merse yourself in the problem until you hit an impasse. Then, when it seems that "nothing good is accomplished," you should find a way to distract yourself, preferably by going on a "walk or a journey." The answer will arrive when you least expect it. Richard Feynman, the Nobel Prize-winning physicist, preferred the relaxed atmosphere of a topless bar, where he would sip 7 UP, "watch the entertainment," and, if inspiration struck, scribble equations on cocktail napkins.

Kounios and Jung-Beeman aren't quite ready to offer extensive practical advice, but, when pressed, they often sound like Poincaré. "You've got to know when to step back," Kounios said. "If you're in an environment that forces you to produce and produce, and you feel very stressed, then you're not going to have any insights." Many stimulants, like caffeine, Adderall, and Ritalin, are taken to increase focus—one recent poll found that nearly twenty per cent of scientists and researchers regularly took prescription drugs to "enhance concentration"—but, according to Jung-Beeman and Kounios, drugs may actually make insights less likely, by sharpening the spotlight of attention and discouraging mental rambles. Concentration, it seems, comes with the hidden cost of diminished creativity. "There's a good reason Google puts Ping-Pong tables in their headquarters," Kounios said. "If you want to encourage insights, then you've got to also encourage people to relax." Jung-Beeman's latest paper investigates why people who are in a good mood are so much better at solving insight puzzles. (On average, they solve nearly twenty per cent more C.R.A. problems.)

Last year, Kounios and Jung-Beeman were invited to present their findings to DARPA, the central research agency of the Department of Defense. ("It was quite strange," Kounios recalls. "I never thought I'd be talking about creativity to national-security officials.") DARPA was interested in finding ways to encourage insights amid the stress of war, fostering creativity on the battlefield. The scientists are convinced that it's only a matter of time before it becomes possible to "up-regulate" insight. "This could be a drug or technology or just a new way to structure our environment," Jung-Beeman said. "I think we'll soon get to the point where we can do more than tell people to take lots of showers."

For now, though, the science of promoting insight remains rooted in anecdote, in stories of people, like Poincaré, who were able to consistently induce the necessary state of mind. Kounios tells a story about an expert Zen meditator who took part in one of the C.R.A. insight experiments. At first, the meditator couldn't solve any of the insight problems. "This Zen guy went through thirty or so of the verbal puzzles and just drew a blank," Kounios said. "He was used to being very focussed, but you can't solve these problems if you're too focussed." Then, just as he was about to give up, he started solving one puzzle after another, until, by the end of the experiment, he was getting them all right. It was an unprecedented streak. "Normally, people don't get better as the task goes along," Kounios said. "If anything, they get a little bored." Kounios believes that the dramatic improvement of the Zen meditator came from his paradoxical ability to focus on *not* being focussed, so that he could pay attention to those remote associations in the right hemisphere. "He had the cognitive control to let go," Kounios said. "He became an insight machine."

The most mysterious aspect of insight is not the revelation itself but what happens next. The brain is an infinite library of associations, a cacophony of competing ideas, and yet, as soon as the right association appears, we know. The new thought, which is represented by that rush of gamma waves in the right hemisphere, immediately grabs our attention. There is something paradoxical and bizarre about this. On the one hand, an epiphany is a surprising event; we are startled by what we've just discovered. Some part of our brain, however, clearly isn't surprised at all, which is why we are able to instantly recognize the insight. "As soon as the insight happens, it just seems so obvious," Schooler said. "People can't believe they didn't see it before."

The brain area responsible for this act of recognition is the prefrontal cortex, which lights up whenever people are shown the right answer—even if they haven't come up with the answer themselves. Pressed tight against the bones of the forehead, the prefrontal cortex has undergone a dramatic expansion during human evolution, so that it now represents nearly a third of the brain. While this area is often associated with the most specialized aspects of human cognition, such as abstract reasoning, it also plays a critical role in the insight process. Hallucinogenic drugs are thought to work largely by modulating the prefrontal cortex, tricking the brain into believing that its sensory delusions are revelations. People have the feeling of an insight but without the content. Understanding how this happens—how a circuit of cells can identify an idea as an insight, even if the idea has yet to enter awareness—requires an extremely precise level of investigation. The rhythms of brain waves and the properties of blood can't answer the question. Instead, it's necessary to study the brain at its most basic level, as a loom of electrical cells.

Earl Miller is a neuroscientist at M.I.T. who has devoted his career to understanding the prefrontal cortex. He has a shiny shaved head and a silver goatee. His corner office in the gleaming Picower Institute is cantilevered over a railroad track, and every afternoon the quiet hum of the lab is interrupted by the rattle of a freight train. Miller's favorite word is "exactly"—it's the adverb that modifies everything, so that a hypothesis is "exactly right," or an experiment was "exactly done"—and that emphasis on precision has defined his career. His first major scientific advance was a by-product of necessity. It was 1995, and Miller had just started his lab at M.I.T. His research involved recording directly from neurons in the monkey brain, monitoring the flux of voltage within an individual cell as the animals performed various tasks. "There were machines that allowed you to record from eight or nine at the same time, but they were very expensive," Miller said. "I still had no grants, and there was no way I could afford one." So Miller began inventing his own apparatus in his spare time. After a few months of patient tinkering, he constructed a messy tangle of wires, steel screws, and electrodes that could simultaneously record from numerous cells, distributed across the brain. "It worked even better than the expensive machine," Miller said.