organizations, formal tests or other kinds of standardized monitoring are by no means the most important sorts of probation. Instead, completely informal tests, whether of one's "character" or of one's abilities, become the key measures of one's standing in an organization. At the lower levels, probations among peers are especially important. For instance, a detective recently described to me an informal authenticity test that he experienced when he was a rookie uniformed policeman. He and his fellow officers had raided a burglary ring's den and discovered a huge cache of stolen goods. A veteran officer ostentatiously picked up a Rolex watch and pocketed it, clearly a reportable action under departmental rules. The rookie decided to do and say nothing. Three weeks later in a bar, the veteran left his own cronies and approached the rookie and his comrades. He took the watch out of his pocket, put it on the bar, and smashed it to bits with his blackjack. The veteran looked at the rookie and said, "You pass."

When one ascends to the middle and higher levels of organizations, probations become more subtle and ambiguous and often cross hierarchical lines. Managers and professionals alike are constantly gauged by how well they have internalized organizational etiquette. How much does one say to one's boss's rivals? How does one show to superiors the requisite combination of self-confidence and deference? Up the ladder, one must meet exigencies while masking the unpleasantness often entailed in doing so. How adroitly does one circumvent bureaucratic procedures, while seeming to adhere to them, in order to do what "has to be done"? How well, at the highest levels, where one's reputation becomes hostage both to one's subordinates and to often unpredictable events, has one mastered the doublethink and doublespeak necessary to address, with seemingly equal conviction, disparate publics with irreconcilable interests and so outfox the media? Indeed, life within bureaucracies consists of an endless round of such informal probations. These, instead of formal standardized tests, are the key mechanisms by which social groups in organizations are formed, alliances are fashioned, and social cohesion, such as it is, is produced.

The book presents a cautionary tale of the hazards of devoting oneself to working out the overarching schemes of authors like the celebrated but single-minded Foucault, whose own work, one could argue, has done much to erode the distinction between social theory and pure speculation.

Robert Jackall
Department of Anthropology and Sociology, Williams College, Williamstown, MA 01267

Vignette: Testing Clean

One ingenious technique to identify a guilty party, reported from India, is to bring all those suspected of a crime together before a tent. They are told that inside is a magic donkey that will bray if a guilty individual pulls its tail but will make no sound if the one administering the tug is innocent. The suspects are then sent into the pitch dark tent one at a time and told to pull the donkey's tail. They are not told that the tail (which is actually attached to no donkey at all) had been liberally smeared with lampblack. After the last one emerges from the tent, they are reassembled and ordered to show their hands. The one with clean hands is judged to be the guilty party.

Setting aside the obvious point that this technique could not be used very often because the word would quickly get around, consideration of it reveals one of the prime characteristics of the asymmetrically skewed logic of lie detection . . . . Why should it be expected that only one of the suspects would emerge with clean hands? Any reasonably prudent individual, innocent or guilty, would probably refrain from pulling the tail. After all, why should one trust an ass, no matter how reputedly magic or sage, not to make mistake? If any suspect should in fact emerge with dirty hands, that person might be judged innocent by the investigators but would also have shown oneself to be a fool.

—*F. Allan Hanson*, in *Testing Testing: Social Consequences of the Examined Life*

Affinities and Rationales

The Diversity of Life. EDWARD O. WILSON. Belknap (Harvard University Press), Cambridge, MA, 1992. viii, 424 pp., illus., + plates. $29.95. Questions of Science.

In *The Diversity of Life* Wilson writes with grace and clarity on an issue he believes to be critically important to the quality of human life—the preservation of biodiversity. Rather than providing a resource or synthesis for biologists or professional conservationists, Wilson explains in simple terms the biological processes responsible for the diversification of species and warns that human activities now cause extinctions of species in historically unprecedented numbers. To provide a rationale for efforts to stave off this great loss, Wilson develops the economic worth of biodiversity and, finally, outlines proposals for preserving the earth's rich heritage of its many millions of species of plants, animals, and microbes. *The Diversity of Life* is a moving and persuasive call to arms by one of the most articulate and influential biologists of our generation.

Because Wilson has become a prominent spokesman for biology and conservation to the general public, professionals should take interest in how he represents scientific issues related to the origins of biodiversity, the basis for concern over the loss of species, and the assumptions underlying his valuation of biodiversity.

Wilson's narrative strengths derive from his ability to convey a wonder for natural history; his pen sketches vivid portraits of habitats and organisms and the rhythms and cataclysms of nature. It is clear throughout this book, as it has been in earlier writings, that Wilson regards nature very personally. This is both the strength and the weakness of *The Diversity of Life*.

The first half of the book presents—at the college freshman level—the evolutionary and ecological processes that have resulted in the buildup of biodiversity: evolutionary change, speciation, adaptive radiation, species interactions. The coverage is conventional, controversies are skirted, and scientific endeavor itself does not figure prominently. Distinction between microevolution and macroevolution is erased by placing these extremes on a continuum produced by scaling single-locus population genetics over time and over the entire genome. Speciation is allopatric, species differences arise from adaptation, and competition plays a prominent role in promoting adaptive radiation on species-poor islands while constraining it in regions of high diversity.

Subtle points of scientific controversy cannot be dealt with satisfactorily in a general treatment, but Wilson nonetheless appears to take sides when it suits his purpose. In doing so, he sidesteps such issues as taxon selection ("Highly diversified groups have better balanced their investments and will probably persist longer into the future"), reductionism ("Only with

a detailed knowledge of the life cycles and biology of a large number of species [can one] chart the future of ecosystems"), and progressive evolution ("Let us not pretend to deny in our philosophy what we know in our hearts to be true. . . . An undeniable trend in progressive evolution has been the growth of biodiversity by increasing command of the earth's environment").

As Wilson points out, extinction has many causes. Cataclysmic events may be important historically but do not illuminate the current crisis. Chronic disappearance of species is made more likely by ecological specialization, habitat fragmentation, and small population size with its attendant problems of inbreeding and loss of genetic variability. Wilson focuses on tropical rainforest, which is disappearing at an accelerating rate, currently about two percent per year. Extrapolating from known relationships between number of species and size of area sampled, and from estimates of the total diversity of tropical rainforests, Wilson estimates that 27,000 species, mostly insects, disappear each year. Seventy-four per day. Three per hour. One may quibble with these calculations, but Wilson makes his point. Species, many of them unknown to science, are disappearing.

Why should this matter? Clearly it does to Wilson. His concern is for the dwindling of the aesthetic richness of nature that is treasured by many naturalists and field biologists. Although Wilson has argued that all humans share the potential for this intimate emotional relationship with nature—what he has called "biophilia"—he clearly recognizes that aesthetic value does not feed the hungry or fuel the economies of poor nations. To justify conservation, one must appraise natural systems in the recognized currencies of economics, politics, and social and cultural institutions.

The conservation movement has had two basic points of view. One emphasizes the preservation of individual species for aesthetic or spiritual reasons, and perhaps as a metaphor of our own precariousness, individually and as a species. The other focuses on the preservation of habitats and ecosystems, partly for their inhabitants' sake, but mostly for the ability of intact systems to support economically important species, maintain watersheds, prevent soil erosion, ameliorate local climate stresses, and reduce the consequences of natural catastrophes. Increasingly, scientists are recognizing the importance of intact ecosystems in countering anthropogenic global climate change.

Wilson clearly adopts the first point of view, preferring the individual species and the multitude of species over the ecological systems they make up. He endorses the New Environmentalism movement, based on the proposition that "new ways of drawing income from land already cleared, or from intact wildlands themselves, will save biodiversity from the mill of human poverty." Wilson explains that biodiversity generates economic value in two ways. One arises from the fact that populations of different species are interconnected: predators and disease organisms control populations of their victims, pollinators and seed dispersers promote reproductive success and population growth of plant species, and so on. Biodiversity also generates economic value from extractable products obtained from individual species. Wilson portrays natural systems as sources of unmined riches and lists pharmaceuticals and foods from little-known plants and animals. A closer look at these reveals that few come from the rainforest treasurehouse of biodiversity; instead many are weedy plants from disturbed habitats or species used by traditional cultures. One wonders whether the value of natural systems as extractive reserves can often exceed their value as sources of wood products or as land converted to conventional agriculture. Wilson cites one well-studied case in Peru, where it was determined that a hectare of intact forest could yield sustainably harvested products with a net annual value of over $400. Ecotourism and pharmaceutical prospecting also have produced income in such countries as Costa Rica.

Wilson does not consider whether such optimistic bottom lines for natural systems as extractable reserves might suffer as they are scaled up from the small study area or pilot project to the enormous areas needed for effective conservation of biodiversity. High values of many products depend on limited supplies and cannot be extrapolated to vast extraction enterprises; ecotourist dollars are finite, and their per-hectare value diminishes when they are spread over the entire area of intact systems. Whether richer nations will support local initiatives in conservation and biological inventory in poorer nations, as in the case of the national park system and INBIO in Costa Rica, remains to be seen on a global scale.

Many pragmatists believe that conservation and rationale development will find greater support from the economic, political, and social worth of intact ecosystem processes than from the value of biodiversity itself. In truth, most humans are concerned more about the fate of their own species than about that of any of their cohabitants on earth. Considerations of quality (and, unfortunately, quantity) of human life would seem to weigh heavily against the economic worth of species, even in their vast numbers. Most of the earth's land and oceans will be managed; perhaps, at best, a sample of the earth's biodiversity will remain in preserves, gene banks, zoos, botanic gardens, and, to some extent, as elements of the landscape created by our endeavors.

Wilson treasures nature for reasons other than its economic worth but is compelled to argue for its preservation in the disadvantageous arena of economics and politics. In the end, however, the value of intact nature is determined by those who claim it. To the extent that biodiversity is preserved, and by whatever rationale, it will be due largely to efforts of committed and persuasive individuals like Wilson, for whom the loss of biodiversity brings an impoverishment of the human spirit. "Wilderness settles peace on the soul because it needs no help; it is beyond human contrivance."

Robert E. Ricklefs
Department of Biology,
University of Pennsylvania,
Philadelphia, PA 19104–6018

■

Being First

The Cambridge Guide to Astronomical Discovery. WILLIAM LILLER. Cambridge University Press, New York, 1992. xii, 257 pp., illus. $29.95.

Being the first to discover something is not as easy as it might seem. There are strategies that pay off and strategies that don't; there are places to explore and places to avoid; there are times that are ripe and times that are not. Above all, there is an intuition or outlook that guides toward the successful choices and persists during long periods of failure.

Such are the lessons brought home by *The Cambridge Guide to Astronomical Discovery* by William Liller. The book discusses and illustrates the process of the discovery of objects in the night-time sky by persons whose resources are limited. Intended as a guide for those who would join this pursuit, the book also serves a more general audience interested either in the tactics of searching for anything new in a scientific arena or in the nature of several types of astronomical objects most amenable to observation with binoculars or small telescopes. The author is a former professor of astronomy at Harvard, now engaged in the search himself.

This readable work conveys its message in a variety of ways. The first portion of the book provides the astronomical background for the types of objects most likely to be investigated by an amateur: comets, novas and supernovas, asteroids, and variable stars. Next, the discoverers speak for them-