UNCONDITIONAL PAVLOV

BY SAMUEL HUGHES

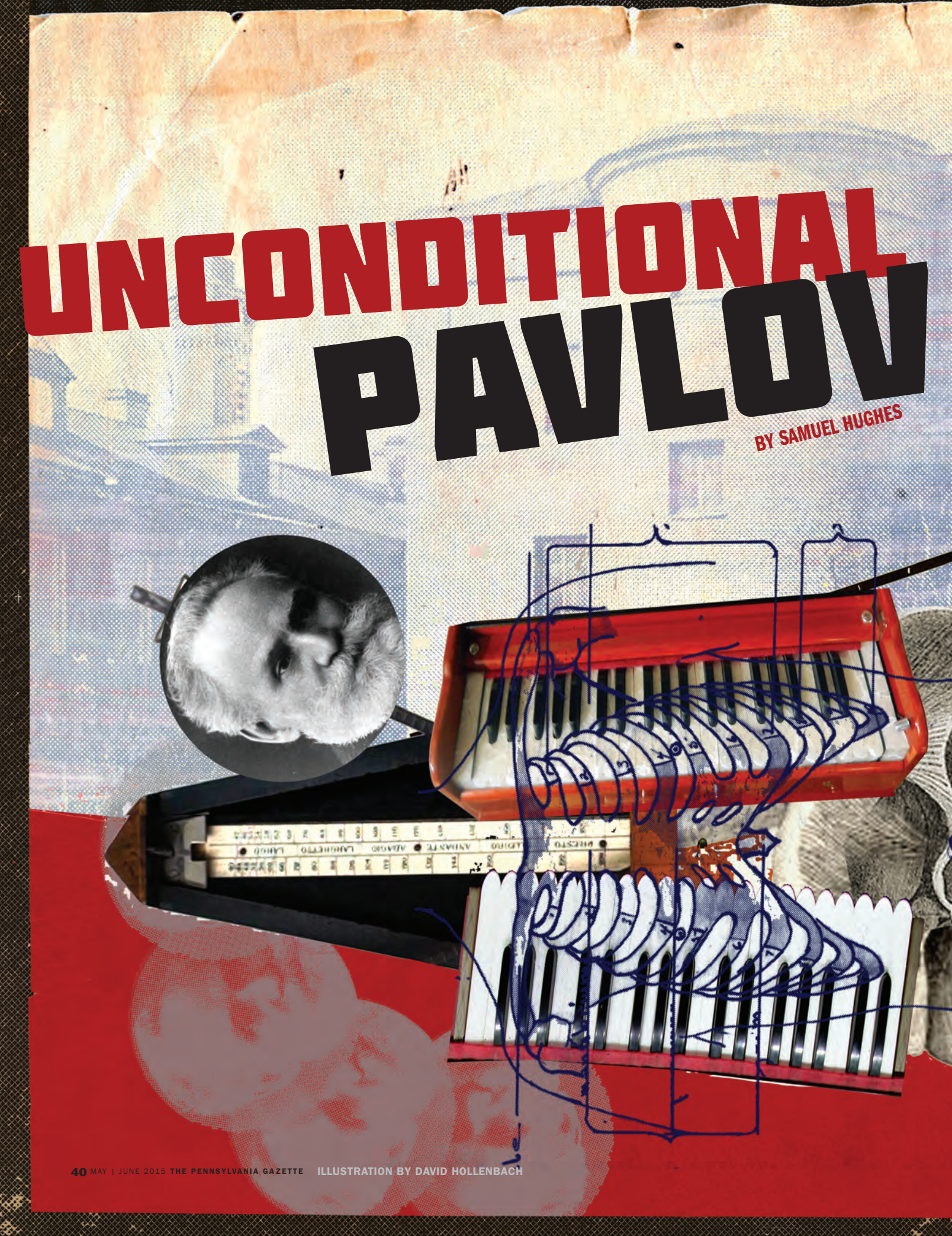


ILLUSTRATION BY DAVID HOLLENBACH

DANIEL TODES SPENT 25 YEARS RESEARCHING AND WRITING HIS EPOCHAL BIOGRAPHY OF IVAN PAVLOV. THE RESULT IS A SCIENCE HISTORIAN'S ANSWER TO TOLSTOY, TURGENEV, AND *DR. ZHIVAGO*.

BY his own account, Daniel Todes C'74 Gr'81 was on the "right side of a perfect storm" when he set out to write a biography of Ivan Pavlov, the legendary Russian scientist.

One element of that storm was the man himself.

"Pavlov's story seemed to have everything a Russianist and historian of science could want," says Todes, whose monumental *Ivan Pavlov: A Russian Life in Science* was published last November by Oxford University Press. "A fascinating man, who led a long and rich life that stretched from before the emancipation of the serfs to Stalin's Russia, with a great cast of characters, including the Eastern Orthodox Church, Dostoevsky, a prince of the tsarist family, the Moscow merchants, Lenin, and Stalin; plus rich and important scientific work—and the archival materials to deal with all of this in a deep and satisfying way."

Having had the great luck to begin his long labor of love at the dawn of *glasnost*, Todes had access to massive amounts of material, much of it previously off-limits—from unpublished letters and drafts of scientific articles to an essay on science, Communism, and religion that Pavlov was writing when he died, to secret Soviet surveillance reports on him and his laboratories and family. What raised the stakes even higher for Todes was that his extraordinary, Nobel Prize-winning character—whose iconic experiments with dogs so permeated Western culture that they made their way into a Rolling Stones song—had never been the subject of a serious biography in any language.

"I knew from my dissertation work that there was nothing even vaguely satisfactory about Pavlov, and that historians had yet to analyze his life and work seriously," says Todes, a professor in Johns Hopkins University's Institute of the History of Medicine. "I realized that, given his life span [1849-1936], there was probably a rich story to tell and that, with the archives now open, I might be able to tell it." By the end of his first year in the archives, he realized he had the opportunity of a lifetime. It would consume more than 20 years—during which time he "often couldn't sleep from the combination of excitement and anxiety."

Which leads to the other key element of a perfect biographical storm: the biographer, who must be capable of understanding his subject and writing him to life. In the case of Pavlov, that required an unusual skill set: fluency in Russian and a deep appreciation for Russian history, a scholarly comprehension of science in the 19th and 20th centuries, and the ability to distill the science as well as the history and personalities into highly readable prose. His respect for the craft of writing can be seen in his view of rewriting: "I love the way that rewriting is rethinking, the way that prose problems expose my ignorance, conceptual ambiguities, and lapses."

All in all, it's hard to imagine Pavlov finding a better Boswell. *Ivan Pavlov*, which tips the scales at three pounds, two ounces, and 880 pages, is a science historian's answer to Tolstoy, and immediately became the definitive biography. ("No review is going to give adequate notice of the wealth of information, which weaves the science, the person, and the staggering historical events into a whole cloth," noted Roger Smith, author of *Between Mind and Nature: A History of Psychology*, in *Somatosphere*, a science blog. "But the cloth is whole." *The Wall Street Journal*'s Raymond Tallis hailed it as a "masterpiece of the biographer's art" and a "mighty work of scholarship.")

It also corrects some surprising misconceptions about Pavlov and his work. He never used a bell to teach a dog to salivate—virtually never used a bell, period—and would hardly have devoted so much of his life and so many experiments to something so rudimentary. Because of an early mistranslation in *The Lancet*, his key terms *conditional* (and *unconditional*) *reflex* became, in English, *conditioned* (and *unconditioned*) *reflex*—a seemingly small change with very different and somewhat misleading connotations.

Finally, it's worth emphasizing that Pavlov was a physiologist, not a psychologist. Which is not to say that he had no interest in the psyche.

"Only one thing in life is of essential interest for us—our psychical experience," he said at the beginning of his investigations into conditional reflexes. And so, starting in 1903 and until his death in 1936, he strove to "explain the mechanism and vital meaning of that which most occupies Man—our consciousness and its torments."

Todes doesn't remember if Pavlov was even mentioned in the "one or two psychology courses" he took as a Penn undergrad. "I knew only the familiar icon—a hard-headed, self-confident, 'just the facts' brilliant experimental scientist who had 'trained a dog to salivate to the sound of a bell.' I didn't find him particularly interesting."

But he did take courses in Russian history with the "wonderful Al Rieber," who soon steered him to Mark Adams, a "lively intellectual and master teacher" who specialized in the history of Russian science. Todes was hooked.

"The Department of History and Sociology of Science at Penn was a very exciting place to be in the 1970s," he says. "Faculty and students were addressing the question *How does context influence scientific thought?* and the department's atmosphere of intellectual search, scholarly rigor, and collegiality became my lifelong model of academic life at its best."

Not all Penn alumni, by a long shot, can trace such a direct path from their undergraduate and graduate experiences to their careers, to say nothing of crowning achievements like *Ivan Pavlov*. The 63-year-old Todes can and does.

"At Penn, I became interested in the history of two scientific subjects that had been highly polarized politically in Imperial Russia: evolutionary theory and the biological approach to the mind," he says. "I have alternated between them throughout my career."

His undergraduate thesis led to his first scholarly article, on the Darwinian paleontologist V. O. Kovalevskii, as well to as his first book, *Darwin Without Malthus: The Struggle for Existence in Russian Evolutionary Thought* (Oxford University Press, 1989). His doctoral dissertation—"From Radicalism to Scientific Convention: Biological Psychology in Russia from Sechenov to Pavlov"—focused on biological psychology in the pre-Pavlov era. It ended with a short section on Pavlov that encapsulated the main point of his thesis: "that, with the development of capitalism and professionalism in late Imperial Russia, biological approaches to mind, considered politically radical in the 1860s and 1870s, had ceased to have that association later in the century—as was evident in the work of the politically centrist Pavlov on that subject." While that "hard-

ly made me an expert on Pavlov," he notes, "I had learned that there was much more to him than met the eye, and that historians had yet to analyze his life and work seriously." During the long years of researching and writing *Ivan Pavlov*, Todes also published two much less ambitious books on the subject: a short biography of Pavlov for young adults in 2000 and the scholarly *Pavlov's Physiology Factory* in 2002.

Todes came by his attraction to Russia early. The self-described "radicalized child of the 1960s" was interested in "alternatives to American capitalism" but also deeply drawn to Russia's pre-Soviet era—and to the "important part that ideas always played in its cultural life." There was also "some cultural resonance," he adds, "because my paternal grandparents emigrated from the Russian empire."

All those factors combined to make him feel "instantly comfortable" when he first visited the Soviet Union in 1976, and the emotional connection only strengthened during his subsequent visits in the late-Gorbachev era and after the fall of the Soviet Union.

"I just like the place," he says, "and find something deeply moving about its people, its culture, and its history." The affection was mutual: "Russians welcomed me and my research with open arms."

"YOU MUST GIVE OUR BARBARIANS ONE THING—THEY UNDERSTAND THE VALUE OF SCIENCE."

THE sweep of history, ideas, and events in *Ivan Pavlov* is somewhere between *Fathers and Sons* and *Dr. Zhivago*, though Pavlov himself was a devotee of *The Brothers Karamazov*. The oldest child of a Russian Orthodox priest in the provincial capital of Ryazan, Pavlov seems to have inherited both his father's great physical strength and intellectual stamina and his mother's volatile temper. (Even late in life, notes Todes, Pavlov "would wonder how such a congenitally imbalanced fellow as he could become a great scientist.") A childhood fall led to months of illness and complications, and undoubtedly fueled his obsessive, lifelong effort to counter life's *sluchainost* (randomness) with *pravilnost* (regularity, correctness).

Pavlov's long and amazingly productive scientific career can basically be broken down into two stages of inquiry. The first was his groundbreaking series of experiments on digestion, for which he won the 1904 Nobel Prize in physiology. He viewed both the digestive system and the scientific laboratory as factories—a salient feature of late-19th-century St. Petersburg—and treated both accordingly. An important source of income for his labs was the "gastric juice factory," which collected and sold canine gastric juices as a remedy for human dyspepsia.

To gather those juices, as well as saliva and pancreatic secretions, Pavlov—a skilled surgeon—implanted fistulas in the dogs' glands. He also devised what Todes calls an "ingenious, even diabolical esophagotomy," in which food swallowed by the surgically altered dog never made it to the digestive tract but instead fell out of a hole in the dog's throat into a bowl. In addition to being "sham-fed" in that manner, the dogs were also "teased" with food waved in front of them. The results proved that, in Todes' words, the "psyche was the first stimulus of gastric secretion." Some dogs, Pavlov noted, seemed to "understand the deceit being perpetrated upon them and turn their back on the proffered food, apparently from a sense of insult." He also observed that some responded to the laboratory setting with fear and suspicion, and concluded that the "depressed state of these dogs does not facilitate the success of experiments." His increasing efforts to eliminate noise and other outside stimuli led to the construction of the ominously named Towers of Silence, which did not turn out to be the experimental panacea he had hoped for.

When Pavlov decided, after some hesitation, to investigate the ever-elusive psyche of dog and man through "logic and the measurement of drops of saliva," he launched a staggering series of programs and experiments that focused on the use of conditional reflexes. The most obvious *un*conditional stimulus was food, and a dog could be trained to respond (with salivary and other juices) to a variety of conditional—and precisely measured—stimuli that accompanied it, such as metronomes, harmoniums, buzzers, and electrical shocks. His efforts to understand the tension between "excitatory" and "inhibitory" reflexes yielded increasingly complex and unwieldy results—and, in some cases, led to breakdowns in the dogs. Though Pavlov often showed a very sympathetic understanding of dogs, and truly believed that their "work" would lead to important breakthroughs, some of his experiments can be hard to stomach.

"I found it very difficult to read about many of his experiments," agrees Todes, "particularly those with [Maria] Erofeeva in which they paired food and electrical shock. But my task, as I saw it, was to describe these experiments, why Pavlov performed them, and how *he* reacted to them."

Pavlov's later efforts to classify dogs by "nervous types" (physiological constitution and personality) quickly morphed into explorations of the "roles of heredity and environment, a eugenics project, and studies of mental illness," writes Todes. And as the number of dogs and experiments and personnel grew, the data they yielded "became increasingly discordant and its relationship to personality and behavior increasingly difficult to divine."

For lay readers, the complexities of Pavlov the man are both more intriguing and less troubling than those of Pavlov the animal experimentalist. Often kind, honest, and invariably thoughtful, he also had a volcanic temper and powerful sense of moral righteousness that terrified students, co-workers, and Soviet officials alike. (See the excerpt on page 47.) Highly

confident in his own opinions, he could be a terrific bully, albeit usually a well-intentioned one. His insistence on the benefits of vigorous exercise, for example, may have contributed to his wife Serafima's miscarriage of their first child. (Chastened by the possibility, he backed off.)

When he was 63 he agreed to allow a talented doctoral student named Maria Petrova to join the ranks of his coworkers, and despite the 25-year age difference and the fact that both were married, the two became lovers. The romance has some comic elements. In her memoir, Petrova recalled that their excitations were first stimulated when she, at a colleague's concerned request, took "the chief's" blood pressure. To her remark that her own blood pressure was normal, Pavlov responded: "It cannot be that such a lively, agile, and enchantingly weighty creature (I was rather plump) is normal; let me measure it myself." On verifying the results, he congratulated her: "To be lively and so passionate, and to have such good regulation." The two soon embarked on a "massive research effort on the irradiation and concentration of excitation and inhibition," which seems almost too good to be true.

Unsurprisingly, the two-year courtship and the full-blown affair that lasted the rest of Pavlov's life did not go unnoticed, by Serafima or anyone else. "In the lab, coworkers grumbled," writes Todes, since the chief pretty much abandoned his practice of spending time with each of them at the bench. When Petrova received a "venomous anonymous letter accusing her of sleeping with him," she immediately concluded that the author was her former supervisor, Maria Erofeeva, who had been "romantically interested in the chief" herself.

Pavlov was 69 when the Bolsheviks seized power and promptly confiscated his Nobel Prize money and his gold medals. His beloved son Viktor died of typhoid while traveling to join the White Army in 1918, and the following year his brother Sergei, a priest, died after contracting pneumonia in a Moscow labor camp. He and Serafima and the rest of his family barely survived the years of civil war and famine. The dogs that lived in the Towers of Silence fared no better; a desperate Pavlov designed conditional-reflex experiments tailored to dogs dying of hunger.

A bitter, despairing Pavlov blamed the revolution and collapse of the Russian empire—not to mention the Bolsheviks' "pretension to leadership of world civilization"—on a fundamental weakness in the Russian mind and an imbalance between the excitatory and inhibitory processes in their central nervous system. His regretful requests to emigrate were blocked by the regime, and by 1924 the situation had brought his anger to a boil. At a public lecture blandly titled "Some Applications to Life of the New Physiology of the Brain," the 75-year-old scientist discussed the reflexes of freedom and self-preservation, and explained how, in differentiation experiments, the rapid alternation of conditional stimuli and conditional inhibitors "strained and disturbed the 'brain machine,' resulting sometimes in a 'breakdown' characterized by abnormal, neurotic behavior." He then applied his findings "to our Russian Revolution":

"In one of his speeches the late Lenin said that the proletariat can hold power only by a dictatorship. And this is the very truth. Now we all know what this dictatorship is: every moment, you fear being shot, and this tension excites strongly your reflex of life or death. You also have been every moment in danger of starving: this too grips you through the food

Q&A

Senior editor Samuel Hughes recently spoke with Todes by email about the making of Ivan Pavlov.

What were your biggest challenges in writing this biography?

The flip side of what made this project so exciting: the great scope of Pavlov's life, his staggering scientific output, and the mass of available archival materials. His published *Collected Works* comprise eight volumes—[which] represent only the tip of an iceberg. Pavlov supervised a number of large labs during most of his career—for some 45 years—and synthesized his coworkers' data in his own articles and books. So, to understand that process of synthesis, I needed to read the coworkers' protocols and articles as well.

The sheer amount of archival material was very exciting, but also daunting. It took me several weeks just to review the *description* of the contents of his personal papers at the Archive of the Russian Academy of Sciences in St. Petersburg, and to plan my approach to it. Another 20 Russian archives also held archival riches—the records of institutions where he worked, Imperial and Soviet state agencies, the Communist Party, and many individuals. And then, of course, there were the archives of his foreign friends and colleagues.

What were some of the most satisfying parts of the process?

Realizing that I didn't understand the goal of Pavlov's conditional reflexes research, and then gradually coming to a new understanding of it, was very satisfying.

Did you have conversations with him in your mind?

All the time—about his science. I felt that I should be able to defend my views about his science in a sustained conversation with him. He needn't agree, I told myself, but I should be able to hold my own. In our later conversations, I succeeded—but perhaps he was a bit off his game.

Give me an example of your detective work.

When I arrived in St. Petersburg in the early 1990s, a good Russian friend informed me that he had negotiated for me a meeting with the director of the archive of the Leningrad Communist Party. The meeting was the next morning, so I staggered to it in full jet lag, but the director was quite friendly and all went well. I found great materials there—personnel records of the Communists in Pavlov's lab, protocols of their meetings, and so forth. By Thursday of the second week, the material was drying up and I was out of ideas about where to look. So, on a whim, I decided to request the "miscellaneous correspondence" files of Sergei Kirov, head of Leningrad's Communist Party, with whom Pavlov had a good working relationship. I paged through them for the next two days until, with just a few hours remaining on Friday, I discovered before me five secret police surveillance reports on Pavlov! These shouldn't even have been in the Communist Party Archive, so I was looking at them, quite by accident, 60 years later. I later heard from two sources that there were some five volumes of these surveillance reports by the early 1930s, but I was never able to gain access to them.

reflex. And under these conditions it is quite plain that you may rule as you like. But it is wholly wrong to think that in such a way you can build a state; you will never have a real government, but only the administration of slaves."

"The audience stirred noisily and some accused Pavlov of treason," writes Todes, who quotes an eyewitness as stating that the scientist "faced the audience almost ferociously and, pounding the table forcefully with his fists until there was silence, continued, 'It makes no difference whether it is sweet or bitter for you to listen to this—you must hear it, you must know the truth, I speak only the truth.'" The Bolsheviks' methods, he concluded, "merely strengthened the reflex of slavery."

Anyone else would almost certainly have been sent to Siberia or shot. Yet the regime, anxious to keep their prize scientist content and productive, treated him with extraordinary deference and gave him increasing resources to carry out his work—leading his inner "beast of doubt" to worry that the results couldn't justify the great expenditure. He never did succeed in developing a unifying theory of the mind, even though his research was supported by some 250 trained men and women, and the Soviets had constructed a science village and country home, called Koltushi, for his explorations of conditional reflexes.

"For Pavlov, the Bolsheviks were criminals, blunderers, and dogmatists who were destroying his beloved homeland," says Todes. "But as a lifelong believer in scientism, he believed that the progress of science would inevitably humanize and civilize mankind, and the development of scientific culture would teach the Bolsheviks to see reason. And under the Bolsheviks Russian science was flourishing, growing as it never had under the tsars. As he put it after returning from the comparatively unfunded lab of a French colleague, 'You must give our barbarians one thing—they understand the value of science.'"◆

What did you most and least admire about Pavlov?

Like all of us, he was complicated and contradictory, with both admirable and not-so-admirable traits. He was certainly overbearing, intrusive, seemingly unbearably self-confident, possessed of a volcanic temper, and often intolerant of criticism. I don't think I would have lasted very long in his lab or enjoyed him as a colleague or a parent. But I admire him immensely as a man of deep principle with a profound sense of right and wrong—a man who stood up to higher authorities in academic institutions and the state when it was not to his advantage; as an individualist in the best sense of that word; as a passionate truth-seeker, and as a man who remained intellectually alive to the end of his life—who at age 86, on the eve of his death, was changing his mind about fundamental issues in his science.

Talk about the many misconceptions about him and his work.

The biggest misconception about his work is that he was a behaviorist, a man who believed that "scientific psychology" should ignore the "subjective world" and concentrate solely on "objective" behaviors that can be seen and measured. Pavlov was certainly interested in "behavior" (a word that people use in lots of different ways), but he was not a behaviorist. Steeped in Russian discussions of free will, human nature, and morality, he believed that his research would enable us to understand and perhaps control "our consciousness and its torments." He used conditional reflexes as a methodology in this grand quest.

In hindsight, did he succeed in that?

It is not at all clear that this great question can be resolved by studies of Pavlov's conditional reflexes or, for that matter, by today's technically sophisticated neuroscience. Reasonable, very smart people disagree on that. My own opinion is that we still learn most about "our consciousness and its torments" by reading good literature and history, by interacting with other people, and by reflection.

But we shouldn't be too hard on Pavlov. His scientific quest was brilliantly conceived and executed, though in a particular style reflective of his time and place. And although, like Newton, he did not resolve the fundamental question that animated him, he bequeathed much of value to science. Certainly, his development of the idea that our bodies and minds are constantly responding to signals is important and fruitful. And scientists and clinicians have used his basic approach to better understand simple learning behaviors, addiction, depression, and many other features of human mental life.

As for the "hard question" of the relationship of biological processes to consciousness—I'm not an expert, but my sense is that we are no closer to solving that than was Pavlov. From Descartes through Pavlov into the present, when thinkers speculate about that relationship (whether or not they invoke scientific data) they are always compelled to resort to some sort of metaphor—which may indeed represent a useful model, but also reflects the limitations of our knowledge.

What were the benefits and drawbacks of using dogs for so much of his research?

I think that it had the pluses and minuses of all models and model organisms. On the plus side, he came to know them quite well and to be able to interpret their responses very sensitively. On the other, the dog in the stand became a model that also restricted his thinking. He began to understand this late in life when his Communist coworkers—who hoped to show him that the psyches of higher primates and humans were in some ways qualitatively different from that of dogs—lured him into experiments with the chimps Roza and Rafael. Pavlov then came to appreciate the ways in which his exclusive emphasis on dogs had limited his perspective, and he was changing some of his basic ideas when he died.

Talk about your visit to the Towers of Silence.

A very thoughtful Russian physiologist took me on a tour of the Towers, and we reached the one original experimental chamber there that has been preserved from Pavlov's day. He invited me in and I was of course curious, trying to take in the scene. I was surprised when he invited me to climb onto the stand, but did so obediently and tried my best to be observant, to see things from the dog's point of view. But he had

a particular lesson in mind: he told me that he would allow me to take it in alone and exited, closing the heavy door, leaving me alone. I felt very ... isolated—which was precisely his point. He then confided in me that dogs often responded badly to that, howling and whining—and that their "fear reaction" skewed the experimental data. I arrived at the conclusion that it was impossible to construct a "neutral environment" (one shielded from all stimuli not in the experimental protocols)—which was, of course, the fundamental rationale behind the Towers.

His relationship with the Bolsheviks was incredibly contentious. How did he survive and even thrive in that atmosphere?

So far as I know, his situation was unique. He criticized the Bolsheviks, not only throughout the civil war and the 1920s but well into Stalin times, until his death in 1936. And he did so not only privately but in public and semi-public forums, and also in letters to Bukharin and Molotov.

The relationship between Pavlov and the Bolsheviks featured both combat and collaboration, and evolved over time. Science and technology were important to the Bolsheviks as important contributors to national power and to the "raising of the forces of production" essential to their vision of socialism. For them, although Pavlov was a political reactionary and a rare public critic, he was also Russia's only Nobel Prize laureate—a first-rate scientist with international contacts, and a materialist who was training a new generation of Soviet scientists. For all those reasons—and for the propaganda value of showcasing a Nobelist flourishing in revolutionary Russia—they tolerated his criticism, funded his labs extremely generously, and allowed him to maintain his authority over them. He "does not sing the Internationale," as Bukharin put it, "but objectively he is working for us." So, they put up with his criticism, funded his labs generously, and even feted him extravagantly on his 80th and 85th birthdays—while also surrounding him with informants and pressuring his circle to encourage him to behave.

During his last few years, Pavlov's attitude toward the Communists became more complex. He never ceased to denounce the repression and terror, the dogmatism, and the suppression of religion. Yet he saw the Nazi seizure of power as a threat to the homeland and, as he had during World War I, publicly closed ranks behind his country's government. [He also] believed that the relative moderation of the Second Five Year Plan and Stalin's announcement that a new constitution would guarantee rights to the secret ballot, freedom of speech, and freedom of assembly reflected a moderation of Bolshevik policies.

Had he lived longer, how might his life and science changed?

There is circumstantial evidence that Stalin thought Pavlov's special status was no longer necessary and was preparing a campaign against him. In any case, he died on the eve of the Great Terror—which would certainly have disabused him of the hope that Stalin was moderating his policies; and four years later came the catastrophic Nazi invasion of the USSR. I doubt if his firm belief in scientism—in the necessary link between scientific progress and the development of more humane behaviors and societies—would have outlived World War II.

What's your next project?

I've begun a new research project on one of Pavlov's contemporaries, Aleksei Ukhtomskii, who was also a fine scientist studying reflexes and the psyche. It seems another great Russian story.

I'm also engaged in one last project concerning Pavlov. Together with my colleague at Johns Hopkins, director John Mann, and producer Sergei Krasikov, I'm working on a documentary film, *Pavlov's Quest*, about Pavlov's life, science, and times. We're trying in this film to combine a contemplative portrayal of Pavlov's psychological drive for certainty (in the lab and in life), a sophisticated treatment of his science, and the great sweep of Russian history. We have Russian co-producers, a great network of Russian consultants, and access to the key materials and sites. If any of your readers would like to help fund the trailer, please have them write to me!

ILLUSTRATION BY DAVID HOLLENBACH

IVAN THE BADASS

As Daniel Todes' new biography makes exquisitely clear, Ivan Pavlov had an astonishingly stormy relationship with the Bolshevik regime that seized power in 1918. The following excerpt chronicles a series of incidents in which the elderly scientist openly defied the Soviets.

EXCERPT

HE indignantly resisted every attempt to extend Stalinist controls to his domain. In 1928, he dismissed a directive to tighten "labor discipline" in his lab at the Academy of Sciences in line with Party priorities for all workplaces: "A scientific laboratory is not a factory, and I am not an overseer. We are all successfully pursuing our scientific mission, and that's all there is to it; one can't treat intellectual labor entirely according to the stereotype of physical [labor]." Year after year, he responded to the demand for a plan of work by explaining that this contradicted the very nature of scientific inquiry. Such a plan was "impossible," he responded in 1929, "since the course of work is determined by questions arising during the work itself." He replied more expansively in 1930 that he planned "to investigate the higher nervous activity in dogs by the conditional reflexes method. I cannot say anything more detailed. ... The actual flow of free scientific work is determined by that which is encountered on the investigative path—and I cannot predict this. These unforeseen, unexpected turns of investigation also comprise the main force, joy, and charm of scientific activity."

He of course had no quarrel with the planning of scientific research, but was defending *his* authority to do that planning, as well as sticking his finger in the eye of the authorities. Having managed a large scientific enterprise for some forty years, he was in fact a master planner—defining key lines of investigation, matching available personnel and resources to them, and constantly adapting to unforeseen developments in the lab. Indeed, while Pavlov lectured the authorities about the incompatibility of planning and science, the delegation from the Worker and Peasant Inspection that scrutinized his physiology division in 1930 praised the "strictly planned character" of its work and the "lively supervision of coworkers and collective discussion of themes."

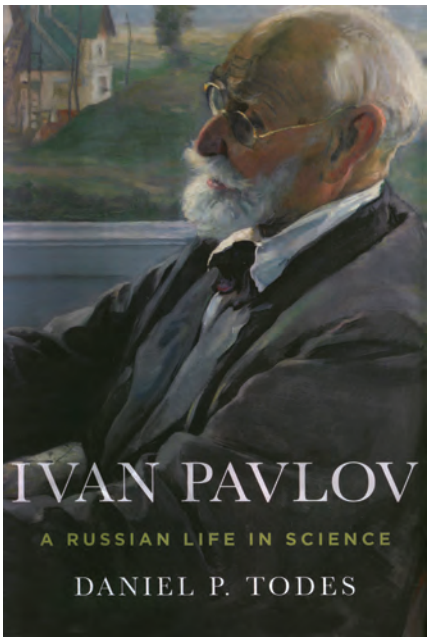
Asked in 1931 to report on his research's contribution to socialist construction and his use of the principles of "socialist competition," he replied: "As for socialist construction, I must affirm that the research I lead has a general cultural—and not a narrow socialist—significance. As for competition: having dedicated my entire life to science, I of course have no need of it." In any case, the state should concern itself only with the "financial side of things." Even Pavlov, however, was not complete master in his own house. Despite his disdain for socialist competition, he did finally permit Podkopaev to arrange for the Institute

to compete with the Academy of Science's Zoological Museum regarding fulfillment of plan, work discipline, economical use of resources, and other priority values of the First Five-Year Plan.

He rejected on principle the extension of the new Stalinist workweek to his labs. In September 1929, the Academy of Sciences announced that it would institute the same new work regime that governed other productive enterprises. "The slogan of individual creativity that characterized the activity of the Academy of Sciences in the preceding epoch brought with it a lack of organizational coordination." Henceforth, scientists would work not according to their spontaneous desires, but from 9 to 5 in five-day shifts during an unbroken workweek. Facilities would thus be operational seven days a week (no need to observe such obscurantist traditions as the Sunday day of rest, Easter, or Christmas). Pavlov was notified on March 11, 1930, that he had four days to inform the city's labor division about his compliance. He did not reply. A second notice elicited his defiant insistence that each coworker's research had a distinctly "individual character" and the very nature of experiment made it impossible to break up a coworker's workweek according to some predefined plan. "In view of this, I inform you that in order to avoid disturbance of the course of its specialized scientific-investigative work, the Physiological Institute of the Academy of Sciences must remain on a [traditional] seven-day week." In a follow-up note to the Presidium of the Academy of Sciences, he acquiesced to a standard 9-5 work day in his Institute only for nonscientific personnel. Scientists set their working hours according to the needs of their research: "In a scientific laboratory, no other order is conceivable."

Compelled eventually to accept the new order at the Institute of Experimental Medicine (where six-day shifts were mandated), he forbade coworkers at the Academy of Sciences to work on Sundays and defiantly closed his labs and discontinued his Wednesday conferences during Easter and Christmas. He was therefore among the "reactionary" academicians targeted by Communists in the Academy for retrograde displays of "religiosity, observance of all rites and holidays." At Koltushi, the Pavlovs always marked Christmas with a traditional tree and a masquerade party. The atheist physiologist and his religious wife also attended Easter services and actively supported the beleaguered parish there.

Another aspect of Stalinist labor policies that drew Pavlov's ire was the pressure on citizens to make the state a "voluntary loan" (*zaem*), usually of a month's salary, as an investment in socialist construction. Pavlov himself refused to subscribe to the *zaem* and criticized it openly—but, in a characteristic kindness to his coworkers, he paid this added tax for each of them. Responding to a colleague's



query in May 1934, he characterized the *zaem* as hypocritical extortion by an unworthy state: "I don't subscribe to the *zaem* for reasons of principle—because I consider the use of the *zaem* by the state to be incorrect. The first task of the state is protection of the people's health, the provision of the basic conditions of existence to the population—but this does not exist (last year's famine, which reached the point of cannibalism; a terrible nationwide typhus epidemic; the current mass malnutrition; the absence of sufficient fuel; crowding and filth; a shortage of the most common medicines, etc. etc.). Second, I protest against the false volunteerism of the *zaem:* the overwhelming majority subscribe to it with their heart in their hands, weeping, because they are afraid (with good reason) of the consequences if they don't subscribe."

The conflict between an explosive Pavlov protective of his authority and various officials attempting to Stalinize his institutions provoked a memorable confrontation at the Physiological Institute at the Academy of Sciences when he literally kicked a meddling militant out of the building. In 1933, the Section of Scientific Workers resolved to purge Pavlov's Institute of undesirables and dispatched a Leningrad University professor to make the initial inspection. Fedorov later described what followed: arriving at the lab in the morning, the professor showed his official orders from the Section to Pavlov, who, apparently confused about the purpose of the visit, obligingly escorted his guest around the facility, introducing him to coworkers and explaining their ongoing research. Finally, at noon, Pavlov bade him farewell and set off for his office to prepare tea. "But Ivan Petrovich, I have some business with you." "What business? I just spent two hours with you," said Pavlov, entering his study. The professor followed him in and Pavlov politely invited him to tea. Finally, he inquired about the purpose of his guest's visit. "I am to conduct a purge in your Institute," said the professor, again displaying his official document. "What? A purge? Purge me? They purge me sufficiently at international congresses," Pavlov shouted. "Get out, bastard!" Grabbing the professor by the collar, he twisted him toward the exit and kneed him in the back. Coworkers saw the frightened militant running down the stairs from Pavlov's study with the eighty-three-year-old scientist in hot pursuit, shouting "Get him the hell out!" A few hours later, the chastened academic recounted his story (minus some embarrassing details) to an emergency meeting of the Section of Scientific Workers. All agreed that Pavlov's behavior was intolerable—but what to do about it? A delegation was dispatched to Kirov. The head of Leningrad's Communist Party heard them out, but, bearing in mind Pavlov's special status, informed them bluntly, "I can't help you."◆