposing arguments."⁹⁹

In a different example of Mayr's argumentative feistiness, in a 1984 interview for *Omni Magazine*, after castigating the influence of American fundamentalism, Mayr next responded to the question, "Do you think there is an unusual amount of antiscience sentiment now in the United States?" by replying: "There is more antiscience sentiment now than there was, say, forty or fifty years ago, and it's stronger in Europe."¹⁰⁰

Though in the interview Mayr did not specifically identify whom he perceived as the more serious adversary in Europe, at the time fundamentalism in Europe enjoyed less influence than it did in the States. For instance, Junker observed regarding the influence of Mayr's continental background: "To sum up, I do not think Mayr's critical attitude toward religion is caused by the aggressiveness of contemporary creationism in the

⁹⁹ Douglas J. Futuyma, "Ernst Mayr and Evolutionary Biology," *Evolution* 48 (1994): 40–41.

¹⁰⁰ Pamela Weintraub, ed., "Darwinian Flights: Ernst Mayr," *The Omni Interviews* (New York: Omni Publications International, Ltd. 1984), 51.

United States; rather, it is part of the antireligious tradition in European thought stemming back to the Enlightenment.”¹⁰¹

But no matter where Mayr found a debate, it would be fair to conclude with historian John C. Greene that he felt equally enthusiastic to defend both “his version of the modern synthesis in evolutionary biology against old-fashioned creationists, vitalists, and teleologists on the one hand, and mechanistic or mathematical reductionists on the other.”¹⁰²

But even in his argumentativeness, Mayr often behaved with a chivalrous charm coupled with a sincere intellectual desire to get to the heart of an issue. Time and again, friends and associates offered testimony that while Mayr could be incessantly argumentative, he was intellectually sincere. For example, David Hull related:

Mayr did not always find himself in total agreement with my views.... In arguing for his position, Mayr was relentless, but he was willing to continue our correspondence in spite of any disagreements we might have. He never went off in a huff. Mayr struck many of his contemporaries as being formidable. He struck me that way too but not so formidable that I felt unable to argue with him, once wagging my finger in front of his nose to emphasize a point. I noticed a slight smile creep across his face in appreciation of my having the courage to stand up to him.¹⁰³

Similarly, Stephen Jay Gould felt Mayr’s “vigor” resulted from being “so in love with his subject, so enthusiastic about its promise and intellectual content, that he couldn’t hold back. He was urging with all the verve of a graduate student because, by God, he remains one himself in heart and content.”¹⁰⁴

¹⁰¹ Junker, “Factors Shaping Ernst Mayr’s Concepts in the History of Biology,” 58.

¹⁰² John C. Greene, “From Aristotle to Darwin: Reflections on Ernst Mayr’s Interpretation in The Growth of Biological Thought,” *Journal of the History of Biology* 24 (1992): 283.

¹⁰³ Hull, “Ernst Mayr’s Influence,” 377.

¹⁰⁴ Stephen Jay Gould, “Balzan Prize to Ernst Mayr,” *Science* 223 (1984): 257.

On Style and Substance

Even though Mayr's persuasive style could be overbearing at times, there is little doubt that his insights were valuable and significant in establishing the new synthesis.

Among the issues critically at the heart of biology as a scientific discipline has been how to empirically define "life." After all, as Mayr explained, "To 'know thyself,' as the ancient Greeks commanded us, entails first and foremost knowing our biological origins. To help readers gain a better understanding of our place in the living world ... is the major objective."¹⁰⁵ Of course, care also needs to be taken when equating "self" with "biology," so to avoid creating another unquantifiable metaphysic.

In the *GBT*, as well as other published works, Mayr promoted a doctrine of organismism, which upholds the phenomenon of emergence as best suited for biologically analyzing the issue of conscious life in the realm of inert matter. In explaining his views he often presented this position as a historical synthesis of prior mechanistic and vitalistic biological philosophies.

As previously mentioned, Mayr defined organismism as a process "best characterized by the dual belief in the importance of considering the organism as a whole, and at the same time the firm conviction that this wholeness is not to be considered something mysteriously closed to analysis." Mayr added that in studying this wholeness, "the organicist does not reject analysis but insists that analysis should be continued downward only to the lowest level at which this approach yields relevant new information and new insights."¹⁰⁶

¹⁰⁵ Mayr, *This is Biology*, xix.

¹⁰⁶ Ibid., 20.

As for emergence, Mayr explained how in “a structured system, new properties emerge at higher levels of integration which could not have been predicted from a knowledge of the lower-level components. . . . By eventually incorporating the concepts of the genetic program and of emergence, organicism became antireductionist and yet remained mechanistic.”¹⁰⁷

In summation, Mayr stated in *The Growth of Biological Thought*:

All biologists are thorough-going “materialists” in the sense that they recognize not supernatural or immaterial forces, but only such that are physico-chemical. . . . Organismic biologists stress the fact that organisms have many characteristics that are without parallel in the world of inanimate objects. The explanatory equipment of the physical sciences is insufficient to explain complex living systems The phenomena of life have a much broader scope than the relatively simple phenomena dealt with by physics and chemistry.¹⁰⁸

But when addressing the issue of conscious life, Mayr could himself be criticized for sidestepping the issue when he stated, “Attempts have been made again and again to define ‘life.’ These endeavors are rather futile since it is now quite clear that there is no special substance, object, or force that can be identified with life. The process of living, however, can be defined.”¹⁰⁹ In other words, questioning too deeply what “life” is, is to reinvoke the vitalist quagmire suggesting that “the movements and other manifestations of life in organisms are controlled by an invisible force, *Lebenskraft* or *vis vitalis*,” along similar lines of reasoning as suggesting “the motion of planets and stars . . . [are] controlled by an occult, invisible force called gravitation.”¹¹⁰ Of course, since no human being has yet to claim the scientific insight required to conclusively explain gravitation

¹⁰⁷ Ibid., 19.

¹⁰⁸ Mayr, *The Growth of Biological Thought*, 52.

¹⁰⁹ Ibid., 53.

¹¹⁰ Mayr, *What Makes Biology Unique*, 22.

with empirical precision, it would appear “life” on Earth remains in good company in its scientific non-definition.

With the phenomenon of “life” itself so difficult to quantify, it is rather the symptoms of life as manifest in “the process of living” that becomes the practical object of biological investigation. Thus, it is with the emergence of the physio-chemical sophistication required to sustain organicism that the science of biology commences.

As a methodological strategy for investigating the perceivable symptoms of “life,” Mayr’s emergent organicism makes for a concise, honest, and powerful analytical tool. Nonetheless, “what” exactly emerges remains unknown, along with “from whence” it might emerge. In other words, it is currently impossible to test the exact quality of self-identifying conscious energy, such as whether it emerges inherently from innate matter, as we currently understand it, or from some other source, currently unquantifiable. In considering this issue in empirical terms, neither the philosophical conclusions of an exclusive mechanist or that of an esoteric metaphysicist can be conclusively tested by any presently known science.¹¹¹

But no matter what the philosophical perspective employed, the organicistic formula works just fine for scientific analysis. It does not matter “what” or “from whence” life emerges; rather, it is the subsequent business of life that defines the science

¹¹¹ In a theoretical scenario offering further complications: if in the future biologists construct “from scratch” an organic system (or in another scenario, physicists engineer a nonorganic robot) that exhibits symptoms of life, the nonmaterial philosopher could argue that a sufficiently sophisticated “machine” had been organized for accepting a supramaterial “driver,” whereas a mechanistic metaphysician might argue that the “driving” phenomenon arises from within the known system. Both hypotheses raise dilemmas currently unresolvable within the realm of experimental knowledge while additionally inviting the quagmire of “intelligent design” regarding the role of the human participants in carrying out the experiment.

of biology. Whatever life may or may not be, it certainly emerges, and at that point it is testable.

While Mayr was on target with regards to setting credible intellectual boundaries for an autonomous biological discipline free from vitalistic or physicalistic paradigms, he unfortunately ventured too far, too often into the realm of his own materialistic sentiments. For when Mayr proclaimed, “All biologists are thorough-going ‘materialists’ in the sense that they recognize not supernatural or immaterial forces but only such that are physico-chemical”—he knew that is not entirely true.¹¹² Nonetheless, one can sympathize with Mayr’s need to emphasize the concrete, for he was attempting to establish disciplinary parameters for biology in an era when “anyone daring to suggest that biological systems may have properties not found in inanimate nature was maligned as a vitalist.”¹¹³

And while by all accounts Mayr was straightforward when expressing his own sentiments, they were far from being an exclusively accepted worldview among leading evolutionists. For example, when considering Provine’s list of influential biologists prominent in their contribution toward establishing the evolutionary synthesis, we find the following: Ronald A. Fisher was an Anglican; Sewall Wright was an advocate of panpsychism; J. B. S. Haldane spoke of himself in terms of being an agnostic Hindu philosopher; Theodosius Dobzhansky considered himself Russian Orthodox frequently disposed to prayer; Julian Huxley, the secular humanist, has been considered indulging in a panpsychic proclivity; Bernard Rensch was also a panpsychic proponent; while Alister

¹¹² Mayr, *The Growth of Biological Thought*, 2.

¹¹³ Ernst Mayr, review of *Natural Selection: The Philosopher and the Biologist*, by Elliot Sober, *Paleobiology* 12 (1986): 233.

C. Hardy was a “semi-vitalist” who established an institute for investigating religious experience with empirical methodology.¹¹⁴ Mayr was undoubtedly familiar with this state of philosophical affairs for a number of these biologists were his close associates.

Thus scientists holding a wide variety of metaphysical perspectives helped establish twentieth century evolutionary biology. In other words, their personal metaphysics did not conflict with their materialistic methodology, as the Mayr of the *GBT* would lead us to think.

¹¹⁴ The *New Oxford American Dictionary*, 2nd ed., offers as a definition for panpsychism: the doctrine or belief that everything material, however small, has an element of individual consciousness.

CHAPTER 3

WORLDVIEWS OF THE SYNTHESIS

The mid-twentieth-century evolutionary synthesis that Mayr helped forge gave biology a disciplinary framework as an autonomous science, free in theory from either obsessive reductionism or unverifiable metaphysics. As Smocovitis described: “The ‘evolutionary synthesis,’ held by historical commentators to involve the synthesis between ‘genetics and selection theory,’ can be reinterpreted as the bringing together of the material basis of evolution (the gene) with the mechanical cause of evolutionary change (natural selection) to make a mechanistic and materialistic science of evolution that could rival Newtonian physics.”¹

Smocovitis continued:

while the possibility of reduction from higher levels to lower levels existed, measures could and would be taken to ensure that certain phenomena were not subject to reduction to the physical world. Emergent properties, which in some measure could be considered metaphysical, would therefore be evoked by these biologists to make room for the possibility of meaningful life, devoid of complete determinism; at the same time, these properties would make possible the independence of the biological sciences.²

Though fellow synthesizer J. B. S. Haldane stated in 1932 that “the doctrine of emergence … is radically opposed to the spirit of science,” in his 1942 book, *What is Life*, Haldane nonetheless appeared to offer an explanation corresponding to emergence.³ For example, in Chapter 14 of *What is Life?*, similarly titled, “What is Life?” Haldane

¹ Smocovitis, *Unifying Biology*, 127.

² Ibid., 128–29.

³ J. B. S. Haldane, *The Causes of Evolution* (New York: Longmann, Green, 1932), 113.

stated, “I am not going to answer that question. In fact, I doubt if it will ever be possible to give a full answer . . . so we should have to define life in terms of matter. . . . What is common to all life are the chemical events.”⁴ In other words, in the end, Haldane made no claim to knowing what the phenomena (or its origin) was other than once it emerged, its chemical events could be studied within the scientific realm of biology.

Mayr admitted that during “its long history, the term ‘emergence’ was adopted by authors with widely diverging philosophical views,” and that it was “particularly popular among vitalists.”⁵ He proclaimed emergence as a methodological construct by stating,

It is now abundantly clear that evolutionary emergence is an empirical phenomenon without any metaphysical foundations. Acceptance of this principle is important because it helps to explain phenomena that previously had seemed to be in conflict with mechanistic explanations of the evolutionary process. It eliminates any need to invoke metaphysical principles for the origin of novelties in the evolutionary process.⁶

In simple terms, Mayr is arguing that the phenomenon’s emergence is an empirically verifiable fact. Beginning at this point (with life as an empirically verifiable fact), then one does not need to invoke or deny metaphysical philosophy in order to engage biology as a science. Thus it is also useful to note how a number of leading evolutionists engaged a variety of philosophical perspectives without empirical disruption.⁷ What will follow is a descriptive presentation of their divergent metaphysics alongside their biological accomplishments.⁸

⁴ J. B. S. Haldane, *What is Life?* (New York: Boni And Gaer, 1947), 53–54.

⁵ Mayr, *What Makes Biology Unique*, 75.

⁶ *Ibid.*, 77.

⁷ As previously mentioned, Provine offered a list of prominent biologists of the genre in whose works “one might hope to find . . . an explicit analysis of the historical origins of the synthesis,” as follows: Fisher, *Genetic Theory of Natural Selection* (1930); Wright, “Evolution in Mendelian Populations” (1931); Ford, *Mendelism and Evolution* (1931); Haldane, *Causes of Evolution* (1932); Dobzhansky, *Genetics and the*

Though Mayr was certainly straightforward about his own metaphysical outlook, he was not always graceful about articulating the difference between his personal views and those of other scientists who apparently diverged.⁹ Possibly this example of a lack of philosophical finesse, especially if taken as an appropriate standard within the discipline, could well be a contributing factor exacerbating some of the politicized metaphysical challenges posed from outside.

Ronald Aylmer Fisher, *Genetic Theory of Natural Selection* (1930)

The first scientific author of the evolutionary synthesis examined from Provine's list is arguably the most traditional in term of his metaphysics. Ronald Aylmer Fisher (1890-1962) earned recognition for his contributions to mathematical statistics and for designing an analysis of experiments. After working on the "genetical mechanism underlying continuous variation, Fisher turned his attention to the relations between Darwin's principle of natural selection and Mendel's principles of heredity," which he later incorporated into *The Genetical Theory of Natural Selection*.¹⁰

Origin of Species (1937); Darlington, *Evolution of Genetic Systems* (1939); Huxley, ed., *The New Systematics* (1940); Mayr, *Systematics and the Origin of Species* (1942); Huxley, *Evolution: The Modern Synthesis* (1942); Simpson, *Tempo and Mode in Evolution* (1944); White, *Animal Cytology and Evolution* (1945); Rensch, *Neuere Probleme der Abstammungslehre* (1947), [translated as *Evolution Above the Species Level* (1959)]; Jepsen, Mayr, and Simpson, eds., *Genetics, Paleontology, and Evolution* (1949); Stebbins, *Variation and Evolution in Plants* (1950); Huxley, Hardy, and Ford, eds., *Evolution as a Process* (1954). The biologists examined in this chapter all contributed to this list. William B. Provine, "Epilogue," in *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, ed. Ernst Mayr and William B. Provine (Cambridge, MA: Harvard University Press, 1980), 400.

⁸This presentation is not intended to provide an authoritative analysis comparing the relative philosophical merits, but rather is a simple illustration of how a wide variety of personal philosophical perspectives were engaged in the successful practice of evolutionary biology. The argument, then, is that this apparently nonsectarian quality of modern biology is something Mayr failed to acknowledge in his otherwise successful presentation as one of its "chief discipline builders."

⁹A general definition of "metaphysics" for this essay would be a worldview that can not be confirmed or denied by empirical investigation or inductive reasoning.

¹⁰F. Yates and K. Mather, "Ronald Aylmer Fisher. 1890–1962," *Biographical Memoirs of Fellows of the Royal Society* 9 (1963): 115.

Among his accolades, Fisher was awarded the “Royal Medal of the Royal Society” in 1938, the Darwin Medal in 1948, and the Copley Medal, the highest award of the Society, in 1955. He was knighted in 1952. He was an honorary member of the American Academy of Sciences, a foreign associate of the National Academy of Sciences of the United States of America, a foreign member of the Royal Swedish Academy of Sciences and of the Royal Danish Academy of Sciences and Letters, and a member of the Pontifical Academy of Sciences.”¹¹

Described as “never much of an organizer,” he was a “likeable but difficult character” whose “eccentricities, though sometimes embarrassing, were for the most part a source of entertainment to his friends, and provided an inexhaustible fund of ‘Fisheriana.’”¹²

Among stories related in his *Biographical Memoirs* from his senior years, included were how Fisher

became almost a legend to [the Cambridge] undergraduates. His venerable figure was well known to them, for every morning he took breakfast in solitary state on High Table. He attended Chapel regularly (reputedly wearing the hood of a different honorary degree each Sunday) and even on occasion preached in his own characteristic style. His scriptural knowledge was extensive and as accurate as his erudition in many fields.¹³

As for Fisher’s metaphysical inclinations, his *Memoirs* add that “although he did not subscribe to the dogmas of religion, he saw no reason to abandon the faith in which

¹¹ Ibid., 95–96.

¹² Ibid., 96.

¹³ Ibid., 95.

he had been brought up, and believed that the practice of religion was a salutary and humbling human activity.”¹⁴

In a broadcast on “Science and Christianity” (1955), Fisher declared:

The custom of making abstract dogmatic assertions is not, certainly, derived from the teaching of Jesus, but has been a widespread weakness among religious teachers in subsequent centuries. I do not think that the word for the Christian virtue of faith should be prostituted to mean the credulous acceptance of all such piously intended assertions. Much self-deception in the young believer is needed to convince himself that he knows that of which in reality he knows himself ignorant. That surely is hypocrisy, against which we have been most conspicuously warned.¹⁵

As is apparent with Fisher, no matter what the metaphysics of the evolutionary synthesizers, they could also engage a fairly consistent dialogue of mature, sophisticated intellectualization.

J. B. S. Haldane, *Causes of Evolution* (1932)

If Fisher might exemplify all that is traditional in British metaphysics, his fellow countryman, John Burdon Sanderson Haldane (1892-1964), could exemplify all that is traditionally “exotic.” A large, “powerfully built” man who could trace his British lineage to 1250, he joined the army after graduating from Oxford, and was wounded in France in 1915. He was again wounded a second time while serving in the Middle East. After convalescing in India, he ran a bombing school there for the duration of the war.¹⁶

Of Haldane’s work in genetics and evolution, Sewall Wright wrote, “Few geneticists had more influence on the steady course of development of the subject than he during his long career. . . . His outstanding contribution, however, was to the quantitative

¹⁴ Ibid., 96.

¹⁵ Ibid.

¹⁶ N. W. Pirie, “John Burden Sanderson Haldane. 1892–1964,” *Biographical Memoirs of Fellows of the Royal Society* 12 (1966): 220.

theory of natural and artificial selection.”¹⁷ Wright also added, “His book *The Causes of Evolution* has become a classic for its lucid examination of the status of Darwin’s theory from the standpoint of twentieth century knowledge of heredity and variation and of his own and other mathematical analyses of the quantitative aspects.”¹⁸

Haldane held a position at Cambridge until 1933, when he went to University College, London, where he initially held a chair in Genetics and then Biometry. In 1957 he left England to become a member of the Biometry Research Unit at the Indian Statistical Institute at Calcutta, after which time he received funding to set up his own research facilities. Soon after becoming an Indian citizen in 1961, he became “head of a new laboratory of Genetics and Biometry established by the Government of Orissa at Bhubaneswar.”¹⁹

Haldane was prominently known later in life for his study of Indian philosophy, along with his intimate familiarity with the classics of ancient Greece and Rome. In a 1956 essay for the *British Journal of Animal Behavior*, he “traced the origins of some ethological ideas as far back as Aristotle and the *Bhagavad Gita*.”²⁰ Concerning Haldane, Julian Huxley commented how “it was still possible to be not merely a polymath but an almost universal teacher and scholar. As a man, he was extraordinary and unforgettable.”²¹

¹⁷ Quoted in Ibid., 224.

¹⁸ Ibid., 227.

¹⁹ Ibid., 221.

²⁰ Ibid., 219, 236.

²¹ J. S. Huxley, “Haldane,” *Encounter* 25 (1965): 59–61.

Along with a lifelong sympathy for Marxist ideology, Haldane showed a “remarkable tolerance, in later life, of other people’s convictions so long as they did not have harmful medical or political consequences.”²² A close associate of Haldane’s in India noted that of his lifestyle there, “Haldane not only wore the Indian dress but seemed very comfortable and impressive in the garb. . . . He wore sandals and occasionally a straw hat during much of his Indian period. He was a vegetarian.”²³ Haldane was said to have described himself as a “Hindu agnostic.”²⁴

Regarding his own synthesis of South Asian philosophy and Darwinian evolution, Haldane wrote in a 1959 essay, “An Indian Perspective on Darwin”:

To Europeans and Americans, it inevitably seems that Darwin’s greatest achievement has been to convince educated men and women that biological evolution is a fact, that living plant and animal species are all descended from ancestral species very unlike themselves, and, in particular, that men are descended from animals. This was an important event in the intellectual life of Europe, because Christian theologians had drawn a sharp distinction between men and other living beings. In view of Jesus’ remarks about sheep, sparrows, and lilies, this sharp distinction may well be a perversion of the essence of Christianity. St. Francis seems to have thought so.

But in India and China this distinction has not been made; and, according to Hindu, Buddhist, and Jain ethics, animals have rights and duties. My wife has stated categorically that Darwin converted Europe to Hinduism. This is, I think, an exaggeration, but is nearer to the truth than it sounds. Hinduism is not a religion as this term is understood by the adherents of proselytizing religions. It is an attitude toward the universe compatible with a variety of religious and philosophical beliefs.²⁵

²² Pirie, 221.

²³ Krishna R. Dronamraju, “On Some Aspects of the Life and Work of John Burdon Sanderson Haldane, F.R.S., In India,” *Notes and Records of the Royal Society of London* 41 (1987): 212.

²⁴ Ibid., 225.

²⁵ J. B. S. Haldane, “An Indian Perspective of Darwin,” *Centennial Review* 3 (1959), 357–263.

While in India, included among Haldane's various guests were fellow synthesizers Fisher, Julian Huxley (as well as his brother, Aldous Huxley), and Dobzhansky. Mayr visited in 1959, and Haldane took him sightseeing to a variety of cultural attractions including the well-known Orissan seaside pilgrimage site at Puri, "to see the Jagannath temple, built in the twelfth century, which is famous for its chariot festival each year. [They] even managed an early morning bird-watching trip in Bhubaneswar."²⁶

Though Mayr hardly converted to "Hindu agnosticism" while touring with Haldane, in his later years he amusingly commented about a photograph of himself as a youthful ornithologist by saying: "I'm very comfortable with the Indian idea of incarnations. This wasn't me. That was a young kid named Ernst Mayr."²⁷

As for an entertaining quotation attributed to Haldane himself, in 1958, G. E. Hutchinson, then President of the American Society of Naturalists, while describing at the annual meeting how over three-quarters of known animal species were insects, and of those, "a quite disproportionately large number ... [were] Coleoptera," depicted a story, possibly apocryphal, of the distinguished British biologist, J. B. S. Haldane, who found himself in the company of a group of theologians. On being asked what one could conclude as to the nature of the Creator from a study of His creation, Haldane is said to have answered, "An inordinate fondness for beetles."²⁸

Sewall Wright, "Evolution in Mendelian Populations" (1931)

In his biography of Sewall Wright, William Provine concluded with the statement, "I predict that historians and biologists in the twenty-first century will look upon Wright

²⁶ Krishna R. Dronamraju, *Haldane: The Life and Work of J. B. S. Haldane with Special Reference to India* (Great Britain: Aberdeen University Press, 1985), 148.

²⁷ Lauren Gravitz, "Ernst Mayr's Scientific Legacy Shines After Nearly a Century," *Christian Science Monitor*, August 17, 2000.

²⁸ G. E. Hutchinson, "Homage to Santa Rosalia or Why Are There So Many Kinds of Animals?" *The American Naturalist* 93 (1959), 146.

as perhaps the single most influential evolutionary theorist of this century.”²⁹ Yet also noted in the Provine treatise was a lack of discussion of Wright’s personal philosophy as a biologist. For example, Stephen J. Gould pointed out that in an otherwise excellent work, Provine rather regularly “asserts his *bona fides*” as a mechanistic philosopher “by pointing out how often—and on truly central issues—he disagrees with Wright’s own view of his life and beliefs.”³⁰

Meanwhile, Dobzhansky is said to have made “substantial use of Wright’s work and ideas” in *Genetics and the Origin of Species*, and although Wright was known to help a wide variety of colleagues through “his correspondence and reworking of their data, his collaboration with Dobzhansky was by far the most extensive.”³¹ On their relationship Gould commented:

The collaboration of Dobzhansky and Wright is a fascinating … chapter in the history of evolutionary thought. It raised many intriguing and troubling questions for historians and philosophers. How could they become so important to each other, when neither really understood the other’s methods? Wright had never worked in the field, and Dobzhansky could barely get beyond Wright’s easiest equations. A common foundation of belief and a common logic of argument can do wonders. With charming candor, Dobzhansky later explained (in 1962): “My way of reading Sewall Wright’s papers, which I still think is perfectly defensible, is to examine the biological assumptions the man is making, and to read the conclusion he arrives at, and hope to goodness that what comes in between is correct. ‘Papa knows best’ is a reasonable assumption, because if the mathematics were incorrect, some mathematician would have found it out.”³²

²⁹ William B. Provine, *Sewall Wright and Evolutionary Biology* (Chicago: University of Chicago Press, 1986): 500.

³⁰ Stephen J. Gould, “The Ontology of Sewall Wright and the Phylogeny of Evolution,” *Isis* 79 (1988): 274.

³¹ W. G. Hill, “Sewall Wright. 21 December 1889 – 3 March 1988,” *Biographical Memoirs of Fellows of the Royal Society* 36 (1990): 576.

³² Gould, “Ontology of Sewall Wright,” 278. It might be useful to consider to what degree a “common foundation of belief” of metaphysical sympathies might have helped catalyze their otherwise highly productive empirical relationship.

In a somewhat metaphysical project, both Wright and Dobzhansky (as well as fellow synthesizer Bernhard Rensch) contributed to a collection of essays published in 1978 titled, *Mind and Nature: Essays on the Interface of Science and Philosophy*. In the book's preface the editors explain:

Neo-Darwinianism has played a prominent role in expanding the power of reductionistic modes of thought in evolutionary theory. It has been an effective force in weakening older forms of vitalism and teleological thinking. Yet some of its chief architects do not themselves draw reductionistic or materialistic implications from their theories. Sewall Wright sees biological science as treating the externals of living things with deterministic and statistical laws, but he believes the creatures themselves have internality and freedom. Theodosius Dobzhansky stresses the miracle of the emergence of humanity in its radical discontinuity with the rest of the world.³³

In the section titled, “The Primacy of Mind,” Wright contributed his essay “Panpsychism and Science,” in which he stated, “The biologist is continually in trouble. . . . [for he] cannot escape the problem of mind and matter.”³⁴ Wright added, “In my own case, I started as a student with the usual conviction that biology, and science in general, requires a rigorously deterministic viewpoint. I still, indeed, hold this viewpoint in practice, but with a radical revision of the philosophical implications of science.”³⁵ Wright then detailed the evolution of his own thought processes while noting that among “zoologists, much the closest in viewpoint seems to be Bernhard Rensch, who probably also arrived at it along a different note.”³⁶

³³ John B. Cobb, Jr. and David Ray Griffin, eds., *Mind and Nature: Essays on the Interface of Science and Philosophy* (Washington, D.C.: University Press of America, 1978), ii.

³⁴ Sewall Wright, “Panpsychism and Science,” in *Mind and Nature: Essays on the Interface of Science and Philosophy*, ed. John B. Cobb, Jr. and David Ray Griffing (Washington, D.C.: University Press of America, 1978), 79.

³⁵ Ibid., 80.

³⁶ Ibid.

The panpsychic view stresses mind as an inherent part of a larger reality. As explained by Wright, “Mind, even [if] denied any role in the inexorable course of events, must be retained at least as an observer.”³⁷ He will then conclude that the idea of an emergence of mind from no mind at all is sheer magic. We conclude that the evolution of mind must have been coextensive with the evolution of the body. Moreover, mind must already have been there when life arose and indeed must be a universal aspect of existence—still assuming that mind cannot arise from nothing.³⁸

To illustrate how biological phenomena could exhibit both symptoms of determinism and “internality and freedom,” Wright said he liked “an illustration … which I used in a class discussion in May 1927, a day or two after Lindberg’s flight across the Atlantic, which seemed almost as sensational an achievement then as the first flight to the moon a few years ago.”³⁹ Basically, Wright explained that on one level a scientist could examine how “from a purely physical standpoint … a great mass of material rose from the ground in Long Island, moved steadily in spite of buffeting winds across the Atlantic and finally settled down gently at the Paris Airport.” But then an engineer could further study air pressure and the propeller motion as connected by levers to movements in the motor, though “that would have involved only an infinitesimal portion of the total energy transactions.”⁴⁰

Wright continued by depicting how a physiologist could then “find that the levers moved as they did because of a certain succession of muscle contractions in the pilot’s

³⁷ Ibid., 81.

³⁸ Ibid., 82.

³⁹ Ibid., 84.

⁴⁰ Ibid.

arm,” with these transactions eventually traced to “neurons from the brain connected by synapses.”⁴¹ As such, Wright concluded:

The energy transactions are here infinitesimal compared with those in the muscles, but again have been shown to be in accord with the conservation of energy. [The physiologist] might not understand just what happened in the synapses which determined which neurons were activated, but would find that only an infinitesimal amount of the energy of the nerve currents was involved. The flight of the plane would be fully accounted for deterministically except for the product of a succession of infinitesimals. Yet the whole was according to Lindbergh’s plan.⁴²

Suffice it to say that Mayr did not endorse such views. In his *Toward a New Philosophy of Biology* he proclaimed, “Vitalism has become so disreputable a belief in the last fifty years that no biologist alive today would want to be classified as a vitalist.” Mayr continued that Wright was not alone as a guilty party among otherwise prominent biologists, for “the remnants of vitalist thinking can be found in the work of Alister Hardy, Sewall Wright, and Charles Birch, who seem to believe in some sort of nonmaterial principle in organisms.”⁴³

Mayr added in a letter written to John C. Greene in 1990:

I am afraid I am not as impressed with Sewall Wright’s enthusiasm for mind; to say that the world is full of mind is for me nothing but words. And reading these claims of Wright’s, I have to think of Haeckel’s crystal souls. My very good friend Bernhard Rensch is also a pan-psychist, and I have never been able to come to any agreement with him. For me it is simply a dodge to say that even every atom and elementary particle has soul or mind.⁴⁴

⁴¹ Ibid.

⁴² Ibid.

⁴³ Ernst Mayr, *Toward a New Philosophy of Biology* (Cambridge, MA: Harvard University Press, 1988), 13. Charles Birch also contributed to the *Mind in Nature* compilation (along with Wright and Dobzhansky) with an essay titled: “Can Evolution be Accounted for Solely in Terms of Mechanical Causation?”

⁴⁴ Ernst Mayr to John C. Greene, April 18, 1990, in John C. Greene, *Debating Darwin: Adventures of a Scholar* (Claremont, CA: Regina Books, 1999), 240.

Bernhard Rensch, *Neuere Probleme der Abstammungslehre* (1947)

[translated into English as: *Evolution Above the Species Level* (1959)]

Charles H. Smith, professor and science librarian at Western Kentucky University, described Bernhard Rensch (1900-1990), as “one of the main architects of the Neo-Darwinian Synthesis, [who] held a position in twentieth century German biology not unlike his contemporary Ernst Mayr did in the United States.” Smith explained how “both men were primarily ornithologists by training, both were centrally interested in evolutionary theory, and both took the philosophy of systematics—and science in general—quite seriously.”⁴⁵

In fact, in the “Acknowledgments” of Mayr’s final book, *What Makes Biology Unique?*, Mayr listed Bernhardt Rensch as second among those to whom he owed “a great debt of gratitude,” with only Erwin Stresemann preceding him.⁴⁶ Actually, both men had been Stresemann’s students together during their youth.

Mayr further wrote of his “very good friend,” that along with being “internationally celebrated as one of the architects of the evolutionary synthesis and for his many contributions to allometry, learning and memory in animals, climatic rules, the evolution of man, and the philosophy of biology, . . . [he] made numerous contributions to ornithology.”⁴⁷

As previously noted, Sewall Wright considered Rensch closest among zoologists to his own philosophy of panpsychism. Rensch himself wrote in his book, *Biophilosophy*:

⁴⁵ Charles H. Smith, “Rensch, Bernhard (Germany 1900–1990),” *Biogeographers, Evolutionists and Ecologists: Chrono-Biographical Sketches*, <http://www.wku.edu/~smithch/chronob/RENS1900.htm>.

⁴⁶ Ernst Mayr, *What Makes Biology Unique?*, XIII. Also included on Mayr’s list from among his fellow synthesizers are Dobzhansky, Haldane, Ford, “and so many others.”

⁴⁷ Ernst Mayr, “In Memoriam: Bernhard Rensch, 1900-1990,” *The Auk* 109 (1992): 188.

“there is no contrast between mind and matter. We must recognize that all ‘matter’ is protopsychical in character.”⁴⁸

Huxley, Hardy, and Ford, eds., *Evolution as a Process* (1954)

Mayr seemed to have a fondness for repeating how Alister Hardy (1896-1985) and Sewall Wright were among the last of the known vitalists. For example, this time in *This is Biology*, he again wrote such comments as—“the few late twentieth-century biologists who had vitalistic leanings (A. Hardy, S. Wright, A. Portmann) are no longer alive.”⁴⁹ Still, while generally disparaging toward vitalists, Mayr did admit, they “were largely responsible for the recognition of biology as an autonomous scientific discipline.”⁵⁰

Provine noted Alister Hardy for his participation in the evolutionary synthesis as a co-editor and contributor, (along with Huxley and Ford,) to the synthesis’s final major publication, *Evolution as a Process*, a work that included essays from nearly twenty major evolutionists including Fisher, Haldane, Mayr and Rensch.

While Hardy chose, “Escape from Specialization,” for his topic, Mayr wrote on “Change of Genetic Environment and Evolution.” It was in this essay that Mayr initially published a theory of “allopatric speciation” in a manner that “clearly related it to paleontology,” thus predating Eldredge and Gould’s theory of punctuated equilibrium by nearly twenty years. In claiming precedent, Mayr stated that “Gould was my course assistant at Harvard where I presented this theory again and again for three years. So he

⁴⁸ Bernhardt Rensch, *Biophilosophy* (New York: Columbia University Press, 1971), 297–98.

⁴⁹ Mayr, *This is Biology*, 16. Mayr made a similar comment in *Toward a New Philosophy of Biology*, 13.

⁵⁰ *Ibid.*, 15.

knew it thoroughly. So did Eldredge. In fact, in his 1971 paper Eldredge credited me with it. But that was lost over time.”⁵¹

Alister Hardy, meanwhile, was a highly regarded marine biologist who among his other accomplishments developed a “Continuous Plankton Recorder” utilized for “detailed charts of the distribution of plankton in the North Sea and adjacent waters, and to investigate more precisely the relationship between plankton and the commercial fish which ultimately depended on it.”⁵² Hardy initially held the position of Professor of Zoology at University College of Hull, where he helped develop a joint department of Zoology and Oceanography. He later accepted the Regius Chair in Natural History at Aberdeen, and then after the war moved to Oxford as Linacre Professor of Zoology. In 1957 he was knighted for his work, and in 1985 he was awarded The Templeton Foundation Prize for Progress in Religion, a \$185,000 award. Following his death later that year, an obituary in the London *Times* referred to him as “Sir Alister Hardy, zoologist and religious thinker.”

In *The Biographical Memoirs of Fellows of the Royal Society*, N. B. Marshall notably related Hardy’s work in reference to Mayr’s disciplinary authority when he reported that Hardy’s

two interests [zoology and religion] were brought together by his activities as a naturalist and his strong religious inclinations. Professor Ernst Mayr has stressed that “Natural history is one of the most fertile and original branches of biology. Is it not true that Darwin’s *Origin of Species* was essentially based on natural history research and that the sciences of ethology and ecology developed out of natural history?” Hardy would certainly agree. Indeed he wished to make natural history still more fertile by linking it to a new kind of natural theology. He was a

⁵¹ Michael Shermer and Frank J. Sulloway, “The Grand Old Man of Evolution: An Interview with Evolutionary Biologist Ernst Mayr,” *Skeptic* 8 (2000): 79.

⁵² *The Times* of London, “Sir Alister Hardy: Zoologist and Religious Thinker,” May 24, 1985.

Darwinian and averse to Paley's argument from design. His concern was to make natural theology more natural and relate it to the evolutionary system.⁵³

Marshall later restated the case by asking, "Would [Hardy] agree with Ernst Mayr that natural theology as a viable concept died on 24 November 1859, the date of the publication of Darwin's *Origin of Species*? In so far as ... natural theology depended mainly on Paley's argument from design, we can be sure that he would agree."⁵⁴

Hardy clearly stated regarding his own views: "I am a Darwinian in the modern sense, but I venture to suggest that there is something more about the process of evolution than is generally conceded by most biologists today; and that this 'something more' does, I believe, link Natural Theology to the biological scheme."⁵⁵ Hardy held the idea that a "natural theology of the future must have freedom of thought and discussion—we must have liberty to debate theological issues just as physicists can discuss different hypotheses."⁵⁶

In his book, *Darwin and the Spirit of Man*, Hardy's dedication page spoke of "the genius of Alfred Russel Wallace ... whom we should never forget and who called his most important book on evolution by just one word, *Darwinism*, and in it . . . claimed to be more Darwinian than Darwin."⁵⁷ Included in the work were chapter titles such as:

⁵³ N. B. Marshall, "Alister Clavering Hardy. 10 February 1896 – 22 May 1985," *Biographical Memoirs of Fellows of the Royal Society* 32 (1986): 225.

⁵⁴ *Ibid.*, 266.

⁵⁵ Sir Alister Clavering Hardy, *The Living Stream: Evolution and Man* (New York: Harper & Row, 1965), 10.

⁵⁶ Alister Clavering Hardy, *The Divine Flame: An Essay Towards a Natural History of Religion* (London: Collins, 1966), 218.

⁵⁷ Sir Alister Clavering Hardy, *Darwin and the Spirit of Man* (London: Collins, 1984).

“The Reality of Evolution,” “The Greatness of Darwin and Wallace,” and “Darwinism with a Difference.”⁵⁸

Theodosius Dobzhansky, *Genetics and the Origin of Species* (1937)

In the *Biographical Memoirs of the Fellows of the Royal Society*, fellow synthesizer E. B. Ford stated:

Professor Th. Dobzhansky [1900-1975] was the most distinguished geneticist in the U.S.A. and one of the most distinguished in the world. He was well fitted to hold an outstanding position in America for, educated in Europe and being an exceptionally traveled man, he had an international outlook, while his ability to read a number of languages enabled him to keep abreast of the literature of his subject published outside North America. He had, moreover, an attribute of value in general discourse; he was a man of wide culture and artistic perception, especially in painting and music.⁵⁹

As previously noted, it was in the evolutionary writings of Dobzhansky that “Mayr saw a kindred spirit.”⁶⁰ He spoke of Dobzhansky’s influence on his career in an interview for *Skeptic* magazine with Michael Shermer and Frank J. Sulloway:

Skeptic: Looking back on the century, give us your opinion on the most significant contributions to evolutionary biology that have helped to elevate it to the status it holds today.

Mayr: The first one was the great debate that led to the evolutionary synthesis. Dobzhansky’s book in 1937, *Genetics and the Origin of Species*, was very crucial because he was a “born naturalist,” became a beetle specialist and so forth. Then at

⁵⁸ Alfred Russel Wallace is considered the co-discoverer of modern evolutionary theory along with Charles Darwin. It was Wallace’s independent development of a similar theory that lead Darwin to publish his more thorough, *The Origin of Species*, earlier than he intended. Later, along with publicly championing a variety of progressive social issues, Wallace explored and personally advocated the empirical investigation of Spiritualism, a popular phenomenon among late Victorian intellectuals. Though Darwin and Wallace maintained a close friendship throughout their lives primarily through correspondence, they did share areas of disagreement on aspects of their theory. For example, whereas Wallace felt natural selection could not account for the finer sentiments of human beings as expressed in the arts and sciences, Darwin argued that sexual selection offered an adequate empirical framework.

⁵⁹ E. B. Ford, “Theodosius Grigorovich Dobzhansky. 25 January 1900 – 18 December 1975,” *Biographical Memoirs of Fellows of the Royal Society* 23 (1977): 59.

⁶⁰ Ruse, “Booknotes,” 430.

the age of 27 he came to America, worked for 10 years in Morgan's lab where he learned all about the genetic aspects of organisms, then combined the two.

Skeptic: Did Dobzhansky's book influence your work significantly?

Mayr: It didn't change it, but it filled in the gaps in my knowledge of genetics.⁶¹

As the interview continued, Mayr brought up the name of Dobzhansky once again:

Skeptic: Looking back, who were the two or three most influential people on your career and your thinking as a scientist? Who were your heroes?

Mayr: As a student, ornithologist Erwin Stresemann was my hero. Later on Dobzhansky. Now? I would have to say Darwin.⁶²

And concerning metaphysics:

Skeptic: Do you consider yourself a humanist?

Mayr: Yes, I do.

Skeptic: You don't believe in God, but are you an agnostic or an atheist?

Mayr: I have the honesty to say I'm an atheist. . . . On the other hand, famous evolutionists such as Dobzhansky were firm believers in a personal God.⁶³

In an essay titled, "The Evolutionary Worldview of Theodosius Dobzhansky,"

Costas B. Krimbas, a former student of Dobzhansky and Professor of the History and

Philosophy of Biology at the University of Athens, wrote:

Dobzhansky considered himself to be an active communicant of the Eastern Orthodox Church. According to his last student, Jeff Powell . . . Dobzhansky prayed daily in his final years

This needs explication. As a scientist he believed that the Church's tendency to deny widely accepted scientific facts or hypotheses because they seemed to contradict the scriptures showed an unhealthy attitude. . . . Instead, he believed that religion should continuously evolve, incorporate scientific findings, and adapt to them.

⁶¹ Shermer and Sulloway, "The Grand Old Man of Evolution," 78.

⁶² Ibid., 82.

⁶³ Ibid.

After 1960 Dobzhansky became interested—and to a certain degree impressed—by the *weltanschauung* of Teilhard de Chardin, and in 1969 he served as president of the American Teilhard de Chardin Association. Along with Teilhard, Dobzhansky recognized that organic evolution was part of a cosmic process that comprised the birth and evolution of matter and stellar bodies, the appearance and evolution of life, and finally the genesis of humankind. . . .

In . . . his writings Dobzhansky modified, or rather adapted, Teilhard's vision according to the dominant neo-Darwinian theory. . . . Thus Dobzhansky saw himself as aiding the evolution of religious thinking in a scientifically evolving world.⁶⁴

Dobzhansky expressed a number of his metaphysical perspectives in an exchange of letters with John C. Greene in 1960, where Dobzhansky compared his personal philosophy with that of some of his fellow synthesizers:

I would like to convince you that Huxley, Simpson, and myself are not 'in the same general camp' as far as our philosophical attitudes are concerned. Huxley is militantly and virulently anti-religious. Simpson can, I think, fairly be described as an agnostic. I happen to be a Christian. . . . Personally, I think that evolution (cosmic + biological + human) is God's method of creation (not a very original idea, I realize).⁶⁵

Again in a letter to Greene the following year, Dobzhansky reiterated: "Let me remove all doubts about this. I am a Christian, hence I stand with my good friend Birch, and you, and Teilhard, and certainly not with Huxley, although his is very much a majority opinion among at least the natural scientists."⁶⁶

Dobzhansky further clarified his view later in the letter when stating, "I do not doubt that at some level evolution, like everything in the world, is a manifestation of God's activity. All I say is that as a scientist I do not observe anything that would prove

⁶⁴ Costas B. Krimbas, "The Evolutionary Worldview of Theodosius Dobzhansky," in *The Evolution of Theodosius Dobzhansky: Essays on His Life and Thought in Russia and America*, ed. Mark B. Adams (Princeton, NJ: Princeton University Press, 1994), 188–190.

⁶⁵ Theodosius Dobzhansky to John C. Greene, September 17, 1961, in Greene, *Debating Darwin*, 92–93.

⁶⁶ Theodosius Dobzhansky to John C. Greene, November 23, 1961, in Greene, 98. Dobzhansky wrote these letters about his personal metaphysics nearly fifteen years before his death.

this. In short, as scientists Laplace and myself ‘have no need for the hypothesis,’ but as a human being I do need this hypothesis!”⁶⁷

Dobzhansky’s last exchange brings up a few interesting philosophical points. First, as a scientist, Dobzhansky felt at home in the world of empirical methodology. On the other hand, Dobzhansky might also be hinting that as a human being he perceived, if only intuitively, something more than that which could be empirically verified.

The Mechanists

The other major architects and participants in the evolutionary synthesis generally upheld a mechanistic worldview. Among them, Huxley was famous as a “missionary” championing “Scientific Humanism” and contending that “man must rely wholly on himself in planning his evolution. Greater achievement and fulfillment were to be obtained if no reliance were placed on supernatural aid.”⁶⁸ In his later works, Huxley began to substitute “Scientific Humanism” with a new term, “Evolutionary Humanism.”

Huxley would claim, “Man is not merely the latest dominant type produced by evolution, but its sole active agent on earth. His destiny is to be responsible for the whole future of the evolutionary process on this planet.” He will go on to state, “There are no absolutes of truth or virtue,”—itself a fairly absolute expression. Huxley professed his faith “only in the possibilities of greater knowledge and fuller perfection.”⁶⁹

⁶⁷ Greene, 100.

⁶⁸ J. R. Baker, “Julian Sorell Huxley. 22 June 1887 – 14 February 1975,” *Biographical Memoirs of Fellows of the Royal Society* 22 (1976): 231.

⁶⁹ Julian Huxley, “Education in the Humanist Revolution,” Fawley Foundation Lecture (UK: University of Southampton, 1962), quoted in J. R. Baker, “Julian Sorell Huxley. 22 June 1887 – 14 February 1975,” *Biographical Memoirs of Fellows of the Royal Society* 22 (1976): 231.

Of interest, then, is John C. Greene's contention that Huxley adopted the philosophy of panpsychism as understood by Bernhard Rensch and Sewall Wright.⁷⁰ Greene, apparently, based this claim on Huxley's statements that nature is "unitary, continuous, irreversible; self-transforming; and generating variety and novelty during its transformations."⁷¹ Greene charged that Huxley, "personifies evolution and exhilarates his readers with an account of his hero's trials and errors, advances and retreats, escapes from blind alleys, and eventual achievements in realizing ever-higher possibilities."⁷²

Though on occasion Mayr stated his affinity for Huxley's worldview as presented in *Religion without Revelation*, Greene observed that for Mayr, it is with "none of Huxley's crusading zeal to persuade others to his own beliefs."⁷³ It could be taken rather humorously, then, when Michael Ruse claimed that of Mayr's metaphysics, "I used to think he was just a fuzzy old vitalist . . . Now, I think that judgment is extreme, although I still feel rather proud of myself for telling Mayr to his face what I thought. (I won't tell you what Mayr said in return.)."⁷⁴

Darwin himself is generally considered with having begun his career with a fairly fundamental view of Palean Natural Theology, then gradually drifted towards an agnosticism that culminated with atheism in his old age. For example, in 1860 he wrote to Asa Gray contending that, "I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we

⁷⁰ Greene, 278.

⁷¹ Julian Huxley, *Evolution in Action* (New York: The New American Library, 1953), 10.

⁷² Greene, 279.

⁷³ Ibid., 20.

⁷⁴ Michael Ruse, "Admayration," *The Quarterly Review of Biology* 60 (1985): 191.

may call chance.”⁷⁵ Nonetheless, by the 1880s, Darwin acknowledged that when it came to such metaphysical questions, “I feel most deeply that the whole subject is too profound for the human intellect. A dog might as well speculate on the mind of Newton. Let each man hope and believe what he can.”⁷⁶ In other words, it could be taken that Darwin more or less admitted he felt he could not know anything for certain.

But no matter what the metaphysics, either of Mayr or his other contemporary evolutionary synthesizers, quite a range of philosophical interests were personally expressed. In their maturity, these leading biologists remained comfortably in agreement regarding the methods of their science. Unfortunate, then, could be the example of Mayr’s ongoing disparaging attitude toward the philosophical approach of others, particularly when it is something that does not come in conflict with the advancement of the science.

⁷⁵ Charles Darwin to Asa Gray, May 22, 1860, in vol. 2 of *The Life and Letters of Charles Darwin*, ed. Francis Darwin (London: John Murray, 1888), 311–312.

⁷⁶ Charles Darwin to William Graham, July 3, 1881, in vol. 1 of *The Life and Letters of Charles Darwin*, ed. Francis Darwin (London: John Murray, 1888), 316.

CHAPTER 4

THE PHYLETIC FRUIT OF MAYR'S METAPHYSICS

On a personal level scientists employ a wide variety of philosophical perspectives, yet their science can move forward nonetheless when executed within well-defined empirical boundaries, something Mayr excelled at articulating.¹ Nonetheless, Mayr's affinity for Julian Huxley's creed of evolutionary humanism was a form of metaphysics, though admittedly positivistic speculations offer a superficial affinity with the empirical methodology that forms the basis of science.²

As a possible example of empirical analysis taken to the level of a religion, Mayr repeatedly, and rather directly, called his approach to biology "religious." When asked what he means by the statement, "virtually all biologists are religious," he consistently responded, "religious is a very broad term. Just think of Julian Huxley's book *Religion without Revelation.*"³ In other words, according to Mayr, biologists are inherently religious, and to be religious meant to uphold the empirical examination of natural

¹ While a scientist could be motivated by a variety of metaphysical perspectives, scientific methodology warrants agreement on certain guidelines such as explaining empirically verifiable phenomenon in terms of the known natural laws of cause and effect. For a historical example, while it has been noted that Newton wrote far more about theology and alchemy than physics and mathematics, he generally did not explore metaphysical themes in works like *The Principia*. It might be said, then, that Newton successfully compartmentalize his interests. The argument of this paper concerning Mayr is that he too often seamlessly wove his personal metaphysical views within an otherwise strong presentation defining scientific discipline and autonomy. While Mayr was not a metaphysical evangelist like Huxley, he did set a prolific example within the scientific community. Possibly more could have been done towards articulating practical disciplinary boundaries distinguishing scientific methodology from metaphysical speculation.

²⁰¹ As an example utilizing a general understanding for the idea of scientific proof—just as it may be impossible to conclusively prove "intelligent design," similar challenges present themselves when attempting to conclusively establish a doctrine of "absolute chance."

³ Mayr, "Darwinian Flights," p. 50.

phenomenon with an almost transcendent aspiration as apparently revealed by Julian Huxley.⁴

Of interest, then, could be the example of Auguste Comte, the prominent nineteenth century rationalist who coined the term “positivism.” Apparently Comte was himself quite “religious,” though arguably in an irrational way. As Walter Simon explained in the 1973 edition of the *Dictionary of the History of Ideas* concerning Comte’s philosophical approach, it appeared to be Comte’s view that the

fashioning of the intellectual consensus must precede the reformation of society, [thus] the creation of a new spiritual power must precede the establishment of a new political order. This new spiritual power or priesthood was to serve, not some outmoded theology, but Humanity itself; and from there it was only a small further step to the idea of a Religion of Humanity and to Comte’s casting of himself in the role of its first High Priest.⁵

All the same, it could be argued that Comte’s influential metaphysics might have proven more conducive to the development of science than Europe’s comparatively traditional paradigms, a view that Mayr appeared to claim in *This is Biology* as a cultural prerequisite for the advancement of the biological sciences. For example, Mayr wrote that a revolution in thought though the Scientific Revolution was … it nevertheless did not include a revolt against allegiance to the Christian religion, and this ideological bias had adverse consequences for biology. . . . As a result, biology was basically dormant until the nineteenth and twentieth century.⁶

But no matter the historical analysis, short of possessing Laplacian omniscience, inquisitive human beings continually indulge in metaphysical philosophy where they

⁴ Huxley viewed scientific humanism as enjoining faith in a “greater knowledge and fuller perfection.” While there is always the possibility that in the future Huxley’s speculations might prove correct, in the present they remain but one of many intriguing philosophical possibilities. Huxley’s “faith,” then, was that in the future science would prove his perspectives true.

⁵ Walter Simon, “Positivism in Europe to 1900,” vol. 3 of *Dictionary of the History of Ideas* (New York: Charles Scribner’s Sons, 1973), 536.

⁶ Mayr, *This is Biology*, p. 29.

“leap” towards whatever they consider the most reasonable conclusion based on their analysis of the available evidence. Michael Ghiselin might then agree when stating, “Biologists can do their metaphysics well or they can do it badly, but believing that scientists can get away from metaphysics altogether is just another example of bad metaphysics.”⁷

Especially when considering the autonomy of biology as science, a discipline that continually negotiates contestable metaphysics in its intimate study of “life,” remaining sensitively aware of the disciplinary boundaries between an empirical conclusion and a philosophical speculation would prove valuable. Unfortunately, in his deployment of otherwise productive Hegelian dichotomies contesting the reasonable with the irrational, Mayr continually dismissed contrasting perspectives in an authoritative manner that suggested intolerance.

For example, historian and philosopher of science Paul Thompson wrote in a review of *The Growth of Biological Thought*: “The impressions one gets from Mayr’s discussions is that philosophers have generally contributed very little to the philosophy of biology.”⁸ Thompson critiqued Mayr’s philosophical analysis as having “the attitude of ‘good guys’ (those who agree with Mayr) and ‘bad guys’ (those who do not) is present,

⁷ Michael T. Ghiselin, review of *Unifying Biology: The Evolutionary Synthesis and Evolutionary Biology*, by Vassiliki Betty Smocovitis, *Isis* 90 (1999): 406. Suffice to say there is a complex relationship between empirical science and metaphysical philosophy, an issue that does not appear adequately addressed in Mayr’s books aimed at a broader audience. While Mayr’s legacy may have been further enhanced if he found himself able to proactively tackle the complexity of the topic, possibly that work might be something left for a future “Darwin.”

⁸ Paul Thompson, review of *The Growth of Biological Thought*, by Ernst Mayr, *Queen’s Quarterly: A Canadian Review* 91 (1984): 198.

with the views of the ‘bad guys’ often discussed and dismissed in a few sentences without argument – some not discussed at all.”⁹

Thompson concluded his review by stating:

While philosophers will rightly find this book naive in many respects, it is, nonetheless, an interesting book from which I learned a considerable amount, and given Mayr’s dim opinion of philosophers and the way they do philosophy, I doubt that he will be too concerned about their criticisms or mine.¹⁰

Perspectives Within and Without

While an experienced academic might take Mayr’s approach as a professional challenge, the public processes its science with a less seasoned analysis. Eugenie C. Scott, serving as president of The National Center for Science Education, lamented, “It appears that among well accepted scientific theories (heliocentrism, cell theory, atomic theory, plate tectonics), evolution alone is rejected by nonscientists.”¹¹ Scott added that in contrast to evolution, a poll taken by the American Museum of Natural History in 1994 showed that nearly 80% of Americans accept the theory of continental drift.¹² Nonetheless, the logistics of continental drift can appear far simpler to appreciate in an immediately testable way than when compared to the complexity of biological change over time. And of course, continental drift carries significantly less metaphysical baggage.

⁹Ibid., 199.

¹⁰Ibid., 200.

¹¹Eugenie C. Scott, “Antievolution and Creationism in the United States,” *Annual Review of Anthropology* 26 (1997): 264. The National Center for Science Education is an organization concerned with maintaining appropriate scientific standards for teaching biology within the public school system.

¹²Office of Public Affairs, *Science and Nature Survey* (New York: American Museum of Natural History, 1994).

As Scott pointed out concerning appropriate standards for promoting evolutionary theory:

Today, all science operates under a *methodological materialism* that assumes that scientific epistemology is limited to formulating explanations of the natural world on the basis of natural, rather than supernatural causes. Materialistic evolutionists . . . go beyond science and propose that the laws of nature are not only sufficient to explain all of nature and evolution but that the supernatural does not exist. This is *philosophical materialism (naturalism)*, the idea that there is nothing in the universe beyond matter, energy, and their interactions.¹³

Scott added, “This view has a long history in Western thought, but as a philosophy it is distinct from the methodological materialism that informs science in the late twentieth century.” Scott then warned that when scientists “present philosophical materialism as the inevitable outgrowth of science or evolution,” they “reinforce” an invitation to be challenged by opposing fundamentalists.¹⁴

In other words, leading evolutionists may do well to better articulate a distinction between their personal philosophical conclusions from their testable empirical science when presenting science in a public forum. After all, a metaphysical proposition is beyond empirical proof and thus outside the realm of conclusive analysis.¹⁵

Edward Larson and Larry Witham notably studied the metaphysical tendencies within the larger community of scientists in a *Scientific American* article titled, “Scientists and Religion in America.” They reported that current polls taken among practicing scientists show that approximately 40% felt congenial to a personal belief in a

¹³ Scott, 272.

¹⁴ Ibid.

¹⁵ For the purposes of this essay, the term “metaphysics” has been utilized as a general definition for any perspective that is currently empirically unverifiable and thus “beyond” conclusive scientific investigation. While a metaphysical perspective is an inherent part of any human endeavor, this issue here rather is how to better develop constructive guidelines for discussing such topics within a scientific context for a broad audience.

Being “to whom one may pray in expectation of receiving an answer.” A similar number felt affinity to the concept of “personal immortality.” Furthermore, these numbers remained consistent with a poll taken nearly a century earlier by a Bryn Mawr College psychologist, James H. Leuba.¹⁶

According to Larson and Witham, it is among the leading members rather than the rank and file where an absolute mechanistic worldview tends to become the dominant philosophical paradigm. For example, whereas sixty years ago less than 20% of those identified as “prominent” claimed an affinity for the Supreme Being and personal immortality constructs, current figures drop to below 10% among the members of the National Academy of Sciences, with an even smaller percentage reported among NAS biologists.¹⁷ Meanwhile, among those scientists considered rank and file, percentages remained steady.

Further, Larson and Witham quote Mayr as an authority by introducing him as the legendary evolutionary biologist … and NAS member since 1954, [who] made a study of disbelief among his Harvard University colleagues in the academy. “It turned out we were all atheists,” he recalls. “I found that there were two sources.” One Mayr typified as, “Oh, I became an atheist very early. I just couldn’t believe all that supernatural stuff.” But others told him, “I just couldn’t believe that there could be a God with all this evil in the world.” Mayr adds, “Most atheists combine the two. This combination makes it impossible to believe in God.”¹⁸

Towards the conclusion of their essay, the authors similarly introduced philosopher of science Michael Ruse as a scholar who has made a career of studying how biologists “do their work and spin their theories.” The authors contend that for Ruse it

¹⁶ Edward Larson and Larry Witham, “Scientists and Religion in America,” *Scientific American* 281(1999): 88-93. Larson and Witham attempted to duplicate Leuba’s methodology in order to obtain a more consistent correspondence between the two studies.

¹⁷ Ibid.

¹⁸ Ibid.

is all for naturalism; it is matter only, all the way down. Yet as an early member of the modern historical school of science, he cannot but see social factors influencing both disbelief among biologists and membership selection in the NAS. Do great minds tend to turn atheistic, or do such academies welcome only atheists? “It is a bit of both,” Ruse says.¹⁹

But whatever the reason, the philosophical percentages among the elite appear significantly different as compared to those polled from among scientists in general. And unfortunately, as was the case with Mayr, these metaphysical inclinations tend to get confused with a strict empirical interpretation of the scientific evidence, a concern that Mayr did not adequately address as a “chief discipline builder” for the science of modern evolutionary biology.

An Intellectual Press

In a 1982 review of *The Growth of Biological Thought*, Princeton Professor of Biology, James L. Gould, lauded Mayr’s Hegelian historical methods for promoting modern science:

He believes that histories should be polemical, to focus issues and provoke contradiction. I agree: The history of science illustrates again and again the generally unappreciated value of clearly defined, explicitly testable hypotheses, independent of whether they are right or wrong. Tightly drawn, highly opinionated presentations are invaluable in science, and Mr. Mayr’s is certainly provocative.²⁰

Overall Gould admired the “magisterial” work, though he also challenged the book’s “one major flaw … evident in Mr. Mayr’s analysis of the history of the ideas that led to evolution.” While Gould upheld his own credentials as a “thoroughgoing skeptic” who felt at odds having “to rebut Mr. Mayr’s assertions,” he nonetheless stated:

Mr. Mayr has a curiously shallow and altogether mistaken view of much of the theological background as it affected scientists. The recent resurgence of so-called

¹⁹ Ibid.

²⁰ James L. Gould, “Ideas about Life,” *New York Times*, May 23, 1982.

fundamentalist Christianity, with its literal, biblical view of Creation, has provided a lamentable opportunity for shallow, wholesale condemnations of religion as the major impediment to science. Unfortunately, in view of the essential role contemporaneous religious thought plays in a problem-orientated history of science, Mr. Mayr provides a remarkably ill-informed and tasteless example of this kind of attack. He repeatedly and with little or no qualification identifies Christianity, past and present, as the chief enemy of scholarship in general and science in particular.²¹

Gould added, “in all fairness I must point out that Christianity is placed in a rather different role by most historians.” He contended, Mayr’s “misunderstanding of Judeo-Christian theology is especially crippling when he attempts to analyze the interaction between religion and evolution.”²²

Then at the heart of the critique Gould states how Mayr

repeatedly asserts that evolution and a belief in the Judeo-Christian God are absolutely incompatible. While I tend to agree, Mr. Mayr seems unaware that most Christians and Jews are able to reconcile the two, often by the astonishingly rational process of reading Genesis as a metaphor God wisely used to explain creation to a scientifically primitive society. As Mr. Mayr’s history proves, the true enemies of science and free scholarship are not people who follow a particular creed or ethos but those who seek to impose their ideologies forcibly on others, be they creationists, fascists, Marxists or whatever. Mr. Mayr does a major disservice to the tenuous intellectual freedom we so carelessly enjoy by thoroughly misidentifying the groups that feel threatened by that freedom.

Darwin’s theory of evolution by natural selection was recognized by thoughtful people of all persuasions to be cogent, clearly reasoned and perhaps even true.²³

Within Gould’s analysis, there is no hint of doubt regarding the relevance of modern evolutionary biology as an empirical science. Rather, it concerned a philosophical paradigm utilizing evolution as a stump from which to launch a metaphysical vendetta.

²¹ Ibid.

²² Ibid.

²³ Ibid.

While considering Gould's points on the apparent metaphysical excess presented in Mayr's work, a recent exposé in *The New York Times* of Daniel C. Dennett's book, *Breaking the Spell: Religion as a Natural Phenomenon*, helps portray the shortcomings of such tendencies.²⁴ Leon Wieseltier, literary editor for *The New Republic*, wrote a rather savage review of Dennett's work, opening his critical barrage by declaring, "The question of the place of science in human life is not a scientific question. It is a philosophical question." For Weiseltier, "scientism" describes a kind of neo-Huxleyan "view that science can explain all human condition and expressions, mental as well as physical." He claimed that this is "a superstition, one of the dominant superstitions of our day; and it is not an insult to science to say so."²⁵

Wieseltier next sets upon Dennett's philosophical musings with the contention the work is "a merry anthology of contemporary superstitions" that presented a world in which you must believe in the assumption that the most extreme statement of an idea is its most genuine statement. Dennett lives in a world in which you must believe in the grossest biologism or in the grossest theism, in a purely naturalistic understanding of religion or in intelligent design, in the omniscience of a white man with a long beard in 19th-century England or in the omniscience of a white man with a long beard in the sky.²⁶

Wieseltier culminated his complaint with the proclamation:

Before there were naturalist superstitions, there were supernaturalist superstitions.... Yet the excesses of naturalism cannot hide behind the excesses of

²⁴ As previously argued, though Mayr was far more conservative about expressing his metaphysics than someone like Dennett, their sympathies otherwise enjoy a variety of similarities and thus Wieseltier's critique of "scientism" has a similar application toward both of their worldviews. On the other hand, Dennett, like Huxley, goes on to engage his credibility as a highly acclaimed scientist for publicly evangelizing a metaphysical perspective. Perhaps, then, there is a "spiritual" connection between an internal culture as championed by Mayr that might appear to endorse this form of metaphysics as something indistinguishable from serious science, and its prominence in a public display as presented by an otherwise serious scientist such as Dennett.

²⁵ Leon Wieseltier, "The God Genome," *New York Times*, February 19, 2006.

²⁶ Ibid.

supernaturalism. Or more to the point, the excesses of naturalism cannot live without the excesses of supernaturalism. Dennett actually prefers folk religion to intellectual religion, because it is nearer to the instinctual mire that enchants him.²⁷

And in a concluding stab that could well also have implications for that “one major flaw” in Mayr’s own earnest presentation: “He [Dennett] cannot conceive of a thoughtful believer. He writes often, and with great indignation, of religion’s strictures against doubts and criticisms, when in fact the religious traditions are replete with doubts and criticisms.”²⁸ And further, “Like many of the fundamentalists whom he despises, he is a literalist in the matters of religion.”²⁹

As with Gould’s essay, Wieseltier offered no complaint towards the empirical boundaries established for evolutionary biological sciences. Rather, under attack is an unquantifiable metaphysical paradigm woven within the otherwise “good name” of science. And thus here lies what could be the only significant weakness in the otherwise brilliant and tremendously effective career of Ernst Mayr, “The Darwin of the 20th Century.” Mayr similarly allowed too much of the science of evolutionary biology to be indistinguishably wrapped within the metaphysics of mechanistic naturalism.³⁰ In other words, he did not articulate the difference between mechanistic naturalism as a methodological tool, from an absolute mechanistic philosophy presented as the obvious conclusion of evolutionary biology as a science. As a result, as part of his legacy he left an unfortunately strong impression, (even if only for a certain vocal and sometimes

²⁷ Ibid.

²⁸ Ibid.

²⁹ Ibid.

³⁰ In this sentence, the term “metaphysics” in relation to “mechanistic naturalism” is used in the sense of when naturalism is stretched into an ultimate explanation that cannot be empirically verified. Or in other words, when naturalism as an ultimate explanation becomes a faith that precludes testability.

influential sector of the American public,) of evolutionary biology as but another contesting metaphysical paradigm jockeying for public sponsorship, as compared to it being the empirical fruit of a disciplined scientific legacy.³¹

³¹ The emphasis here regards broad public presentations of topics that articulate the disciplinary requirements for “what is biology” and “the growth of biological thought.” It is otherwise natural and expected that as an individual, each scientist will carry his or her own metaphysical assumptions. Historically a wide variety of metaphysical perspectives, all arguably unprovable in their day, have been engaged in a manner that proved highly conducive to scientific advancement.

CHAPTER 5 CONCLUSION

In this essay, not only were the roots of Mayr's psychological foundation as a leading biologist examined, but also of the culture, both scientific and popular, in which he operated and in which the discipline of modern evolutionary biology was established. While Mayr excelled in helping solidify credible disciplinary boundaries for the biological sciences on par with physics and chemistry, certain aspects of his work in the "history and philosophy of biology" tended far too frequently to mix his personal philosophy based on a brand of metaphysical naturalism, with the rightful promotion of the scientific practice of methodological materialism. As a result, throughout his work his personal worldview as an intelligent human being became nearly indistinguishable from that of his otherwise laudable championing of the modern discipline of evolutionary biology. This helped perpetuate an internal culture supportive of a missionary brand of scientism based on absolute naturalism as being the obvious and appropriate conclusion to evolutionary studies.

Also examined were a number of his contemporary biologists who were, like Mayr, scientific leaders making critically important contributions to the establishment of the modern synthesis of Mendelian genetics and Darwinian evolution. While Mayr excelled at empirically negotiating a productive middle ground between the unquantifiable theories of vitalism and reductionism, he at times appeared almost dogmatic in declaring an affinity for a worldview akin to Huxley's doctrine of evolutionary humanism. In contrast, upon closer examination, quite a variety of metaphysical perspectives were

cultivated by leading evolutionary biologists who were hardly naive about the intellectual ramifications of the new synthesis.

It thus could be unfortunate, then, that Mayr's writings on the history and philosophy of biology offered little (or rather, no) discussion on the metaphysical flexibility of the science of evolutionary biology. Mayr's work rather conveys a sense of exclusivity towards a philosophical view in step with the same metaphysical perspectives that he personally subscribed too.

Perhaps it would have been better for Mayr to rather emphasize his doctrine of emergence as a logistical boundary between metaphysical inquiry and empirical testability. Whatever life is, it currently remains testable only once its symptoms manifest themselves in matter, so that would appear a logical empirical beginning. Then, personal exploration of metaphysical speculations and their ethical implications could be left for texts not otherwise dedicated towards offering broad public guidelines for what the scientific discipline stands for. In other words, the autonomy of the discipline would be better protected from a public debate surcharged with fundamentalism if important works such as Mayr's better articulated a distinction between personal metaphysics and empiricism in practice.

But in light of these concerns, even if Mayr still wished to include his metaphysical perspectives within a work dedicated to science, it would have been more constructive to clearly articulate for his audience that he was simply sharing his philosophical views based on his personal experience as a scientist. That would avoid leaving an impression that his own metaphysical opinions, however popular he felt they might have been among his fellow colleagues, were the practical standard by which the value of good biology

should be judged. After all, leading biologists held a wide variety of metaphysical perspectives while performing at a high level of achievement progressing the science of evolutionary biology.

Tact and sensitivity would seem to be at a premium when discussing such topics for a wider audience. Thus Mayr's rather Hegelian approach would well have been more constructively engaged among seasoned scientists and veteran academics than among nonprofessionals who might confuse his strongly argued metaphysical assumptions as the conclusive result of the research in his discipline. That, of course, is debatable, and thus the criticism of Mayr's presentation is that along with his extremely valuable scientific observations he did not set the most progressive example as to how to gracefully negotiate the metaphysical questions that naturally arise.

While Mayr was no evangelist for his philosophical views like a Huxley or a Dennett, his voluminous works in the history and philosophy of biology helped to perpetuate a supportive internal culture for such projects. Unfortunately, the otherwise productive scientific culture he worked to help establish may have also left a legacy for a lack of philosophical introspectiveness regarding the relationship between the professional practice of evolutionary science and its reception within a diverse public audience.

Hopefully this essay has effectively shown this does not need to be the case. While negotiating the metaphysics of life is an important concern for any intelligent human being, promoting any one particular philosophical doctrine does not need to be an integral part of evolutionary biology as a science in practice. Especially for a broad audience, such endeavors might be better handled in texts or humanity courses geared towards

exploring the philosophical and ethical implications of scientific discovery. By avoiding a mood of promoting any one nonverifiable “dogma” as being the definitive conclusion to scientific research, a more varied philosophical arsenal might go far toward reducing the fundamental fervors swirling about evolutionary science.

While this essay criticizes Mayr for handling these sensitive issues with less tact than might be otherwise desired, he nonetheless left his audience with a rather intriguing statement at the conclusion of his final interview, when he proclaimed: “Greetings to everyone at *Scientific American*. And I hope you find my provocative ideas sufficiently useful that you will at least be gentle in your criticism.”¹ Certainly, no matter what criticism may be presented, Mayr was genuine, sincere, and a highly successful scientist who deservedly received accolades for his determined pursuit of scientific progress.

But methods utilized to discuss metaphysical issues within the discipline will eventually show up when members of the genre make presentations to a larger audience.² And sensitivity towards this issue is significant, for as Michael Ruse articulated in the conclusion to his recent book, *The Evolution-Creation Struggle*, what

we have [is] no simple clash between science and religion but rather between two religions.... Those of us who love science must do more than simply restate our positions or criticize the opposition. We must understand our own assumptions and, equally, find out why others have (often) legitimate concerns.³

¹ Steve Mirsky, Claudio Angelo and Marcelo Leite, “The Evolution of Ernst: Interview with Ernst Mayr,” *Scientificamerican.com*, July 06, 2004, <http://www.sciam.com/article.cfm?SID=mail&articleID=0004D8E1-178C-10EB-978C83414B7F012C>. This quotation was taken from the complete and unedited version of the interview available as a .pdf download from a link at this site.

² Or, if expressed in the language of a time-worn folk saying: “Sometimes its not what you say, but how you say it that counts.”

³ Michael Ruse, *The Evolution-Creation Struggle* (Cambridge, MA: Harvard University Press, 2005), 287–88.

This is an ongoing debacle where Mayr's legacy may not have proven itself a strength as compared to the rest of his otherwise highly successful and tremendously important career as "The Darwin of the Twentieth Century." Yet, proactively distinguishing between scientific discipline and metaphysical faith will critically and increasingly require quite a bit of internal attention as the modern science of biology continues to evolve.

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BIOGRAPHICAL SKETCH

Stewart Edward Kreitzer's interest in a graduate degree in the history of science developed while completing his Bachelor of Arts in history at the University of Florida (*cum laude*, 2004). While working with his advisor, Betty Smocovitis, he began to focus on Ernst Mayr as a prominent scientist exemplifying biology in the twentieth century, and most significantly evolutionary biology, with its profound influence on the scientific and intellectual culture of the modern era.

Kreitzer plans to continue his graduate studies in this field.