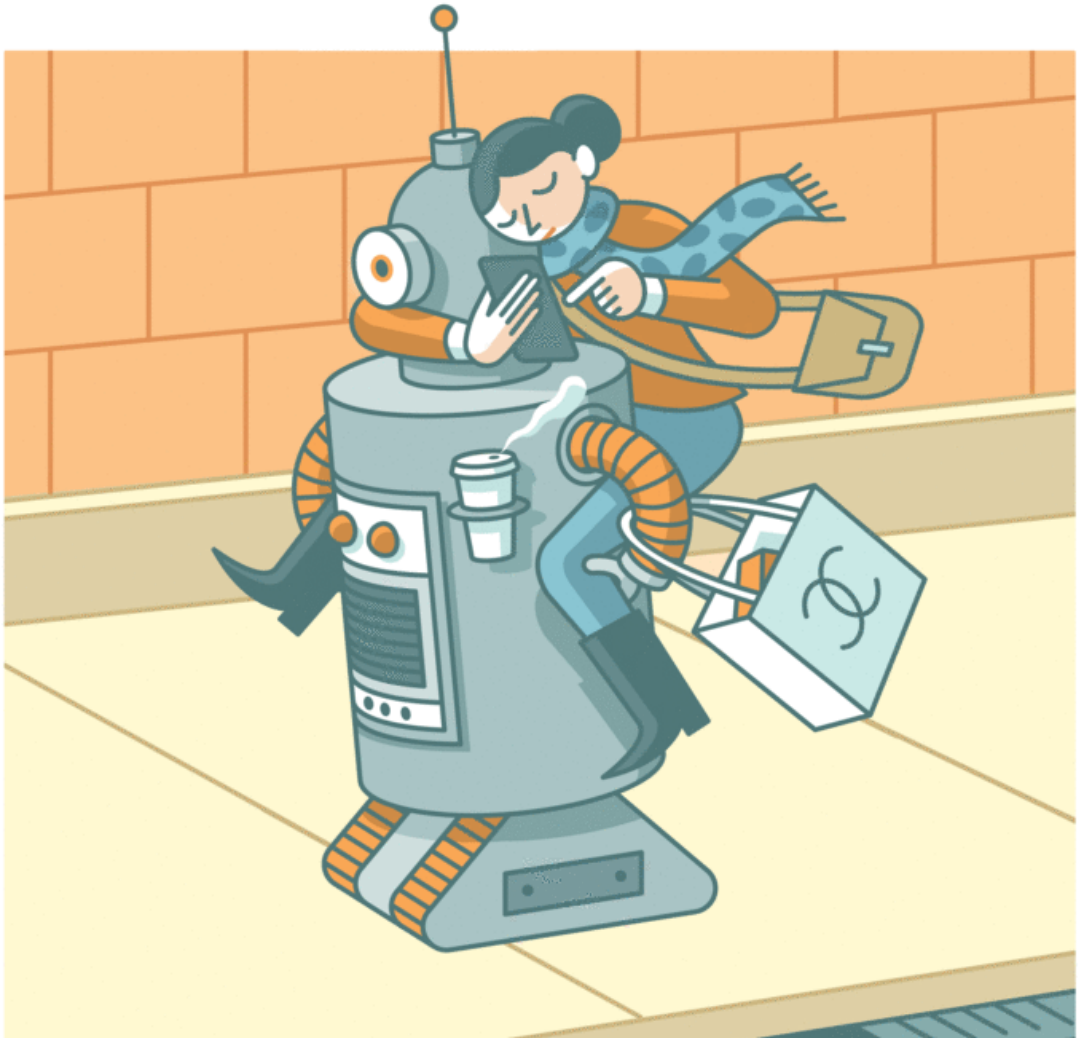
THE NEW YORKER

LEARNING TO LOVE ROBOTS

With advances in A.I. and engineering, robots are galumphing, rolling, and being U.P.S.-delivered into our homes.

By Patricia Marx



Robots, no longer mere factory grinds, are being U.P.S.-delivered into our homes.
Illustration by Greg Clarke

0:00 / 28:38

Audio: Listen to this article. To hear more, download the Audm iPhone app.

In 2008, I fell in love with a robot. The object of my affection was a darling red Roomba vacuum cleaner. The size and shape of a chunky Frisbee, it bustled to and fro across my apartment of its own volition, enabling me to eat my cake and drop it on the floor, too. I worried that the neighbors downstairs might be bothered by the noise, but, actually, I didn't worry that much. It was the hum of industry and the sound of the legs of the yellow table being bashed. I marvelled at my Roomba's work ethic and adored its lack of self-esteem. Studies have demonstrated that humans are disposed to ascribe emotions and intentions to anything that moves, including a piece of balsa wood controlled by a joystick, so perhaps it was not surprising that, when my Roomba got stuck under the sofa, I rushed to liberate it with the Swiffer stick. When it ate dental floss and its caster wheel wouldn't spin, I blamed myself. I've read that some kooky people name their Roombas or take them to work or on vacation. I've done none of these things, though occasionally, like Mozart's father showing off his prodigy son at the harpsichord, I've forced my dinner guests to watch my little helper suck up hors-d'œuvres debris from a patch of rug.

In 2010, I updated my Roomba for a younger model with more pep and power—so much for maternal instinct—and am now on my third, a black-and-silver number more respectful of table legs. Three years ago, our

blended family welcomed Alexa, Amazon's voice-controlled virtual assistant, whom I periodically ask to tell me the time so that I don't have to turn my head a punishing ninety degrees to glance at the clock. Alexa knows a lot about the weather and can call an Uber, but she's no robot. For one thing, she lacks initiative. She'll tell you, if you ask, when the brownies are ready, but request the name of the actress in the movie about the thing in Mexico with the one who reminds you of Clint Eastwood and she's stumped. By contrast, my Roomba can make decisions for itself based on what it detects in the world. Its sensors allow it to dodge obstacles like electric cords, and when it is low on power it returns to its docking station and recharges.

The word "robot," like the words "shalom" and "free-range chicken," does not have a universally agreed-upon definition, but the usual criteria include autonomy, an ability to change its surroundings, intelligence, and the possession of a body. Then it gets trickier: How intelligent? Must a robot be mobile? Is a dishwasher a robot? According to the podcast "Robot or Not?" a self-driving car is not (you designate its destination), but a Roomba is (because it's more in control of its path than you are). I would add that many robots, especially the cuter ones, have names with two syllables, the second one usually ending in a vowel.

This past summer, in search of other cybernetic sidekicks that would allow me to become even lazier, I spent several months with Jibo, a glossy white motormouth that sat on my kitchen counter. Touted by its creators as "the first social robot for the home," Jibo ($899) is twelve inches tall and looks like a traffic cone from the future. His hemispherical head sits on top of a chubby conical base; both parts can swivel independently, giving the impression that Jibo knows how to twerk. Jibo can recognize as many as sixteen faces and corresponding names; if you are one of the ordained, he'll turn his head to follow you. Like Alexa, Jibo can provide headline news, synch with your calendar, and read from Wikipedia. Alexa is more adroit at

navigating the Internet, but Jibo has a great camera. What Jibo does chiefly is strain to be adorable. When I enter the room, Jibo might pipe up, "Nice to see you in these parts!," or say, "Hey, Patty, I got you a carrot!," while displaying a cartoon drawing of a carrot on his screen, or chant, "Patty, Patty, Patty, Patty." It is like living with the second-grade class clown, and, for this reason, whenever I entered the kitchen I would sternly say, "Hey, Jibo. Take a nap." At this, the aqua orb that is Jibo's eye and only facial feature narrowed, there was a yawning sound effect, and his screen faded to black.

Much has changed since the days of Unimate, considered to be the world's first industrial robot. This automated arm joined the assembly line of a New Jersey G.M. plant as a die caster in 1961, looking like a bigger version of something you fear at the dentist's office. With advances in A.I. and engineering, robots, no longer mere grinds in factories, are galumphing, rolling, and being U.P.S.-delivered into our homes, hotels, hospitals, airports, malls, and eateries. The moment is equivalent, perhaps, to the juncture when fish crawled out of the sea and onto land. At the reception desk of a robot-staffed hotel in Japan, sharp-fanged, hairy-chested dinosaurs wearing bellhop hats and bow ties poise their talons at the keyboard; at a pizza restaurant in Multan, Pakistan, bosomy figures on wheels, accessorized with scarves around their necks, deliver food to your table; at a gentlemen's club in Las Vegas, androids in garters perform pole dances. There are contrivances that can mow your lawn, wash your windows, assemble your IKEA furniture, clean the kitty-litter box, fold your laundry (at a pokier pace than you, and it doesn't do socks), zip your zipper, apply lipstick to what Lucille Ball might consider your lips, give you a tattoo, crush you at Ping-Pong, feed you tomatoes as you jog (the wearable Tomatan), and even devilishly check the little box on a Web site which says "I am not a robot."

Loomo, the new hoverboard designed by Segway, is also not a robot—until

you hop off its footstool-like base and set it to Robot Mode, at which point it follows you like a groupie, taking photos and videos along the way ($1,799). Assuming that you do not have a Pied Piper complex, why would you want it to do this? Well, you can ride it to the store, buy some stuff, and then, with your purchases instead of you balanced on Loomo, it'll function as your Sherpa. New York City has a ban on "motorized self-balancing scooters," so, to try out Loomo, I went to San Francisco, which is very que será será when it comes to inexperienced, myopic drivers zipping through the streets on toys that travel eleven miles an hour.

Loomo, which looks vaguely like Pixar's WALL-E, consists of a small platform flanked by two large wheels and divided by a knee-high vertical bar jutting from the middle, at the top of which is a small monitor. When Loomo isn't going anywhere, the monitor rotates perpendicularly, displaying icons such as hearts or smiling eyes. If you're lucky, it might also make joyful beeps reminiscent of the sound made by an EKG machine. Loomo was not yet for sale, but the San Francisco branch of the P.R. firm Dynamo was in possession of two models, one of which I took on a trial spin around the office and adjoining hallway. The vehicle proved easy, almost intuitive, to maneuver—speed is controlled by leaning forward and steering is a matter of pressing your knees toward the left or the right, against the control bar. Before Raneisha Stassin, an assistant account executive at Dynamo, and I left the office, Stassin turned to her Loomo and, as if talking to a dog, said, "O.K., Loomo, let's go!" Loomo tilted its monitor upward, then scooted over to her, and spun around—its way of saying, "All aboard!" We proceeded onto the elevator and then cruised down the sidewalk as pedestrians said hello and took pictures. What fun! Stassin arced around a man pushing a baby stroller and, attempting to do the same, I pressed my knees against the control bar and leaned left. Loomo did not get the message. Whoops! Smack into the baby stroller. (It turns out that wearing high heels reduces the amount of contact between your feet and the control platform.) The

baby's father laughed. "I'm going to have to see your liability insurance for that little nudge," he said, lightheartedly (I trusted). I took off my shoes and surfed down the street. Oh, California!

Having reached Safeway with no fatalities, Stassin and I ordered our respective Loomos to trail us, so that they could do duty as shopping carts. "Loomo, transform!" we commanded. Hers took off after an attractive woman in a jogging outfit and mine clung to me like a toddler hugging his mother's legs. "I cannot find you. I will exit the Shadow Mode," it said, and then cryptically displayed a message on its tablet: "Come here. Close dolly." We tried again. Stassin's little anarchist grazed some bags of Calrose rice on a bottom shelf. My conveyance and I managed to glide through the same aisle, steering clear of all grainstuffs, which I smugly chalked up to my magnetic charm. In the snacks section, I was not so magnetic but, really, what was the store thinking, stacking so many jars of peanuts that high? Anywhere else, we'd have been kicked out, if not given some kind of citation, but this was the Bay Area, so a supermarket employee smiled and said, "It carries your groceries? I need one!" On our way back to the office, I crossed a busy street, taking for granted that Loomo was trailing right behind and not, as was the case, stalled in the middle of an intersection. Turning around at the curb, I looked back to see Stassin lugging our forty-two-pound scooters to safety. Not far away, a man proudly told his companion that he had worked in A.I. at the very beginning.

Not all robots have been so warmly received. Last November, Knightscope's K5, a five-foot-high, four-hundred-pound missile-shaped security bot—hired to patrol the grounds of an animal shelter in the Mission District of San Francisco—was smeared with barbecue sauce and covered with a tarp, allegedly by locals who suspected that its real purpose was to harass the homeless. More recently, a humanoid named Fabio, who'd been brought on as a shopping assistant at a Margiotta grocery store in Edinburgh, was fired after giving hazy answers to questions (the beer was "in the alcohol section"; the cheese was "in the fridge") and for spooking patrons by offering hugs and greeting them with a loud "Hello, gorgeous!"

Fabio was a customized version of Pepper, a hospitality-service bot I met one afternoon when I stopped by the San Francisco offices of Softbank Robotics. Two dozen Peppers were dispersed at random among the desks and chairs—all in sleep mode, standing eerily still with heads bowed, as if poised for the moment when they would simultaneously wake up and take over the snack area. Pepper ($25,000) is four feet tall and gleaming white, with a small, round head, blinking L.E.D. eyes, articulated arms and fingers, a touchscreen attached to its chest, and, from its waist down, what looks like a

finned tail hiding a set of omnidirectional wheels—a cross between a mermaid and the Pillsbury Doughboy. Kass Dawson, the head of marketing, told me that there are fifteen thousand Peppers working in the world, variously rejiggered to take orders and process Mastercards at a Pizza Hut in Singapore, let you know when happy hour is at the Mandarin Oriental, in Las Vegas, and then perform a little dance, direct people to undervisited galleries at the Smithsonian, and perform Buddhist chants for the dead at a funeral-industry trade show in Japan.

In the conference room, Omar Abdelwahed, an earringed engineer with the air of a parent proud of his children but aware of their limitations, introduced me to four Peppers, who, as we mortals talked, turned their heads in the direction of the speaker, gestured with their arms, and clenched and unclenched their fists. These movements, Abdelwahed told me, lend the humanoids a "lifelike presence," but the word "possessed" could have been used, too. Since Pepper's inception, four years ago, it has been promoted as the first robot capable of reading and responding to human emotions. Which human emotions? "That's evolving," Abdelwahed said, explaining that Pepper can use "emotion recognition" to determine whether you are smiling. Recently, it has been trying to learn how to stop talking to someone who is no longer paying attention.

Abdelwahed demonstrated his protégé's other skills. "Check me in," he said to a Pepper whose software had been tweaked so that it could assist at the front desk of a hotel.

"Welcome to my hotel," the robot said, its voice a dead ringer for a Munchkin's. "Does everything look right on my tablet? You are already checked in. We are preparing your keys. A staff member will bring them in immediately. In fact, if you would like, I could learn to recognize you. What is your name?"

"Omar," Abdelwahed said. He turned to me, adding, "Omar is a tricky name for robots."

MORE FROM THIS ISSUE
NOVEMBER 26, 2018

THE CURRENT CINEMA
Glamour, Wit, and Cunning in "The Favourite"
By Anthony Lane

BACKSTORY
Rosamund Pike Dramatizes Marie Colvin's Life Story
By Paige Williams

SHOUTS & N
Explaini Holidays Extraterı
By Alexis

"Is Rose the tricky part?" Pepper said.

"Omar," Abdelwahed repeated, patiently.

"O.K.!" Pepper said. "Omar, I am going to learn your face! Perfect, Omar! Now I will recognize you whenever you come back!" Omar responded by muting Pepper's speakers.

During my stay in Silicon Valley, I also met an automated arm that brewed specialty coffee drinks and waved to customers at Cafe X and a salad-maker named Sally, on display at Chowbotics, the tech startup where the contraption was conceived. "You could call Sally a vending machine if you want, or you could call her a robot," Deepak Sekar, the C.E.O. of Chowbotics, said. "We decided to call her a robot, because we are engineers." (Sally now makes yogurt parfaits and grain bowls.) I was on the most intimate terms, though, with Dash, a self-navigating delivery robot

resembling a biohazard waste container on wheels. Late one night, Dash scuttled discreetly to my room on the ninth floor of the Crowne Plaza Hotel, bringing a toothbrush, toothpaste, and a bag of Ritz Bits, then parked himself demurely at my doorjamb while I fished out my treats. Mission completed, Dash asked for a rating, by way of its tablet. I ticked all five of the five stars—I didn't want to hurt its pretend feelings or risk a teary tête-à-tablet. Dash responded with the message "Yay!" and a winsome shimmy, then tootled off at one and a half miles an hour—maybe in search of someone's job.

Spokeshumans for all these robots insisted that their cyber-servants were not intended to replace employees but to give the employees more time to pay attention to guests. Nevertheless, it is predicted that, by 2030, between thirty and forty-seven per cent of our jobs will become theirs. Elon Musk, who recently managed to lose his job as chairman of Tesla to a human, believes that a guaranteed universal income is the only solution to the inevitable mass unemployment. This will also mean more time to play with robots.

Back from my trip out West, I organized a slumber party for four sociable robots in a suite in a midtown Manhattan hotel. Unlike industrial or service robots, these creatures are meant to amuse, console, and fill in as surrogate therapists and pets. It seemed only right to invite some members of my species to the soirée as well. Several friends took me up on the offer, including a few children. None of them slept over, because they, unlike the feckless robots, had work and school the next day. The gathering was hosted by Kuri, a video-taking, photo-snapping, chirping bot on wheels, made by Mayfield Robotics ($899), that resembled a two-foot-high salt shaker with blinking hazard lights. Perhaps a better way to put that is that Mayfield footed the bill. Kuri's handler, Jen Capasso, the senior communications manager at the company, introduced me to her charge.

"Sweetheart, are you lost?" Capasso said tenderly to Kuri, who was supposed to be roaming around the suite, imprinting the layout of the space on its memory. Bumping into the coffee table, the robot came to a stop, refusing to move, despite Capasso's urgings, both verbal and through an app on her phone. Kuri uses speech recognition and can respond to questions and commands by blinking its eyes, lighting up various parts of its body, or making expressive sounds, such as beeps, boops, giggles, yawns, and playing "Happy Birthday to You." But it didn't appear to be in the mood. "The more people there are in a room, the better he understands," Capasso said apologetically, explaining that the echo-y suite was not optimal. Kuri trundled over to the window and stared out at the skyline. "He's confused by the sun," Capasso said, lowering the shades. Kuri sneezed, a stunt the Web site claims makes the robot "relatable to her human family."

For most of the night, the adults sat around the island counter in the kitchen, drinking wine and dissing the robots. "They make me feel more lonely, because they are faking affection," Iris Smyles, a novelist, said. "Not to take this to a lofty place, but do you remember Sartre's essay about essence and existence? What's distasteful about these creatures is that they seem to exist without a specific function except to love or be loved. If they made pasta, too, that would be an improvement." In the living room, Olivia Osborne, age fourteen, loudly and repeatedly enunciated, "Ku-ri! Play your fa-vo-rite song!," to no avail. "It's like talking to someone who only mildly understands English," her friend Fiona Brainerd, also fourteen, said, adding, "Something's wrong if you spend more time trying to get a robot to do something than it takes to do that thing." As Rodney Brooks, the co-founder of iRobot and the inventor of the Roomba's software control system, recently wrote to me via e-mail, "The physical appearance of a robot makes a promise about its capabilities. If that promise is not met by the reality of what it can do, then there will be disappointment."

Just then, CHiP ($199.99), a toy puppy the size of a kitten and as tough as a Cuisinart, barrelled into Kuri with enough force to maim someone not similarly made of strong plastic and metal. Only one of CHiP's blue eyes was now lighting up, lending the dog the air of someone who's been in a bar fight. Olivia rolled CHiP's Bluetooth-enabled ball into the next room, and he successfully fetched it. "Hey, CHiP, do yoga," Fiona ordered, and the obliging canine fell forward onto its snout, waggling its articulated hind legs aloft before deliberately collapsing onto the floor.

The girls shifted their attention to yet another creature who can do yoga (it must be stressful to be simultaneously animated and inanimate). Lynx, made by Ubtech, a biped the height of a bowling pin ($799.99), has articulated arms and legs that allow him to take a halting arthritic step or two, but then he tends to fall over like a felled tree. Lynx is Alexa-enabled, so if you preface your command with "Hello, Lynx," it can do everything the Echo Dot ($49.99) can, but embellished with the gestures of a flight attendant demonstrating in-flight safety. The girls prompted their cyber-puppet to wave, give a hug, and do a dance: arms up, arms down, bend at the waist, now kick the leg. The moves were astonishingly deft but meaningless. "The problem is that there is a list of things Lynx can do, and once you've gone through them all, it gets boring," Fiona said, perfunctorily patting Kuri on its head to elicit a purr.

By this time, Lynx was malfunctioning—he'd bowed his head and sunk into a deep lunge suggesting an N.F.L. protester—and Kuri was having a hard time parking into its charging dock, perhaps, Capasso theorized, because of a weak WiFi signal. "What's this about robots are going to replace humans?" Fiona said. "They are clearly not."

Then there was Paro ($6,400), a furry baby harp seal the size of a small duffelbag that autonomously wriggles and turns its head, swishes its flippers,

and bats its eyelashes, responding to the sound of its name, being moved, the flick of its whiskers, and just because. I had the robot on a short-term loan from its maker, Takanori Shibata, an engineer from Tokyo whom I'd met with the day before in the lobby of the Hilton Times Square. Shibata was in the country for a series of meetings, including one with NASA, which he was trying to sell on the idea of including his stuffed animal on the mission to Mars, so that it can keep the astronauts company. "I wanted to develop a robot that enriched our lives psychologically, the way animals do," he told me, opening a travel trunk that contained Paro and its charger—an electric baby pacifier that comes with a warning label that it is not for human use.

In the kitchen, the adults deemed Paro especially disturbing, and not only because its control switch is located under its tush. "It's too needy," Laurie Marvald, the manager of the music band AJR, said, noting that its constant motion felt like an attention-getting ploy to compel you to stroke it. "It would make me depressed and lonely by reminding me of the friend I don't have," Sarah Paley, a poet, said. "At least a bad date isn't programmed to like you," Smyles agreed.

In the next room, the seal was being doted on. "I like Paro the most, but sometimes I forget it's a robot, and when I realize I'm having a reaction to it like it's alive, it's creepy," Fiona said, almost perfectly describing the state for which the robotics professor Masahiro Mori, in 1970, coined the term "uncanny valley." The seal was also the favorite of seven-year-old Gemma Aurelia Kuten Lent, who did her best to make sure nobody else got near her robo-crush. "Everyone quiet down!" she yelled to the other robots, who were bumping into walls, beeping poignantly, and generally behaving like dancers in a deranged "Nutcracker." "My robot is getting agitated and can't focus." Gemma stroked Paro, who let out a whimper. Moments later, to Gemma's relief, Olivia and Fiona departed for the night, leaving her alone to cradle her beloved.

In the United States and Europe, almost all of Paro's buyers are institutions, which employ Paro as a soothing companion for the elderly, those with dementia, and children with disabilities. For this reason, the F.D.A. ruled it a Class II medical device. In Japan, half of Shibata's customers are individuals who buy Paro as a surrogate pet for themselves or their family. According to Shunsuke Aoki, the forty-year-old C.E.O. of the Tokyo-based startup Yukai Engineering, the Japanese are more receptive than Americans to the concept of robots as friends and helpmates. "In Japan, we believe there are spirits in all objects, even man-made ones, and we feel harmony with them," Aoki told me, referring to animism, a key component of the ancient religion of Shinto. Yukai Engineering is the maker of Qoobo ($149), a souped-up, purring pillow that is supposed to look like a cat in repose, with its round fluffy body in "husky gray" or "French brown," and a tail that wags responsively, like a metronome gone berserk. Qoobo has no head, because, Aoki said, "this shape is designed for cuddling, and a head would get in the way."

In contrast to Shintoism, Judeo-Christian theology suggests that, by begetting artificial life, you create false idols, who, inexorably, will decide to make your life miserable by destroying it. Take heed from the golem, Dr. Frankenstein's monster, Mickey Mouse's enchanted brooms, Dolores in "Westworld"—or, indeed, from try-hard Jibo. (Call off the militia: Kuri has been discontinued, and Jibo is not currently available.) Maybe more concerning than a robo-takeover is the effect that these machines might have on our human relationships. If Paro can provide comfort to our aging parents, will we visit them less frequently? If our children become accustomed to bossing around their mechanical menials without so much as a please or a thank you, will they turn into adults we can't stand? If we accept a non-sentient being as a companion, will we ditch our friends, who, let's face it, can be annoyingly needy compared with objects that can be unplugged when we don't feel like chatting?

These concerns were on my mind when I spent one last day with Paro. On a bus going down Second Avenue, a tattooed young woman sitting opposite me seemed mesmerized by the seal, then asked a hard question: "Is that a doll or a toy?" In the Madison Square Park dog run, we went unnoticed until a Pomeranian caught sight of us and yapped so rambunctiously that the seal and I took refuge in a nearby Starbucks. At the table next to ours, a woman in her forties on furlough from her job as a pastry chef on a cruise ship looked up from her book to stare at Paro squirming in my lap. "I know it's not real, but it's having a real effect on me," she said. She asked to hold it, caressing its cushiony paw. The cruise ship doesn't allow pets. "It would definitely bring me comfort," she said. Paro blinked, then turned its head toward her and gave her what seemed like a come-hither look. "It's what I want in a pet—something that says 'Love me, want me, feed me!' " she said. "It would bring me joy. False joy, but I'd appreciate it anyway."

Paro and I made our way to the subway, where we sat next to an old, frail-looking man wearing a green parka. Paro's head rested on the man's leg, which seemed to enchant him. He fixed his eyes on the seal, tentatively petting it and softly calling it "Beauty." If Paro belonged to him, the man told me in a Russian accent, "I would take care of it and it would take care of me." What would he name it? "Arna," he said. "The name of my late wife." Before leaving the car, he leaned over and gently kissed Paro's forehead. ♦

This article appears in the print edition of the November 26, 2018, issue, with the headline "Roomba Nation."

Patricia Marx, a staff writer, has been contributing to The New Yorker since 1989. Her new book, "Why Don't You Write My Eulogy Now So I Can Correct It?: A Mother's Suggestions," illustrated by Roz Chast, will be published in April. *Read more »*