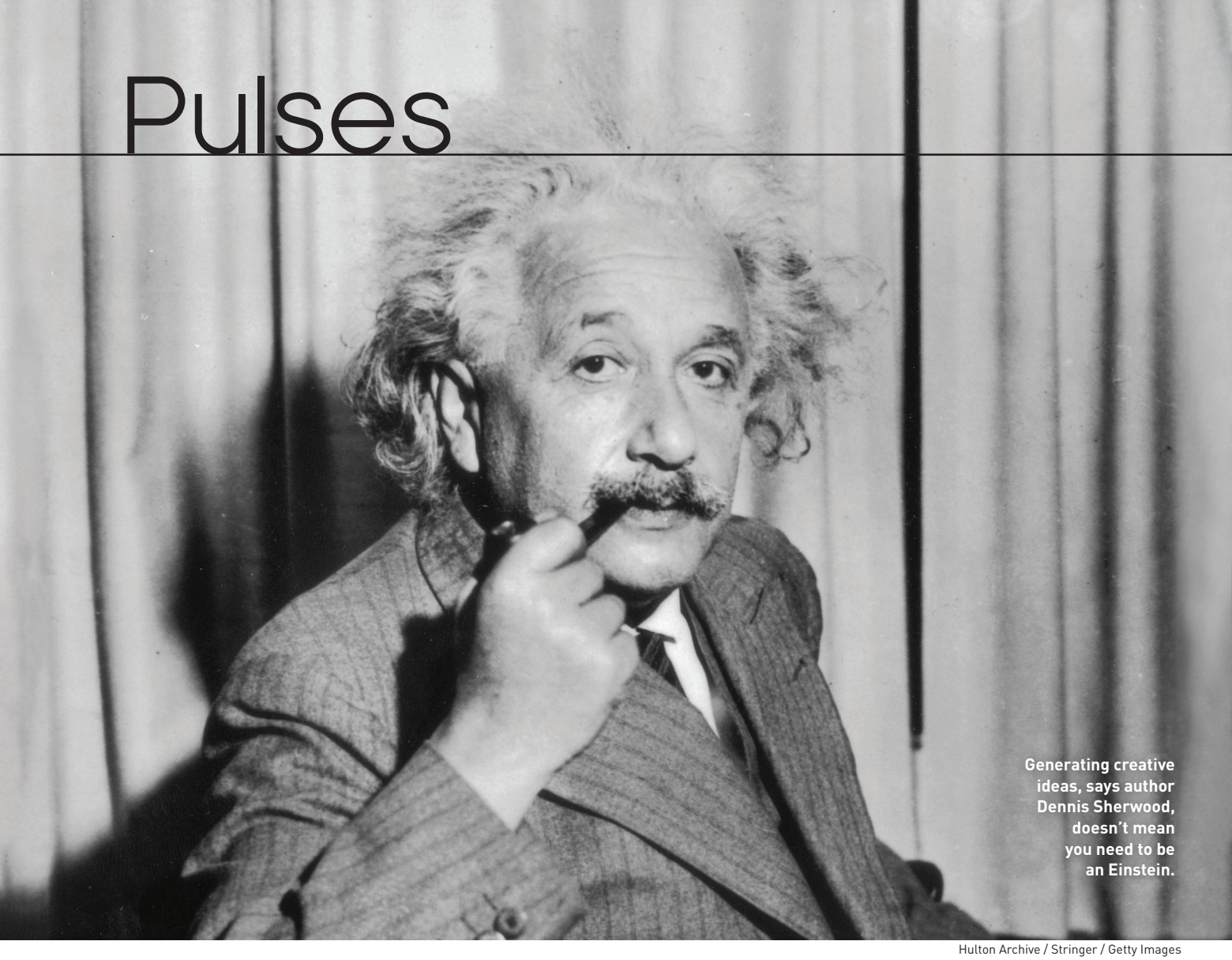

Generating creative ideas, says author Dennis Sherwood, doesn't mean you need to be an Einstein.

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IDEAS

Creativity on Demand

The myths of the "creative genius" and the "Eureka moment" in science.

Stewart Wills

When we talk about creativity, the metaphors usually are all about sudden illumination—the spark of an idea; the "Eureka" moment. And the knack for generating such ideas, it seems, is reserved for certain gifted "creative geniuses."

But Dennis Sherwood, the author of *Creativity for Scientists and Engineers: A Practical Guide*, says we need to think very differently about the creative process. "For a long time, I believed that creativity was a happy accident … [It] was something special; you had to be a special person," Sherwood told OPN. But decades of studying, advising and running workshops on creativity have convinced him that—with the right tools, techniques, processes and hard work—creative ideas can flow, "on demand," from a wide range of individuals and teams.

Making "silver bullets"

Sherwood came to his work on creativity through a long professional journey, including Ph.D. study in biology and senior positions at SRI Consulting, Goldman Sachs and several leading management-consulting firms. For two decades, he has run his own firm, The Silver Bullet Machine Manufacturing Company, focused on building creative toolkits for organizations and individuals.

The firm's whimsical name comes from the notion of a "silver bullet" as a metaphor for a great idea. "Every enterprise, every organization, benefits from having great ideas," Sherwood says. "But rather than having the great idea, it's much smarter to have the machine that builds them ... again and again."

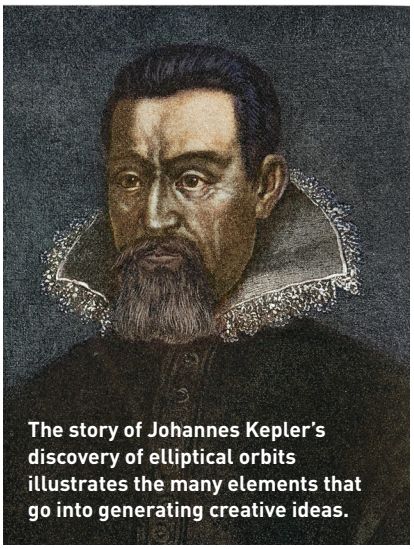
Creativity as reshuffling

For the notion that one could create such a "machine"—a disciplined process for generating creative ideas—Sherwood says he's particularly indebted to the work of Arthur Koestler. Best known as the author of the classic novel *Darkness at Noon*, the Hungarian-born Koestler was also a journalist and the author of a number of books on human creativity, a topic in which he had a profound interest.

In one such work, *The Act of Creation*, Koestler wrote that the "creative act" does not make "something out of nothing; it uncovers, selects, reshuffles, combines, synthesizes already existing facts, ideas, faculties, skills." That observation, Sherwood says, implies that creativity is about recognizing patterns, ideas and components already on hand, and putting them together in new ways. For him, the idea has a liberating one. "It suddenly made creativity an accessible process," he says. "You can design a process to make that happen deliberately, rather than just rely on luck."

Sherwood spends much of his book on creativity for scientists and engineers sketching out such a process. The first task, he says, is deliberate and detailed observation of "what is happening now," and breaking that current state—whether it's a device, a scientific concept or a business process—into its elements.

That exploration will suggest things that might be done differently,



The story of Johannes Kepler's discovery of elliptical orbits illustrates the many elements that go into generating creative ideas.

Getty Images

We need to think very differently about creativity, argues Dennis Sherwood.

or will surface missing components on which to focus. It is also a process ripe for "bisociation"—the bringing-together of bits of information that previously seemed unrelated, which Koestler viewed as a fundamental process of creativity. "It's out of that exploration," Sherwood maintains, "that the ideas flow."

Learning by example

Sherwood begins his book on creativity in science with the example of Johannes Kepler's discovery that planetary orbits are elliptical—an example also cited, he notes, by Koestler in his book *The Sleepwalkers*.

Kepler's story "exhibits, in one place, all of the attributes of creativity," Sherwood told OPN. "All of those features—about luck, about hard work, about bisociation—that are fundamental features of creativity, are there in spades in the Kepler story." And he uses numerous other examples from the history of science and engineering—from the invention of the incandescent light bulb, to the formulation of the special theory of relativity, to the discovery of DNA's structure—to illustrate the long and patient journeys leading to seemingly inspired "Eureka" breakthroughs.

There's also inspiration in the experiences of those doing creative work today. In the book, Sherwood asks a number of prominent scientist and engineers he's worked with in the past, including Optica Fellows Bill Barnes, Miles Padgett and Anatoly Zayats, to recount some of their own creative stories.

"Unlearning" and evaluating

Sherwood cites several other ingredients necessary for generating creative ideas. One is the ability to "unlearn" old patterns, a necessary precondition for the building of new ones that lies at the heart of creativity. Another is the need to ruthlessly evaluate and test new ideas. Such evaluation, he says, is "a big part" of creativity. "It's harder than having ideas in the first place. But it's really, crucially important. Not all ideas are good ones."

And, Sherwood observes, organizational culture also has a huge impact. "A lot depends on interpersonal behaviors; a lot depends on leadership and the language that is used."

"Scientists and engineers are hugely creative—they wouldn't be [scientists and engineers] if they weren't," he says. "Hopefully, my book can help turbocharge that." OPN

Stewart Wills is the senior editor of *Optics & Photonics News*.

Sherwood's Creativity for Scientists and Engineers *is available from IOP Publishing. To read an interview with Sherwood, go online: optica-opn.org/link/sci-creativity.*