Elisabeth Moss gets the gaslighting treatment in Invisible Man trailer

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[embedded content]
Elizabeth Moss plays a woman who thinks her abusive ex-lover has risen from the dead to haunt her in *The Invisible Man*.
A young woman believes she is being tormented by the ghost of her abusive ex-boyfriend, only to discover something far worse in *The Invisible Man*, Universal Pictures' rebooted adaptation of the classic science fiction novel by H.G. Wells. Judging by the trailer, the new movie will deviate considerably from the source material in some interesting ways to bring Wells' tale into the 21st century.

(Spoilers for the 1897 novel and 1933 film below.)

First serialized and then published as a book in 1897, the novel tells the story of a scientist named Griffin, whose research into optics leads him to invent a means of turning himself invisible by chemically altering his body's refractive index to match that of air. Wells cited Plato's *Republic* as one of his influences, notably a legend involving a magic ring that renders a man invisible, which Plato used to explore whether a person would behave morally if there were no repercussions for bad behavior. The novel opens with Griffin taking a room at a village inn, clad in long coat, hat, and

gloves and his face swathed in bandages. He mostly keeps to himself, performing chemistry experiments in his room, but eventually his landlady discovers that he is invisible beneath the heavy clothing.

Griffin flees—killing a tramp in the process—and takes refuge with his former medical school colleague, Dr. Kemp, to whom he recounts his tale of inventing the chemicals that rendered him invisible. He has been trying to reverse the invisibility, to no avail. He is also quite mad, telling Kemp of his plans to use his invisibility to launch a murderous "Reign of Terror" on England. Kemp informs the authorities, making him Griffin's first target. Ultimately, Griffin is cornered and beaten to death by an angry mob. His body gradually becomes visible again as he dies.

The critically acclaimed 1933 film adaptation by director James Whale starred Claude Rains as the titular Invisible Man and was so successful it spawned several sequels and spinoffs. The film is a reasonably faithful adaptation of Wells' novel, except it is set in 1933 rather than the 1890s, and it fleshes out Griffin's character to include a fiancée named Flora (Gloria Stuart). It's also a more sympathetic treatment of Griffin as a tragic figure, showing him as being driven mad by a scientific experiment gone wrong rather than portraying an unhinged man drunk on power who readily resorts to murder.

- Adrian (Oliver Jackson-Cohen) is a controlling and abusive boyfriend.
- Cecilia (Elisabeth Moss) plots her escape.
  YouTube/Universal
- Adrian turns violent.
  YouTube/Universal
- Cecilia and her sister (Harriet Dyer) learn about Adrian's surprising will.
  YouTube/Universal
- A suspicious kitchen fire.

YouTube/Universal

- A ghostly hand on the shower door
- Could someone be sitting in that chair?
  YouTube/Universal
- Cecilia certainly thinks so.
  YouTube/Universal
- Neighbors James (Aldis Hodge) and Sydney (Storm Reid) are concerned for Cecilia's mental wellbeing.
  YouTube/Universal
- There might be cause for their concern.
  YouTube/Universal
- Cecilia discovers Adrian's experimental apparatus.
  YouTube/Universal
- Adrian goes all stalker with his mind games.
  YouTube/Universal
- Nobody believes Cecilia's story of an invisible man.
  YouTube/Universal
- A mysterious patient swathed in bandages.
  YouTube/Universal
- An invisible Adrian has an advantage over the guards.
  YouTube/Universal
- "There you are."
  YouTube/Universal

Universal announced a remake of *The Invisible Man* in 2016, part of a planned series of films for the studio's Dark Universe project, which draws on the studio's classic monsters. The shared cinematic universe would include *The Mummy*, *Bride of Frankenstein*, and *The Invisible Man*. But yet again, a major studio discovered that the "Marvel model" is actually pretty difficult to pull off. Universal's 2017 film *The Mummy*, starring Tom Cruise, was a critical and box office failure, and the studio abandoned the shared universe plan to focus on standalone stories. Jason Blum of Blumhouse Productions signed on to produce *The Invisible Man*.

Written and directed by Leigh Whannell (best known for the *Saw*

and *Insidious* franchises), this latest film version seems to combine the original premise with another classic film, *Gaslight* (1944), about an abusive husband who tries to drive his wife mad. Per the official synopsis: “After her abusive ex-boyfriend commits suicide, naïve Cecilia (Elisabeth Moss) begins to rebuild her life for the better. However, her sense of reality is put into question when she begins to suspect her former boyfriend is not actually dead as she had thought.”

The trailer opens with Cecilia fleeing her toxic relationship in the dead of night, aided by her sister (Harriet Dyer), only to have the sociopathic Adrian (Oliver Jackson-Cohen) smash the car window as they drive away. Cut to the sisters sitting in the office of a lawyer who informs them that Adrian has committed suicide. The twist: he’s left Cecilia $5 million in his will, provided she is found to be mentally sound. Cecilia starts rebuilding her life, but mysterious, ominous phenomena keep happening. At first, she thinks Adrian’s ghost is haunting her, but her sister and neighbors dismiss that possibility, expressing concern about her mental health.

A visit to Adrian’s old house convinces Cecilia that her ex is still alive and has figured out how to turn himself invisible, the better to play his mind games to torment her.

“He said that wherever I went, he would find me, walk right up to me, and I wouldn’t be able to see him,” Cecilia says in a voiceover. Naturally, nobody believes her, until an invisible Adrian turns violent. One assumes that Cecilia will have to face down her abuser to finally bring the nightmare to an end. And given the Invisible Man’s fate in past incarnations, we don’t like Adrian’s chances for survival.

The Invisible Man *hits theaters on February 28, 2020.*

Listing image by YouTube/Universal

https://arstechnica.com/?p=1598445

How Arcade1Up found a sweet spot for scaled-down home game cabinets

Enlarge / A selection of some of Arcade1Up’s early 3/4 scale home arcade machines.

reader comments

17 with 14 posters participating

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Back in June 2017, Tastemakers CEO Scott Bachrach was at a meeting discussing a hole in the ever-expanding market for retro games. Specifically, there was no cheap and easy middle ground for a generation of classic arcade fans who wanted an authentic cabinet in their home.

“We looked and said there are ‘under $100’ solutions, [but they] don’t really feel like a real arcade,” Bachrach began in a recent phone interview with Ars. “There are $3,000 solutions that feel like a real arcade, but they’re $3,000 and 300 pounds. How do we make something that is affordable to the masses but gives you the same play as a real arcade?”

From that meeting, the Arcade1Up line was born. Beginning in 2018, Tastemakers launched a series of 3/4-scale replica arcade cabinets, each with a handful of emulated games and a $300 to $400 price tag. The initial batch focused on Bachrach’s personal wheelhouse: ’70s and ’80s classics from

companies like Namco (*Pac-Man*, *Galaga*), Midway (*Rampage, Defender*), and Atari (*Asteroids*, *Tempest*). Soon though, the line expanded into the ’90s with *Street Fighter II* and *Mortal Kombat*-themed machines, a move Bachrach called a “natural progression.”

“We looked and said, ‘What are the best-selling arcade games?'” Bachrach said. “‘Who had them? When did they come out? What audiences did they go after?’ And [we] made a strategic line on each one of them.”

Growing Pains

The early days of the Arcade1Up line included its share of quality-control challenges, as Bachrach is willing to acknowledge. Early control panel stickers were rapidly fading from basic use, and general questions about build quality and low-grade LCD screens popped up regularly online.

While certain Walmart locations eventually marked those first-generation units down to as low as $75, Bachrach claims this wasn’t a sales issue or quality problem. “We can’t dictate what a retailer will sell their product for. What I can tell you is a retailer only has so much space… if they sell 98% of their inventory and they want to get rid of the last 2% so they can make space for a new title, they look at what they can do to an immediate effect to get rid of whatever is there.”

[embedded content]
Bachrach shows off some of Arcade1Up’s newest cabinets at this year’s E3.

In any case, Bachrach said Arcade1Up’s days of low-quality parts are behind it. “We reacted to those [complaints],” he told Ars, noting the improvements have been made between the Arcade1Up’s original *Asteroids* release and the new *TMNT* machine. “We’re using better controllers, we’re using better switches, we’re using better buttons,” he said. “We put more

packing material on the inside [of the box]. We have really stepped up our game as a result of the community telling us what they don't like and what the problems are that they may have experienced."

Bachrach also pointed proudly to the stronger materials and a new type of trackball on Arcade1Up's version of *Golden Tee*, a game that needs to be able to take a beating thanks to enthusiastic trackball spinning.

Based on a review sample of its *Marvel Super Heroes* cabinet, things have definitely improved since those early cabinets. The new screens boast far better contrast, the cabinet's wood feels both heavier and sturdier, and the control panels are now covered by hard plastic to prevent wear. Assembly is still relatively easy (aside from some tiny screws that hold the LCD screen), and everything survived delivery intact (except for a minor glue-like substance on the side art). The *Marvel Super Heroes* cabinet is also the first legitimate home release for *The Punisher* arcade game since a limited Sega Genesis port, and it seems to be emulated quite well on Arcade1Up's board.

Given those improvements, did Arcade1Up's early adopters essentially serve as beta testers for an inferior product?

"It's like this," Bachrach said. "Is your [current iPhone] the first phone you've had?… Every time they come out with a new iPhone, they've tried to do something to upgrade the past. Does that mean the first one was no good? Absolutely not. It was great for what it was at that time. To perfect your manufacturing, you have to consistently get better or your consumer goes away. I think we're following that same pattern."

Turtle problems

Build quality aside, releasing Arcade1Up's latest cabinet, which includes both *Teenage Mutant Ninja Turtles* and *Turtles*

in Time, came with its own unique challenges. While those games' four-player cabinet designs worked fine in a real arcade, the smaller scale of an Arcade1Up machine is already cramped even for two-player games.

The solution? Keep the *TMNT* body to Arcade 1Up's usual scale but expand the control panel. "If you look at the body of the machine itself, it didn't really change in terms of height or width," Bachrach explained. "What we did was the extensions around the control deck, and the deck is set up in a way that you can fit four players."

- Tonight we're gonna party like it's 1989.
- Squeezing four controls onto the Arcade1Up *TMNT* cabinet required expanding the playing surface a bit.
- Enough room for four sets of hands, technically…

The Arcade1Up release of the *Turtles* arcade games couldn't have come at a better time for fans looking to play the arcade titles at home. Yes, the 1989 original was made available on console download services in 2007, and a Ubisoft *Turtles in Time* remake hit in 2009. But both were removed from digital storefronts in 2011 when an expiring licensing agreement made them unavailable for legitimate at-home play (with some obscure exceptions).

Rescuing arcade *TMNT* from the digital death zone took about a year of fighting through a contractual quagmire, Bachrach said. While the character license is currently under Nickelodeon's banner, Konami still owns the original game code (which is run through a licensed custom emulator for the cabinets, Bachrach said). Incidental material like the art on the side of the cabinet had to be appropriately licensed, too, causing even more headaches and delays.

New frontiers

With a firm foothold in the US market, Arcade1Up is now taking to Japan and is working with Taito on a *Burgertime* cabinet for that region. And Bachrach said Tastemakers is always looking for more games, no matter the location.

Does that mean the company might follow *TMNT* with Konami's other popular brawlers like *The Simpsons* or *X-Men*? Bachrach paused for a few seconds when we asked him, then he replied, "Uh, we agree with you that they are very popular cabinets."

He laughed. So, are those games happening too? "Maybe," he said with another laugh. "I cannot confirm or deny that."

For this year, though, the focus is on *TMNT*, *Star Wars*, and *Marvel*. And those *TMNT* units, which are exclusive to Walmart for now, will only be available in limited quantities, Bachrach warned. But he was quick to add that this doesn't mean Tastemakers is creating an intentional shortage to drive up demand and create the next Tickle Me Elmo.

"We wanted to have it centralized and be able to promote it the right way and [let] consumers know where to go," he said. "Walmart will have it. And no, we couldn't make more… There are only so many cabinets we can build at the level of quality we want to maintain and improve."

No conspiracy then, other than trying to cover up the *X-Men* and/or *Simpsons* releases on the way.

Probably, anyway.

https://arstechnica.com/?p=1597581

A young couple might regret their choice of nanny in creepy new Servant trailer

reader comments

14 with 13 posters participating

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[embedded content]
Toby Kebbell and Lauren Ambrose star as grieving parents in M. Night Shyamalan's new series, *Servant*.
Fresh off the release early this year of *Glass*, the final film in his *Unbreakable* trilogy, director M. Night Shyamalan is back with an intriguing new series for Apple TV+. *Servant* might be best described as a psychological thriller with supernatural overtones, about young parents who hire a nanny to help care for their newborn infant. But the nanny—and the baby—aren't quite what they seem to be.

It's frankly a surprising move for Shyamalan, who typically avoids working in television. Sure, he directed the pilot episode of limited series *Wayward Pines* in 2015, but he has said he doesn't like the tight shooting schedule required for TV. "The great thing about the format is it's character-driven," he told the audience at New York Comic-Con last month when the first teaser debuted. "But the amount of content you have to deliver for the amount of time and resources, the math just doesn't work—which is why we can count on two hands every show that has gone from beginning to end with the same quality."

Series creator Tony Basgallop convinced him otherwise. It helped that *Servant*‘s 10 episodes are a bingeable 30 minutes each and everything takes place in a single location (the grieving couple’s home), giving the series a “play-like quality,” according to Shyamalan. Like much of his work, the series is set in Philadelphia and was shot there, with Shyamalan doing the editing in his own home.

- Sean (Toby Kebbel) and Dorothy (Lauren Ambrose) Turner welcome new nanny Leanne (Nell Tiger Free) into their home.
- Dorothy seems to be a devoted mother.
  YouTube/Apple TV+
- That’s not how you pick up a baby, Sean!
  YouTube/Apple TV+
- Little Jericho is actually a doll replacement for the couple’s dead baby.
  YouTube/Apple TV+
- Deep in uncanny valley territory here.
  YouTube/Apple TV+
- Leanne seems to buy into the delusion that Jericho is a real baby.
- Sean and his BFF Julian (Rupert Grint) are concerned.
  YouTube/Apple TV+
- Where did Leanne really come from?
  YouTube/Apple TV+
- Is that a voodoo doll?
  YouTube/Apple TV+
- “What if she remembers?”
  YouTube/Apple TV+
- At some point the police will get involved, it seems
  YouTube/Apple TV+
- A striking shot of Sean investigating strange sounds from upstairs.
  YouTube/Apple TV+
- Who, or what, have the Turners brought into their home?

YouTube/Apple TV+

Per the official synopsis, "*Servant* follows a Philadelphia couple in mourning after an unspeakable tragedy creates a rift in their marriage and opens the door for a mysterious force to enter their home." Toby Kebbell and Lauren Ambrose play Sean and Dorothy Turner, who are struggling to cope with the loss of their baby, Jericho. Sean agrees to try "fringe therapy": using a doll as a replacement for their dead baby as they work through their grief. But it seems Dorothy starts to believe the doll actually is her baby. And when she decides to hire a complete stranger named Leanne Grayson (Nell Tiger Free) as a nanny, things really start to get weird, in fine Shyamalan fashion.

The trailer opens with Leanne's arrival at *chez* Turner to care for what we might initially assume is a normal baby. Dorothy considers Leanne a godsend; Sean finds her a bit weird. "She's cool with everything? She knows the situation?" Sean's buddy Julian (Rupert Grint) asks. And we see Sean looming over the crib before picking up "baby" Jericho by the legs and dangling the doll in the air. Cut to Sean telling Leanne that it's OK to put the doll down when Dorothy isn't home. But Leanne seems to have bought into Dorothy's delusion, too, which Sean understandably finds disturbing. The final voiceover ominously asks, "Do you know who you welcomed into your home?"

We don't get much in the way of a mysterious supernatural force in the trailer, but the cinematography looks spectacular. And there are hints that something was not quite right about the Turner baby's death. Shyamalan said at NYCC that he has mapped out 60 episodes, or six seasons over six years, for *Servant*. I'm not convinced this is a strong enough premise to work beyond one or two seasons, but the director is known for his unusual concepts and ingenious twists. If anyone could flesh it out for six seasons, it's Shyamalan.

Servant premieres on Apple TV+ on November 28, 2019.

Listing image by YouTube/Apple TV+

https://arstechnica.com/?p=1597537

Scientists unlock the chemical secrets of a 19th-century photography technique

Enlarge / A black-and-white photograph treated with the mordançage process shows characteristic ‘veils’ deposited on dark areas of the print.

reader comments

22 with 21 posters participating

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Mordançage is a photographic process that yields striking black-and-white photographs characterized by ghostly veiling effects. Scientists from George Mason University have recently figured out precisely what is happening chemically during the process, according to a recent paper in Analytical Chemistry.

Mordançage has its roots in a late 19th-century method of changing a film negative to a positive, first documented by a man named Paul Liesegang in 1897. In the 1960s, French photographer Jean-Pierre Sudre further refined the technique to produce silver gelatin prints and dubbed it “Mordançage.” It’s also known as “etch-bleaching,” because it uses an acid-

copper bleaching solution to dissolve the darker parts of the silver gelatin layer so that it partially lifts away from the print. Those areas can either be rubbed away, creating an image reversal, or retained to produce a veiling effect.

The solution is then rinsed off in a water bath (an additional stop-bath step is optional), then the print is redeveloped to restore the black color before being dried and pressed flat. The result: those dark areas that had lifted from the paper during the earlier stage of the process are preserved to produce the ghostly final veils. Sudre's American protegé, Elizabeth Opalenik, is perhaps the best-known photographer who uses the process.

Mordançage works best for images with lots of black or detailed dark patterns since darker areas experience more dissolution. The most common solution consists of copper chloride, citric acid (or glacial acetic acid), and hydrogen peroxide mixed with distilled water.

Enlarge / One of Elizabeth Opalenik's photographs undergoing the Mordançage process.

Vimeo/Elizabeth Opalenik

There have been several patents relating to a similar chemical process, according to GMU chemists Caroline Fudala and Rebecca Jones, the authors of this latest paper. This suggests that the copper chloride plays a significant role in the initial bleaching. Hydrogen peroxide is known to soften gelatin during bleaching and hence likely also plays a role. Opalenik has said that paper type is also a factor in controlling the process.

But there have been no rigorous experiments to back up these assertions. “Clearly, the various components of the process are interacting with the silver gelatin photographic print,” the authors wrote. “However, the chemical details and processes, especially regarding the formation of veils, has remained obscured.”

So Fudala and Jones performed a series of experiments to put those assertions to the test. First, they created black-and-white photographs using 35mm film and standard darkroom procedures, using different kinds of photographic papers (multi-grade resin-coated, fiber based, and cotton rag). They used a filter to increase contrast in the images and an enlarger to project images onto the photographic paper.

Once the prints were dry, they subjected them to the Mordançage process. During these experiments, Fudala and Jones measured how much hydrogen peroxide was absorbed by the paper, and they noted correlations between how long a print was submerged in the solution and the type of photographic paper used. They also performed spectral and pH measurements to determine the effects of the copper chloride.

Enlarge / These images show the results of varying how long a print was submerged in the Mordançage solution. (a) 1 minute, (b) 4 minutes, (c) 8 minutes and (d) 60 minutes.
Fudala and Jones/Analytical Chemistry

They found that the hydrogen peroxide and acetic acid served to soften the photographic paper. That meant the copper chloride was better able to permeate it and oxidize the metallic silver, turning it to silver chloride as the surface layers lift off as veils. The veils darken again during redevelopment because the silver chloride returns to metallic silver. The emulsion lift continues in the water bath phase, while the optional stop-bath step reacts with residual hydroxide to neutralize redevelopment.

“The final drying step gives the artist one opportunity for control,” the authors wrote. “When making the final transfer from the water-bath solution, the veils succumb to gravity and, depending upon how the print is finally moved from the solution, reattach to the substrate in strategic locations.”

The GMU experiments also confirmed Opalenik’s assertion that the type of photographic paper used matters. Cotton-rag paper is the most permeable and had the most dramatic reaction to the Mordançage solution, i.e., the greatest emulsion lift, compared to the resin-coated and fiber-based photograph papers. So Fudala and Jones used cotton-rag photographic paper to perform control experiments to explore further the effects of each of the solutions’ chemical components (copper

chloride, hydrogen peroxide, and glacial acetic acid).

The results: prints processed in a solution with just copper chloride and water bleached the print but did not produce any emulsion lift. Prints processed in a solution of hydrogen peroxide and water, or acetic acid and water, showed no bleaching or emulsion lift at all. It takes the combination of all three components in the solution to get the full veiling effect. Finally, as expected, the longer a print was in the solution, the more emulsion lift occurred, and the more pronounced the resulting veiling effect in the final photograph.

DOI: Analytical Chemistry, 2019. 10.1021/acs.analchem.9b03205″ (About DOIs).

[embedded content]
Photographic artist Elizabeth Opalenik demonstrates her work in Mordançage and images photographed underwater.
https://arstechnica.com/?p=1597167

Red Dead Redemption 2 on PC: More frames, more volumetric beauty, no Steam

reader comments

60 with 46 posters participating, including story author

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- Let’s get stoic again… this time on Windows PC. All images in this gallery were captured from live gameplay at near-max settings.
- The first thing to call out is the incredible upgrades to volumetric particle fields. Every foggy, misty sequence looks jaw-dropping in action.
- The way light particles scatter in these dense fields of fog is remarkable. You normally want an HDR monitor to see colors fade and melt in the horizon like this. Bravo, Rockstar.
- Shadow resolution is also quite impressive for both close and distant shadows.
- It’s a shame Rockstar didn’t get a ray-tracing pipeline worked up in time for this PC launch, as the game’s screen space reflection tech is a bit ho-hum (not really evidenced by this image, admittedly).
- Another look at high-res real-time light-and-shadow systems. Lights off.
- Lights on.
- I’m not sure the horse is gonna make it.
- Sorry about that last shot. Here’s some horse friendship to make up for it.
- In general, texture resolution during real-time gameplay looks this good.
- Notice this zoomed shot’s awful treatment of shadow resolution. This appears to be a PC launch-day bug on how a camera zoom isn’t being met with a proper system to convert “far” shadows to “near” ones.
- Those kinds of shadow tweaks are less noticeable when the fortress in question is so distant.
- Why am I zooming on the sky here? Because this plume of smoke looks wonderful in action, with its every particle moving at a different speed.
- Clearer day, clumpier snow.
- Slow-mo kill shot.

After years of waiting, we finally have a *Red Dead Redemption* game on Windows PCs… and it's the newer one from October of last year. Tuesday morning marked the PC launch of *Red Dead Redemption 2*—now available for purchase exclusively through the Rockstar Games Launcher for $60 and up—so we grabbed a copy to see how this PC port turned out.

The meat of it all comes in the attached galleries, which all include near-max settings at native 1440p resolution and the game's temporal anti-aliasing (TAA) toggle turned to "high." I've only tested enough to get through the campaign's opening snowy portion, though the game's built-in benchmark mode (below) includes plenty of outdoor footage.

In good news, *RDR2*'s PC port works as a pretty, settings-cranked-high alternative to last year's console release. Its most obvious upgrade comes in the form of an unlocked frame rate. In one morning of testing, I was already able to crank performance (after downgrading a bunch of settings) to an apparent 120fps-and-up threshold, although random performative spikes—usually triggered by sharp cuts in cinematic scenes—made me glad I had a variable refresh rate monitor.

Otherwise, my 1440p gameplay worked with near-max graphics settings at roughly 70fps, which only required a settings downscale of the game's "distant volumetric" settings (which got me nearly 18% of my frames back with zero apparent difference in terms of visuals). Keep that toggle in mind if you're using a system weaker than mine (i7-8770K, RTX 2080 Ti, 32GB of DDR-3000 RAM, SSD drive).

In bad news, *RDR2*'s facial and body animations were never built for these kinds of high speeds. What looks tolerable and fine enough on a console, locked to 30fps, comes off a bit last-gen when the camera sway and particles run at higher speeds. (To be clear: all animations of up-close characters appear to run at organic speeds, as opposed to some weird lock on 30fps. Whether that's the same for NPCs rendered in the

distance isn’t yet clear.)

But that’s more of an issue during cut scenes than in the live gameplay. Riding a horse, ducking into cover, and pumping vagrants full of shotgun shells feels *so* much better in this version of the game, especially when you go into your graphics card menu of choice and toggle low-latency settings. *RDR2* famously came with control latency issues on console, and while you’re not going to get the immediate twitchy response of a shooter in this PC version, we’re back in respectable tap-and-response timing thanks to the luxuries of the PC platform.

- This first gallery is dedicated to the new *Red Dead Redemption 2* benchmark app, exclusive to the new Windows version. It includes four scenes in all. The first primarily tests particle effects in the game’s opening snow biome.
- Then we move into a swamp zone, where the game’s volumetric haze and fog is most loudly tested. You’ll want to pay attention to this with various effects enabled and disabled to see how the quality toggles look in action.
- All images in this gallery are set to their maximum values. In this shot’s case, that means the volumetric clouds look a lot more convincing in motion.
- A wide-open vista, arguably best used to test HDR effects. Here it is with a hint of sunset…
- …and the same scene with zero hint of sun remaining.
- This benchmarking moment quietly pans over a sleepy town. Not much here in action beyond some lights turning on inside of homes and torches in the streets. I’ll point out that Vulkan is the default renderer for the PC version; if you switch to DirectX 12, the lights and textures in this scene (and others) consistently stutter to load as of press time. Until Rockstar addresses this issue, stick with Vulkan.

- The final scene of the benchmark is the “real gameplay” sequence. It opens with petty larceny.
- Then our hero runs through a town, which works out the CPU’s ability to render a variety of NPCs.
- Enjoy a couple of horse-racing shots to check out the game’s shadows at maximum quality.
- More max-quality shadow shots.
- We’ve got company.
- Reminder that this whole gallery is rendered at 1440p with all effects cranked to maximum and TAA set to “high.”
- Throw some dynamite, watch the carriage go kaboom.
- When you run the benchmark a few times, the fallen horses here sometimes derp out.
- Away we go, over this bridge.
- All settings at max, so this reflection is crisp.

One more detail about the PC version lands in both the “good” and “bad” news columns: internal resolution scaling. Should you wish to crank up settings and still lock a 60fps refresh, you can pick some simple toggles to bring total rendering resolution down to a fraction like 50%, 75%, 90%, and so on (or go crazy and get up to 120% and more, if you’re on a workstation). However, Rockstar has elected not to implement any kind of dynamic resolution scaling system, which could have simplified PC users’ efforts to stick to either 30fps or 60fps with fewer hassles. (To be fair, this is consistent with the console versions, which also skipped any dynamic resolution scaling options.)

In order to play this version of *RDR2*, you’ll need to not only use the Rockstar Games Launcher but also pump it full of payment information. For now, there’s no way to purchase or download this game via Steam; Rockstar has clearly followed the likes of Epic, EA, and Ubisoft in using its own launcher to sidestep other retailers’ percentage fees. A Steam version will reportedly follow in December of this year, though it

looks like it too will require the Rockstar Games Launcher, much like how the *Grand Theft Auto V* PC version was patched to require RGL earlier this year.

The bad news in the case of *RDR2*'s launch on Rockstar Games Launcher came from the obnoxious pre-load process, which added a painfully long "decryption" process to my Tuesday morning installation. (In spite of my loading the game on my SSD the night before, I still had to wait 40 minutes for its 110GB install to unlock itself.) Other than that, the Launcher worked fine enough, particularly in terms of its cloud save feature working as advertised (though I only tested that on a single extra system as of press time).

Dig through the galleries for more context, including an explainer on how Rockstar has buried the ability to rebind controls until you've loaded the campaign and hit the pause button—better than nothing, but still an accessibility barrier as of press time.

- Graphics menu time. We have four screens of toggles to pick from. Worth noting here: the "quality preset level" bar has more than a dozen toggles, but Rockstar hasn't built these to scale on a performance level. Many of the steps afforded my system nigh unnoticeable gains.
- Ignore the red highlighted parts. Something was always selected when I hit the screenshot button. Also, note that you can toggle TAA, FXAA, and MSAA simultaneously, if you want to pummel jaggies.
- Want to crank up performance while still otherwise running your game at peak settings? That "far volumetric resolution" toggle should be turned from "ultra" to "high" for seemingly identical visuals and a whopping 18% performance boost.
- Final graphics menu. Let's get that fur quality up! All the fur!
- Now for some very bad news, PC players. These two

screens are the keyboard-and-mouse options…
- …and they don’t include any remapping options. Where are they? Turns out, you have to go into the *in-game* settings menus to access rebinding. You cannot rebind controls until you’ve actually launched the game.

This article has been updated to clarify the ability to rebind controls.

Listing image by Rockstar Games

https://arstechnica.com/?p=1596829

Aimbot video leads to lifetime ban for popular Fortnite pro

reader comments

213 with 122 posters participating

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[embedded content]
Jarvis Khattri offers an emotional apology after being banned from *Fortnite*.
Jarvis Khattri has built a significant part of his 17-year-old life around *Fortnite*. The UK-based player has attracted over 2 million followers on YouTube in just a couple of years, and he signed with the esports monolith FaZe Clan for competitive

play in April.

Now all that is at risk of falling apart. That's because Epic Games has issued Khattri a lifetime ban from *Fortnite* after he posted a video (since deleted, mirrored here) showing him using aimbot software to cheat in the game.

In an emotional apology video posted Sunday, Khattri admits to posting "some videos of me using aimbots in solo and playground mode." But he says in the apology that this is the "first time I've ever done anything like this" and that he's "never done anything like this in a competitive scenario."

In the video that led to the ban, Khattri says he's not playing on his main account and that he will play "a game or two without aimbot" to avoid ban detection. Khattri also mentions "playing on a new PC" because "I don't want to get my main PC banned," suggesting he was somewhat aware of the risks of using an aimbot on video.

[embedded content]
A mirror of the "aimbot" video that led to Khattri's ban.
In his apology, though, Khattri said that he "just thought about entertaining you guys" when making the aimbot video and never expected this level of consequence. "Being banned forever… a lifetime ban is just… I didn't expect this would happen," he says while holding back tears. "Especially from a game I would love so much." Khattri also said that using the aimbot was a "huge mistake and completely wrong on my end… Cheating is never acceptable. I should have paid more attention to the community rules and ToS."

The *Fortnite* EULA explicitly prohibits "running or using methods which are not authorized by Epic and which interfere with the outcome and/or the course of the Software (including Cheats, bots, scripts, or mods not expressly authorized by Epic)."

"We have a zero tolerance policy for the usage of cheat

software," *Fortnite* maker Epic said in a statement provided to press. "When people use aimbots or other cheat technologies to gain an unfair advantage, they ruin games for people who are playing fairly."

While some are applauding Epic's decision, others see some hypocrisy in Khattri's treatment when compared to other *Fortnite* cheaters. Back in May, duo partner XXiF and Ronaldo received a ban of just 14 days after they were caught colluding for easy kills during professional qualifiers. The pair later qualified for August's World Cup Finals, where they were received poorly by the crowd.

https://arstechnica.com/?p=1596787

Splatter master Jackson Pollock avoided "coiling" when creating his paintings

Enlarge / Jackson Pollock working in his Long Island studio adjacent to his home in 1949.
Martha Holmes/The LIFE Picture Collection via Getty Image

reader comments

40 with 33 posters participating

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Famed abstract expressionist Jackson Pollock notoriously

relied on non-traditional painting techniques to create his masterpieces. Physicists have pondered the presence of curls and coils in his work, and whether the artist deliberately exploited a well-known fluid dynamics effect to achieve them. Now a recent paper in PLOS One is claiming the opposite: Pollock deliberately avoided so-called “coiling instabilities” as he worked.

For the last few years, Roberto Zenit, a physicist with the National Autonomous University of Mexico and Brown University, has been studying the physics of fluids at work in novel painting techniques like those used by Pollock and Mexican muralist David A. Siqueiros. Pollock, for instance, early on employed a “flying filament” or “flying catenary” technique before he perfected his dripping methods. The paint forms various viscous filaments, which are thrown against a vertical canvas. Zenit and several colleagues were able to recreate the fluid action by mounting a paint-filled brush on a rapidly rotating mechanical arm.

Pollock’s dripping technique involved laying a canvas flat on the floor and then pouring paint on top of it. Sometimes he poured it directly from a can, sometimes he used a stick, knife, or brush, and sometimes he used a syringe. The artist usually “rhythmically” moved around the canvas as he worked. His style has long fascinated physicists, such as the controversy surrounding the question of whether or not Pollock’s paintings show evidence of fractal patterns.

Most notably for this latest work, in 2011, Boston College physicist Andrzej Herczynski and Harvard mathematician Lakshminarayanan Mahadevan collaborated with art historian Claude Cernuschi on an article for *Physics Today* examining Pollock’s use of a “coiling instability” in his paintings. As Ars reported last year, this mathematically describes how a viscous fluid folds onto itself like a coiling rope—just like pouring cold maple syrup on pancakes.

The patterns that form depend on how thick the fluid is (its viscosity) and how fast it's moving. Thick fluids form straight lines when being spread rapidly across a canvas, but they will form loops and squiggles and figure eights if poured slowly. Herczynski *et al.* measured the thickness of lines and the radius of the coils in a Pollock painting showing this effect, and the team used that data to estimate the flow rate of the paint as the artist's hand moved across the canvas.

An intuitive physicist

According to Zenit, Pollock almost certainly relied heavily on physics as he painted, whether he did so deliberately or not. He liked to play with texture and viscosity when mixing his paints, often adding solvents to make them thicker or thinner. There's even 1950 video footage of Pollock at work, in which he asserts, "I can control the flow of paint. There is no accident." What's currently in question is whether or not the artist deliberately used coiling in his work.

- Schematic view of a small portion (lower right) of 'Number 14: Gray', by Jackson Pollock (1948).
  R. Zenit et al./PLOS One
- Schematic reproduction giving a side view of Pollock painting, while moving around the canvas.
  R. Zenit et al./PLOS One
- Schematic reproduction of Pollock painting over a transparent glass sheet.
  R. Zenit et al./PLOS One

From a fluid mechanics perspective, the artist's famous technique isn't really "dripping" at all, according to Zenit *et al*. That technical term "refers to the break up of a fluid jet onto drops, resulting from a surface tension instability," they wrote. "For the condition under which Pollock painted, the fluid filaments rarely fragmented while they were applied." The authors chose Pollock's "Number 14: Gray" to

illustrate the technique, because it was painted with just one color (black enamel paint over gesso-covered paper), making it easier to track the various lines, which differ in thickness and shape.

First, Zenit *et al*. carefully analyzed video of Pollock working in his studio—taken from the 1950 footage shot by Hans Namuth—and then they measured how quickly he moved, as well as the distance from the canvas as he dropped the paint. Next the researchers built an apparatus to mimic those movements—essentially a big syringe mounted on an adjustable stand. "We can vary one thing at a time so we can decipher the key elements of the technique," Zenit said. "For example, we could vary the height from which the paint is poured and keep the speed constant to see how that changes things."

They found that the vast majority of Pollock's traces were produced because the artist actively avoided coiling instabilities, contradicting the 2011 conclusions of Herczynski *et al*. "Specifically, Pollock moved his hand at sufficient high speed, and at a low-enough height as to suppress the emergence of coiling. Like most painters, Jackson Pollock went through a long process of experimentation in order to perfect his technique," said Zenit. "What we were trying to do with this research is figure out what conclusions Pollock reached in order to execute his paintings the way he wanted. Our main finding in this paper was that Pollock's movements and the properties of his paints were such he avoided this coiling instability."

> *"Pollock's movements and the properties of his paints were such he avoided this coiling instability."*

That said, this is not the final word on the matter. Zenit *et al.* note that the low resolution of the video footage means there's uncertainty regarding the measurements they were able to make. Specifically, they were unable to get simultaneous height and hand speed measurements, and hence they were unable

to correlate those two variables. While they used a paint similar to those used by Pollock (a commercial black cellulose Nitrate lacquer), the materials used by Pollock likely had a different composition and hence different degrees of viscosity and density. Also, Pollock did not typically hold the stick he used to deposit paint vertically, often swinging it in wide arcs, although Zenit *et al*. determined this was not significant enough of an effect to alter their conclusions.

"This result could be of importance for authentication: a painting with too many coiled traces would indicate that the painting was not created by Pollock," the authors concluded. "Furthermore, understanding the conditions for which the coiling instability can be prevented could have implications in practical applications where such an effect needs to be prevented, as in the case of ink-jet printing or the fabrication of optic fibers."

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https://arstechnica.com/?p=1595661

Blizzard won't reverse Hearthstone pro's Hong Kong protest suspension

Enlarge / Ng "Blitzchung" Wai Chung declares his support for Hong Kong while two announcers duck behind their desks.

reader comments

159 with 115 posters participating

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Blizzard President J. Allen Brack said in an interview with PC Gamer this weekend that the company will not be reversing a six-month suspension for Ng “Blitzchung” Wai Chung and two *Hearthstone* casters that were involved in Hong Kong-related protests on a live esports stream last month.

In explaining that decision,Brack reiterated the message that Blizzard supports free speech and encourages employees and players to say what they want in “all kinds of ways and all kinds of places.” The one exception to that, he said, is “official broadcasts,” including Blizzard-sponsored esports events, which the company wants to be “focused on the games.”

“Again, it’s not about the content of Blitzchung’s message,”Brack said, echoing previous comments from Blizzard. “It’s about the fact that it was not around the games. If we hadn’t taken action, if we hadn’t done something, you can imagine the trail that would be in our future around doing interviews. They would become times for people to make a statement about whatever they wanted to, on whatever issue. That’s just a path that we don’t want to go down. We really want the content of those official broadcasts to be focused on the games, and keep that focus.”

Brack added that Blizzard employees, including “esports athletes, our Grandmasters, or anyone who is participating in esports [are] free to say and do whatever they want on their social channels.” That seems to directly contradict the reported experience of Justin “Jayne” Conroy, assistant coach for the Dallas Fuel pro *Overwatch* team, who told the Dallas Morning News last month that Blizzard asked him to remove a tweet criticizing the Blitzchung decision.

Brack’s interview comes after he issued a vague apology from the Blizzcon stage Friday, in which he accepted “accountability” for the Blitzchung decision and said the company would “do better” in the future. The decision to keep the suspension in place comes despite pressure from Blizzcon protesters, pro *Hearthstone* players, Blizzard employees, Twitter hashtaggers, and a bipartisan group of US legislators.

Brack also reiterated in the interview that Chinese regulations and business pressure has nothing to do with the company’s decisions regarding Blitzchung. Though *Hearthstone* is available in China,Brack stressed that it was only through local publishing partner NetEase, and that Blizzard itself is “not legally allowed to operate or to publish games in China.”

Brack also said NetEase was to blame for a Weibo post from Blizzard China shortly after Blitzchung’s on-stream protest, which suggested the company would “always respect and defend the pride of [China].”Brack said directly that Blizzard “did not authorize [the post]. We did not approve it. We would not have approved it had they asked.”

Elsewhere in the interview, though, Brack says that Blizzard Taiwan, *Hearthstone* leadership, and Blizzard’s “esports team” were all “in conversation [with NetEase] around the issue.” Together, Brack said, those groups “acted very rapidly and we acted very quickly” in handing out Blitzchung’s initial ban, using an amount of haste that Brack now calls “the failure of this story.”

https://arstechnica.com/?p=1595979

Mad Max meets Ferris Bueller in boldly outrageous Netflix series Daybreak

reader comments

8 with 7 posters participating

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[embedded content]
Angelica Green (Alyvia Aly Lind), Josh Wheeler (Colin Ford), and Wesley Fists (Austin Crute) are just trying to survive in their post-apocalyptic dystopia in *Daybreak*.
The adults are gone in the wake of a catastrophic event and teens rule what's left of society in *Daybreak*, a new post-apocalyptic teen dramedy from Netflix. With its whip-smart dialogue, killer soundtrack, and rich trove of sly pop culture references, the show is almost too smart for its own good. I say "almost," because this eclectic genre mashup turns out to be an outrageously over-the-top delight. If you liked Amazon's *The Boys*, chances are you'll like *Daybreak* too.

(Some spoilers below, but no major twists are revealed.)

Daybreak is based on the graphic novel of the same name by Brian Ralph. His first graphic novel, *Cave-In*, was notable for having no words at all. *Daybreak* was ground-breaking in a different way, told entirely from the perspective (both narratively and visually) of an unnamed survivor to an apocalyptic event, breaking the fourth wall to address readers directly. The young man wakes up to find the world he once knew destroyed, before a one-armed man appears and takes him

under his protective wing. They are joined by other survivors, teaming up to avoid zombie-like creatures that lurk in the shadows, but are never fully shown. It's a quiet, understated post-apocalyptic story that's been described as "*The Road* meets *Dawn of the Dead*."

Created by Brad Peyton and Aron Eli Coleite, the Netflix TV adaptation is more "*Mad Max* meets *Ferris Bueller's Day Off*"—and in a nod to the latter, the original Ferris Bueller, Matthew Broderick, plays high school principal Michael Burr. Set in Glendale, California, our main protagonist is high school student Josh Wheeler (Colin Ford), who transfers to Glendale High right before a nuclear bomb/biological weapon combination hits the region. The few surviving adults have become "Ghoulies," doomed to crave human flesh and wander aimlessly in search of food while muttering the last thing they said before the bomb hit ("Why so many superhero movies?").

With no adult supervision, the teens stick with what they know, grouping into "tribes" based on stereotypical high school cliques to survive. The Jocks dominate all the other tribes, led by the brutal former star quarterback, Turbo "Bro Jock" Pokaski (Cody Kearsley), and his right hand, Mona Lisa (Jeante Godlock). There are also the Cheermazons, STEM Punks, 4H Club, Game Overs, Disciples of Kardashia, and so forth. It works about as well as you'd expect from teens with no governing experience who have watched way too many movies. Punishment is meted out according to the rules of ancient Rome, except the accused must perform onstage for "American Ninja Idol," hoping Turbo gives them a thumb's up to spare their lives.

- New student Josh (Colin Ford) is befriended by Sam (Sophie Simnett).
- Matthew Broderick is an inspired choice to play the high school principal.

- The apocalypse begins
  YouTube/Netflix
- Turbo (Cody Kearsley) and Mona Lisa (Jeante Godlock) rule the jocks.
- Meting out punishment
- The golf team appears to be cursed.
  YouTube/Netflix
- Meet the STEM Punks (aka science geeks)
  YouTube/Netflix
- The Cheermazons
- The mysterious Baron Triumph kidnaps kids and eats them.
- Angelica (Alyvia Aly Lind) is a twisted genius who likes setting fires and just wants to belong.
  YouTube/Netflix
- Wesley Fists (Austin Crute) is inspired by the ronin legend to seek redemption for his past misbehavior.
- Jock attack
- A clever means of beating back the jocks
- Eli (Gregory Kasyan) wants “his” mall back, minus the interlopers.
- Biology teacher Ms Crumble (Krysta Rodriguez) seems to be the only adult who hasn’t become full-on Ghoulie.
- Could a dance help heal the rifts between factions?
- Stronger together

Josh is a loner by choice, deftly evading Ghoulies, Jock bullies, and a mysterious figure known as Baron Triumph who hunts surviving kids and purportedly eats them. He is mostly living what he thinks is the high life, camping out in swank abandoned digs while looking for his missing girlfriend, Sam (Sophie Simnett), who he’s hoping has managed to survive as well. But then he has a run-in with the Golf Club (a lowly subgroup of the Jocks, who don’t consider it a real sport because of the tiny balls) and rescues 10-year-old Angelica (Alyvia Alyn Lind), a foul-mouthed “MENSA-level genius with flexible morality” and a deep love of fire and explosions. She latches onto him as her best chance to survive.

Josh gradually starts to attract other potential allies among his fellow surviving outcasts who haven't pledged fealty to Turbo. They include Wesley Fists (Austin Crute), a former Jock turned pacifist samurai, who hopes to redeem himself for past bad acts via the code of Bushido; Eli Cardashyan (Gregory Kasyan), a bit of a self-serving tool who has holed up alone in the Glendale Mall; and former biology teacher Ms. Crumble (Krysta Rodriguez), who seems to be the only surviving adult who hasn't gone full-on Ghoulie, in that she can form complete sentences and resists the urge to eat the kids.

Like its source material, *Daybreak* deliberately breaks the fourth wall to address viewers (and sometimes, the writers) directly—a narrative device also used to great effect in Phoebe Waller-Bridge's hit series, *Fleabag.* But it cleverly tailors the style to the different main characters, each of whom gets a chance to tell their backstories in *Lost*-style flashbacks. For instance, Angelica self-identifies as "gangsta," and adopts the *Goodfellas* voiceover technique for her featured episode. Wesley's story is narrated by the Wu-Tang Clan's RZA and illustrated with kung-fu movie animations. Ms. Crumble finds herself in a cheesy sitcom narration of her backstory (directed by Angelica with a canned laugh track).

> *More often than not, the writers subvert our expectations in creative, surprising ways.*

It would be so very easy to screw up such an ambitious mix of genres and complicated narrative threads, but Peyton and Coleite pull it off. And that's largely due to the strong writing, terrific cast, and well-developed characters, especially the teens, who reveal themselves to be far more than the stereotypical roles they've adopted because they're frightened and crave some semblance of familiar structure. Deep down, they are still just kids, a dilemma best captured by Angelica, whose tough, sassy exterior hides a lonely, vulnerable pre-teen who desperately wants to belong somewhere. Her deepening relationship with Ms. Crumble, who gradually

becomes a demented mother-figure/mentor, is a highlight of the series.

Sure, it’s best not to overthink the outrageous premise, and some of the teen soap moments are predictable, but they are also genuinely moving. And more often than not, the writers subvert our expectations in creative, surprising ways. I’d wager there’s never been an after-school special as graphically on point as when Angelica gets her very first period and has to figure out how to use a tampon while hiding from Ghoulies in an abandoned cereal factory restroom.

Josh’s search for Sam is nominally the broad narrative arc for the season, but it’s the makeshift family he finds along the way that gives the series its heart. The teens didn’t destroy the world, but they’re the ones who have to rebuild a functioning society from the ashes. On the upside, the apocalypse gives the survivors a chance to figure out who they really are and re-invent themselves accordingly—for better or worse, depending on the characters. *Daybreak* concludes with a final unexpected twist and several unanswered questions that neatly set up a possible second season. Here’s hoping Netflix gives the show that chance.

Daybreak is currently streaming on Netflix.

Listing image by Netflix

https://arstechnica.com/?p=1591973

The best new board games from

the world’s biggest board game show

Enlarge / There were a *lot* of people at Essen this year.

reader comments

11 with 10 posters participating

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Welcome to Ars Cardboard, our weekend look at tabletop games! Check out our complete board gaming coverage at cardboard.arstechnica.com.
For four days each year, the German city of Essen becomes the center of the tabletop gaming universe. The annual Internationale Spieltage fair—better known simply as “Spiel”—sees publishers from around the world unleash their most anticipated new releases.

This year, more than 1,200 exhibitors from 53 countries showed off their games across 86,000 square meters of floor space. With so much to see, it’s impossible to take in more than a tiny fraction of the games on offer. But for the past few years, I’ve been wandering the halls on behalf of Ars readers, hunting for clever, cool, innovative, and entertaining new tabletop titles. So once again I took a deep breath and dove head first into a maelstrom of cards, dice, meeples, and miniatures. And here are my picks from the games I managed to play.

Obscurio

A growing subcategory of board games challenges players to convey information using cryptic collections of images—think

Dixit, *Mysterium,* or *Deception: Murder in Hong Kong*.

Obscurio is the latest addition to the bunch. It casts you and your partners as wizards trapped in a maze-like magical library. To escape, you need to open a succession of doors and find your way to freedom. Each door shows a different arcane image, and one player acts as a guide, using picture cards and subtle similarities between different illustrations to point everyone else in the right direction.

It might sound familiar to anyone who has played similar games, but *Obscurio* makes some tweaks to the well-established blueprint. For one thing, the guide can use a pair of magnetic arrows to highlight particular elements on the image cards, drawing players' attention to different colors, shapes, and objects. There's also a limit on how long players can deliberate over their decisions, and taking too long to choose a door incurs penalties which make things tougher in subsequent rounds.

One player also acts as a secret traitor, actively trying to frustrate the group's effort to escape. In a game with such a pronounced element of ambiguity, there are plenty of opportunities to subtly derail your friends' progress, and it's all bound together with a Hogwarts-style aesthetic.

Pandemic: Rapid Response

With the lineup of *Pandemic* games growing at a rate that would make a virulent strain of *e. coli* jealous, it’s tempting to wonder how far the franchise can expand without running out of creative juice. *Rapid Response* suggests it has a ways to go yet.

Players control a team of specialists, each with different abilities, rushing to locations around the world to combat epidemics and prevent the fall of civilization. Rather than a map, though, the board now represents a plane, with different sections devoted to producing different types of medicines and resources needed to fight various infectious strains.

You’ll do this by rolling and re-rolling dice, using the results to move around the aircraft and complete tasks while *en route* to the next global trouble spot. What makes this

tricky is the remorseless time limit, forcing you to make quick decisions under pressure and inevitably creating more trouble in the process.

There’s a thematically jarring element where you can lose the game because your plane becomes too full of trash. But, like the original *Pandemic*, *Rapid Response* skillfully creates a mounting sense of tension. The game wasn’t the most fun I had with sand timers at Spiel, however…

House Flippers

This quick and quirky game sees players become rival property developers aiming to buy and sell a succession of homes, using the profits to retire to a life of luxury and leisure.

You start out with a single card—representing a dilapidated house—and a plastic sand timer. Whenever it runs out, you flip it over and receive a wooden cube representing rental income. Rent money and the proceeds from house sales combine to let you buy more expensive house cards, and along the way you can acquire additional timers and staff who increase your takings, allowing you to develop a prestigious property portfolio.

It’s reminiscent of *Splendor* and the *Century* series of spice-trading games, where players aim to string together a succession of judicious deals as efficiently as possible. But what makes *House Flippers* deliciously different is that you and your opponents all play simultaneously, snatching helpful cards before your rivals and constantly keeping one eye on your growing collection of timers.

At its core, the game is incredibly simple, but it creates a real frenzy at the table as you frantically claw your way towards the high life.

Marvel Champions: The Card Game

For years, tabletop studio Fantasy Flight Games has produced faithful adaptations of big-name pop-culture franchises. (See the *Game of Thrones* board and card games, *Star Wars X-Wing* miniature battle game, and the succession of releases based on J.R.R. Tolkien's *The Lord of the Rings* novels.)

Fantasy Flight recently added Marvel Comics to its collection of geek-friendly licenses, and at Spiel the company was showing off a new cooperative card battler in which players become mighty heroes working together to take down an assortment of dastardly villains.

Mechanically, *Champions* feels like a slightly streamlined version of Final Fantasy's now-defunct *Warhammer Quest Adventure Card Game*. Players go head-to-head with an AI adversary. On each round, the antagonist works to fulfill their schemes, attacks the heroes, or dispatches minions to menace them. To save the day, players have to find clever ways to combine their strengths and overcome a constantly evolving set of dangers and obstacles.

Each player controls a single character, and it's impressive how well their stats and abilities reflect their comic book representations. In our demo game, Spider-Man flipped and dodged to negate attacks, Black Panther deployed an array of advanced gadgets, and Captain Marvel used her powers of leadership to coordinate the heroes' efforts.

Another nice touch is that heroes' character cards are double-sided, with one face representing their secret identity and the other showing their spandex-clad alter ego. Each side comes with different powers, and working out which can be of most benefit at different points is an important step towards victory. The game's pacing also does a great job of recreating an adrenaline-fueled comic book fight scene. Even though I'm not a fan of superheroes, I'd be more than happy to play

Champions again.

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