



READY TO RETIRE?

A nascent movement to send aging research monkeys to sanctuaries divides the biomedical community

By **David Grimm**, in Winamac, Indiana

It's been a long road to retirement for Bush the monkey—and not just because he's spent the past 15 hours in the back of a van motoring red-eye from New Jersey to Indiana.

For nearly his entire life, the 23-year-old macaque lived in a lab at Princeton University. There, researchers conducted MRI scans on him to understand which parts of the brain perceive faces, and he spent much of his time in an indoor

cage. In 2017, with Bush suffering from arthritis and nearing the end of his life span, the lab decided to send him to a sanctuary.

"We had a very deep emotional relationship with Bush," says Sabine Kastner, a Princeton neuroscientist who oversaw studies on the monkey. "We were all very sad the day he left, but we were happy for him."

The university took more than 2 years to find a sanctuary it felt could provide high-quality care for Bush and had space for him.

Finally, on 1 October, Princeton animal resource staff checked Bush's vitals, made him a care package of his favorite toys and treats, and placed him in a van that would bring him here to Peaceable Primate Sanctuary, a former farm amid sugar maples and cornfields where he'll spend the rest of his days.

Bush's big move is part of an unprecedented retirement collaboration: Princeton, along with Yale University, has just partnered with the sanctuary to ensure

Bush, a cynomolgus macaque, was a research monkey at Princeton University for nearly 20 years.

both schools can seamlessly retire more monkeys there in the future. It's a sign of increasing interest in sending former research monkeys to sanctuaries instead of euthanizing them or transferring them to another project. A growing number of scientists say retirement is the right thing to do for these social, intelligent creatures, and it can be cheaper than keeping the animals in labs. "We want to do right by these animals," says Peter Smith, associate director of Yale's Animal Resources Center. "It's good for them, and it's good for the people who have spent their time caring for them."

Yet the effort faces many obstacles. More than 100,000 monkeys are in U.S. research facilities, and retiring even a fraction is a challenge. Labs often can't afford it or can't find a sanctuary they trust or that has space. And some primate researchers say sending monkeys to sanctuaries is simply a bad idea. Every one of these animals could contribute to crucial research, they argue, because monkeys can offer a deeper understanding of how our minds work as well as speed the search for cures for Ebola, Alzheimer's, and other diseases. Critics also fear that even talking about retirement could eventually lead to all monkeys disappearing from biomedical studies, as happened with chimpanzees. "I don't know of any monkeys that are not needed in biomedical research," says Amanda Dettmer, a comparative psychologist and primate researcher at Yale.

The discussion has grown even more heated in the past few months. Animal activist groups have pushed legislation that, if passed, would compel federal agencies to draft retirement plans for monkeys and other lab animals. "Taxpayers bought these animals, and we want the government to give them back," says Justin Goodman, vice president of the White Coat Waste Project, a Washington, D.C.-based group that has found an increasingly sympathetic ear in Congress by painting animal research as a misuse of tax dollars.

Meanwhile, according to a National Institutes of Health (NIH) report released in 2018, planned use of research monkeys was expected to continue to rise; the number used in experiments reached a record high in 2017 according to the United States Department of Agriculture (USDA), even though the total number held in U.S. labs has declined slightly over the past decade. Higher demand could cause a space crunch at biomedical facilities and expand the pool of older monkeys, making the question of retirement more urgent. All of this has left individual labs caught in the middle, struggling with whether to retire their

monkeys—and the best way to do so.

As Bush, groggy and anxious, prepares to enter his new digs, it's unclear how many others will follow in his footsteps.

THE DIRT ROAD LEADING into Peaceable Primate opens up into 30 hectares of patchy grass bordered by tufts of woods. On the left, behind a chain-link fence, a couple of baboons chase each other through open concrete cylinders in an outdoor play yard. On the right, a single rhesus macaque with fluffy auburn fur scales a wooden climbing structure inside another play area, this one attached to a green, ranch style building with a red roof. Bush waits just inside.

He's still in the wooden shipping crate

banana chips."

Tarwater and an animal caretaker shuffle Bush's crate farther inside the building. Here, 13 macaques live alone or paired in cinder block and wire runs the size of small bedrooms, filled with perches, swings, and rubber toys. Some animals are squat, long-tailed cynomolgus macaques (or "cynos") like Bush; others are lankier, short-tailed rhesus macaques. A few squawk and climb their enclosure to peek at the newcomer.

Tarwater and the caretaker set Bush's crate down firmly against the gate of his new run and open the doors on both to let him inside. He hesitates for a few minutes and then gingerly makes his way in. "It's his arthritis," Conour says. "He's probably



Animal care staff at Princeton University prepare to transfer Bush to the van that will bring him to Peaceable Primate Sanctuary.

he has been in since leaving Princeton. He pushes a couple of fingers through the wire mesh on top and peeks out cautiously, revealing a chestnut coat, stubby triangular ears, and bushy gray hair below his nose, giving the impression of a Mark Twain mustache. "I know, it's superscary," coos Laura Tarwater, head of animal care here. "Don't worry, we'll get you out of there soon."

Another Laura paces nearby: Laura Conour, director of lab animal resources at Princeton. She flew here to make sure Bush arrived safely, and she hovers around his crate like a nervous mother dropping her kid off at college for the first time. "He likes grapes—he likes to peel them," she tells Tarwater. "He likes the crunch of

stiff from the ride."

Like Bush, every animal in the building came from a research facility. Sixty-five percent of monkeys used in NIH-funded projects are rhesus; they're typically involved in brain studies or tests of therapies such as vaccines. Another 15% are cynos, which constitute most monkeys in industry labs that test drug safety. Thirteen other primate species—including baboons and marmosets—make up the rest (see graphic, p. 1184).

None has been part of the retirement conversation until recently. For the past decade, the focus has been on chimpanzees. In 2010, in response to public and congressional pressure, NIH commissioned a report that concluded most biomedical research

on chimps was unnecessary. Five years later, the agency announced it would no longer support invasive research on the animals and would retire all its chimpanzees (*Science*, 16 June 2017, p. 1114).

Animal activist groups are following the chimpanzee blueprint in their public relations campaigns, pushing for monkey retirement as a way to reduce—or one day even eliminate—use of the animals in research. Last year, White Coat Waste orchestrated a congressional letter that urged federal labs to disclose what they did with monkeys after experiments ended. In May, the group got members of the House of Representatives to include language in a report attached to a proposed NIH spending bill that asks the agency to reduce its use of the monkeys it owns and formulate a plan to retire them. That same month, House members working with the group introduced a bill that would require all federal agencies—which own about 9000 monkeys—to create policies to retire lab animals. (The Senate followed with its own bill.)

None of the proposed legislation has passed, and none would force agencies to retire their monkeys. But researchers have been blindsided before, when efforts by White Coat Waste ended studies on squirrel monkeys, cats, and dogs at several federal facilities. Adding fuel to the retirement conversation, a January memo to Congress from the Department of Health and Human Services—which includes NIH, the Centers for Disease Control and Prevention, and the Food and Drug Administration—stated that it is working toward retiring lab animals. “We are supportive of the adoption of cats, dogs, and primates when relocation is safe and medically appropriate,” the agencies wrote.

The proposals target only federal research, so they wouldn’t affect academic institutions. But a few are moving ahead with their own plans.

A HALF-HOUR HAS PASSED, and Bush seems more at ease in his new quarters. The sanctuary staff open a small door that leads outside to his own play area, with barrels to crawl into, swinging ropes made of firehoses, and bright orange balls stuffed with treats. Bush inches toward the opening and stops. He has never been outdoors. He has

only seen the sun through a skylight. “Come on, Bushy!” Conour calls. But he just stares through the door at the world beyond.

“All of them eventually go outside, but we don’t force them,” says Scott Kubisch, the sanctuary’s founder and director. “Being retired is all about having choices.”

Kubisch talks about the sanctuary with the affection of someone who has spent more than 2 decades building it from nothing, largely with his own hands. He had the idea for Peaceable Primate in 1996, when he was a primate keeper at the Lincoln Park Zoo in Chicago, Illinois. He wanted to do something for laboratory monkeys after their research days ended. So he started

ties trying to retire macaques,” he says, so the sanctuary began to take them in 2018. It now has 18 baboons and 14 macaques, including Bush.

Such calls represented a shift: Many U.S. biomedical researchers have traditionally viewed sanctuaries suspiciously, fearing they are run by animal rights activists who will tar labs in the press to gin up public sympathy and donations. Other scientists have worried about the quality of care, noting that unlike labs, sanctuaries don’t have to register with the USDA, which requires regular inspections. (Many sanctuaries do seek membership with the North American Primate Sanctuary Alliance, which imposes

strict standards of care.) When you send an animal to a sanctuary, says Cindy Buckmaster, chair of Americans for Medical Progress and former director of one of the country’s largest animal care and use facilities at Baylor College of Medicine in Houston, Texas, “you’re putting them in a situation full of question marks.”

Kubisch has addressed those concerns head-on. He is careful to neither extol nor denigrate monkey research. “Our stance is that we don’t take a stance,” he says. He also has registered Peaceable Primate with USDA and always has at least three animal care staff on the premises.

Kubisch has tried to keep costs down as well. Sanctuaries can charge up to \$25,000 to care for a monkey, depending on how many years it has left. (Macaques live an average of 27 years.) Peaceable Primate asks for about \$2500 per year per animal. That’s much more expensive than euthanizing a monkey, but it’s cheaper than

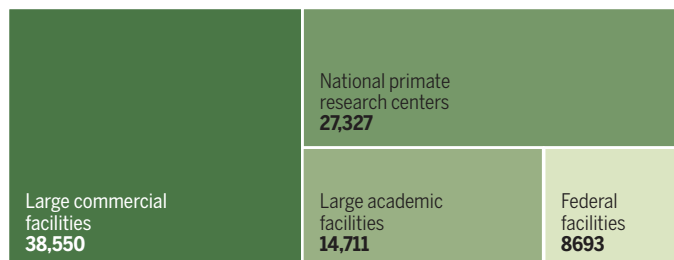
keeping it at a university—“a fifth of what Yale pays,” says Smith, who oversees about 150 monkeys there.

Both he and Conour say monkey retirement had always been informal and piecemeal at their universities. Each has retired only about a half-dozen monkeys during their tenures. When they learned about Peaceable Primate, they persuaded their institutions to make a large financial investment. (Neither school would say how much.) Conour and Smith say their universities felt that forging a relationship with a single, well-regarded sanctuary would smooth the path of retirement.

The result: a newly cleared plot of land just west of the macaque house. It’s not

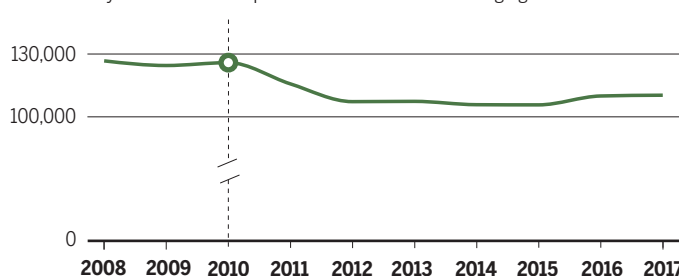
Where the monkeys are

Most U.S. research monkeys live in four main types of facilities. In 2015, the last year relevant data were available, industry labs held the most.



Primed to rise

The total number of monkeys held in U.S. facilities has trended slightly downward over the past decade, but NIH expects these numbers to rise as researchers request more monkeys for studies on topics such as vaccines and the aging brain.



a nonprofit, asked friends to collect coins in monkey-shaped piggy banks, and took money from his retirement savings to buy land here, more than 2 hours south of Chicago, near a farm where he lived as a kid.

“On weekends, I would come down and build the chicken coop and put in fences. Every tree you see here, I planted,” he says. “People at the zoo thought I was crazy.”

In 2014, a friend left Kubisch a large donation in her will. With it, he created an endowment for the sanctuary and constructed most of the remaining buildings. He originally intended Peaceable Primate as a baboon refuge, and the sanctuary took in its first three baboons in 2016. “But we were getting a lot more calls from universi-



From his indoor run, Bush peeks out at his play area at Peaceable Primate Sanctuary.

much to look at today—a few cinder block bricks and a whole bunch of dirt. But by the end of the year, it will be a new macaque building, with the same large runs and outdoor play area as the first one. “In their indoor runs alone, they’re going to have 10 to 20 times as much space as they do at Yale,” Smith says.

Bush will eventually move in here, and the house will be reserved for animals from Yale and Princeton. “It’s going to be the Ivy League building,” Smith jokes. “They’ll all be wearing tweed coats.”

The universities’ arrangement covers the cost of the building and lifetime care for six macaques from each school, even as old ones die and new ones come in. “We now have a pipeline to retirement,” Smith says.

But not everyone in the biomedical community is likely to get on board.

“IMAGINE YOU’RE A 70-YEAR-OLD human who knows everyone in your neighborhood, and then people pack you in a van and take you to a strange, new place where you don’t know anyone,” says Dettmer, the Yale primate researcher. “Even if it’s beautiful, being ripped away from everything you know can be devastating.” She points to an incident about 5 years ago, when 13 elderly research chimpanzees were transferred to a federal sanctuary in Louisiana. Within 2 years, nine had died. The sanctuary said the chimps were sick and elderly, but many people in the biomedical community blamed the stress of relocation.

Dettmer says the decision to retire chimpanzees to sanctuaries was a mistake, one she fears is being repeated with monkeys. Even older animals can be used in studies of the aging brain and body, she says. “There’s no such thing as a surplus monkey.”

She, Buckmaster, and others also say none of the pending retirement legislation is realistic—it offers no money for retirement and creates no federal sanctuary, as was done with chimps. To retire and care for just the few thousand monkeys in federal facilities would cost more than \$400 million, according to Speaking of Research, an international organization that supports the use of animals in labs. And because only about a dozen U.S. sanctuaries now take monkeys, the sanctuary system doesn’t have space for even a fraction of them.

Critics like Dettmer (who is active in Speaking of Research) also worry about a slippery slope. Talk of chimpanzee retirement went hand in hand with removing those animals from biomedical research—a concern “in the forefront of researchers’ minds,” regarding monkeys, Dettmer says.

Dettmer says she understands the emotional appeal of monkey retirement but argues that the needs of humans should come first. “We’re not just concerned about the welfare of animals,” she says. “We’re concerned about the welfare of society.”

IN THE SWIRL OF OPINIONS, labs are trying to find their own way forward. Some universities have already reached out to Smith to see whether they can create a retirement pipeline, too. Conour says a drug company has contacted her. “Right now, we’re the cool kids on the block,” she laughs.

Johns Hopkins University in Baltimore, Maryland, is taking a different route. It’s considering creating its own sanctuary, on a farm in the Maryland countryside. Having its own facility would be cheaper and easier than sending monkeys to an outside sanctuary. What’s more, university staff “would see the animals they cared for and came to

know, sometimes since they were babies, enjoying their postresearch lives,” says Eric Hutchinson, associate director of research animal resources at the university, who came up with the idea. “And the public would see that an institution can be committed to both animal welfare and high-quality biomedical research.”

For labs going it alone, the Research Animal Retirement Foundation may be able to help. Founded by former monkey lab manager Rachele McAndrew in Gilbert, Arizona, the organization is trying to raise funds for scientists who want to retire monkeys. It also offers advice on finding and working with sanctuaries. “We want to be a one-stop shop for labs interested in retirement,” McAndrew says. Smith says the interest is there. “I think it’s going to be a fairly hot topic for the foreseeable future.”

Even Buckmaster, with her concerns about the sanctuary community, has found one she trusts and has retired close to a dozen monkeys there. “My pipe dream is for a small network of government-owned sanctuaries spread throughout the country that could take any type of research animal,” she says. “The public wants that. We want that. These animals deserve that.”

Kubisch has his own dream, hoping to continue to grow his sanctuary. “I think we could eventually house up to 500 animals,” he says. “I want to be the go-to place for retirement.”

Tomorrow, Bush will venture outdoors for the first time. He’ll wince at a blast of wind against his fur. He’ll stare curiously at birds as they chirp overhead. And he’ll push his hand into the dirt, feeling it envelop his fingers. Then he’ll look behind him at the small door to his run, perhaps pondering whether he should go back inside—or remain in the sun. ■

Ready to retire?

David Grimm

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