Shadow of the 16-bit Beast: an Amiga gaming retrospective

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Author's note: I want to personally thank the literally hundreds of people who replied to my call for stories from Amiga game developers, without whom this article would not have been possible. Unfortunately, it was not possible to include everyone's stories in the article, but I did make an honest attempt to reply to every email I received. If I missed you, I apologize.

Introduction

The Amiga was born a game machine, but it entered a world where the video game industry was well-established and changing rapidly. Long gone were the days where a lone coder would stay up all night in his basement for six weeks and bang out a hit for the Atari 2600. Even the younger and smaller computer game industry had moved far beyond Roberta Williams putting floppy disks into ziplock bags and answering phone calls from players in her kitchen. The success of the Commodore 64 (and on the other side of the pond, the Sinclair Spectrum) meant that more money was available for computer game development, and it was a good thing too, as the more powerful 16-bit machines were starting to seriously test the limits of a one-man development team.

For the first time, specialized careers were starting to emerge in game development. The Amiga's rich, 4096-color palette demanded people who were skilled artistically to create the sprites and backgrounds. The four-channel sampled sound chip cried out for musicians to make it sing. The larger size and complexity of the games required that someone other than the programmers be asked to test the games before they were released. Finally, new management positions were needed to oversee the work of these creative people.

Life in the trenches

Finding these people wasn't easy. In many cases it was a matter of people fresh out of their teens hiring their peers—people they knew from high school or from computer clubs. Some of the larger development firms, like Ocean, had a stable of in-house developers, but for most games the work was contracted out to a third-party team. These teams, often staffed with green developers, were dangerously unstable. Most teams never made it past their second game. Clashing egos and arguments, fights over poorly-worded or non-existent contracts, and disappearing funds would stretch friendships to the breaking point. When a studio was in desperate need of cash, developers and artists would work 16-hour days and beyond. Managers would call up contract workers at 2 AM to make sure they were still working. Miha Rinne, who worked at Terramarque, told me how his supervisor demanded that he write down all the time he spent writing notes, doing backups, and even going to the washroom! He later took his experiences in the game industry and made a comic out of it, which can be found here.

The glamor of game development

Despite the long hours and low pay, there were still plenty of people eager to jump into Amiga game development, and many who considered themselves lucky when they got to be part of it. As Daniel Filner, who ported classic LucasArts titles like LOOM and Indiana Jones to the Amiga, told me, "At 17 or 18 my 'dream job' list was something like this: 1) Superhero, 2) X-Wing pilot or any other kind of astronaut, 3) Video game programmer."

Then as now, there was a split between development groups and publishing houses, and the two parties' goals were not always compatible. Publishers wanted to maximize revenue, so many games were released on "all formats"—the Amiga, Atari ST, a

stripped-down version for the IBM PC, and even versions for older 8-bit computers like the Commodore 64 and Sinclair Spectrum. The requirement to make games hit the lowest common denominator held back developers who wanted to unleash the Amiga's full power.

Some development companies, like Psygnosis, went the other way. They concentrated on the 16-bit machines and went for as much graphical impact as they could. This strategy proved to be a success, as the owners of older machines now had a compelling reason to upgrade. As the 1980s passed, other companies followed suit. The Amiga became the showcase machine for games that pushed through the boundaries of what was considered possible. This in turn attracted exceptional people, like artist Jim Sachs, who were drawn to the idea of doing something new.

"I really enjoyed those early Amiga days," Jim said. "I couldn't wait to get up in the morning, knowing that I'd be creating brand-new effects which no one had ever seen on a computer screen before."

Even though the computer game scene was—then as now—much smaller than the market for home video game consoles, it had an effect on the larger world. Michael Crick, author of the game WordZap, recalled a story where the then-CEO of Nintendo (whose daughter was friends with Michael's daughter) walked in on Michael playing *Defender of the Crown* on his Amiga. The Nintendo chief, whose company was at the time bestriding the video game world like a colossus, could do nothing but stare, dumbstruck, at the machine while muttering "great graphics" over and over.

Jim Sachs' artwork for *Defender of the Crown*

Magazines and reviewers

Out of this industry grew a community. New and established gaming magazines became the focal point, bringing together the game developers, their games, and their users. Tom Malcom spent six years reviewing Amiga games for *.info*, one of the most popular magazines of the time. "If there was an Amiga game, I probably saw it and played it," Tom said. "Every day, the UPS truck, always referred to as the Toy Truck, would pull up to the back door and drop off another load of games." On some days, over a dozen new titles would arrive.

The relationship between magazine reviewers and the developers was friendly and close. It was a more innocent time, before the days of pushy PR firms and pressure on reviewers to deliver "appropriate" scores. Tom would often visit the Psygnosis offices. His favorite game was an obscure side-scrolling shooter called Menace, and the developers told him a cheat code: "xr4titurbonutterbastard". This code was based on the car and driving habits of one of the developers, whom the rest of the team was afraid to ride with. Later, at a trade show in Chicago, he took some of the Psygnosis developers for a drive in his convertible as a way of returning the favor.

In October of 1989, Tom was scheduled to go to California to make the rounds of the game publishers. Three days before he left, the Loma Prieta earthquake hit. "The ceilings of SFO were in piles on the floor, the Marina district was still on fire, the Bay Bridge had a collapsed section, and the freeway in Oakland was pancaked," he told me, recalling the surreal experience. "I visited Electronic Arts in Redwood City, where David Dempsey, one of EA's marketing people, showed me the large cracks in their stairwells. People were a little skittish, but trying hard to carry on. I'd been kind of nervous about intruding on people so soon after the quake, but all of them seemed glad to have the distraction." Not even the collapse of the world was enough to stop these game developers from their work.

Once the games were developed and reviewed for the gaming magazines, the next step in the journey to the customer was the retail store. In those days, most places that sold computer games were independent businesses, each with its own layout and personality. Kevin Hollingshead ran a branch of the Program Store, which was one of the first of these places to become a chain. They sold games for the Amiga and Atari ST as well as other platforms. One afternoon, Trip Hawkins (the founder of Electronic Arts) showed up in his store, after his records showed that the branch was selling more EA games than any other retail outlet. Trip told Kevin about his favorite games, as well as his master plan to make the Amiga a larger success and justify all the investment and enthusiasm that he had personally put into the platform. He had arranged tentative agreements from Japanese companies to make game consoles based on the Amiga

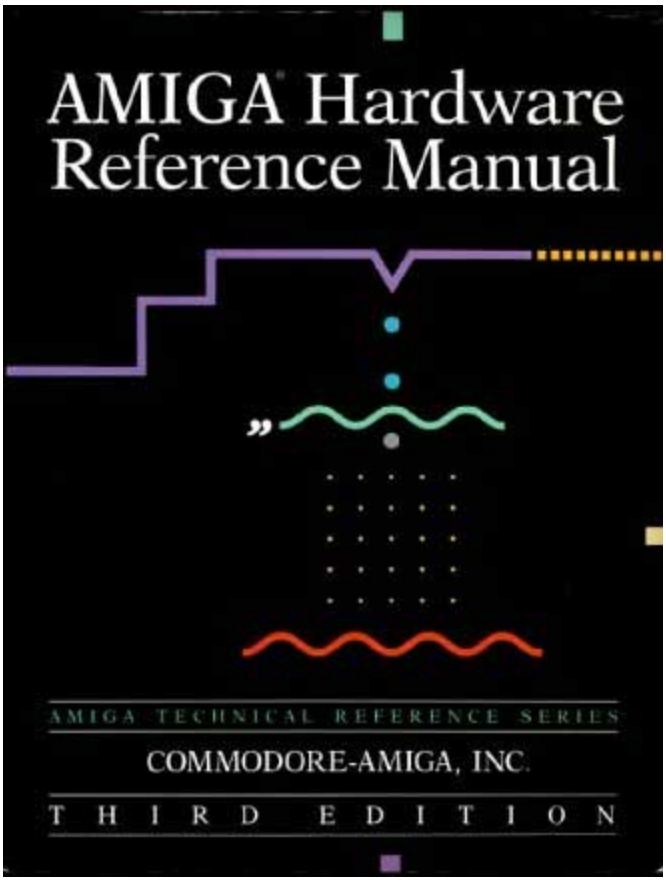
chipset, as well as an "Amiga-on-a-card" for the IBM PC. It's difficult to predict what would have happened to the Amiga game scene had these plans become reality, but in the end it didn't matter as Commodore shot down both ideas.

Still, the Amiga game industry thrived as the 1980s turned into the 1990s. As developers learned more and more about the platform, the Amiga began to be known as the computer with the best games. Publishers would often put the Amiga screenshots on the back of the retail game box, even on the Atari, Commodore 64, and IBM PC releases, with the text "Amiga version shown" in tiny print below.

Uncovering the mysteries of game development

The tips and techniques required to make great Amiga games were not taught in any schools. Developers often started playing with the built-in BASIC on computers like the Commodore 64 and moved on to playing with assembly language. By the time the Amiga was released, magazines such as Commodore Gazette and MC MicroComputer contained articles that delved into the innards of the hardware.

Still, to really understand the power of the Amiga's chipset, there was only one reference guide that really mattered: Commodore's own Amiga Hardware Reference Manual. This was the Bible for Amiga game developers. It let dedicated explorers discover how the Blitter chip blasted graphics directly from memory to the screen, how the Copper let the programmer jump in and change the way the display worked even in the middle of scanning a line on the screen, how the audio chip offloaded sound processing, and how the CPU synchronized all these activities together.



The Holy Bible

The first thing developers would typically do when starting to write a game was to gently cut off the operating system in order to gain complete control of the hardware, including memory. This was done to save memory and so that games could squeeze every last amount of power from the custom chips. When the game ran, however, the developer was running without a safety net. There was no integrated development environment or debugger that could execute at this point. Clever developers would use the hardware itself as a monitor, sending signals to the Copper to change the background color at key points in the program.

When things went wrong, they went wrong spectacularly. There was no memory protection, so if one part of the program started to overwrite another, the screen could erupt in random fireworks before the system locked up. The only way to make sure the whole thing would work was to build and test specific routines for each small component of the game before starting on another.

Amiga game developers used many different tools in their work. To save on development time, many used high-level languages, mostly C. Popular compilers were Lattice C from SAS, Manx C, and DICE.

Still, for raw speed and power, you couldn't beat 68000 Assembly language. On early Amigas, memory was at a premium: the market consisted of machines like the Amiga 500 with 512 KB (that's kilobytes, not megabytes!) of RAM, split between "chip" (memory dedicated to the display and custom chips) and "fast" RAM. Getting everything to work smoothly, without flickering and at high frame rates, took a lot of mental juggling.

Consider the task of Cesare Di Mauro, developer of USA Racing. He wanted a target of 50 frames per second to retain a smooth experience, but this, combined with RAM constraints, meant that it was impossible to use double-buffering (a technique where a second screen with the next frame of action is stored behind the scenes in memory). Using a single screen saved execution time and memory, but made the task of scrolling the background and updating the BOBs (blitter objects, similar to sprites) much more difficult.

His solution consisted of a 352 x 272 virtual screen, with only 320 x 240 pixels viewable at any time. The area was divided into two vertical slices, combined to show a single view. The background consisted of 32 x 32 pixel tiles, arranged in a large map of 4096 x 65536 pixels (coders everywhere will recognize those numbers).

Juggling the number of tiles, the BOBs displayed on top, the music and sound effects, and collision detection with walls and other cars was a huge challenge. Cesare ended up writing a tool in assembly language that handled all of these at 50 frames per second, sorting drawable objects into a display list to maximize performance. The program would first display all BOBs in-order on the list, then update hidden areas to handle scrolling (horizontal scrolling was handled by the graphics chipset by setting a scroll register value, while vertical scrolling was similar but more complicated), then waited for the monitor's display beam to reach the bottom position of each BOB to restore the background they had "stained." He wrote custom routines for sound and even disk access to maximize speed and minimize RAM usage.

This sort of careful balancing was typical of game programmers who wanted to push the envelope. Many of the concepts they came up with would be recreated as part of industry standard libraries much later—display lists, for example, are a crucial element of Direct3D.

Painting the canvas

Dedicated graphic artists were no less innovative. Deluxe Paint from Electronic Arts was the premiere drawing program at the time, but it did not have many of the features (such as layers and history) that Photoshop would later make standard. Graphics tablets and scanners were expensive back then, so many artists had to improvise.

Miha Rinne worked on many images for Amiga games. In the following example, he had to make a background image for a driving game. Time was always of the essence. A typical workflow would start with Miha drawing an outline sketch, done at 2x zoom with the mouse, using the lightest gradient.

He finished the outline in a darker shade. Once he was confident about how the image looked, he could move on to the next stage: coloring.

To save memory, 32 or even 16 color modes were commonly used. This made it extremely important to choose the right color palette. This picture was the artist's first 256-color image.

The next stage involved adding shading and smoothing the edges. Miha did this by hand, pixel-by-pixel. Slowly the original outline was erased.

The final image. This was the last piece of artwork that Miha ever did for the company he was working for at the time.

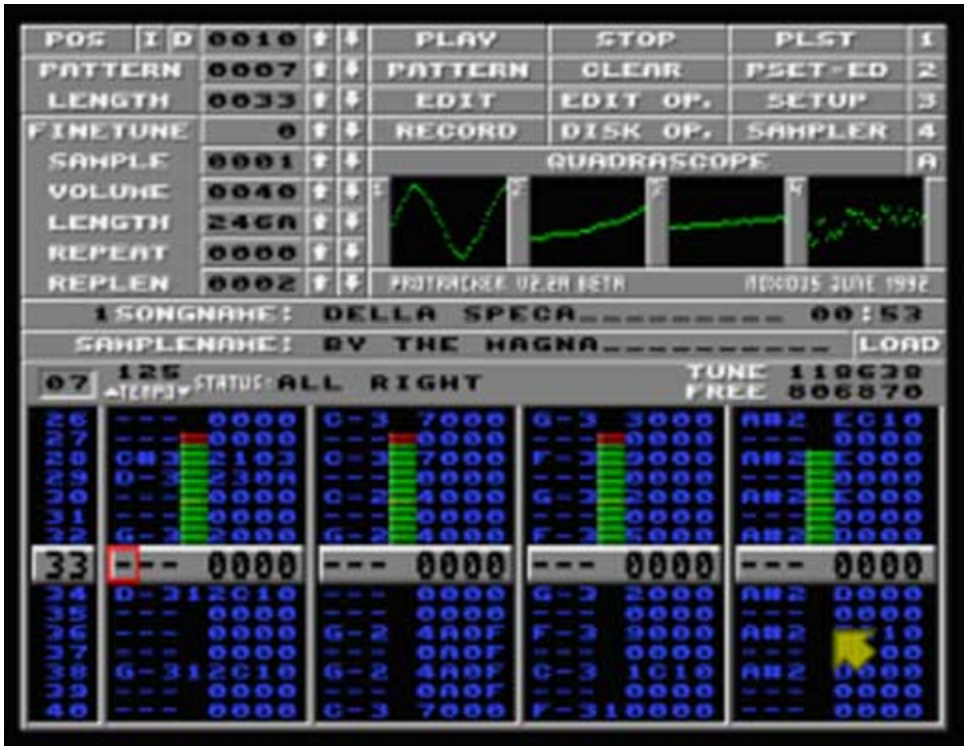
Sometimes a simple effect could make all the difference in a game. Christopher Jackson, a developer for the Amiga version of *Wayne Gretzky Hockey 3*, added an animation of a hockey player shooting the puck towards the player and appearing to "shatter" the monitor as it went through. Then there were the little touches: adding tiny trails of pixels behind the players that the Zamboni could later scrape off. Unsurprisingly, the other versions of *Wayne Gretzky Hockey* had the "Amiga version shown" screenshots on the back of the box.

Many game artists who moved to the Amiga felt an amazing sense of freedom that they hadn't experienced before. Manfred Kramer, who later became a computer graphics artist for video games and movies (and most recently worked on Avatar), wrote:

"I was using a C64 for doing pixel graphics, so you can imagine how it felt the first time I had a real color palette and a mouse! I remember exactly how it felt when I moved the mouse and added yellow color to the screen in realtime. I also remember also that I had tears in my eyes when I saw my first 3D rendering show up on my newly purchased framebuffer for the Amiga 2000."

Bringing the noise

No less important than writing the code or creating the graphics was completing the soundtrack. Even graphically stunning games like *Shadow of the Beast* were known for their hauntingly evocative music. No longer confined to beeps and bursts of static, the Amiga musicians could play with four channels of sampled stereo sound. Amiga music files, called MODs, stored samples of each instrument along with information about the duration, intensity, and special effects applied to each note. These files were created with programs called sequencers, which ranged from freeware applications like Noisetracker and Protracker all the way up to custom-coded sequencers.



Protracker screenshot.

Creating music for Amiga games was usually a rapid effort, and musicians were often brought in near the end of a project for at most a couple of weeks. Matt Simmonds once had to work over a weekend because two games needed their soundtrack by the following Monday. He wrote about 30 songs over two days, a level of productivity not often seen even today.

Never giving up

Creative programming techniques, brand new graphic effects, and innovative music were all par for the course for Amiga game developers. But who were these people? What drove them? Jim Sachs had an answer:

"...[E]ven in those days, it was not really about the hardware. It was about the type of people that were attracted to it—their "can-do" attitude. When I started consulting on PC projects after the Amiga, I was surprised that developers were not eager to try something unless some other developer had already done it. With the Amiga developers, it was almost pointless to try for an effect unless NOBODY had done it before."

These types of people existed all over the world, some of them in very trying circumstances. Rabah Shihab was a student at Baghdad University in Iraq during the early 1990s. Together with his artist friend Murtadha Salman and musician Mahir AlSalman, they developed an Amiga game called *Babylonian Twins*. The game was developed on an Amiga 500 computer with only 512 KB of RAM, and had impressive graphics inspired from history texts. While the game was virtually finished, the first Gulf War and the subsequent sanctions on Iraq made publishing the game impossible.

Rabah didn't give up, however. Decades later, now living in Canada, he salvaged the assets of the game and reunited his old team to finish the product. A demo version of the original Amiga code was finally released to the public, with the full release to follow. However, there is another gaming platform that has just arrived on the scene—one where small groups of independent developers can still compete with giant companies. An enhanced version of *Babylonian Twins* has recently shipped for the iPhone and in an HD version for the iPad. I've played the game, and it is an engaging side-scrolling action puzzler, sort of like *Prince of Persia* meets *The Lost Vikings*. It has already won several awards. You can get it via the Apple store or from their website.

Babylonian Twins running on the iPhone

In the next installment, I'll explore the 'demo scene'—groups of artists, musicians, and coders that stretched the limit of what was possible on the Amiga hardware in the quest to make the ultimate demo. If any of you know people who were part of that scene (which still exists today!) please contact me at: jeremy_reimer@hotmail.com.

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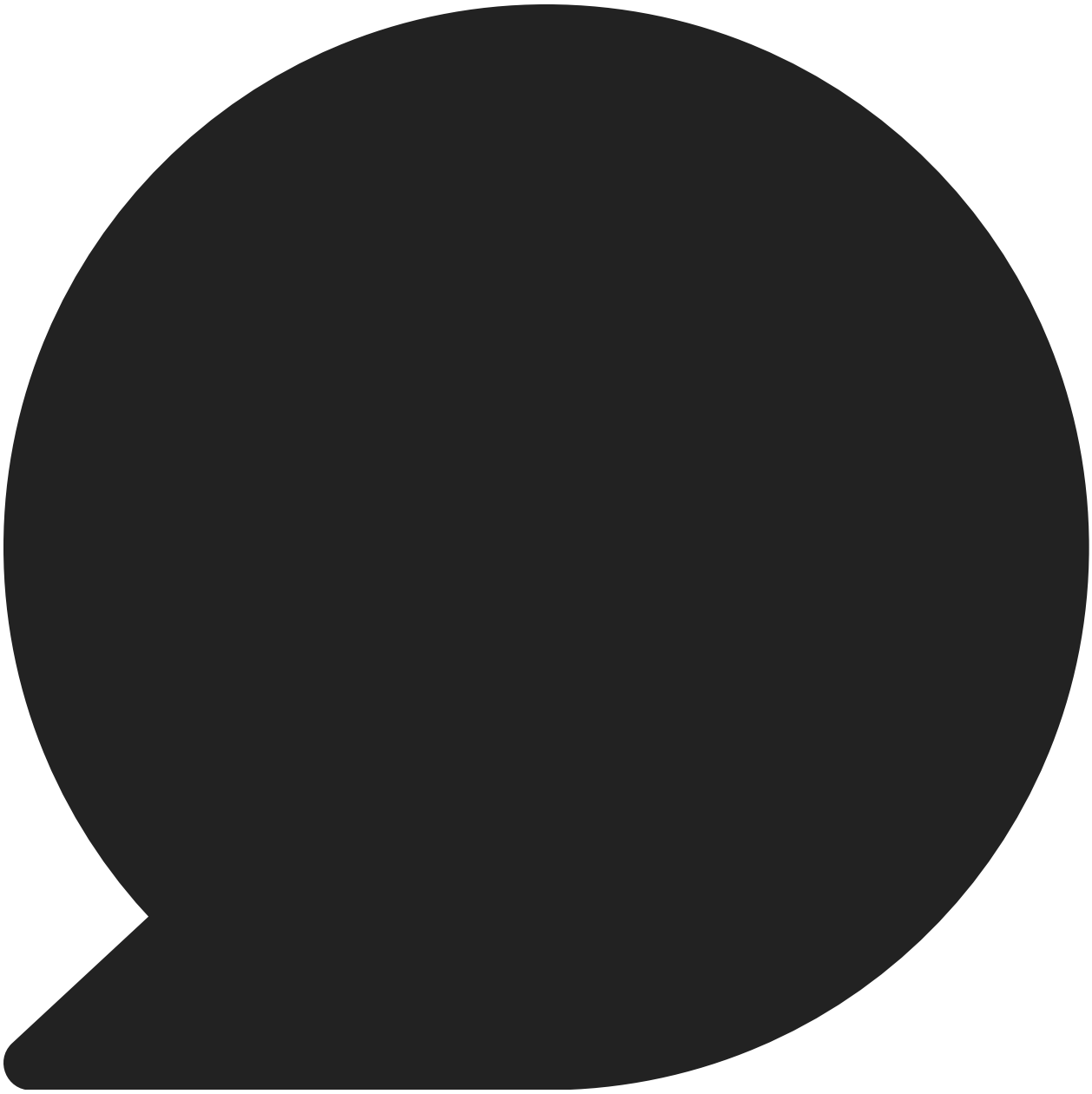
I'm a writer and web developer. I specialize in the obscure and beautiful, like the Amiga and newLISP.



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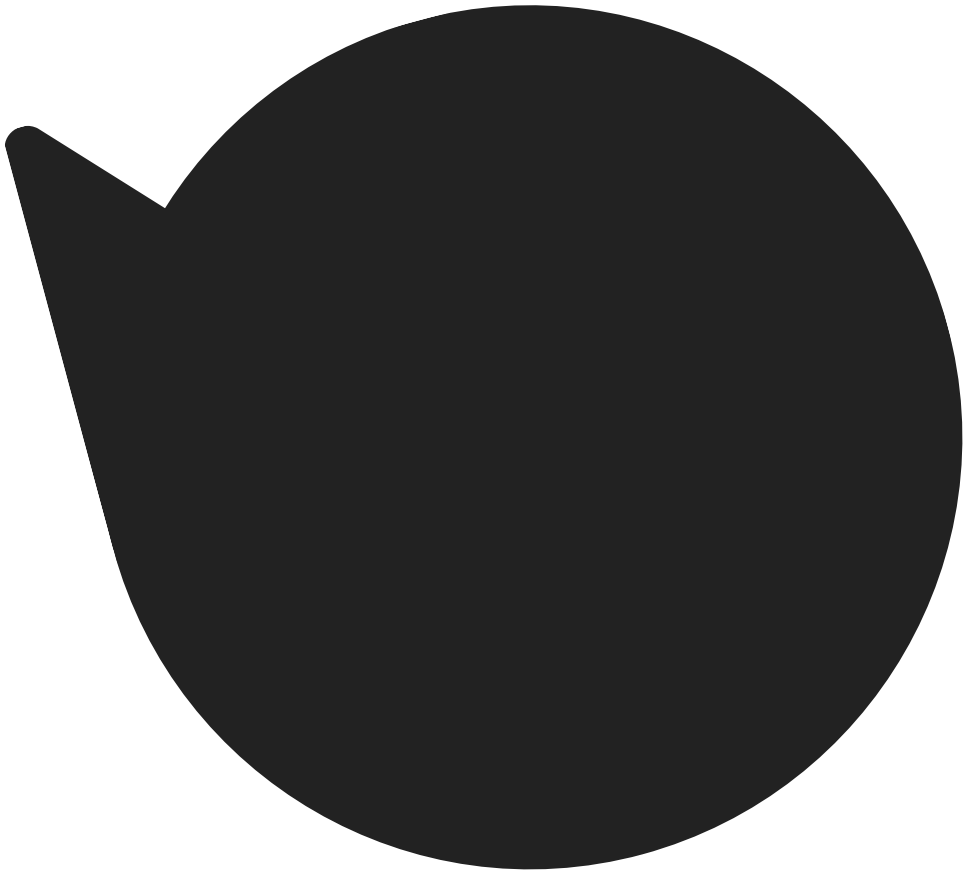

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