Why Virtual Reality Is About to Change the World

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Gregg Segal, a Valve engineer, demonstrates the Vive virtual-reality headset, which can track a user's locomotion, head movements and hand gestures.

It's nearly upon us, and it could revolutionize the way we live, play and learn

Palmer Luckey isn't like other Silicon Valley nerds.

He's a nerd all right, but not the kind who went to a top-ranked university, wrote brilliant code or studied business plans. He's cheery and talks in normal sentences that are easy to understand. He was homeschooled, and though he did drop out of college, it was California State University, Long Beach, where he was majoring not in computer science but in journalism. He prefers shorts, and his feet are black because he doesn't like wearing shoes, even outdoors. He doesn't look like a guy who played Dungeons & Dragons so much as a character in Dungeons & Dragons. He's a nerd from a different century, working on the problems of a different century. Palmer Luckey is a tinkerer.

If he had been one of those kids obsessed with Matchbox cars, we might have a flying car by now. But he was into video games and 1990s-era science fiction, so this year we will have virtual reality. As an 18-year-old who took apart smartphones and fixed them for cash, he figured out that the solutions to the problems virtual-reality engineers weren't able to solve were right inside his phone. Now 22, Luckey sold his company, Oculus VR, to Facebook last year for $2.3 billion, allowing it to grow to more than 350 employees in

offices in Silicon Valley, Seattle, Dallas and Austin as well as in South Korea and Japan. That's because, as fantastical as Luckey's dreams were–I want to feel like I'm really running down halls shooting bad guys!–Mark Zuckerberg and the rest of the tech industry had a much bigger hope for the sensory-immersion goggles Luckey used to carry around in a yellow bucket in order to hold loose wires. They had seen the Internet get disrupted by mobile and were wary of being blindsided by the next platform for accessing information–which they thought might be hiding in Luckey's yellow bucket.

"We were thinking about how this will affect our friends who are into gaming," says Oculus CEO Brendan Iribe, sitting in his company's building on the Facebook campus in Menlo Park, Calif. "Mark is always thinking about, How does this impact 1 billion people?" Luckey, who loved The Matrix and Neal Stephenson's virtual-reality thriller Snow Crash, understood Zuckerberg right away. "Could you call a book the final platform? Of course not. It's limited in the kind of stimulus it supplies," Luckey says. "Virtual reality is the final platform." And while the first true virtual-reality machines won't start coming out until Christmas, a lot of people have already quit their jobs or funded projects in the belief that the final platform is here.

Virtual reality has been promised for decades, but in my conversations with the top developers in the field, it quickly became clear that never before have so much money and talent bet on its imminent arrival. Headsets will start going on sale this year, and competition will increase dramatically through 2016. At first they'll be bought by hardcore gamers and gadget geeks. They'll be expensive–as much as $1,500 with all the accoutrements. And just as with cell phones, everyone else will mock the early adopters for mindlessly embracing unnecessary technology with no useful purpose. At first.

A good place to start that mocking would have been AT&T Park. In April, a group of virtual-reality entrepreneurs are wearing huge bright red plastic sunglasses, walking on the field where the San Francisco Giants play. Venture capitalist Mike Rothenberg, 30, rented the stadium so the 360 guests he's invited can see the 20 virtual-reality companies that his firm, Rothenberg Ventures, has funded. They can also take batting practice, drink cocktails, pet adoptable dogs and build their own goody bags.

For each VR demo, I put on a clunky pair of goggles, most of which have a smartphone slipped into a slot in front of my eyes, which does most of the work. These machines are not as complex as what Luckey developed, but they provide a cheap, effective rendition. The screen, when it's that close to your face, fills your field of vision–the first frameless visual medium. The sense of depth is far more realistic than 3-D, with everything stretching out to infinity, scaled perfectly. And I can look all around, whipping my head to see above, below and behind me, which gives me brief moments of what virtual-reality pioneers longingly call "presence"–when you really feel like you're inside a fake environment. It's an amazing technical achievement. I'm psyched I got to try it, but it's not something I'm going to choose over watching TV. The graphics are clunky, and I can see individual pixels, so I'm pretty far from fooled into thinking I'm not inside a ballpark. It's like the coolest version of the 1970s View-Master toy I could imagine.

It's also close enough to The Matrix to excite all these people. Xavier Palomer Ripoll has come from Spain to work for three months at Rothenberg Ventures' VR accelerator. He's

created a bunch of animated situations that allow therapists to use immersion therapy with clients who have anxiety disorders, letting them virtually sit on a plane or ride in an elevator, for example. "They currently use imagination. They hold a picture of a plane, and they say, 'Imagine you're in a plane.' What the f—, man?" he asks.

Everyone here is equally aghast that we're stuck in a pre-virtual-reality world: Ryan Holmes paid $15,000 to put a camera on the International Space Station so he can one day charge people $10 a month to see space in virtual reality; Ashley Granata is creating Pendnt, which allows people to try on clothing virtually; Howard Rose had me use a joystick to shoot VR balls hanging from VR landscapes to distract me from the pain of having my free hand submerged in ice-cold water.

On the deck of the stadium, wearing a Founder Field Day baseball jersey and sunglasses, Rothenberg says his firm has already secured enough money to invest in a second round of virtual-reality companies this fall. "It's hard for people to write checks for virtual reality until they try it. Then, not that hard," he says. He likens this opportunity to the Internet in 1995. "No one calls a company an 'Internet company' anymore. In 10 years, everyone will have VR as part of their company."

It's already starting. Lately, I've been bombarded by virtual reality. At a party in Los Angeles in May, Patrón launched a virtual tour of the hacienda in Mexico where its agave is distilled. Birchbox announced that this month its men's subscription box will include a virtual-reality viewer and app allowing its subscribers to surf or fly a helicopter. And at North Face stores, you can see virtual video of dudes climbing a rock face in the company's gear. James Blaha, a game developer with severe lazy eye–a condition that affects about 2% to 3% of the world's population–has used virtual reality to basically cure the disease in 30-minute sessions over three to four weeks; he's sold 1,000 copies of the system to optometrists already. And Hollywood is putting nearly as much money as Silicon Valley into the concept.

Nearly every week, there's a virtual-reality convention. Standing in line with 1,500 other people for the sold-out Virtual Reality Los Angeles spring expo in March to visit the booths of more than 50 companies, I am asked to sign a contract. It is not, like other tech releases, about me not telling anyone about anything I saw or thought I might have seen here. Instead, it says, "I am aware that some people experience nausea, disorientation, motion sickness, general discomfort, headaches or other health issues when experiencing virtual reality." The final platform is not making a great first impression.

Luckily, I don't barf. The nausea caused by virtual reality is the inverse of car sickness: your eyes see motion but your middle ear feels nothing. This challenge has largely been solved by faster screen-refresh rates–the final version of Oculus will allow only 20 milliseconds between a head turn and visual change; an eyeblink takes about 300 milliseconds. VR companies are also shying away from putting viewers on virtual roller coasters and Formula One tracks. But they are creating everything else. In a speech in a packed auditorium, Jens Christensen, CEO of Jaunt, which makes high-end VR cameras, says building actual flying cars and jet packs is now irrelevant. The only question, he says, is how soon we can "simulate our own personal Tomorrowlands."

Two months after Facebook paid $2 billion for Oculus, Google responded at its annual I/O conference in San Francisco's Moscone Center by handing each of the audience members a piece of flat cardboard as they left the keynote presentation. This, they were told, when folded up and paired with a smartphone, was Google's new virtual-reality player. Most people thought it was a joke. But with two cheap plastic magnifying lenses placed in a box that cradles your phone, it can create a 3-D effect not unlike that of much more expensive equipment. At the Googleplex, Clay Bavor, vice president of product management, shows me the second generation of Google Cardboard. "The delta between expectation and delivery is so high," says Bavor. "It's cardboard–how good can it be? And then it's like, 'Whoa! I'm sitting somewhere else!'"

In 1994, when Bavor was 12, he used the HyperCard program on his Apple computer to stitch together hundreds of photos of his house in his first attempt at VR. Google's version of virtual reality isn't that much more cutting edge. "It's going to be a long, long time before anywhere near that many people have these high-end devices," says Bavor. So for now, you can do a lot of low-tech virtual-reality stuff with Google Cardboard. Google doesn't bother making money off Cardboard–the specs are free online, and many companies sell them for $6 and up–but the company is making software for it.

You can download an app made by Jaunt and get a good sense of what it's like to be backstage at a Paul McCartney concert. Google teamed up with GoPro to make a wheel of 16 cameras that shoots 360-degree video and created software that allows you to stitch the shots together into a video you can then upload to the new virtual-reality section of YouTube. Through a program called Expeditions, Google has already sent 100 classrooms a field trip in a box; teachers use Cardboards to lead kids through natural, architectural and Martian wonders. The company worked with partners like the Smithsonian and the American Museum of Natural History to create 3-D images not unlike those in the plastic viewfinders that were popular in the 1970s. This comparison isn't lost on Google, which has a deal with Mattel to put out a version of Google Cardboard in a View-Master.

Oculus has also entered the mobile space, since it isn't planning to release its main product, the Rift, until 2016. ("If the iPhone were introduced in any quarter, it would have been a hit. I doubt they were saying, 'What's important for the iPhone? We have to hit Christmas,'" says Luckey about letting his competition beat him to market.) Oculus partnered with Samsung to build Gear VR, a pair of goggles with motion detectors that you can slip a Galaxy Note 4 phone into. The device is available at Best Buy for $200 and is lent to first-class passengers on Qantas.

Three high-end virtual-reality products not made of cardboard are being put out by Oculus, Sony and Valve. The latter two companies have an advantage in that their gamer customers already own machines with powerful graphics capabilities. Founded by former Microsoft developers, Valve makes popular games and runs the Steam download store, which sells about three-quarters of all PC games.

As I walk into one of the rooms used for demonstrating the company's Vive headset, scheduled to be released this Christmas, I see Steve Jurvetson, one of the most powerful Silicon Valley venture capitalists, walking out of the other one. Valve gives several

demonstrations a day. "We won't talk to people until they have a demo," says Ken Birdwell, a longtime employee. "If we talked to them before, it would just be arguments about why these things wouldn't work. After, they say, 'We have to hurry. We have six months until this hits the consumer space.'" When they agreed to show their technology to an employee of Taiwanese smartphone manufacturer HTC, they were surprised when she turned out to be Cher Wang, who runs the company. After seeing it, Wang asked if HTC could manufacture the product for Valve, which it is now doing.

Unlike Google Cardboard or anything else you can buy right now, the Vive requires you to hook it up to a computer fast enough for gaming. And for you to be physically attached to that computer with a wire. And to strap on a pouch. And to put little laser sensors in the corners of the room. In return, you can get out of your chair and unvirtually walk around the virtual world you see through the Vive goggles.

This would seem dangerous. But the headset alerts you when you're near a wall. It would also seem to require you to have a 16-by-12-ft. (5 by 4 m) empty room in your house. Jeep Barnett, who has worked on the project from the beginning, isn't worried. "Sell your dining-room table and eat over your sink," he says. "If you have a pool table, get rid of that. Get a Murphy bed. People are going to find a space. You have a space for your car because you have to have the superpower of getting downtown in 20 minutes."

They strap the Vive goggles and pack on me, put a controller in each of my hands and bring up the menu. I instantly understand virtual reality. At the press of a button, I inflate and release a cartoon balloon in the air, and it floats into the infinite black sky. This is just to make sure the controllers work, so they want me to move on, but I keep doing it. The sense of scale is like seeing the night sky for the first time in a national park: peaceful, awesome, meditative. I feel like I have disappeared.

Eventually, I try their games, pulling an arrow from a quiver and shooting it, feeling the tension of the bow thanks to the specifically designed VR controllers' haptic feedback, which is much more subtle than the vibrations of a typical game controller. I crawl underneath game pieces in a live board game where tiny fighters shoot each other. And in the most impressive virtual-reality experience I have, I use a program called Tilt Brush (since purchased by Google, which has a bunch of high-end virtual-reality projects it's keeping quiet) to paint in three dimensions. Walking around dripping neon, I paint in the sky in a way that makes me never need to try LSD.

I take the goggles off, making what people call "VR face," the geek version of "O face." Birdwell says, "You're seeing the Pong version. These are early, early days." Every program I saw used graphics instead of real video, which still looks like crap; this is why virtual reality might be the first technology not successfully pioneered by the porn industry. (Though a lot of companies are trying VR erotica.)

Sony's Project Morpheus, which will be available next year, is similar. Because 20 million people own the Sony PlayStation 4—which has the controller, tracking camera and powerful gaming chips that Oculus and Valve users will need—it's got a huge advantage. As with the Oculus, Sony doesn't expect you to walk around like you do with the Vive but just to move around on your couch.

In a room at E3, the video-game industry's giant annual convention in Los Angeles (the Oculus offices have a clock that counts down to it), I slip on a light, sleek, ready-to-ship Morpheus headset that plugs into the PlayStation 4 and has a button that lets you extend the glasses out so you can check your phone or sip a drink. In one demo, from a company called VirZOOM, I sit on a stationary bike to feel like I'm riding a horse (and later a Pegasus) while I work out. The company was co-founded by Eric Malafeew, who quit a developer job at Harmonix, where he made Guitar Hero and Rock Band. Large game companies are now losing engineers who are eager to play with virtual reality while they wait until enough people own headsets to make it a decent business proposition.

Richard Marks, a senior researcher at Sony, says that in the past few months it has gotten the hardware far enough along that the software will now matter more. Already, he says, what game designers call "talent amplification" is more impressive than he imagined. "I can point at something and have the force and levitate it, and it really feels like I'm doing it. When you play a game, you say, 'I died.' But in virtual reality, man, it's even more powerful." I try a few more games before I'm ushered out so they can clear the room for a VIP. As I walk out, Steven Spielberg walks in.

At the Oculus building on the Facebook campus, I have a transcendent virtual-reality experience while using the latest version of the Rift. Palmer Luckey, whose real name is Palmer Luckey, wears flip-flops today instead of going barefoot, out of respect for our meeting. People here are so comfortable with VR that they refer to things outside of virtual reality—what most people call "life"—as RR, or real reality. A team of directors and writers led by Saschka Unseld left Pixar and DreamWorks to work at Oculus Story Studio, a 10-person team making short movies like Henry, the story of an adorable hedgehog with a hugging addiction. Oculus can't spend the money in-house fast enough: it offered a total of $1 million for the winners of its gaming competition, the Mobile VR Jam.

Just four years ago, an 18-year-old Luckey had amassed a personal museum of old VR gear. "I had one system that was originally $97,000. I bought it [used] for $80," he says.

So he got two eyeglass lenses, duct-taped them over a phone, shoved the equipment that was too heavy to fit on someone's head into a bucket and drove from his parents' house to tech shows, draping a black T-shirt over users' heads to block their peripheral vision. Soon John Carmack—the gaming legend who popularized the first-person perspective—asked to buy one. Luckey, out of respect, refused to charge him. Carmack was so impressed, he quit the multimillion-dollar company he'd founded—aware it would sue him for leaving—to work for a homeschooled teen. In 2012, Luckey tried to raise $250,000 on Kickstarter and got $2.4 million. "It was nice to find out I wasn't the only nutter," he says.

The version Oculus plans to sell next year will be a niche product for gamers, not a mass-market device. To get to that level there are still kinks to work out, including a screen that is 32,000 pixels by 32,000 pixels, instead of the current 1,000 by 1,000; a way to power that screen, preferably with smaller batteries that don't get so hot they'll burn your face; a way to make the parts directly in front of your eye super-clear, as in

real reality; scent and touch; a camera that shoots virtual video. That last one, Palmer says, will be huge–the way that photographs and then video changed the way we record history.

Already, at E3, Oculus showed some impressive demos. Sure, it had a game where I was an NHL goalie that was fun and another wonderfully vertigo-inducing flight simulator where I flew a spaceship fighting some vaguely Death Star–like enemy, but the coolest thing by far was something it's not even planning on selling: Toy Box. I held thin black plastic circle-shaped controllers called Oculus Touch, put on the goggles and saw the vague figure of a guy who was really in a room next door. While we spoke, I used my fist to play tetherball with him and flicked foam blocks at him with my finger. He shot me with a laser to make me tiny. We even hugged, and my personal space felt virtually invaded. He had my attention in a way that no one on a phone or Skype call ever has. And not just because he had a gun that could reduce me to Ant-Man.

Everyone working on virtual reality knows that even after they manage to make goggles the size of sunglasses, as Zuckerberg keeps promising, the technology will merge with augmented reality, which is the new term for holograms. Seeing fake things overlaid on the real world makes a lot more sense, since you'd get to see all the real world's inconvenient walls. But holograms are an amazingly hard thing to do. Nobody at any of the VR expos even bothers to give speeches about it. The Oculus guys figure that maybe their kids will work it out. "We started on augmented reality," says Valve's Birdman. "There are hard physics problems. You can't get a wide field of view. You can't draw a shadow. There are power and battery problems. When it happens, I'll buy it."

Underneath the most well-trodden spot on Microsoft's Redmond, Wash., campus is the secret bunker where it makes holograms. The company is trying to jump from behind Silicon Valley to get in front of it. So it's skipping virtual reality before it even comes out and selling augmented reality. The lab looks like the place a James Bond villain would work in if he hired interior designers from the W Hotel and lighting experts from Virgin America. Everyone here is futuristically calm. A huge man who is not a bouncer but an engineer silently lets me in and points me to a bench where a woman named N stands in front of me, demoing how to wear Microsoft's HoloLens goggles. They are beautiful and comfortable and weigh about a pound. No wires tether me to a computer, thanks to a Holographic Processor Unit built into the gadget next to the central processing unit and graphics processor. I don't need to carry a smartphone, strap a pack around my waist or hook laser sensors to a wall. And I can see out the clear visor perfectly.

Alex Kipman is in charge of the bunker, having overseen Microsoft Kinect, the Xbox add-on that allowed people to control what happens onscreen by waving their hands and using their voices, like in Minority Report. When the first version of Kinect was released five years ago, it was the coolest thing Microsoft had ever made. Kipman is also cool. He's got a Brazilian accent and dresses like a man who takes Burning Man seriously: shiny gray pants; a long jacket with embroidery; blunt, shoulder-length hair.

"If I told people at Microsoft I wanted to make virtual reality, they would have nodded their head yes," he says. But Kipman wants to save us from spending yet more time on our computers instead of with one another. "Virtual reality is not embracing that which

makes us human. Kinect was about embracing what's in all of us. Humans exist in the real world. Holograms say, 'Hey, technology has become sophisticated enough today that we're ready to go beyond being stuck behind pixels all day long.'" Holograms, he believes, will reverse our isolation and inactivity.

HoloLens is not a pet project for Microsoft. It's an integral part of Windows 10, its major new operating system released in July. To see it, I am led to well-lit rooms where I get to do amazing, sci-fi-level things. I look at a real table holding a holographic architectural model of an office complex; I move my hand to raise and lower parts of the building, or zoom in on a wall and look at the pipes behind it. At E3, I get to project Minecraft on a real table, zooming in on another player running up a tower faster than he ever could with a keyboard; I torment him by flicking my finger and verbally calling in lightning strikes.

As amazing as this is–I am moving around holograms with my hand and voice–it still looks fuzzy, like something went wrong with R2-D2's message from Princess Leia. It all has to fit on this rectangle in front of my eyes, and the small field of vision makes it seem like it's on a screen instead of being real. It's impressive–and the hardware and packaging are way ahead of those of Oculus and Valve–but holograms just don't seem real yet. As I leave, Kipman asks me how much I think the HoloLens will cost.

"Assuming there are apps I want, $250," I say.

Kipman looks at me. "You know there's a computer in there?"

"$350?" I suggest.

"Thank you for your honesty," he says.

Still, HoloLens is a convincing proof of concept. And Kipman's pro-hologram, anti-virtual-reality logic seems incontrovertible. "The amount of data and signal you get for free from the real world is massive," he says. "You already know how to walk around and communicate." But Palmer Luckey thinks holograms will never be a platform. "Augmented reality is well suited for utility purposes," he says. "Look at science fiction. Most uses of AR are how to repair things, navigation aids, more information about the environment. But there's no proof it can be a canvas for compelling storytelling."

The guys working on virtual reality since the 1980s hadn't all stopped by the time Luckey began buying their old models for his collection. Mark Bolas, a professor at the University of Southern California both in the film school and at his Institute of Creative Technologies, open-sourced his design for the very Cardboard-like FOV2GO in 2012, which thousands of people downloaded so they could have a $5 homemade virtual-reality headset. And Luckey worked in Bolas' lab for a year before Bolas suggested he start Oculus, in which Bolas was an early investor. "He was the right guy to bring it out," says Bolas. "He had the charisma."

Bolas, who has puffy white hair and types on a computer keyboard raised by six unwrapped blank VHS tapes, works out of a huge Los Angeles warehouse that has an

enormous room with tiny tracking cameras hanging along the periphery. He cannot wait to start making virtual-reality worlds, which he thinks will save us. He has no fears about humanity being sucked into the Matrix. "I believe we're in the virtual world now more than the real world already. It's just that our interface sucks," he says, pointing to his phone. Just as early Industrial Revolution machines killed people, he thinks, our computers are killing a part of us. "We're in that barbaric place where the interfaces to the machines don't consider the human side," he says.

He's been building virtual-reality worlds with stop-motion Claymation, trying to get at the interactive, world-bending experiences VR can offer. Because, unlike movies, virtual reality can make you feel dumb or successful by reacting to you. "Presence has to go both ways. The world has to acknowledge that you're in it," he says. "This is what I have film students for. To figure out what I do with this."

Now that the hardware can be made at a price for the consumer market, a lot of people are trying to figure that out. Both Oculus and Valve pretty quickly got that the storytelling rules of video games don't work. Like Luckey, Valve employees also initially thought, I want to feel like I'm really running down halls shooting bad guys! But they quickly discovered they did not want that at all. One of the first things they created was a zombie game where you mow down bad guys. "We noticed that everyone would move as far away from a zombie as they could. One zombie! And it was barely moving. It was like a statue of a zombie. The terror level of a single zombie was ridiculous," Birdman says. "But now I have all these emotional cues I've never been able to use before. It's what makes this terrifying and exciting at the same time."

Jeremy Bailenson has been thinking about these problems since he founded Stanford's Virtual Human Interaction Lab in 2003. He has a suite of offices in the communications department, which, until recently, was one of the few places in the world to try real virtual reality, because a system used to cost $100,000. He runs psychological experiments where people become aged versions of themselves to help them save for retirement; in a video on how to deal with harassment, the user can become a young black woman being interviewed by an old white guy. After people fly like a superhero and deliver medicine to a sick child, they are more helpful when an assistant pretends to accidentally drop her stuff in the hallway.

Bailenson doesn't think that his life's work is the final platform. He thinks people will get hurt walking into walls or when a dog darts across the room. He thinks the glasses will never be comfortable to wear for long periods. And that an all-virtual world is creepy. "I'm actually a Luddite. I don't play video games. I don't have a Facebook account," he says. At the Tribeca Film Festival's symposium on virtual reality this year, he warned the audience against making entertainment for virtual reality. "Do you want to be in the trash compactor in Star Wars? No, you don't. If Jaws felt like what you just did in my lab, no one would ever go in the ocean again." VR, he believes, is an empathy machine and should be saved for that purpose.

Felix Lajeunesse and Paul Raphael totally agree with everything Bailenson says and are making virtual-reality entertainment anyway. In their 20-person ministudio in Montreal, they've built their own camera to capture video: it's the size of a seated

person, with a battery for a body, two cameras for eyes and four sets of molded ears for microphones. They use the camera to allow viewers to slowly explore a place. They're documenting nomadic tribes around the world so you can sit in a Mongolian yurt while a family cooks. When they showed Oculus what they were working on, they feared the company would think it was dumb. Instead, Oculus gave them money to make films for its own studio. "You can be slow in virtual reality and lose fewer people. In fact, they prefer it," says Raphael. Universal Pictures hired them to make an experience tied to Jurassic World to show at festivals, and they made the single longest dinosaur shot in history. Because, they knew, it's plenty interesting to look at a dinosaur.

But when Raphael showed virtual reality to director James Cameron–the technology-pushing creator of Avatar, Titanic and Terminator–in May 2013, Cameron stated that he had no use for it. "This has very little to do with controlling the viewers' attention," says Lajeunesse. "It's not necessarily a medium for filmmakers." He and Raphael have mostly been hiring painters, photographers and stage directors. Chris Milk, a music-video director whose interactive installations have been shown at MOMA and the Tate galleries, believes VR, like all media before it, is for storytelling. He's built his own VR camera to let him get closer to his subjects, who include a 12-year-old Syrian refugee and a Liberian Ebola survivor. "There's something about sitting on the same ground someone else is sitting on that changes the way your brain registers their humanity," he says.

Commercial director Jonnie Ross met Palmer Luckey at a convention. After using the Oculus Rift that day, Ross quit his job and called his friend Gil Baron, a visual-effects supervisor. "He was talking fast," says Baron. "Like that moment in Back to the Future where Marvin Berry calls Chuck Berry to tell him what he just heard." Baron quit too, and they now work at Visionary VR in downtown Los Angeles. They're trying to figure out how to tell a story in virtual reality. "It's like you went back in time and gave a caveman a video camera," Baron says. To make their animated short, they developed editing software that involves holding two controllers and seeing those controllers in virtual reality as you move elements on the screen. It's incredibly intuitive. But, they both say, figuring out how to tell a story in virtual reality–first person? choose your own adventure? scene cuts?–is not.

Jaron Lanier, who in 1984 founded VPL Research, the first company to widely sell VR products, and is credited with, depending on whom you ask, either creating or popularizing the term virtual reality, is pretty sure they're all as wrong as the directors of the first movies, who just filmed stage performances. Virtual reality, he says, is a means of spontaneous, improvisational visual expression, the same way that talking is a means of aural communication; it's the next logical step from written language to printing press to photograph to audio recording to film. "It can blur the distinction between you and the rest of the world. You have the option to map yourself to the clouds or the grass. When you move your body, all the clouds and animals can move in sync with you," he says. "In about a year or two, nobody will find this hard to understand. This will become totally ordinary." And Lanier, author of the 2011 critique of digital culture You Are Not a Gadget, can't wait. "In the 1980s, this was a really big deal. I was in my 20s. It wasn't at all clear I'd live long enough to see it cycled back again."

Maybe virtual reality will be a radical new form of expression. Maybe it will just be for short, immersive, therapeutic experiences. Or maybe it's just another entertainment medium to accompany theater, painting, print, music and film. In the Oculus office, an executive showed me a game called Keep Talking and Nobody Explodes. It's a three-player game, and before we opened the office door to look for someone to join us, Palmer Luckey noticed what we were doing and sat down. I put on the goggles and described the bomb I saw. Luckey sat in the physical world next to me, excitedly flipping through an instruction book, telling me which wires to snip. I had no idea what virtual reality added to this game. But Luckey couldn't have been more into it, instinctively racing against the clock. He was determined to figure it out.

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