

Review of
MARTIN GARDNER, *THE NIGHT IS LARGE:
COLLECTED ESSAYS, 1938-1995*

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“Man is a small thing, and the night is very large and full of wonder.” Martin Gardner derives the title of his collection of essays from this excerpt from a play by Lord Dunsany, one of his favorite authors. Gardner finds wonders everywhere, as evidenced by these forty-seven pieces, which originally appeared in such disparate places as *Scientific American*, *Fantasy and Science Fiction*, *Journal of Philosophy*, *The Skeptical Inquirer*, *The New York Review of Books*, and several of Gardner's monographs. Although *The Night Is Large* comprises seven sections entitled Physical Science, Social Science, Pseudoscience, Mathematics, The Arts, Philosophy, and Religion, Gardner typically takes an interdisciplinary approach, and many an essay would comfortably fit into a section different from its assigned one. Several of the articles in this volume discuss subjects in mathematical logic and foundations and so deserve more detailed consideration here.

Two of the three pieces in the Mathematics section of *The Night Is Large* deal with mathematical realism. In Gardner's words, “Do mathematical structures have a reality independent of human minds?” Although most practicing mathematicians take an objective, if not downright Platonistic, approach to the field, more anthropocentric viewpoints get expressed disproportionately often. In general, those holding a majority opinion can tend to take their outlook for granted and not expound on it, while those in the minority will have more need to articulate and maybe even proselytize for their position. Gardner's article, written some thirty years apart, straightforwardly and wholeheartedly attack the more subjective conceptions of mathematics. In the one case, his main target is the anthropologist Leslie Alvin White and his book *The Science of Culture*; in the other, the mathematicians Philip Davis and Reuben Hersh and their book *The Mathematical Experience*.

Both of Gardner's essays provide something that is sometimes short-changed in the popular literature on mathematics: an explicit defense of mathematical realism. Many of the themes developed in these two articles also reappear throughout the collection in other contexts, such as physics and anthropology.

The Philosophy section of *The Night Is Large* begins and ends, respectively, with "The Significance of 'Nothing' " and "The Irrelevance of 'Everything' ", articles that originally appeared in Gardner's Mathematical Games column in *Scientific American*. The essay on nothing starts with the empty set. Gardner then describes the Frege-Russell-von Neumann construction of the natural numbers from the null set. Rather than transfinitely extending this construction to produce the ordinals, he directly proceeds to the definition of the surreal number system. By an induction not much more complicated than that yielding the ordinals, one obtains a system that includes the ordinals, the reals, infinitesimals, and much more. Gardner incorrectly describes the surreals as forming "a real and closed field", rather than a real-closed field, a quite different kettle of fish. (In fact, the word "field" needs to be taken with a grain of salt here, since the surreals form a proper class.) Naturally, the complementary essay on everything contains a discussion of the concept of universal set, along with the paradoxes of Cantor and Russell. Neither essay is restricted to the mathematical, though. Gardner treats nothingness and "everythingness" in a variety of contexts, including the musical: "I have not heard '4'33'" performed, but friends who have tell me it is Cage's finest composition."

Somewhat puzzlingly, Gardner's dual review of Rudy Rucker's *Mind Tools* and Eli Maor's *To Infinity and Beyond* appears among the essays on physics, rather than mathematics. In his discussion of Maor's book, Gardner touches on limits and infinite series, and countable and uncountable cardinals. The article states that "Cantor believed that 2 raised to the power of aleph-null is the same as C ," but does not mention the results of Gödel and Cohen on the consistency and independence of the Continuum Hypothesis. Gardner also lapses slightly by listing the set of integers as $1, 2, 3, 4, 5, \dots$. The section of the review devoted to Rucker's book also refers to infinity and infinite cardinals. Symbolic logic, Gödel undecidability, automata and Turing machines, and work by Gregory Chaitin all come into play as well.

Other pieces of more or less particular interest to readers of MODERN LOGIC discuss Quine, Lewis Carroll (although the logical and mathematical work of Carroll/Dodgson receives little mention), artificial intelligence, and various mathematical topics. But *The Night Is Large* deals with much else as well, from Arthur Conan Doyle's

spiritualistic gullibility to Shakespeare to free will, from “The Royal Historian of Oz” to “White, Brown, and Fractal Music” to “Klingon and Other Artificial Languages”. Indeed, the variety of subjects and their often unexpected relationships characterize the best of Gardner’s writing. And his acknowledged expository skills enhance the intrinsic interest of his topics. His prose is lucid, usually down-to-earth, but with the occasional surprise — how often do you encounter the word “fugleman”? In addition, he displays a sense of humor that, though sometimes falling flat, generally scores more hits than misses. Gardner, true to his considerable background in sleight-of-hand, takes particular delight in straightfacedly pulling off the outrageous. In “Gardner’s *Whys*”, which first appeared in *The New York Review of Books* and is reprinted in this collection, he pseudonymously and scathingly panned one of his own books.

The Night Is Large does contain some slip-ups — mathematical errors like those mentioned above, misidentified people, and so on. But the book’s main drawbacks come from the assembly of its individual pieces into a whole. Several of the essays overlap with each other, and on occasion the prefaces Gardner gives to the articles compound the *déjà vu*. And most, if not all, of the pieces in *The Night Is Large* have appeared in previous Gardner anthologies, so a true aficionado will not find much new here. But for those to whom these writings are unfamiliar, the book provides a wide and interesting sampling of Gardner’s output. “The night is very large and full of wonders”, and Gardner possesses a correspondingly large scope of interests and the ability to convey those wonders to his readers.

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