

Underselling Hawking

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Hawking Hawking: The Selling of a Scientific Celebrity

by Charles Seife

Basic Books, 400 pp., \$40.00.

STEPHEN HAWKING WAS an icon of twentieth-century science, renowned for both his contributions to physics and his inspiring battle against motor neuron disease. But four years after his death, Charles Seife's *Hawking Hawking* paints a different picture. As indicated by its provocative title, this book is no hagiography. Seife disparages Hawking on three levels, arguing that his status as a great physicist has been exaggerated, cataloging his various personal failings, and suggesting that he was a genius at self-promotion, his iconic status being attributable to media manipulation.

As one of Hawking's first PhD students and his friend for forty years, I do not share Seife's views.

Although his status as a physicist was sometimes exaggerated by the media, Hawking was undoubtedly one of the brightest stars within the relativistic community. Indeed, his discovery of black-hole quantum radiation was one of the key insights of twentieth-century physics. Hawking certainly had his failings, as acknowledged by the people who loved and admired him the most, but it is misleading to elevate these above his strengths: his courage, sense of humor, and determination to live life to the full, despite the relentless progress of his illness. While Hawking enjoyed his fame and sometimes used it to promote good causes, he never misrepresented himself or his work. He was the victim rather than the instigator of media manipulation and always resented the constant intrusion into his personal life.

Seife's book is not without its merits. *Hawking Hawking* is well written and contains some interesting insights into Hawking's life. The descriptions of his early scientific discoveries—while avoiding technicalities—is generally excellent and Seife's analysis of the remarkable success of *A Brief History of Time* is particularly revealing and carefully researched. Taken as a whole, the book is not quite as disparaging as the description on the dust cover might suggest. These qualities would be much more apparent were it not for Seife's relentless focus on the negative aspects of Hawking's life. By emphasizing the testimonies of people

who disagreed with his work or found themselves at odds with him, Seife gives a misleading and selective account of both his scientific achievements and personality.¹

IT SHOULD COME as no surprise that there are different views on Hawking's place among twentieth-century physicists. There is no doubt that he was extraordinarily smart, and I found it daunting when, on becoming his research student in 1972, one of my tutors told me that he was the brightest person in his department at Cambridge University.²

Indeed, on matters of physics, I regarded Hawking as an oracle. Just a few words from him would yield insights that would have taken me weeks to work out. On one occasion, after many days of calculations, I recall rushing excitedly to his office to give the good news that I'd solved some equation and being dismayed to find that he had just done the same calculation in his head.

Ultimately, physicists are judged by their contributions rather than their smartness. There may have been other people as bright as Isaac Newton, but they didn't discover the universal law of gravitational attraction. Hawking made many important contributions: the singularity theorem,³ the black-hole area theorem,⁴ the laws of black-hole mechanics,⁵ black-hole radiation,⁶ inflationary fluctuations,⁷ and the no-boundary proposal.⁸ These would surely have qualified him as a great physicist even if he had never been disabled. Although his condition partly freed him from the usual distractions of life, so that he had more time to think and focus on his passion, his disability inevitably made reading and writing papers challenging. This makes his achievements all the more remarkable.

Seife quotes John Barrow's assessment that "in a list of the 12 best theoretical physicists this [twentieth] century Steve would be nowhere near."⁹ I disagree with both Seife and Barrow, but there is no objective measure for ranking physicists. It is true that Hawking did not contribute to M-theory, but this was not his area of research. He did work on aspects of supergravity, and his discovery of black-hole radiation is the touchstone for all theories of quantum gravity. He never received the Nobel Prize because the existence of Hawking radiation is still not experimentally confirmed; and some of his discoveries might be regarded

as mathematical rather than physical. But had he lived a few years longer, it is possible that he would have been ennobled along with Roger Penrose.

Hawking certainly made mistakes in his physics, but so have other great physicists. Albert Einstein did not initially believe in the cosmic expansion, gravitational waves, or black holes, and regarded the addition of the cosmological constant to the equations of general relativity as his biggest blunder. “An ordinary mistake,” Frank Wilczek once remarked, “is one that leads to a dead end, while a profound mistake leads to progress. Anyone can make an ordinary mistake, but it takes a genius to make a profound mistake.”¹⁰ Some of Hawking’s mistakes are like that.

While Seife appreciates the importance of Hawking’s early contributions and describes them well, he dismisses his later work, commenting that, “the early 1980s marked the last time that Hawking was producing truly novel ideas in physics,”¹¹ and that, “in the last decade of his life he did little science of note.”¹² Hawking may well have peaked in the early 1980s, and I would agree that his discovery of black-hole radiation in 1974 was his greatest triumph. In 1982, he proposed inflationary fluctuations before anyone else in the West,¹³ an idea that was then worked out in detail at the Nuffield Workshop, and has now been verified experimentally by the Wilkinson Microwave Anisotropy Probe and Planck satellites. But even in his final decade, Hawking published twenty-three papers and collaborated on influential projects: his work with Malcolm Perry and Andrew Strominger on the black hole information paradox, for example, and his work with James Hartle and Thomas Hertog on quantum cosmology.¹⁴

Seife is not a professional physicist and his assessment reflects the opinions of the people he interviews. Neil Turok is an eminent physicist but his opposition to some of Hawking’s ideas is widely known. In response to Turok’s assertion that, “the idea [of the ‘no-boundary’ proposal] has never been accepted,” it would have been fair to seek the reaction of Hartle, Hawking’s friend and collaborator.¹⁵ There were certainly mathematical difficulties with the original proposal, but these were later addressed, and Hawking never gave up on the idea.

Another topic Seife summarily dismisses is primordial black holes (PBHs). These are black holes that formed in the early universe, a field of research that Hawking helped to initiate and that has been the focus of much of my own work for the last fifty years.¹⁶ PBH studies motivated Hawking to consider the quantum effects of black holes because only PBHs could be small enough for these to be important. Those of 10^{15} grams—that is, with the mass of a mountain but the size of a proton—would be exploding at the present epoch, but there is still no evidence for them. Seife gives the impression that Hawking abandoned the idea of PBHs. While his work with Raphael Bousso suggested that PBHs might not form in one particular scenario,¹⁷ it is wrong to think he gave up on them entirely, as there are many other scenarios in which they could form.

Larger, non-evaporating PBHs have attracted attention in recent years as possible dark matter candidates and sources of the gravitational waves detected by the Laser Interferometer Gravitational-Wave Observatory and Virgo interferometer.¹⁸ If these ideas are confirmed, Hawking’s paper on the subject will have been another major contribution to physics.

DESPITE BEING BLESSED by four popes and interred in Westminster Abbey, Hawking was no saint. He had failings, and doubtless the frustrations of being confined to a wheelchair for fifty years did not always bring out the best in him. He could be difficult, erratic, and he did not suffer fools gladly. On one occasion, when I made a remark in the department common room that showed I had misunderstood what he had been saying, he screamed “No!” so loudly that his wheelchair shot back halfway across the room under the recoil. He did not like to lose. As an amusing illustration of this, on a trip to China in 1985, he was greatly displeased when I beat him at Scrabble with the word “unproven.”

The scientific sections of the book include some unflattering accounts of what Hawking was like to work with. He was dependent on his students, so this made him vulnerable to the charge of exploitation, as illustrated by Marika Taylor’s complaint that “he took credit for something which wasn’t his.”¹⁹ But most of them did not feel this way and Seife acknowledges that “the students whom Hawking depended upon never resented their adviser or begrudged him his needs.”²⁰ Although I spent a lot of time helping Hawking in ways that would not usually be required for a doctoral student, I got far more back in return, not only by having access to his mind but also through the friendship of his family.²¹ Seife also includes the positive and often humorous recollections of Hawking’s student Raymond Laflamme, made more poignant by his own brush with death. “When I get discouraged,” Laflamme remarked, “I go back and say that bugger can make it for fifty years. I’m gonna ask only for twenty-five.”²²

The enormous determination, stubbornness, and reluctance to admit defeat, which probably kept Hawking alive for so long, may well have led to confrontations in other contexts. There are episodes that do not reflect well on him. Accusing Paul Steinhardt and Andy Albrecht of plagiarism was clearly a misjudgment, for which he later apologized.²³ His initial dismissal of Jacob Bekenstein’s doctoral work was also wrong. These mistakes must be set against Hawking’s positive personal qualities, such as his stoicism, lack of self-pity, kindness, sense of humor, and habit of finding the advantage in what other people perceived as a disadvantage. I’m informed that one of his doctors once observed: “He is the rarest thing of all, a sample size of one. We have no one to compare to him because there is no one else like him.”

In discussing Hawking’s personal relationships, Seife leans heavily on media sources, and, in particular, a selec-

tion of revealing quotations from Hawking's first wife, Jane,²⁴ and comments by family members. None was interviewed directly by Seife for the book. The public may have an appetite for these revelations, but they add little to Seife's account. Hawking may have had a strong libido, but does it really matter if he visited strip clubs?²⁵

Like other friends of Hawking, I witnessed many death-defying moments, such as the periods of critical care during his bouts of pneumonia and the frightful and increasingly frequent choking fits that could have asphyxiated him within seconds. He also endured horrendous medical procedures, such as his tracheostomy, and the almost total paralysis of his body. All of this he brushed off with a steely determination to keep going and a refusal to be beaten by motor neurone disease.

HAWKING'S DISABILITY CLEARLY played a role in his becoming an iconic figure, but he never played on this, and he was irritated when the media stressed his physical predicament rather than his work. Particularly relevant here is Seife's account of how *Brief History* became such a runaway success, the suggestion being that Hawking's disability was used to promote the book. It is unclear to what extent Hawking was complicit in the publisher's strategy. When he signed with a mass-market publisher, his colleague and editor at Cambridge University Press, Simon Mitton, cautioned him to be "careful if you're dealing with those people."²⁶

Hawking may have courted the media toward the end of his life, but this was not solely for self-promotion. Instead, he used his fame to instill public interest in some of the deepest questions of physics and thereby inspire the next generation of physicists. Seife barely mentions Hawking's impact on public engagement with science, but it was hugely important to him. The children's books he wrote with his daughter Lucy are further evidence of his aspirations. Hawking also used his fame to promote causes he thought would benefit from his support: he fought for the rights of the disabled, bringing support to the Motor Neurone Disease Association in the United Kingdom and the Amyotrophic Lateral Sclerosis Association in the United States.²⁷

In some sense, Hawking *needed* fame because it was only the income resulting from it that allowed him to pay for the nurses and assistants required for his twenty-four-hour care, only a small percentage of which was covered by state support. He never knew how long he would be able to continue working, and he feared a long period of life when he would still incur great costs without having any income. In *Hawking Hawking*, Seife undersells the struggle of being profoundly disabled and the amount of energy and effort that went into maintaining Hawking's life.

The book ends with an account of a conversation with the film director Errol Morris, who asked Hawking why he so admired Marilyn Monroe and suggested rather cheekily that what they had in common is that the world was more

interested in their bodies than their minds.²⁸ Apparently Hawking grimaced and answered "yes," but I doubt that is why her picture adorned his office wall.

As a professor of media studies, Seife is well qualified to write on the nature of fame, but this is clearly not his primary intention in *Hawking Hawking*. Instead, he focuses on the negative aspects of Hawking's life to an extent that feels mean-spirited and will pain his admirers. The authenticity of the accounts in the book are not in question, but the treatment is too one-sided and downplays Hawking's achievements in physics and his struggle to live a full life. This is why he was so loved and admired. Steinhardt, with whom Hawking crossed swords, once remarked in an interview with *Newsweek*: "Hawking is an outstanding physicist. But he's not a god. He's a human being."²⁹ The same is true for all icons and perhaps this is the message one should take from the book.

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1. The book suggests that Hawking's relationship with some of his doctoral students was strained. But he had forty students and the majority, including myself, had a very positive experience. We met every ten years at his birthday conferences, and our general admiration and affection for him were evident. There is certainly a curious contrast between the accounts in the book and the glowing tributes from friends and colleagues in the aftermath of Hawking's death in 2018.
2. The tutor was the physicist Jeffrey Goldstone, who might himself have been a contender for that position.
3. Stephen Hawking and Roger Penrose, "The Singularities of Gravitational Collapse and Cosmology," *Proceedings of the Royal Society of London A* 314, no. 1,519 (1970): 529–48, doi:10.1098/rspa.1970.0021.
4. Stephen Hawking, "Black Holes in General Relativity," *Communications in Mathematical Physics* 25 (1972): 152–66, doi:10.1007/BF01877517.
5. James Bardeen, Brandon Carter, and Stephen Hawking, "The Four Laws of Black Hole Mechanics," *Communications in Mathematical Physics* 31, no. 2 (1973): 161–70, doi:10.1007/BF01645742.
6. Stephen Hawking, "Black Hole Explosions," *Nature* 248 (1974): 30–31, doi:10.1038/248030a0.
7. Stephen Hawking and Ian Moss, "Fluctuations in the Inflationary Universe," *Nuclear Physics B* 224, no. 1 (1983): 180–92, doi:10.1016/0550-3213(83)90319-X.
8. James Hartle and Stephen Hawking, "Wave Function of the Universe," *Physical Review D* 28, no. 12 (1983): 2,960–75, doi:10.1103/PhysRevD.28.2960.
9. Charles Seife, *Hawking Hawking: The Selling of a Scientific Celebrity* (New York: Basic Books, 2021), 178.

10. Frank Wilczek, *The Lightness of Being: Mass, Ether, and the Unification of Forces* (New York: Basic Books, 2008), 12.
11. Seife, *Hawking Hawking*, 253.
12. Seife, *Hawking Hawking*, 99.
13. Stephen Hawking, “The Development of Irregularities in a Single Bubble Inflationary Universe,” *Physics Letters B* 115, no. 4 (1982): 295–97, doi:10.1016/0370-2693(82)90373-2.
14. Stephen Hawking, Malcolm Perry, and Andrew Strominger, “Soft Hair on Black Holes,” *Physical Review Letters* 116 (2016): 231301, doi:10.1103/PhysRevLett.116.231301; James Hartle, Stephen Hawking, and Thomas Hertog, “The Classical Universes of the No-Boundary Quantum State,” *Physical Review D* 77 (2008): 123537, doi:10.1103/PhysRevD.77.123537.
15. Seife, *Hawking Hawking*, 122.
16. Stephen Hawking, “Gravitationally Collapsed Objects of Very Low Mass,” *Monthly Notices of the Royal Astronomical Society* 152, no. 1 (1971): 75–78, doi:10.1093/mnras/152.1.75.
17. Raphael Bousso and Stephen Hawking, “Probability for Primordial Black Holes,” *Physical Review D* 52, no. 10 (1995): 5,659–64, doi:10.1103/PhysRevD.52.5659.
18. Bernard Carr and Florian Kühnel, “Primordial Black Holes as Dark Matter: Recent Developments,” *Annual Review of Nuclear and Particle Science* 70, no. 355 (2020), doi:10.1146/annurev-nucl-050520-125911.
19. Seife, *Hawking Hawking*, 71.
20. Seife, *Hawking Hawking*, 224.
21. Bernard Carr, “Stephen Hawking: Recollections of a Singular Friend,” *Paradigm Explorer* 1 (2018): 9–13.
22. Seife, *Hawking Hawking*, 11.
23. Jerry Adler, “Stephen Hawking, Master of the Universe: Our 1988 Cover Story on the Legendary Physicist,” *Newsweek Magazine*, March 14, 2018.
24. Jane Hawking, *Travelling to Infinity: The True Story behind the Theory of Everything* (Croydon: Alma Books 2014).
25. This reminds me of an amusing episode. When Hawking was close to death in 1985 after his tracheostomy at Addenbrooke’s Hospital, I was reading to him from a David Lodge novel and reached a passage that features the central character’s visit to a strip club and an explicit description of the scene. I was embarrassed to read this in front of the nurse, so I asked if I should continue. For the first time since falling ill, he smiled and struggled to nod and that’s when I knew he would recover.
26. Seife, *Hawking Hawking*, 223.
27. In fairness to Seife, he does include some stories that paint Hawking in a good light: how he often gave large sums of money to charity and how, whenever he traveled, he would ask his hosts to set up meetings with local children with disabilities. He might have added that, at his memorial service, the family reserved many seats for young disabled people who had been inspired by Hawking to believe they could contribute to society.
28. Seife, *Hawking Hawking*, 346.
29. Jerry Adler, “Stephen Hawking, Master of the Universe: Our 1988 Cover Story on the Legendary Physicist,” *Newsweek*, March 14, 2018.

DOI: 10.37282/991819.22.15

Published on March 7, 2022

<https://inference-review.com/article/underselling-hawking>