



POSTSCRIPT THE TERROR OF ERROR

On a February day in 1997, not long after the Valentine's party described in the epilogue to this book, I walked into Gell-Mann's office at the Santa Fe Institute for another interview. Chien-Shiung Wu, the Chinese American physicist whose landmark experiment on parity conservation shocked the world of theoretical physics, had died three days earlier at age eighty-four, and her obituary appeared in *The New York Times*.

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"They always make the deceased sound so admirable," Gell-Mann said, or words to that effect. (I had not yet turned on my recorder so I am relying here on memory.) Then, smiling devilishly: "We called her the Dragon Lady." We laughed at what was now a familiar sobriquet. "I suppose you might be writing my obituary some day," Gell-Mann mused. "I hope you make me sound like a nice person." We were still on good terms then.

Our relationship—that of biographer to subject—started to fray when he began pressuring me to leave out some parts of his life story. That, I objected, would undermine the integrity of the biography. And after long consideration, I turned down his insistent requests to let him read the manuscript before publication. As a journalist you become wary of such appeals. You work late into the night meticulously checking and rechecking, fearful of committing the slightest imprecision. Over the years it took to write the book, I had also recruited physicists and friends to comment on drafts of the manuscript. This had become a standard part of my effort as a journalist and author to be both true to the science and clear to smart general readers, one with a fascination for ideas but often lacking a formal background in science. Readers like myself. Next came more rounds of scrutiny by the editors at my publisher, Alfred A. Knopf.

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The more eyes the better, for hard as you try some errors inevitably squeak through. But granting prepublication review to the subject himself is a very different matter. You leave yourself open to being nudged, or intimidated, into writing a less than objective account. Your readers are left to wonder how much say your subject had over your depiction of his life. None of us, after all, are the best judges of our own stories.

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With Gell-Mann the danger seemed especially acute. “Don’t do it,” I was warned by a colleague. “The book will never be published.” He compared the likely result to the Uncle Remus story of Br’er Rabbit wrangling with the Tar Baby. Months, maybe years would go by, as Murray procrastinated and procrastinated interrupted by bouts of caviling at great length over every word. The result would be a quagmire.

As soon as *Strange Beauty* was published, eagle-eyed Murray scoured it line by line. He was playing the role of the mythical lighthouse keeper he had described in his preface to *The Quark and the Jaguar*, occupying long, lonely nights poring over books, page after page, intent on finding each blunder. “The reader of this volume,” Gell-Mann had written, “can therefore readily imagine the agonies of embarrassment I am already enduring just through imagining dozens of serious mistakes being found by my friends and colleagues after publication and pointed out, whether gleefully or sorrowfully, to the perfectionist author.”

Painful as they were to me, my own errors were minor. I had already learned from an early reader that in the first printing of the hardcover edition, I had confused the physicist William A. Fowler with the physicist William B. Fowler. Elsewhere I’d misspelled Lake Patzcuaro and said that the strangeness of the xi particle was 2 instead of -2 . In a sentence mentioning Murph Goldberger’s term “physics in never-never land” (where absurd quantities like negative probabilities popped up in the calculations) I had attributed the phrase to *Alice in Wonderland* instead of *Peter Pan*. (Future printings and editions were corrected and an errata list of these and other errors appears on the book’s website.)

When Gell-Mann had told me in an interview about buying his first car, a Chevrolet, I had mistakenly assumed it was a used one. “Brand-new Chevy,” Murray now informed me. Gwen Groves, General Leslie Groves’s daughter, should have been called matron (not maid) of honor for Gell-Mann’s wedding to Margaret since she was married by then. I had written that Margaret, his first wife, had embroidered a turtle on their daughter’s ski cap. It was actually a tortoise. I hadn’t known the distinction.

But what he complained about most vehemently were not actually errors. He was particularly miffed that I had associated his family’s early years in the United States with the Lower East Side. Gell-Mann’s grandparents, Moses and Celia Gellmann, were part of the late nineteenth and early twentieth-century migration of Eastern European Jews to the southeast corner of Manhattan. Bounded roughly by 14th Street on the north and Broadway on the west, the entire area was referred to then as the Lower East Side and later as the Historical Lower East Side. The Gellmans’ first known address was on East 4th Street, squarely in that neighborhood, which included what would come to be called the East Village (also known today as Loisada, after a Latino pronunciation of “lower east side”). After their marriage, Gell-Mann’s parents lived for a while a few blocks north on St. Mark’s Place, and Murray himself was born at the northern edge, on 14th Street between 2nd and 3rd Avenues. These days Lower East Side is used more specifically to mean a smaller neighborhood bounded on the north by Houston Street and on the south by Canal—one that evokes the image of tenement houses and pushcart peddlers, not something that Gell-Mann was keen to be identified with.

I knew he would object to my conclusion, shared by science historians and Gell-Mann’s old colleagues, that he hadn’t originally believed in the ontological reality of the quark, considering it more of an abstract tool for solving equations than a fundamental component of matter. He had spent an entire interview trying to pound this into my head—when, in the past, he had spoken of quarks as being “fictitious” or “mathematical” he had been using the terms

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in his own special sense. The next time we met he cut short my opening questions, insisting on another round of pounding. But the material I found in various archives told a different story. Why did this fine philosophical point matter so much to him? It took nothing away from the magnitude of his accomplishment.

From then on he castigated the book and treated me with cold cordiality. (We both continued to live a little more than a mile apart in Santa Fe and would sometimes attend the same events.) “Murray never forgives and never forgets,” his friend Murph Goldberger had told me back in 1996. “He tends to remember certain things and you can’t disabuse him because he is never wrong.”

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The first edition of *Strange Beauty* left off in the late 1990s, when I attended what would be the last Gell-Mann party that I was invited to. But I continued to follow his career as a new millennium unfolded.¹ In 2005 he and Marcia divorced, leaving him alone with his intellectual pursuits. Though he maintained his fascination with high-energy physics, most of his attention was devoted to his other work. His range was astounding. He continued to publish papers with James Hartle on the fundamentals of quantum mechanics, rich with their ideas on coarse-graining, decoherence, and thermodynamics, all part of the story of how our seemingly solid world emerges from the indeterminate realm of particles. He collaborated with Seth Lloyd on an influential paper about the nature of complexity and worked with the linguists Merritt Ruhlen, Sergei Starostin, and others on the origin of language, exploring the idea that all the world’s babel could be traced back to an original ur language, the mother of all tongues. Gell-Mann’s long interest in the tension between regularities of nature and the randomness of frozen accidents led him to speculate about the possibility of rough rules of human history, an idea, he mused, that was “becoming a trifle more respectable” than before. In 2016 he and the mathematician

¹ During this time Gell-Mann may have become more comfortable with his immigrant past. In 2005 he accepted the Ellis Island Family Heritage Award along with the artists Christo and Jeanne-Claude, the winemaker Robert Mondavi, the astronaut Scott Parazynski, and Retired General Colin Powell.



Gell-Mann, surrounded by researchers at a celebratory tea at SFI in 2009.

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Ole Peter published “Evaluating Gambles using Dynamics,” which was named the most widely read paper of the year in the journal *Chaos*.

All of this high-powered thinking took place under the auspices of the thriving institute that had become his passion. From its original location in the old convent on Canyon Road, the Santa Fe Institute had moved to a hilltop overlooking the city,

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renovating and expanding a mansion once owned by the American statesman Patrick J. Hurley into an intellectual aerie. The ballroom became a conference hall, with a large portrait of Isaac Newton looking down from one wall, and an interior courtyard was surrounded by glass panels. Pictured in films and magazines, images of these transparent blackboards scribbled with equations became something of an institute hallmark. The lunch tables on any one day might be occupied by scientists studying the thermodynamics of computation, the scaling laws of organisms and cities, the nature of intelligence, natural and artificial, the social dynamics of the Anasazi, and the origin of life on Earth. Sitting among them might be a writer or artist on an intellectual retreat as one of the institute’s Miller Scholars (named for a particularly generous donor). Chief among them was Gell-Mann’s friend, the author Cormac McCarthy, who had moved to Tesuque and become a regular presence at seminars, demonstrating an erudite range of interests, including physics

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and mathematics, and socializing with the scientists at the afternoon teas. He went on to become a trustee and benefactor. When he decided to retire his old Olivetti typewriter, it was auctioned at Christies for more than a quarter of a million dollars, the proceeds donated to the Institute.²

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Gell-Mann had once described himself as being pulled as a child between two poles—the rational, analytic “Apollonian” nature of his father and the intuitive, romantic “Dionysian” nature of his mother. For himself he sought a vantage point that lay somewhere in between, as what he called an Odyssean, one of the “tortured souls” who “strive for the union of both sides.” His long search for a haven for those embodying this view was flourishing at the Santa Fe Institute.

Throughout these intellectual ventures, Gell-Mann remained an eminence of high-energy physics. On a VIP tour of the Large Hadron Collider in January 2012, he visited the caverns housing the CMS and ATLAS detectors, which were instrumental in the discovery, announced just a few months later, of the long-sought Higgs boson. “It’s a magnificent achievement,” he said in an interview recorded at CERN. He compared the construction of the collider to the building of Stonehenge and the great cathedrals of Europe, which had been motivated by human awe toward the mystical. “But now the driving force is trying to understand our universe, and it’s extremely impressive that we’re willing to devote that much ingenuity and that much labor . . . to this extraordinary enterprise.” In a video clip of the interview airing on the CERN website, a Rachmaninoff piano concerto plays in the background, adding an Odyssean touch.

For all its impressiveness, the LHC would have been dwarfed in size and energy by the ill-fated Superconducting Supercollider.

² McCarthy, who died in 2023, also penned the “Operating Principles” that appear on SFI’s website (<https://santafe.edu/about/operating-principles>). They read in part: “Scientific work at SFI is always pushing creativity to its practical limits. We always court a high risk of failure. Above all we have more fun than should be legal. . . . Occasionally we find that an invited guest is insane. This generally cheers us all up. We know we’re on the right track.”



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Murray and Cormac, September 2009. COURTESY SANTA FE INSTITUTE

And while the discovery of the Higgs tamped tight one more piece of the Standard Model, as of this writing no supersymmetric “sparticles” have been found providing another level of unification. And despite Gell-Mann’s cheerleading, superstring theory has yet to be accepted as the long-sought theory of everything uniting all four of nature’s forces. Not long after the triumph of M-theory in distilling the five different versions of string theory into one, there was another splintering: Now there seemed to be some 10,500 string theories, each describing a separate universe, a hypothetical landscape of alternate realities each with a different physics and each forever sealed off from one another—mutually undetectable. For some of superstring’s champions this amounted to a profound new understanding of existence and even of the nature of science itself, while to detractors it seemed the ultimate demonstration that superstring theory is more akin to metaphysics—theology, as Glashow had put it. If so then maybe the Standard Model, which Gell-Mann had done so much to develop, was as close as we humans were going to get to the big picture.

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A year after his visit to CERN, Gell-Mann, who was approaching his mid-eighties, returned to Caltech for a symposium commemorating the fiftieth anniversary of quarks, the cornerstones of the model. A former student was sad to see his old teacher shuffling with a cane and human assistance. He was learning to use a walker. The slow grind of entropy was taking its toll. After the succession of speakers, Gell-Mann offered brief closing remarks, insisting once again on the distinction he saw between George Zweig's constituent quarks and his own more abstract current quarks, this idea for which he still seemed to lack words to convey it outside his head. He looked and sounded very tired.³

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By the autumn of 2014, I saw that he had descended another rung on the ladder of mobility when he was bestowed with the Helmholtz medal by the Berlin-Brandenburg Academy of Science. Named for the nineteenth-century scientist Herman von Helmholtz, the prize is customarily awarded every two years in Berlin at the academy's Leibniz Day celebration. (Gottfried Leibniz himself had founded the institution in 1700.) But this time the academy came to the winner, sending an emissary to the Santa Fe Institute. As Gell-Mann watched from a wheelchair, Hartle honored his colleague for his "remarkable ability to see through all the clutter, to cut to the heart of matter . . . to discard the cherished old ideas that are an obstacle to progress." Whether the domain was particle physics, human language, complex adaptive systems, or cosmology,

3 In chapter V of *The Passenger*, published in 2022, McCarthy, who was acquainted with both Zweig and Gell-Mann, writes about the issue. Over beers, the protagonist, Bobby Western, is speaking with a character, identified only as Asher, about the history of modern particle physics, including the discovery of quarks. "But it's also true that Murray originally presented the theory as speculative," Western says. "As a mathematical model. He always denied this later but I've read the papers. George on the other hand knew that it was a hard physical theory. Which of course it was." The erudite conversation, spanning eleven pages, also touches on the *S*-matrix, Kaluza-Klein theory, quantum electrodynamics, and quantum chromodynamics with references to Feynman, Glashow, Weinberg, Salam, Dirac, Pauli, Heisenberg, and other luminaries whose names will be familiar to readers of this book.

Gell-Mann was driven, as Hartle put it, “to find the pattern that no one else had noticed was there.”

“To find the connections that no one else had sought. To see the symmetry that is hidden or only manifested approximately. . . . To know what is fundamental and what is excess baggage. To have the guts to guess the answer.”

It was the best description I’d heard of what made him such a powerful thinker. In a reception afterward, Cormac McCarthy raised a champagne toast. During the ceremony, Gell-Mann had been described as “one of the great physicists of the latter half of *the* twentieth century.” McCarthy begged to differ. Gell-Mann, he said, is “undoubtedly one of the great scientists of the twentieth century.”

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By then SFI’s campus had been named the Cowan Campus after Gell-Mann’s sometime antagonist George Cowan, who had died two years earlier. But the year after the Helmholtz award, the headquarters was officially christened the Murray Gell-Mann Building. Maybe it could be taken as a kind of compromise. The institute may have never become more than an idea without Cowan’s determination and ability to get things done, but the intellectual spirit was pure Gell-Mann. After tributes from Santa Fe’s mayor and colleagues from various walks of Gell-Mann’s life—his old student Seth Lloyd, the superstring pioneer John Schwartz, a former SFI president, Geoffrey West, and the new president, David Krakauer, Murray was handed a microphone. The room fell silent.

“I’d like to request that each letter of my name be in twenty-foot-high letters,” Gell-Mann began, pausing in anticipation of the ensuing laughter. “As in the Trump Tower in Chicago . . .” More laughter, another pause. “And that the letters are fully lit at night.” His timing as sharp as ever, he brought down the house. Bemused but grateful, he concluded: “My thanks to the entire Santa Fe Institute community for this wonderful honor.”

Though never quite reaching the magnitude of Richard Feynman, Gell-Mann’s stardom had expanded well beyond scientific circles. In 2007 he had spoken at a TED Conference in Monterey,

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California, as one of “fifty remarkable people” invited to “share whatever it is they are passionate about.” His subject was “Beauty and Truth in Physics,” with a coda on the origin of languages. Along with scientific luminaries like E. O. Wilson and Steven Pinker, other speakers that year included the director/screenwriter J. J. Abrams, the business magnate Richard Branson, the novelist Isabel Allende, and former president Bill Clinton. It was the kind of mix of big money and big ideas that TED was becoming known for. Giving a TED talk was a rite of passage into this world.

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On the eve of the conference, Gell-Mann socialized at one of his agent John Brockman’s annual “billionaire dinners” (timed to coincide with that year’s TED fest), posing for a picture with Anne Wojcicki, cofounder and CEO of the consumer genomic company 23andMe. Jeff Bezos of Amazon and Sergei Brin of Google were also there. Over the years a strange symbiosis had been emerging between the rich and powerful—investors, venture capitalists, and technology entrepreneurs—and certain public intellectuals and top-tier scientists, including a few cosmologists and particle physicists. Probably no one did more to bring together these seemingly disjunct realms than Brockman, who presided over an online intellectual soiree called Edge.org, an adjunct of which was the billionaire dinners. Physicists of the caliber of Freeman Dyson, the cosmologist Alan Guth (known for the inflationary universe model), and the superstring theorist Leonard Susskind would rub elbows with Silicon Valley tycoons as well as media moguls like Rupert Murdoch. The scientists apparently enjoyed the lavish attention, and the billionaires could flatter themselves as honorary members of Brockman’s Third Culture, invited to help bridge the divide between science and the humanities by hobnobbing with the scientific elite. These were expensive affairs, and much of the cost was borne by a financier named Jeffrey Epstein, who was to become a particularly notable example of wealthy jet-setters who burnished their auras by hanging out with big thinkers.

In 2006 Epstein underwrote a conference in the Caribbean on cosmological questions, hosting a barbecue on his private island. Three Nobel laureates in physics, Gerard 't Hooft, David Gross, and Frank Wilczek, were there, as well as Stephen Hawking. Gell-Mann was a guest at another of Epstein's Caribbean fests called "Mindshift." (Topics included artificial intelligence, complexity theory, theoretical physics, and evolutionary biology.) In the acknowledgments to *The Quark and the Jaguar* Gell-Mann had thanked Epstein for donations supporting his research at the Santa Fe Institute. Like other prominent Santa Feans, Murray and Marcia were invited to Epstein's Zorro Ranch, a short drive south of Santa Fe, and they dined with him in Aspen and at his Upper East Side townhouse. Marcia found Epstein increasingly repellent, and she worried that Murray seemed too easily flattered by this intellectual pretender. But nothing they experienced prepared them for the revelations to come. In 2008 Epstein's carapace began to crumble when he was convicted, in a plea bargain, of soliciting a minor for prostitution and sentenced to eighteen months in minimum security lockup—so minimal that much of that time was spent in work release performing "community service" at his own nonprofit foundation. As part of this white glove treatment, federal charges involving other girls and young women were not pursued. By then the Santa Fe Institute had already received a quarter million dollars of Epstein funding, earmarked for Gell-Mann's research. After another donation, of \$25,000 in 2010, the administrators thought it wise to accept no more. This turned out to be a prescient decision.

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In 2019 Epstein was arrested a second time and charged with sex trafficking underage girls, at the New Mexico ranch as well as on his island and at his mansions in Manhattan and Palm Beach. There was never a trial. He died, apparently of suicide, while in custody.

By then a kind of moral calculus was under way in segments of the scientific world. Were you in the clear if you had taken Epstein's money before the first charges were filed, or at least before his conviction? After all, the money came with no strings attached. Or had there been clues to his behavior that you should have noticed? How

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about after his release in 2009? Did it strain morality to give the guy a second chance, especially when the money was for the benefit of your research, for the noble endeavor of science? And what if you had taken money only before the 2008 conviction but then later acknowledged Epstein in published papers or socialized with him at parties when he was an ex-con? Were you culpable for helping launder his reputation? How does one split the hairs of culpability? Hanging out with the billionaire club could have its complications.

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In light of the new charges, SFI donated \$25,000 (equal to the amount received after the earlier arrest) to a sexual violence treatment center. Seth Lloyd, who had also accepted research money before Epstein's second arrest, apologized and was sanctioned by his employer, MIT. Though Gell-Mann's name appeared in some of the news coverage, his early contacts with Epstein left him largely unscathed. Nothing emerged to indicate that he or his colleagues had been drawn by anything other than Epstein's aura of endless wealth.⁴

THE LAST TIME I SAW MURRAY, his wheelchair pushed by an attendant, was at a Christmas party in 2015 hosted by Marcia in a sprawling white tent, bedecked with lights, on the grounds of a downtown Santa Fe hotel. Since their divorce they had gradually

⁴ Gell-Mann also gained celebrity outside the world of science for the term "Gell-Mann amnesia," which was coined by Michael Crichton, the bestselling writer of techno-thrillers. He and Gell-Mann, both highly impressed with their own intellects, shared a disdain for journalists, and in a 2002 talk titled "Why Speculate?" delivered in La Jolla to a meeting of the International Leadership Forum, Crichton recounted a conversation the two men once had. Gell-Mann liked to muse about how he would pick up a newspaper and read a story about high-energy physics only to become appalled at the errors he perceived and the shallowness of the reporter's understanding. Then he would turn to a story about, say, politics at the Kremlin or the American economy, and take every word as fact. Crichton, a well-known skeptic of anthropomorphic climate change, loved the story. "That is the Gell-Mann amnesia effect," he said in his talk. You forget the bad impression you received from the misreporting of a subject you think you know well when the experience should have caused you to doubt the rest of what you read in the press. Incongruously, considering Murray's liberal leanings and passion for environmental issues, the term has become a favorite among the alt-right, who use it as a fancy name for the Trumpian epithet "fake news." Search social media for "Gell-Mann" and you will see numerous mentions of "Gell-Mann amnesia"—often a dozen day—far more than for his scientific work. I suspect he would be appalled.

developed a new kind of closeness. As hard as Murray could be to live with, she had come to appreciate how he had respected her and her career as a poet as no other man had in her life. It was sad to remember how happy he had appeared with her at that Valentine's Day celebration eighteen years before, and to think of him living alone again in an enormous house (as he had in Pasadena after Margaret died) accompanied by caretakers. As lonely as he might have been, he had no shortage of visitors. Colleagues and former students would arrive from afar to sit with him and reminisce. Cormac McCarthy would drive in his pickup truck from his house in Tesuque, bringing food and wine for a lunchtime conversation that often included Geoffrey West and other Santa Fe Institute friends. Gell-Mann's children, Nick and Lisa, were there for him, and his stepson, the other Nick—whom I'd encountered on the trail with Murray so many years ago—would bring him soup on Sundays.

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*“He looked like an old god
grown small with the seasons. . .”*
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Another regular visitor was Laurence Gonzales, an author who had spent time at the Institute as a Miller Scholar. “He looked like an old god grown small with the seasons,” he later wrote. Sometimes they would have long conversations. Other times they sat together in silence. “I could almost see his mind working and working, and every now and then a complete thought would emerge. But sometimes he'd simply say, ‘Direct TV,’ because that was what the bouncing screen saver on the television said when no program was playing.” On another visit Gonzales asked Gell-Mann how well he remembered his scientific work. “His face twisted into a pained expression. ‘Well, I remember it to some extent.’” After more silence, the conversation turned to his childhood, the old stories about Ben, the boring physics class at Columbia Grammar School.

I asked Murray if he remembered what took him from dull physics to interesting physics. Long pause. The foot tapped gently

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up and down, up and down. “I don’t remember very well.” A sad look crossed his face. He sighed and emitted small sounds of frustration. “I was interested in the mathematics of physics, especially symmetries and conservation laws.”

I asked him which of his many awards was most important to him. “The Nobel Prize.”

A bird called outside. “What was that?” I asked. He didn’t know.

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WHAT WAS SAPPING GELL-MANN’S STRENGTH was a degenerative nervous system disease caused when a protein, alpha-synuclein, builds up in the brain. Normally the protein helps regulate how neurons communicate through their synapses. But, especially in old age, it can clog the brain with clumps called Lewy bodies. (The phenomenon was discovered by Fritz Jakob Heinrich Lewy in 1912 at a laboratory in Munich run by Alois Alzheimer, namesake of a more widely known dementia.) The disease afflicting Gell-Mann also affects motor control causing stooped shoulders and a shuffling gait—characteristics that colleagues had noticed with Murray in recent years. As the condition tightened its grip, Gell-Mann was sometimes admitted to the local hospital. With each relapse colleagues were warned that this might be the end. But time and again, he managed to spring back, though a bit more beaten than before.

In early April 2019, when West visited Gell-Mann in the hospital’s intensive care unit, Lisa was at his side. Murray was looking almost comatose, West later wrote to friends. “But when he saw me his face lit up and exploded into a beautiful smile!” A few days later he was moved from the ICU to a hospital room. When West and McCarthy came by, they were encouraged that their friend was able to intermittently join the conversation. West quipped that Murray was now famous because a new kind of pentaquark (consisting of four quarks and an antiquark) had just been discovered at the LHC. Gell-Mann had predicted pentaquarks in 1964. “To my surprise,” West reported, “he hadn’t yet heard of the result and didn’t seem

particularly impressed, other than to say that he thought the designation ‘pentaquark’ was a lousy name! Very Murray!” Not long afterward he was discharged and able to go home for what turned out to be the final time. Early in the morning of May 24, 2019, a caretaker found that Gell-Mann had died overnight, about four months shy of his ninetieth birthday. He was buried alongside Margaret in Aspen.

A FEW WEEKS LATER, on June 30, there was a small private ceremony, organized by Lisa and Nick, at the Santa Fe Botanical Garden, just up the hill from Gell-Mann’s house. I was away in Argentina then on a long-planned trip to see the total solar eclipse. But later I watched a video recording of the memorial. As in so many past occasions to celebrate Murray, the speakers mixed heartfelt memories with their favorite anecdote about this sometimes charming, sometimes exasperating, unquestionably brilliant man. For me the most memorable story came at the end when his son, Nick, described the day in 1977 when the family went to see *Star Wars* during its Hollywood premier at Grauman’s Chinese Theatre (then called Mann’s Chinese Theatre).

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As he sat between Murray and Margaret, the now iconic opening scene came onto the screen. “I’m sure all of you’ve seen it,” Nick said, reliving the excitement of a thirteen-year-old boy: “a large ship coming into frame and then behind it the fighters, which were making these really cool laser noises—*tchoo, tchoo, tchoo, tchoo*. So while I was thinking to myself *boss! neato! incredible! great!*, Dad leaned over and whispered in my ear, ‘You know, Nick, space is in a vacuum so those noises would not exist.’

“So I tried to ignore that comment, but he kept scientifically deconstructing the entire movie, every scene. For some reason it didn’t seem to bother him that the antagonist was a seven-foot-high Sith who wore a black suit with a Nazi helmet and used something called The Force. But when it came to the scientific stuff . . .”

He also remembered the family camping trips. “Dad was a big big outdoorsman, and every time we heard the words ‘it’s too damned

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congested around here,' I knew that we were going to be packed off in the car and rushed away to some mountaintop humping forty-pound packs over rocks for twenty miles. I remember my mom had this trick—whenever I got tired and started whining, she'd shove a lemon drop in my mouth, but before she could do that I would say, 'I'm tired. How much farther is it?'

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"Just around the next bend,' Murray would say. Five bends later we would still be walking and I would have more lemon drops shoved in my mouth." The audience laughed, and then came the conclusion. "I like to think that somewhere he's waiting for all of us just around the next bend with a smile and his infectious laugh. So please try to remember him that way."⁵

Tributes poured in from around the world, and a memorial page appeared on the Santa Fe Institute's website. "Losing Murray is like losing the Encyclopaedia Britannica," McCarthy said. "He knew more things about more things than anyone I've ever met." Geoffrey West honored Gell-Mann as "the twentieth century's renaissance man." Of all the encomiums, one that stood out and forms an apt ending to this postscript was from David Krakauer, the new SFI president: "I have often heard it said that after the nineteenth century it was no longer possible to be both deep and broad—that we had optimistically seen the last of the great polymaths in Hermann von Helmholtz who died in 1894 or more pessimistically with the earlier passing of Johann Wolfgang von Goethe in 1832. But I know this cynicism to be misplaced because I have benefited from the multitudinous accomplishments of John von Neumann (who died in 1957) and personally known a living polymath of equal, monumental, distinction—a mind both cavernous and extensive—animated by the most intense fire of roguish curiosity that I have ever beheld. This is Murray Gell-Mann..."

5 Less than four years after his father's death came the sad news that Nick had died unexpectedly, at age fifty-nine, of complications from an injury.

Coda

Early on a Saturday morning in October, a crowd gathered in front of Gell-Mann's house on Camino Piñones for what a local consignment company advertised as "A Quark of a Sale." An employee handed out numbers—first come, first served—and described the late owner as an "uber nerd" who had left all kinds of books and stuff inside. On offer were antique glazed Chinese figurines, vintage prints of birds by John Gould and Joseph Wolf, a Francisco Zúñiga lithograph, an assortment of pre-Columbian and African masks and baskets, Native American blankets, and Oriental rugs. There was furniture—Danish modern and vintage Taos—and antique maps, the fruits of a lifetime of collecting. Not everything that day was up for sale. Gell-Mann's collection of Southwestern pottery had gone to the School for Advanced Research, and he had earlier donated more than a thousand Arab, Byzantine, and Sassanian bronze and silver coins to his alma mater, Yale.

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The sale came as a surprise to old friends at the Santa Fe Institute, who learned about it at the last minute when McCarthy's brother saw an advertisement in the local newspaper. (I heard about it after the fact when my next-door neighbor told me that he and his wife had been at a big estate sale for some guy who had won the Nobel Peace prize, or something like that.) Navigating through the crowd, Krakauer, the SFI president, managed to come away with the giant bird statue that had long stood in Gell-Mann's foyer (it now occupies a similar position at SFI's Gell-Mann building), along with a QUARKS license plate from California and a two-volume edition of Herodotus.

A sign taped to the door of one room advertised more mundane items:

Nobel Recipient

Hats: \$3/each

Ties: \$10/each

T-Shirts: \$3/each

Elsewhere was a table piled with toiletries: skin cream, deodorant soap, and hydrogen peroxide along with a paperback

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collection of Wallace Stevens's poems. There were racks of men's clothing ("Size Large & XL"), a table of shoes and boots. It seemed a tawdry denouement to such a remarkable life.

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The most valuable of Gell-Mann's possessions, his Nobel Prize medal, later went on the block at Sotheby's in New York and fetched \$625,000, far above the auction house's estimate. (The winner was said to be an SFI trustee.) Included along with the medal was Gell-Mann's personal Nobel festival program. His surname had been misspelled on the cover, as "Gell-Man," with one *n*, and had been corrected by hand, presumably by Murray, in blue ink. The auction, whose theme was history of science and technology, also included an assortment of his other medals as well as several items that had belonged to Feynman. His "beloved bongo drums" went for \$44,100 and a drawing of a topless dancer on a placemat for \$6,300.

In the end, I may be the last person Murray would have chosen to write his obituary. But that had been decided long ago. *The New York Times* maintains a library of advanced obits—often written years beforehand and ready to be retrieved and updated at the time of death. Back in 2006 I was asked to write one for several scientists, including Gell-Mann. Over the years I had revised the draft several times, often remembering the day he and I had talked about the passing of the Dragon Lady. In the weeks before his own death, I took the draft out again and realized I had almost done what Gell-Mann suggested others did with Chien-Shiung Wu. In celebrating Gell-Mann's accomplishments I had smoothed over some of his rough edges. So I revised the piece once again and examined each sentence, obsessively checking and rechecking, terrified of making a mistake. Just after the obituary appeared in print I was dismayed to learn from a reader that I had misstated a point of physics about the principle of conservation of strangeness (a point I had described correctly in this book). So the *Times* had to run a correction. It was as though Gell-Mann, red pencil in hand, was reaching from beyond the grave. 🖊️