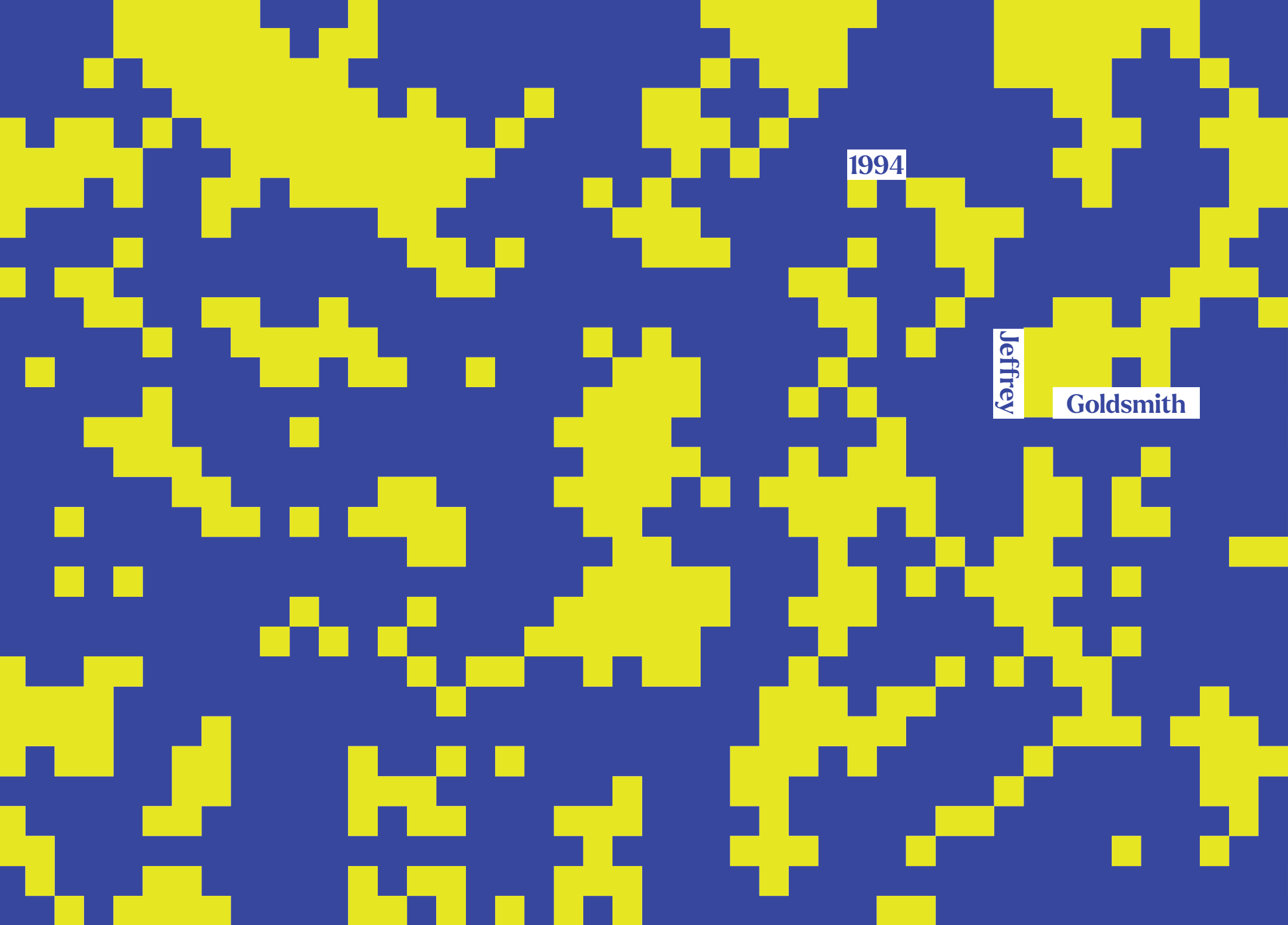
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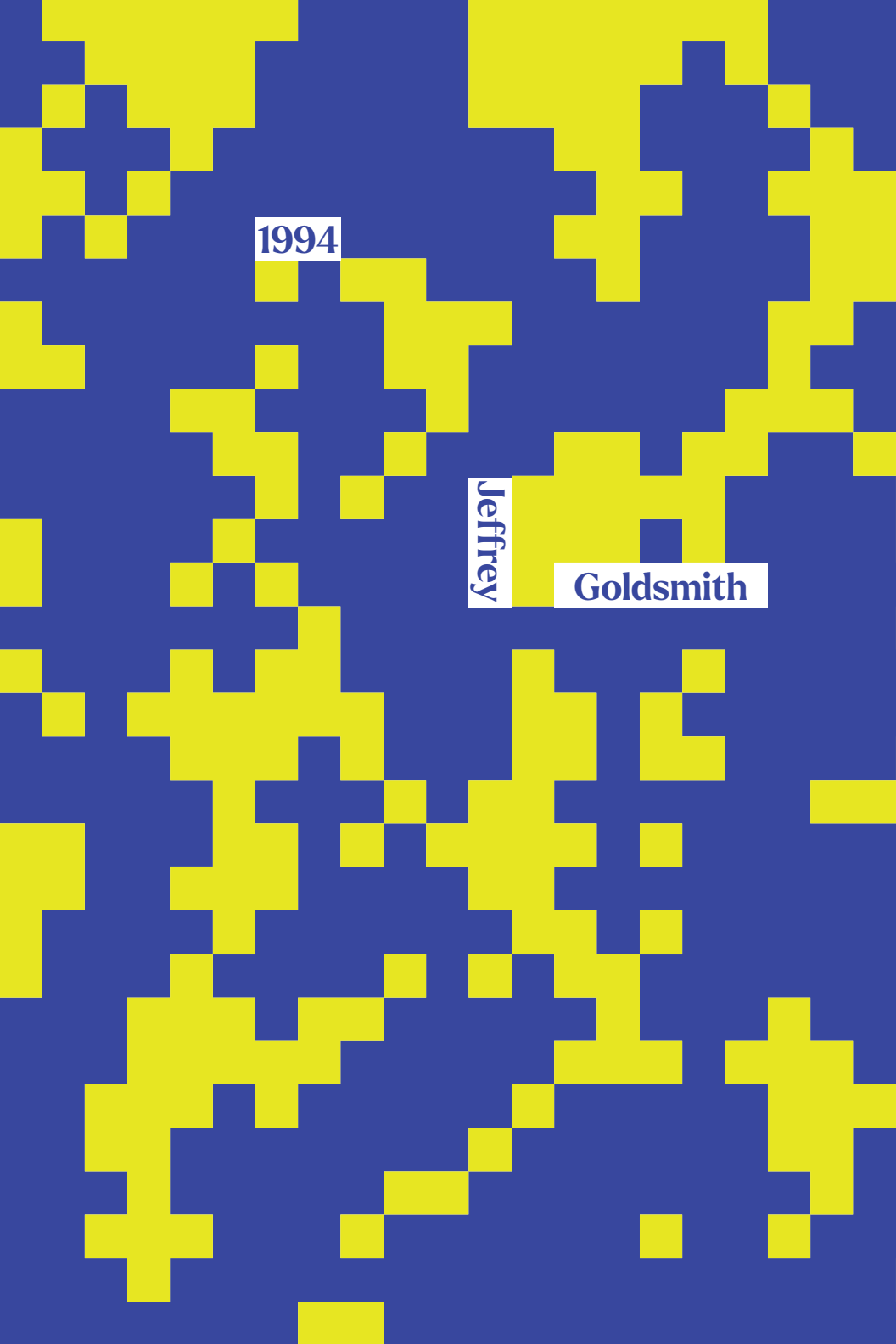
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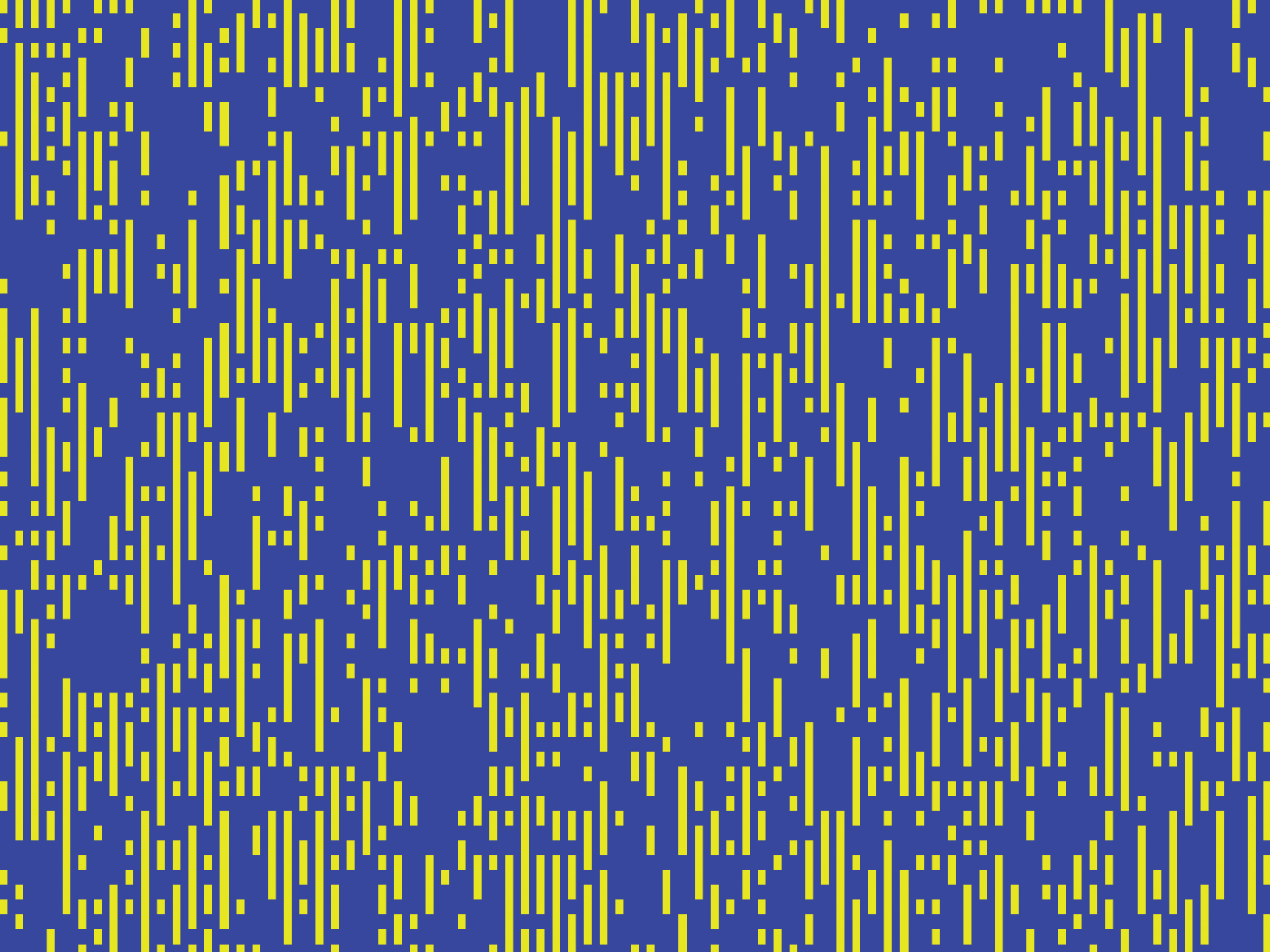

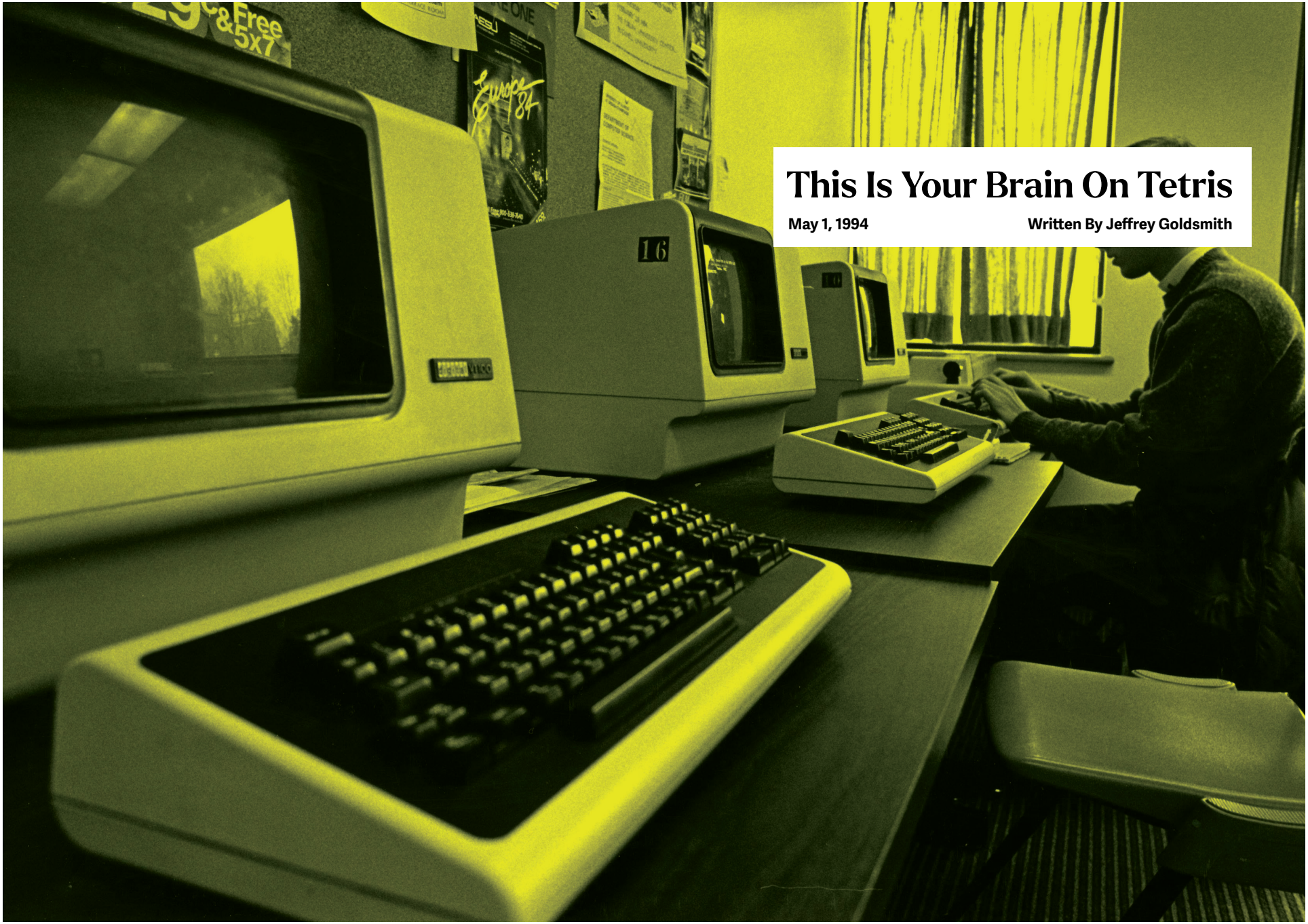

This Is Your Brain On Tetris

May 1, 1994

Written By Jeffrey Goldsmith

Ten years ago, a gleam lit Alexey Pajitnov's eyes. As an AI man in Moscow, Pajitnov had designed games for fun until an ancient Roman puzzle, Pentamino, made him blink. He tweaked its simple geometric formations into real time. And thus, with brackets delineating blocks, Tetris was born.

Even spanking new, Tetris was so addictive that Pajitnov himself was instantly hooked. He laughs,

"You can't imagine. I couldn't finish the prototype! I started to play and never had time to finish the code. People kept playing, playing, playing. My best friend said, 'I can't live with your Tetris anymore.'"

That friend, former clinical psychologist Vladimir Pokhilko, recalls,

"When I met Alexey, I had heard about Tetris. He gave it to me and I took it to my lab at the Moscow Medical Institute. Everybody stopped working. So I deleted it from every computer in the lab."

Everyone went back to work, until a new version appeared in the lab.

Tetris changed Pokhilko's life. Having used games for psychology tests, he "realized games could be interesting by themselves." Now he is a partner with Pajitnov. Based near San Francisco and in Moscow, their company, AnimaTek, is producing software such as El-Fish, El-Dino (due for Christmas '94), and Arena ('95). In designing these "interactive, mental worlds with rules," they heed the lessons of Tetris. Pokhilko and Pajitnov believe it was Tetris's "emotional dynamics" that led to its astounding success.

No home was sweet without a Gameboy in 1990. That year, I stayed "for a week" with a friend in Tokyo, and Tetris enslaved my brain. At night, geometric shapes fell in the darkness as I lay on loaned tatami floor space. Days, I sat on a lavender suede sofa and played Tetris furiously. During rare jaunts from the house, I visually fit cars and trees and people together. Dubiously hunting a job and a house, I was still there two months later, still jobless, still playing.

My friend, an economist, threatened a battery deprivation, but he knew my habit ran deep, knew that I could always tilt, blinded by sunlight, to a convenience store. To save face, I would buy a box of tiny chocolate-filled bears, as if AA power cells were an afterthought, not the meaning of my wretched life.

We should all learn from the "emotional dynamics" of Tetris, no? Surely, my experience, albeit radical, was not too atypical. At the time, eyes everywhere were glued to those little green-gray screens. So far, Nintendo alone has sold 35 million Tetris cartridges for Gameboys, and countless copies of Tetris software exist worldwide. I wondered if Tetris wasn't really some sort of electronic drug—a pharmatronic.

At the idea of a pharmatronic, Pajitnov laughs.

"Many people say that, but my feeling is it's more like music. Playing games is a very specific rhythmic and visual pleasure. For me, Tetris is some song which you sing and sing inside yourself and can't stop."

This is true, I couldn't stop but I was still mystified as to how Tetris slyly manages to interface with the neural net in the human skull. At the University of California at Irvine's Department of Psychiatry and Human Behavior, Richard Haier did the demystifying. In 1991, Haier scanned the brains of Tetris players.

PHARMATRONIC

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In Tetris, Haier sees "a tremendous learning curve. The question became: When the stimuli are faster and the decision making is harder, does the brain require more energy?" Haier found, as he suspected, that the brain requires less energy to play higher levels of Tetris. This is "counterintuitive," he says, "but consistent with a brain efficiency idea."

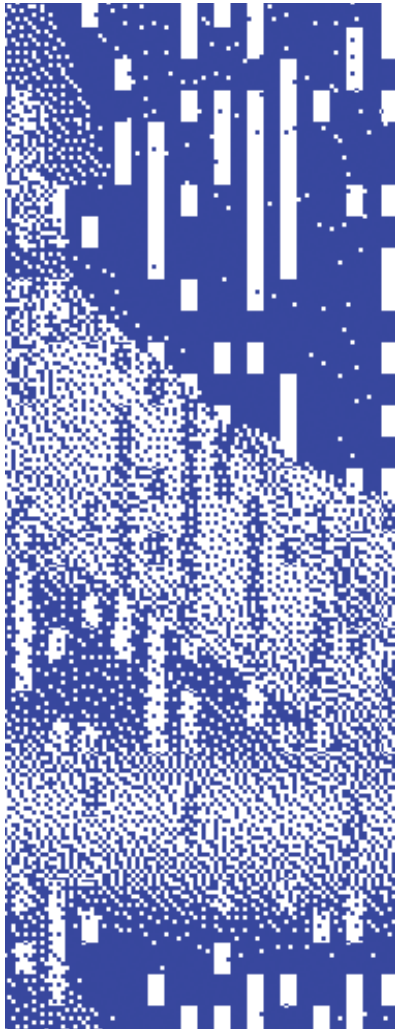
In first-time users, Tetris significantly raises cerebral glucose metabolic rates (GMRs), meaning brain energy consumption soars. Yet, after four to eight weeks of daily doses, GMRs sink to normal, while performance increases seven-fold, on average. Tetris trains your brain to stop using inefficient gray matter, perhaps a key cognitive strategy for learning. In fact, the lowest final GMRs are found in the best players' brains, the ones most efficient at dealing with Tetris's Daedalian geometry.

The elevated GMR "high" is why you get wired after hours of play. Your old dog of a brain learns the Tetris trick by munching cerebral glucose. Neural hoop-jumping seems to be streamlined until performance peaks, and then your old dog stops craving Milkbones.

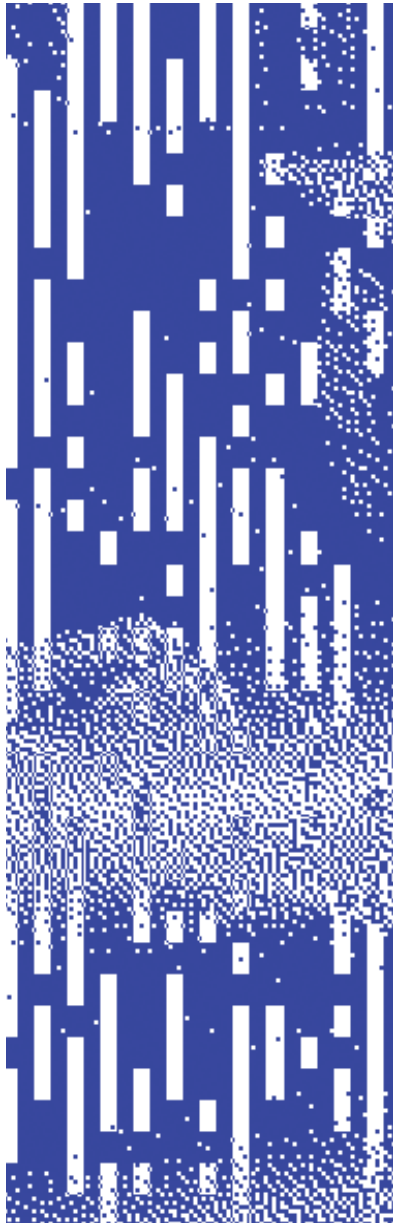
The Tetris effect is a biochemical, reductionistic metaphor, if you will, for curiosity, invention, the creative urge. To fit shapes together is to organize, to build, to make deals, to fix, to understand, to fold sheets. All of our mental activities are analogous, each as potentially addictive as the next.

How a poet's mind struggles to compose a phrase is equivalent to how an engineer frets — we hope — over a new concept in bridge suspension, or how a neat freak invents infinite corners to dust, or how anyone gazes into perpetual motions in liquid crystal.

To solidify these images of cerebral addiction, we need the purely psychological hook of Pokhilko:



"The main part is visual insight. You make your visual decision and it happens almost immediately. Insight means emotion: small, but many of them, every two, three seconds. The second mechanism is unfinished action. Tetris has many unfinished actions (that) force you to continue and make it very addictive. The third is automatization: In a couple of hours, the activity becomes automatic, a habit, a motivation to repeat."



Repeat I did in 1990. I repeated until I consistently won rocket blastoff imagery, the prize for the highest score and the end of the game on a Gameboy. When the GMR high wore off, my old dog of a brain went on to learn new tricks.

And so did Alexey Pajitnov's. Pajitnov is hardly on automatic, repeating himself endlessly by producing puzzles. He, too, needed to fit shapes together in new ways. AnimaTek is now building the foundation for virtual worlds, aspects of which will appear over the next few years.

Vaguely nervous about the whole idea, I ask Pajitnov why he is sure people will make the trip. "They will have no choice. That's how progress works. Everybody is trying to switch from 2-D to 3-D," he says.

Worried that a 3-D pharmatronic is just over the rainbow, I very casually gasp, "You mean soon we'll have to go to your world?"

"Oh, no. I am much more modest," Pajitnov says. "For the first years we'll concentrate on tools, knowledge, algorithms, and technology."

How about you? Will I see you in the virtual world?
Will we interface each other as we lounge on lav-
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Will we munch those tiny chocolate-filled
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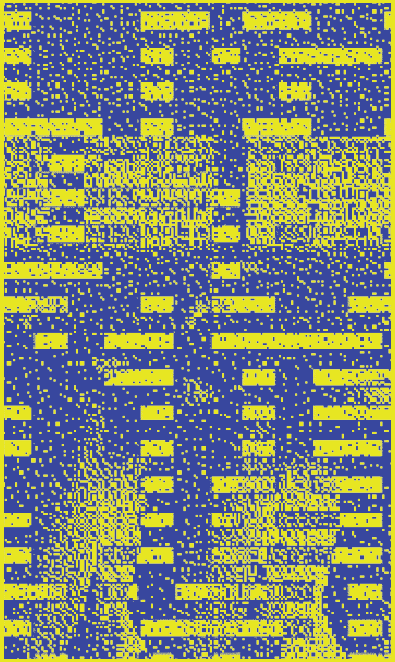

I was relieved, but I had to ask, "And then?"

That's the last thing I need.

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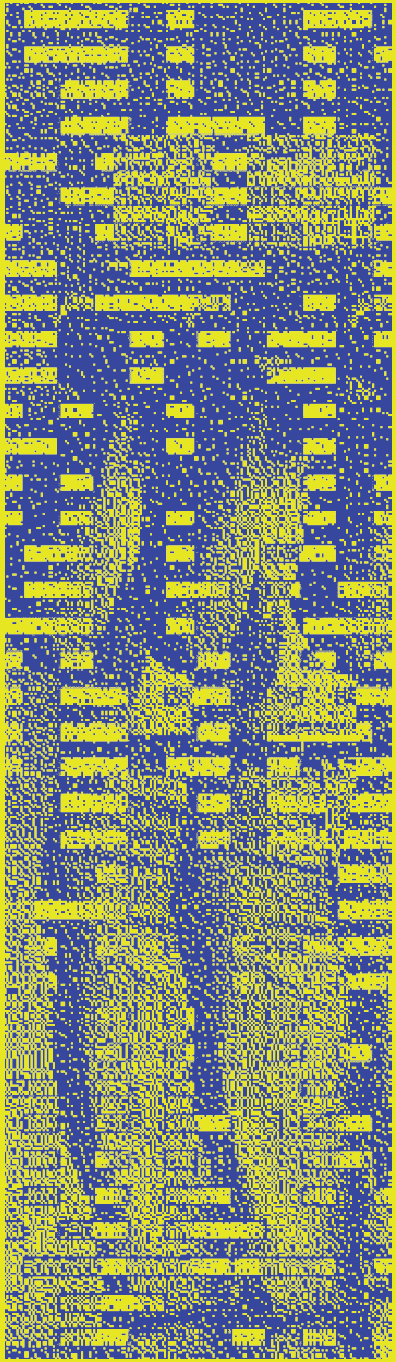

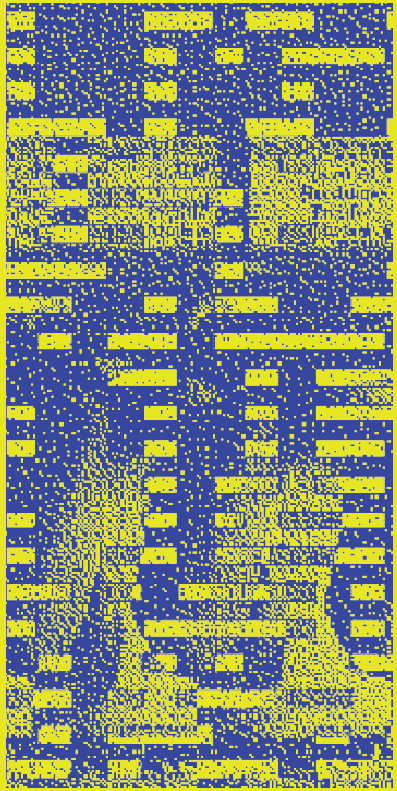

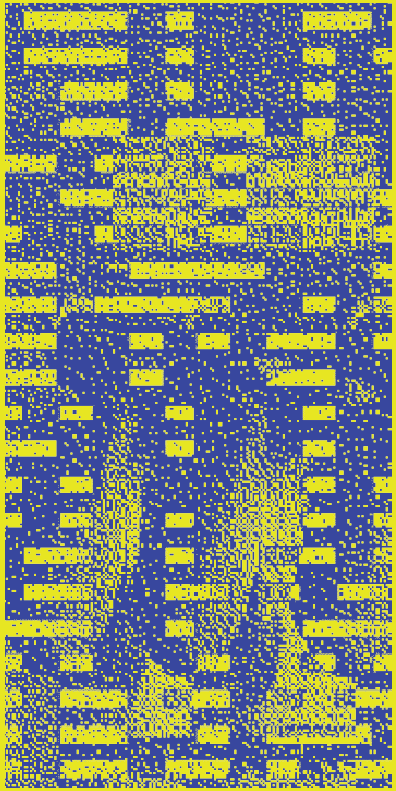

"And then, yeah, sure," he laughs, benevolently hoping we'll be hooked. "But not only to my world. There will be some new genius, new talent. It will be a new cultural phenomenon."