



A recreation of Pacific Biological Laboratories (PBL) on the aquarium's ACNH island. PBL was run in the early 1900s by pioneering marine biologist Edward Flanders Robb Ricketts, who was fictionalized as “Doc” by his close friend John Steinbeck in the novel *Cannery Row* and other works.

Level Up

Streaming Popular Video Games to Inspire the Next Generation of Learners

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Cultural institutions have been building bespoke digital exhibitions for decades.¹ They are often costly to create, hard to sustain, and require robust marketing efforts to be discovered by their intended audiences.² When its doors closed in March 2020 due to COVID-19, the Monterey Bay Aquarium – like so many visitor-serving institutions – was faced with the challenge of keeping people aware of and engaged in our mission without the benefit of access to our physical exhibitions. Rather than build a stand-alone digital exhibition – which could take months to design and code, as well require a concerted effort and budget to attract an audience – the aquarium team dove into an existing ecosystem of video games and shared our game play live on the fast-growing livestream platform Twitch.

One of the aquarium's Key Performance Indicators (KPIs) is trust in us to protect and conserve the ocean.³ Building empathy with marine animals and developing a personal connection to our experts are critical features of the aquarium's approach to inspiring people to care about, and to take action for, ocean conservation. In our social media communications strategy, we lead with a gift-giving mentality: each post and livestream is an opportunity to bring joy and spark curiosity in our followers' daily lives. Over time, this strategy has primed a receptive social audience that is 3.5 million people strong and growing – and ensures that when we ask our fans to take meaningful conservation action (e.g., to contact their legislators), they act. During COVID, livestreaming – including video game streaming – helped us deepen relationships with and among our audiences, ocean animals, and experts across our social media accounts. We continued to stream on Facebook, Instagram, Twitter, Tumblr, and YouTube as well as expanded to newer platforms like Twitch and TikTok.

Like YouTube, Twitch attracts fans to the live video broadcasts of individual content creators.⁴ Twitch is best known for gaming, where individual streamers share their video-game screens with viewers, who can hear and watch them play live (as well as engage with the Twitch community via chat).⁵ Through livestreaming on Twitch, we were able to reach a young (73 percent of users are under 35) and highly engaged audience (daily active users spend an average of 95 minutes on the platform). In the process, we learned a lot about the power of offering live interpretation from within virtual games and expanded our ability to engage young people in a deep, sustained (and fun!) way around complex topics like climate change and plastic pollution.

Timing is Everything: The Pandemic and the Release of *Animal Crossing: New Horizons*[™]

Livestreaming is one of our social media superpowers. While we also publish text-based posts, photos, and pre-recorded videos, it is the live-video format that gives our 3.5 million social media followers the best chance to interact with knowledgeable humans and hear topical conversations explored with more nuance and depth than many other formats allow. For cultural organizations, this is akin to supplementing your exhibition labels with live public programs and staffing your exhibit with knowledgeable interpreters. At the Monterey Bay Aquarium, we know that increasing the number of interactions with our people on the floor (we call them “personal facilitated experiences”) is the best way to increase overall satisfaction scores for guests.⁶ While we haven't studied this formally, the same principle seems to bear out on social media as well. Between livestreaming (during which staff react to the audience and pull individual questions from the chat to discuss) and our commitment to social care (personnel dedicated to reviewing and answering or acknowledging comments and direct messages on all social media platforms in a timely manner), these increased personal interactions have helped drive our overall success as a brand online.

Since 2015, we have positioned the aquarium as a leader in livestreaming educational content on such platforms as Periscope, Facebook Live, YouTube, and Instagram Live. Our programming has been led by social media team members who began their careers in the guest experience department: our front-of-house team that provides visitor services and programming on the aquarium floor. These team members bring a unique mix of in-depth



Fig. 1. Former Monterey Bay Aquarium interpreter and plankton expert Jane Silberstein joins the social media team to look at plankton live under a microscope. The livestream was broadcasted to YouTube, Twitch, Periscope, and Facebook where audience members could submit questions and have them answered in real time.

knowledge of marine biology as well as the charismatic presence required for live, on-the-floor interpretation of scientific content and interaction with the public. In addition, they're Certified Interpretive Guides through the National Association of Interpretation. This expert team found success with long-form, video podcast-style shows in which they tour our exhibit halls or report from adventures in the wild (such as exploring tidepools along the rocky shore of the Monterey Bay), with subject matter experts fielding questions from the audience (fig. 1).

We began our foray into Twitch in late 2019 by establishing a branded channel and simulcasting some of this existing livestream programming to the new-to-us streaming platform, building an interested audience who watched and commented in the chat.⁷ Twitch attracts a young audience (more than three-quarters of active app users are in their teens and twenties⁸) and a large and loyal one at that, with 15 million users who tune in daily.⁹ Testing the waters with our

existing programming enabled us to master the technical ins and outs of the platform before diving more deeply into the content. Twitch is best known for: live video-game streams. Much like millions of people who may or may not play basketball enjoy watching professionals excel at the game during an NBA game, Twitch provides a platform for millions of people to watch talented individuals who are incredibly good at video games do what they do best with the camaraderie of other video-game enthusiasts. With a vision of streaming ocean-focused games featuring curated conversations with experts, we set our legal and marketing teams to work clearing a list of potential games for us to stream. And then the pandemic hit.

With the closure of the aquarium due to the COVID-19 pandemic on March 13, 2020, a few days prior to the Monterey County Health Department shelter-in-place order, the social media team no longer had access to the physical exhibits and animals that resonated with our livestreaming audiences.¹⁰ Coincidentally, a week after our closure,

Nintendo released *Animal Crossing: New Horizons* (ACNH). The game's popularity spread like wildfire. With over 31 million copies sold in less than a year, ACNH became not only the top-selling video game of 2020, but one of the top-selling video games of all time.¹¹ The game itself is a life simulator, putting players on a deserted island and tasking them with gathering enough resources to customize their own island paradise – complete with a museum to display what they've collected in the game (fig. 2). Amidst the chaos of the start of the COVID-19 pandemic, building a utopian community in ACNH became an escape from the myriad stressors of real life.

A key part of the development of your island is tied to exploring, discovering, and cataloguing the natural life that inhabits it – from bugs to fishes to fossils and invertebrates. You are tasked with acting as a curator (in addition to resident, city planner, and farmer), collecting and learning more about the island's native critters while building up the island's museum.¹² Players can fish and snorkel in the ocean, catch bugs in different habitats they create on land, and dig for fossils in the idealistic paradise of their own creation.

As the world obsessed over ACNH, people were thirsty for more information about the strange and delightful creatures they found. In the game, a delightfully bookish, anthropomorphized owl named Blathers runs the museum and presents players with a fun tidbit about the critters and fossils they collect, sparking curiosity but never delving too deep into natural history interpretation. While playing ACNH, a member of our social media staff noticed that many of the fish players collect are species found in Monterey Bay (fig. 3) or have connections to our conservation work – and had the idea that they would make

a perfect virtual exhibit hall for the aquarium during our closure. A bonus was that the animals featured in the game change each month, which would give us a fresh stream of new topics to talk about with our audience. The combination of natural history, low-stakes gameplay, and popularity hit at just the right moment, and gave us a chance to inject a little bit of joy into our shared quarantine experience.

Interpretive Strategies for Nurturing a Livestream Forum

In 1998, museum scholars Kristine Morrisey and Douglas Worts explored the use of technology to further the concept of the museum as a forum in their chapter of the seminal book *The Virtual and the Real: Media and the Museum*. In their chapter, they unpack an influential 1971 essay, “The Museum, a Temple or the Forum,”¹³ by Duncan Camerson (then director of the Brooklyn Museum). They write:

The concept of a forum suggests that museums can extend beyond the authoritative roles of traditional museums to serve as a context where individual and group knowledge and experiences are shared, interpreted, and passed on, thus becoming part of the living and evolving dimension of culture. A forum is based on a process of shared dialogue that accepts and integrates the authenticity of the knowledge and experiences of all visitors, museum professionals, and communities.¹⁴

In building our ACNH museum and hosting conversations between aquarium staff members and invited experts within our livestreams, we intentionally invested time and attention



Fig. 2. The entrance to the Monterey Bay Aquarium’s museum on their *Animal Crossing: New Horizons* island. Players can create custom designs to use and share with others in the game – like the Monterey Bay Aquarium logo on the ground.

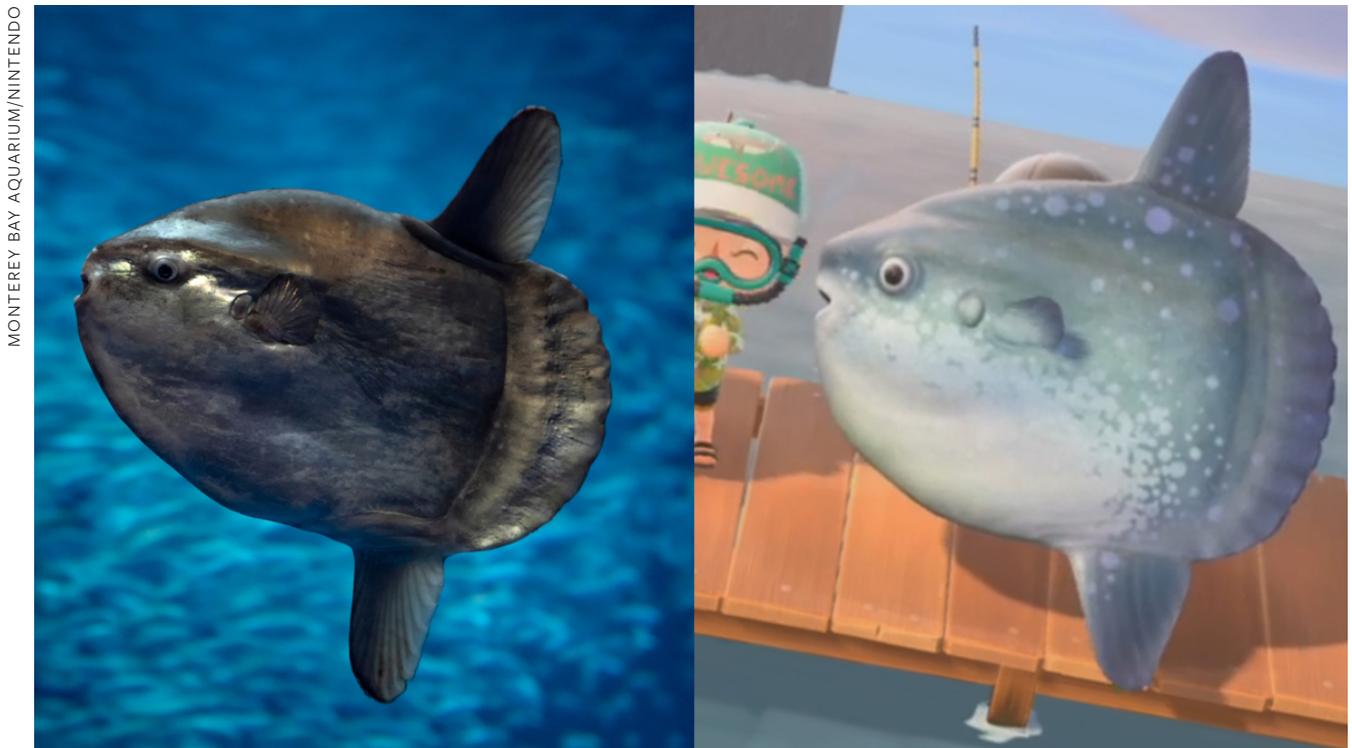


Fig. 3. Many organisms found in *ACNH* are also found at the Monterey Bay Aquarium, like this ocean sunfish (*Mola mola*). Sunfish are one of the most infamous fish on the Internet and a personal favorite of many aquarium staff members. Catching one in-game led to a spirited conversation with the livestream audience.

Fig. 4. *Animal Crossing: New Horizons* players can visit each other's islands using special "Dodo Codes." In this screenshot from the game, multiple characters representing aquarium staff are visible on our island.



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to cultivate this kind of forum. Using many of the interpretive strategies outlined by Morrissey and Worts, we've been able to create a community where "individuals come together to share the task of understanding our present and defining our future," and to nurture a forum that enables conversation, transcends power differentials, and fosters respect for all parties involved.¹⁵

Although the Morrissey and Worts chapter is several decades old, we found many of the

interpretive strategies remain incredibly relevant today for understanding the success we've had on Twitch. These include the following:

1. Facilitate and encourage playfulness.

While our social media team brings subject matter expertise to the table, knowledge alone doesn't make for an interesting conversation. To come through as authentic and engaging, our staff members needed to be themselves in addition to being formal representatives of the aquarium's brand. By letting our naturally and unabashedly nerdy personalities fly, we encouraged people tuning in to the streams to also feel safe to let their own unabashedly nerdy personalities fly in the chat. For example, the excitement around catching our first ocean sunfish (*Mola mola*) in-game sparked a 16-minute conversation with the live viewers covering everything from sunfish biology to bioengineering to a mola breaching out of the water during a marriage proposal.¹⁶ Engaging with (and goofing with) our audience, we created a space where they felt comfortable asking questions and starting discussions with us, ranging from "What's your favorite fish?" and "Tell me more about parrotfish poop," to more difficult conversations about climate change, overfishing, and equity in science and the outdoors. Tools like live closed captioning ensured greater accessibility for our enthusiastic audience.

2. Provide multiple perspectives or viewpoints. We invited internal experts as well as scientists and

science communicators from other institutions to join our streams. As an example, our applied water sciences team, already popular with our Twitch audience as #TeamWaterQuality, joined us for a few streams (fig. 4) to talk about the behind-the-scenes work that goes into creating and caring for an aquarium through a tour of our virtual museum. Guests included Emily Graslie (former host of the Field Museum's educational YouTube channel, The Brain Scoop), Tennessee Aquarium's Dr. Bernie Kujada, the Smithsonian National Museum of Natural History's Dr. Floyd Shockley, and Nicole Budrovich from the Getty Museum. All brought their enthusiasm and knowledge of the bugs, freshwater fishes, fossils, and even art that occupy ACNH, helping us engage an even broader audience.

3. Involve visitors in making decisions, choices, judgments.

An online community can be difficult to manage. It takes time and resources to moderate and nurture a community of individual commenters who are being asked to accept that community's norms. We established rules that people visiting our channel and chat had to accept before joining. We also linked to our Social Media Community Guidelines to be sure that people would feel safe and included (and so we would feel comfortable enforcing those rules).¹⁷ We utilized a program called NightBot, an automated moderation tool, to help free up our team to focus on conversation rather than moderation.¹⁸

4. Involve the public not just as consumers, but as creators and contributors. Because we're a small team, we couldn't have staff monitor our chat all the time. We were very fortunate that early on into streaming, we were able to recruit three of our subscribers as volunteer channel moderators on Twitch. Having real human moderators in tandem with NightBot helped us to engage with our audiences more directly during streams and helped create a welcoming and inclusive environment on our channel. Moderators pop into the chat to help monitor a few hours a week, focusing mainly on livestreams when our content creators are on-camera and focused on game-play or interviews. With the help of one of our followers (who happens to work for a professional game-stream company), we were able to troubleshoot problems as they arose. Were we to do this all over again, we would reach out to established streamers earlier on before diving into streaming ourselves.

5. Create responsive environments. Because *ACNH* is built around customizing an island, we were able to change the island's terrain, layout, and entire appearance to meet different interpretation needs. Our island was designed to represent pieces of the Monterey area, from a Big Sur campground to the orchards of the Salinas Valley and a re-creation of marine biologist Ed Ricketts' Pacific Biological Laboratories ([intro image](#)). This mimicked our physical aquarium, which features regional marine life. In building these defined and thematic

spaces on our virtual island, we tried to capture the unique experience of visiting the aquarium by borrowing from our own exhibit design, which leads people through the building based on the habitats described and catalogued in *Between Pacific Tides*, Ricketts' ecological book.

Unlike a real, physical museum, as topics came up during livestreams, or if we knew we were going to host a specific guest expert, we could easily and quickly create new environments to fit the conversation. Developing new exhibits and experiences, whether digital or physical, can take years and millions of dollars, but in *ACNH* we could have an art museum in our basement one day and a museum featuring a deep sea collection the next – for just the investment of staff time and effort. While *ACNH*'s built-in

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pattern tool requires some tinkering to master, it is built so that players from child to adult can create unique designs.¹⁹ It also features an easy-to-use search feature to find designs that other players have already created and shared. Building a new environment on our island then, depending on how complex, could be completed in a matter of minutes to a few hours. Using the same creator and pattern tool, we could also develop designs that anyone could download and use themselves, bringing a little bit of the aquarium experience into their own *ACNH* world.

By lavishing the virtual world in *ACNH* with as much care as we would for interpreting and facilitating an experience in our own exhibit halls, our team was able to connect similarly with people in a virtual environment. Bringing our interpretation online extended our reach to tens of thousands of people who normally would not be able to visit in person. By building our island and museum within a game that was already wildly popular, we've been able to reach nearly 250,000 unique viewers (and 14,000 subscribers) who combined have watched over 7 million minutes of our content within one year. We've also uncovered a new revenue stream in the form of 200 monthly paying Twitch subscribers. Much like the "pay what you want" model in physical museums, Twitch viewers can watch for free or choose to support the content creators they love through subscriptions. This broader Internet trend can also be seen with the rise of platforms that people can use to send micro-payments as a form of financial repayment for educational labor.

Lessons Learned

While we've found success overall on Twitch, this achievement came with some bumps in the road. Our advice to those just starting out:

- 1. Invest in your tech.** Like many nonprofit museums, we're used to being scrappy with emerging technology. But when it comes to success on Twitch, a powerful gaming PC is critical to ensure your livestream presence is as polished as your in-person presence. Be sure to invest in the right equipment for gaming, including adequate processing power and graphics capabilities. We are currently running our gaming streams with a custom built PC with an Intel Core i7-10700K 8-core processor, GeForce RTX 2070 graphics card, 16GB DDR4 system memory, and 2.5 TB SSD storage, and when we play anything on our Nintendo Switch, we use an external video capture card (Elgato HD60S).
- 2. Have legal counsel on call.** It's a good idea to conduct legal research when deciding which games to play. As with any initiative on an external social platform, you'll also need to be prepared to adapt when the rules of engagement change. For example, we had to suspend our *ACNH* streams while we figured out how to interpret Nintendo's new guidelines prohibiting organizations from obtaining "any financial benefit" from using the game (essentially, we needed to remove any asks to donate or subscribe during Nintendo



Fig. 5. ABZÛ Creative Director Matt Nava joins a livestream with the aquarium’s social media team. As our technology has improved, we’ve been able to bring in video of our guests into streams.

MONTEREY BAY AQUARIUM/GIANT SQUID

streams but could reinstate those asks during streams not featuring their trademarked content).²⁰

3. Staff your efforts appropriately.

You’ll need a passionate team and a right-sized allocation of time to be successful. Streaming games twice per week has required 10 to 25 percent of our social media team’s time, along with additional hours from other staff who served as guests on our streams. At the aquarium, our social media team consists of a manager, two content creators, and 20 hours per week of social care (online community management) from a digital engagement associate. In terms of technical capacity, the content creators took on the responsibility for learning, configuring, and troubleshooting our tech stack for live video game streaming; in other organizations this expertise may need

to be resourced by an audiovisual team or other technically skilled staffer or contractor. When assembling your team, try to separate the “backstage” and “performer” roles to ensure you can keep the conversation going while addressing community moderation needs and technical issues.

We’ve already begun applying lessons learned from *Animal Crossing: New Horizons* to new initiatives as we branch out into streaming other popular ocean-centric video games, such as diving adventure games *Beyond Blue*[™] and *ABZÛ*[™] (fig. 5). For a few of these streams, we’ve been fortunate to be joined by the game developers who reached out to us after seeing us streaming their games, attracting even more people to our little corner of marine science interpretation on the internet.²¹ We’re excited by the potential in game streaming. It can bring our mission of inspiring conservation of the ocean to a wider audience and engage that audience

in a meaningful forum about the natural world and the responsibilities we have to the future. As streaming platforms grow exponentially and continue to attract young and diverse audiences, museums have an exciting opportunity to expand their unique talents – from thoughtfully built environments to engaging people in object-based learning – to an online world without walls. ■

1 See Tinkler and Freedman’s “Online Exhibitions: A Philosophy of Design and Technological Implementation,” *Museums and the Web* 1998, www.archimuse.com/mw98/papers/tinkler/tinkler_paper.html, for some timeless advice about what makes a good online exhibition, including: “A Museum’s online presence should reflect the role the Museum plays in the community. Part of that role is providing thought-provoking experiences for the visitor, whether they are physical or virtual.”

2 See Martha Henson, “Stop wasting money on digital projects if you are not prepared to promote them properly,” *Medium*, March 10, 2016, <https://medium.com/@marthasadie/stop-wasting-money-on-digital-projects-if-you-are-not-prepared-to-promote-them-properly-6441a6db57e8>.

3 We measure this KPI on an ongoing basis through our market research partner, IMPACTS.

4 For more information on the usage and users of Twitch, see Mediakix’s “Twitch stats” at <https://mediakix.com/blog/top-twitch-statistics-live-streaming-game-platform>.

5 Twitch is a popular live-video streaming platform “for gamers and other lifestyle casters that supports building communities around a shared and streamable interest.” For more information and stats on the millions of users who visit Twitch each day, see Devon Delfino’s “What is Twitch?” in *Business Insider*, June 11, 2020, www.businessinsider.com/what-is-twitch.

6 See Colleen Dilenschneider’s 2014 blog post, “Personalizing the Onsite Experience Increases Satisfaction in Visitor-Serving Organizations (DATA),” for more on how personally facilitated experiences (PFEs) contribute to a more meaningful experience for guests, at www.colleendilen.com/2014/05/07/personalizing-the-onsite-experience-increases-satisfaction-in-visitor-serving-organizations-data/.

7 Each social media platform is different in how it alerts users to livestreamed content; most push out some kind of notification to followers on the platform that the account is live. We often pre-promote the topic and time of a livestream with a text post. Streams on Twitch also use tags and categories; these help users who don’t already follow us find our streams by sharing our content to their suggested channels to watch based on their interests. You can subscribe to the Monterey Bay Aquarium Twitch channel here: www.twitch.tv/montereyaq.

8 Stream Scheme, “Twitch Demographic & Growth Statistics 2021,” accessed March 26, 2021, www.streamscheme.com/twitch-statistics.

9 Mediakix, “The Top 10 Twitch Stats that Marketers Must Know,” accessed March 26, 2021, <https://mediakix.com/blog/top-twitch-statistics-live-streaming-game-platform/>.

10 The County of Monterey Health Officer issued a Shelter-in-Place Order on March 17, 2020. See www.co.monterey.ca.us/home/showpublisheddocument/87957/637200587045700000.

11 Mary Meisenzahl, “Animal Crossing’ is on track to become the best-selling Nintendo Switch game ever after selling more than 26 million copies,” *Business Insider*, November 5, 2020.

12 To learn more about how museums are built on a player’s island in ACNH, see the entries for “Museum” on the “Animal Crossing: New Horizons Wiki Guide” at www.ign.com/wikis/animal-crossing-new-horizons/Museum#How_to_Move_the_Museum and the Animal Crossing Wiki on Fandom at animalcrossing.fandom.com/wiki/Museum.

13 Duncan Cameron, “The Museum, a Temple or the Forum,” *Curator: The Museum Journal* 14 (1971): 11–24.

14 Kristine Morrissey and Douglas Worts, “A Place for the Muses?: Negotiating the Role of Technology in Museums,” in Ann Mintz and Selma Thomas, eds., *The Virtual and the Real: Media and the Museum* (Washington, DC: American Association of Museums), 1998.

15 Ibid.

16 See Monterey Bay Aquarium’s July 3, 2020 Twitch stream clip (from timestamp 01:36:57 to 01:52:45) discussing the ocean sunfish (*Mola mola*) as an example of how the presenters used natural history interpretation, personal stories and live viewer questions to engage the audience: www.twitch.tv/videos/675663968?collection=B2eYd5CdAxZ8DA&t=01h36m57s.

17 See the Monterey Bay Aquarium Social Media Community Guidelines at www.montereybayaquarium.org/about-us/social-media-community-guidelines.

18 The website “Nightbot” notes that “Nightbot is a chat bot for Twitch, YouTube, and Trovo that allows content creators to automate their livestream’s chat with moderation.” See Nightbot, nightbot.tv.

19 See Polygon’s “How to Turn Photos into Patterns in Animal Crossing: New Horizons,” <https://www.polygon.com/animal-crossing-new-horizons-switch-acnh-guide/2020/3/27/21197396/turn-pictures-into-murals-patterns-in-game-nook-link-qr-code>.

20 Nintendo, “Animal Crossing™: New Horizons Usage Guidelines for Businesses and Organizations,” November 19, 2020, www.nintendo.co.jp/animalcrossing_announcement/en/index.html.

21 See: Monterey Bay Aquarium Twitch stream with ABZŪ Creative Director Matt Nava, www.twitch.tv/videos/912000903.