Incarnations of the Metaverse in Science Fiction

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Ever since Mark Zuckerberg announced a rebrand of his company and the shift in investment towards the next big leap in technology, the concept of the Metaverse is no longer just an obscure science fiction (sf) reference that crypto fans throw around to indicate some future evolution of information technology. Instead, the Metaverse now "owns real estate in the heads of every single technologist, future-thinker, and CNBC-watcher who wants to understand how to capitalize on the next phase of the Internet,"[1] as one of the many business advisory books on the subject points out. The term has become the "buzzword of 2022,"[2] with Zuckerberg proclaiming the technological teleology of changing media forms:

> "We've gone from desktop to web to phones, from text to photos to videos. But this isn't the end of the line. The next platform and medium will be even more immersive, an embodied internet where you're in the experience, not just looking at it."[3]

But as with a lot of commentary on the Metaverse, Zuckerberg is light on the actual definition of what he means or the origin of the concept in a science fiction novel.

The idea of the Metaverse is plucked directly from Neal Stephenson's novel *Snow Crash* (1992), where the material world has turned into dystopia and people

1 Terry, QuHarrison/Keeney, Scott: *The Metaverse Handbook: Innovating for the Internet's Next Tectonic Shift*. Hoboken, NJ: Wiley 2022, p.18.

2 Ibid., p. 19.

3 Meta: "The Metaverse and How We'll Build It Together—Connect 2021," *Meta*, October 28, 2021, https://www.youtube.com/watch?v=Uvufun6xer8

escape into the virtual world represented by the Metaverse. As Gundolf S. Freyermuth has pointed out, the novel's Metaverse combines "global digital networking"—i.e., the mapping of material reality onto the digital for aspects of commerce, work, the social—"with a material experience of virtuality,"[4] i.e., being able to fully immerse oneself into and embody the experience. Current explorations by tech companies and creators, though not yet fully realized, are both more extensive and less clear-cut than merely a virtual world parallel to ours. Instead, the Metaverse will encompass hard- and software aspects; it consists of protocols as much as content or communication.[5] Taking this and especially the wide variety of applications into account, in the most comprehensive attempt to date, Matthew Ball defines the Metaverse as follows:

> "A massively scaled and interoperable network of realtime rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments."[6]

Problematically, big tech's efforts to create closed-off virtual worlds and proprietary hardware and services currently lead the charge in development, which would entrench corporate control and ownership of the Metaverse, including our personal data. As Mark van Rijmenam warns, just like in *Snow Crash*, a closed Metaverse "will very likely result in a dystopian nightmare, that we should avoid at all cost."[7] The better option, van Rijmenam argues, would be an open, "evolving, decentralized, and creator-driven ecosystem"[8] that is beneficial to society.

Given its origin in science fiction, the development of the Metaverse is deeply linked to its cultural representation. Functioning as a "shared vision," sf provides

4 Freyermuth, Gundolf S.: "Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century," in: Beil, Benjamin et. al (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-89, here p. 84.

5 Cf. Ball, Matthew: "The Metaverse: What It Is, Where to Find It, and Who Will Build It," January 13, 2020, https://www.matthewball.vc/all/themetaverse

6 Ball, Matthew: *The Metaverse: And How It Will Revolutionize Everything*. New York, NY: Liveright 2022, eBook, ch. 3.

7 van Rijmenam, Mark: *Step into the Metaverse: How the Immersive Internet Will Unlock a Trillion-Dollar Social Economy*, Hoboken, NJ: Wiley 2022, p. xxix.

8 Ibid., p. 16.

engineers and developers with what Jim Karkanias has called "hieroglyphs—simple, recognizable symbols on whose significance everyone agrees,"[9] which then set in motion creative processes of innovation in a market of ideas. Stephenson's Metaverse is one such hieroglyph and has inspired the current technological boom. But even though Stephenson coined the term and created a specifically powerful version of the Metaverse, he wasn't the first sf author to explore similar ideas: William Gibson's cyberspace or Star Trek's holodeck provide obvious related concepts.[10] In fact, all of these incarnations exist within the sf "megatext," which, according to Sherryl Vint, "reveals the way that sf explicitly refers back to earlier instances of itself, each text adding to and playing with the larger body of signs, images, and scenarios that make up sf's shared world."[11] Considering the projected impact of the Metaverse on the evolution of the Internet and our social, cultural, and economic futures, in what follows, I want to look at the different incarnations of the Metaverse in the science-fictional megatext and explore how they developed the idea in different, meaningful ways.

I EARLY INCARNATIONS OF LIVING IN THE MACHINE

Not quite a virtual reality yet, but already presenting the concept of living mainly through screens and aided by machines, the first incarnation of the idea that would later develop into the Metaverse, I argue, can be found in E. M. Forster's short story "The Machine Stops" (1909). Forster's imagined world is not so much a

9 Jim Karkanias, no original source given, quoted in: Stephenson, Neal: "Innovation Starvation," *Wired*, October 27, 2011, https://www.wired.com/2011/10/stephenson-innovation-starvation/

10 Gibson's cyberspace is discussed below. The holodeck was popularized in STAR TREK: THE NEXT GENERATION (1987-94). It is Metaverse-adjacent technology featuring a physical room in which an immersive virtual reality can be projected, but one that is neither persistent nor shared beyond the confines of the holodeck itself. It showcases Star Trek's "post-scarcity utopia," reflecting late 20th-century technological optimism and daily life enmeshing with computer technologies. See Chambers, Amy C./Skains, R. Lyle, "Science and Technology," in: Garcia-Siino, Leimar/Mittermeier, Sabrina/Rabitsch, Stefan (eds.), *The Routledge Handbook of Star Trek*, New York, NY: Routledge 2021, pp. 348-56, here p. 350.

11 Vint, Sherryl: *Science Fiction*, London: Bloomsbury 2014, p. 57. The term "megatext" was coined by Damien Broderick (*Reading by Starlight: Postmodern Science Fiction*. New York, NY: Routledge 1995).

description of virtuality but of the shift towards "electronic communications technology. With its early vision of the allure and danger of global, networked communication, the story is in direct conversation with classic cyberpunk"[12] and thus with concepts such as cyberspace and the Metaverse. In the story, humanity has left material reality behind and now lives in hive-like structures underground, each person inhabiting a cell that is a separate, closed-off, parallel reality in that the Machine provides full remote control of all aspects of life. First-hand experiences and human encounters have been replaced by telepresence and telecommunication. The Machine's services go beyond information, though, as food, hygiene, and shelter are all taken care of—that is, the parallel reality created is not just virtual but also very much material. Nonetheless, as Alf Segert has remarked, the informational reality, "the visual and auditory images provided by the Machine" can be seen as "a striking analogue for 'being connected' in contemporary cyberculture,"[13] as Forster is mainly interested in the intellectual life and interhuman communication the machine allows.

Vashti, one of the main characters, knows "several thousand people," as the story points out, as "in certain directions, human intercourse had advanced enormously."[14] All of Vashti's social interactions—her communication, the lectures she gives, the concerts she attends—are done via telepresence, in Marshall McLuhan's sense, extending the body through mediation.[15] What is important to note here is that the Machine "did not transmit nuances of expression. It only gave a general idea of people—an idea that was good enough for all practical purposes."[16] Forster's story here anticipates the problem that interactions lose complexity, as "our presence in the world"[17] is mediated through an interface. As our experiences

12 Berger, Rachel. "The Horror of Direct Experience: Cyberpunk Bodies and 'The Machine Stops.'" *SFRA Review* 54.3 (2020): pp. 37-44, here p. 37.

13 Segert, Alf: "Technology and the Fleshly Interface in Forster's 'The Machine Stops': An Ecocritical Appraisal of a One-Hundred Year Old Future." *The Journal of Ecocriticism* 2.1 (2010): pp. 33-54, here p. 34.

14 Forster, E. M.: "The Machine Stops," in: Barnes, Douglas M./Egford R. F. (eds.), *Twentieth Century Short Stories*. Cheltenham: Harrap 2001 [1959], pp. 126-167, here p. 126.

15 McLuhan, Marshall: *Understanding Media: The Extensions of Man*, London: Sphere 1967 [1964]. Given the experiences of the COVID-19 pandemic and the lockdowns, scholars have commented on the "fresh urgency" of Forster's vision; see R. Berger, "The Horror of Direct Experience," p. 37.

16 E. M. Forster, "The Machine Stops," p. 129.

17 Zimmermann, Ana Cristina/Morgan, W. John: "E. M. Forster's 'The Machine Stops': Humans, Technology and Dialogue." *AI & So*ciety 34.1 (2019): pp. 37-45, here: p. 42.

with video conference tools such as Zoom or Skype (and their issues with granularity, lagging, noise overlays, etc.) make clear, the "type of mediation" we have for our presence is key to whether or not our experience in the world will be "enrich[ed] or impoverish[ed]."[18] The Metaverse, as Zuckerberg promises, will allow us to experience virtual reality with what Ball refers to as "a sense of presence."[19] In a transhumanist sense, this virtual presence allows our bodies to become extended, to expand and enrich our experience with the world. Poignantly, Segert sees a similar argument to be made for the Machine, as "technology becomes a mode of awareness in itself, something so pervasive that it infiltrates the very shape of our world-view."[20] In his view, humans have co-evolved with their technologies, integrated them into the way they interact with the world so seamlessly that they do not even notice them anymore—this happened to Vashti with the Machine, and it will happen to us with new virtual experiences such as the Metaverse: "The immediacy humans once felt only through gross physical contact now in many respects has given way to virtualized interactions that now feel just as immediate."[21] In this regard, "The Machine Stops", for the first time, imagines the way that the Metaverse will replace large parts of our physical interactions via technological surrogacy.

How alluring such a surrogate world can be is the topic of another early 20th-century short story. "Pygmalion's Spectacles" (1935), by Stanley G. Weinbaum, features the invention of a pair of goggles, which from today's perspective seem "magical VR-like"[22] in that they provide a projected image, which is sensory-enhanced through technology: "I add taste chemically and sound electrically. […] I electrolyze the solution, the story, sight, sound, smell, taste and all."[23] Protagonist Burke puts on these spectacles and loses himself in the story that they provide—the narrative, focalizing his perception, suggests that the user of the goggles is free to explore the projected, fantastical world, interact with it and its inhabitants as he pleases. While Burke starts off aware of "the miserable hotel room" he is in and that the fantasy world is a mere "illusion,"[24] his perception soon changes. He becomes immersed, accepting the reality presented by the goggles, his mind tricking

18 Ibid.

19 M. Ball: *The Metaverse*, ch. 3.

20 A. Segert: "Technology and the Fleshly Interface," p. 41.

21 Ibid., p. 44.

22 M. Ball: *The Metaverse*, ch. 1.

23 Weinbaum, Stanley G.: "Pygmalion's Spectacles," in: *A Martian Odyssey*, London: Sphere 1977, pp. 116-34, here p. 118.

24 Ibid., p. 119.

him into experiencing touch and, ultimately, volition, though in the end, what he experienced was pre-recorded, "pre-programmed" for interaction.

What is interesting here, aside from the immediately noticeable hardware set-up of VR goggles, is that Weinbaum foresaw the human desire to explore virtual worlds as fantasy and escape, as well as their very real impact. Burke's experience has him so enthralled with Galatea, the beautiful young woman he meets in the virtual world, that he falls in love and later experiences emotions of loss when he returns to his world and the hotel room. As Ball remarks, "as our online experiences become more 'real,' we place more of our real lives online, live more of our lives online, and human culture overall becomes more affected by the online world,"[25] suggesting that virtual reality is linked and interwoven with material reality. In fact, Herman Narula suggests that the Metaverse is not merely a few virtual worlds built for entertainment but rather provides "a structure of multiple worlds that permits value exchange between them."[26] He stresses the cultural function and the transfer of value and meaning between worlds as central to the idea—something Weinbaum explored in 1935 by having his protagonist feel the impact of his virtual experiences in the material world.

II 1980S CYBERPUNK: DEFINING CYBERSPACE

The interconnection of the virtual and real world becomes a central motif in the texts of proto- and early cyberpunk in the late 1970s and early 1980s, when computer networks became more widely known and used and when sf authors explored the potential and risk of this technology. While other sf authors have picked up on ideas related to Weinbaum's immersive virtual world,[27] the breakthrough

25 M. Ball: *The Metaverse*, ch. 3.

26 Narula, Herman: *Virtual Society: The Metaverse and the New Frontiert of Human Experience,* New York, NY: Currency 2022, eBook, here ch. 1.

27 Matthew Ball (*The Metaverse*, ch. 1) suggests stories by Ray Bradbury ("The Veldt," 1950), Philip K. Dick ("The Trouble with Bubbles," 1953) and Isaac Asimov (*The Naked Sun*, 1956). Svante Lovén (*Also Make the Heavens: Virtual Realities in Science Fiction*, Uppsala: Uppsala University 2010) discusses Frederick Pohl's "The Tunnel under the World" (1955), Daniel F. Galouye's novel *Simulacron-3* (1964), and two novels by Dick (*Time out of Joint* [1959] and *The Three Stigmata of Palmer Eldritch* [1964]). I would add Dick's novel *Do Androids Dream of Electric Sheep* (1968), which uses a specific virtual reality in its inhabitation of the religious martyrdom of Mercer. Depending on how widely one defines virtual worlds, there will be more examples.

text of virtual reality is undoubtedly Vernor Vinge's novella "True Names" (1981), which has been lauded for its introduction to and inspiration of a slew of innovations in computer technology (such as individually customizable avatars, software agents, real-time immersive environments, social media, the importance of cryptography and many more).[28] In fact, Vinge's story has been so central to key figures of early cyberculture, such as members of the Electronic Frontier Foundation and the Cypherpunks, that it was considered "required reading"[29] in these groups and was used to build these online communities with cryptographic protocols gleaned from its pages.[30]

In "True Names," Vinge imagines a global interconnected computer network that is represented via a virtual reality called the "Other Plane," and which is accessed by users through a device like an EEG, the "Portal's five sucker electrodes,"[31] a web of input/output devices attached to the skull to manipulate brain activity. In the story, a hacker named Mr. Slippery is blackmailed by the government into fighting the Mailman, another hacker who later turns out to be an artificial intelligence, for control over the global virtual network and its databases (i.e., the digital infrastructure that runs the real world). Several aspects of the story and its description of the Other Plane make it the first true representation of what Ball, Zuckerberg, and others would come to consider the Metaverse.

First, the story highlights the ubiquity of networked computer systems in that "ninety-eight percent of the jobs in modern society involved some use of a data set,"[32] as well as showing users socializing online, thus anticipating how the Metaverse—just as the Internet now—is used globally and encompassing both economic and social aspects of our reality. In fact, as Janet Abbate points out, Vinge was visionary expressly because he "saw the potential for what we would

28 Abbate, Janet: "True Risks? The Pleasures and Perils of Cyberspace," in: Ferro, David L./Swedin, Eric G. (eds.), *Science Fiction and Computing: Essays on Interlinked Domains*, Jefferson, NC: McFarland 2011, pp. 189-204.

29 Milburn, Colin: "Activism," in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk*, New York, NY: Routledge 2020, pp. 373-81, here p. 376.

30 May, Timothy C.: "True Nyms and Crypto Anarchy," in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 33-86, here p. 38.

31 Vinge, Vernor: "True Names," in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 239-330, here p. 250. A longer discussion on interface devices and their representation follows below.

32 Ibid. p. 248.

now call social networking."[33] Moreover, the story points out the potential and necessity for (some of) these interactions to be anonymous or screened behind a curated image. For Vinge, government regulation of data was the enemy of the hackers, highlighting the need for securing personal information and how all "political power is inherently flawed, and when it becomes over-centralized […] it becomes downright dangerous."[34] And while Vinge saw the government as overreaching on data control and collection, not large corporate entities, the story nonetheless emphasizes concerns with privacy regulation and the threat of identity theft, as well as the general principles of surveillance capitalism.[35]

Second, the story is the first to use avatars—i.e., interactive representations "in place of, indeed as direct *extensions* of, the spectator"[36]—though the term itself was only popularized over ten years later by Stephenson. Avatars in the story are not mere reflections of the user; they are "a reservoir that can be filled with your own desires, intentions, and goals"[37] and fully curated to look and act as the user sees fit, even beyond the laws of physics (i.e., given the ability to fly). Vinge foresaw that customization, especially the aspect of becoming "more powerful, attractive, or exotic than one's real physical body,"[38] would appeal to users—thus anticipating a central feature of already existing Metaverse worlds such as games and a key aspect that monetization is built upon, allowing the use and transference of special appearances. Meta, for example, promises different options to stylize one's avatars depending on a need for verisimilitude—from a hyperrealistic image of the user for business, cartoon-versions of oneself for social events, to fantastical representations in game environments.[39] How much a reflection of ourselves we

33 J. Abbate: "True Risks?," p. 194.

34 Doubinsky, Sébastien: "Vernor Vinge," in: McFarlane, Anna/Murphy Graham J./Schmeink, Lars (eds.), *Fifty Key Figures in Cyberpunk Culture*, New York, NY: Routledge 2022, pp. 241-46, here p. 243.

35 Cf. Zuboff, Shoshana: *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, New York, NY: PublicAffairs 2019.

36 Rehak, Bob: "Playing at Being: Psychoanalysis and the Avatar," in: Wolf, Mark J. P./Perron, Bernard (eds.), *The Video Game Theory Reader*, New York, NY: Routledge 2003, pp. 103-27, here p. 103.

37 Gee, James Paul: "Video Games and Embodiment," *Games and Culture* 3.3-4 (2008), pp. 253-63, here p. 259.

38 J. Abbate: "True Risks?," p. 194.

39 Cf. Meta: "The Metaverse." To showcase this, Zuckerberg attends a conference call in the Metaverse as a cartoon-version of himself, while another co-worker is shown as a realistic (filmed) image of herself and yet another is represented as a red robot.

see in the avatar is important to how we perceive our agency in the virtual realm, as we "invest an acted-on object [the avatar] with the characteristics of an acting subject [ourselves]."[40]

Lastly, related to the issue of customizable avatars, "True Names" describes the virtual world via the imagery of fantasy: Hackers are warlocks and witches, the community is a coven, programs they enact are spells, and their own server is entered through a magical gate. Envisioning the Metaverse as a fantasy world further speaks to our ability to explore different identities online, but it also highlights that everything within the virtual world is a construct of the mind, that "*every object in cyberspace is a magical object*"[41] imbued with meaning by consensus of its users. As Abbate makes clear: "Using magical analogies is no more childish or irrational than using the metaphor of a 'trashcan' or 'file folder' to represent locations on a personal computer."[42] In this, Vinge's Other Plane provides an important precursor to the fantastical worlds of today's online gaming, such as WORLD OF WARCRAFT, MINECRAFT, ROBLOX, or FORTNITE, which can be seen as driving forces behind the development of the Metaverse and will comprise a large part of its multi-world makeup.

It is interesting to note that aside from these game worlds, Vinge's fantasy-inspired imaginary has not become the standard metaphor for computer systems. Instead, a concept introduced by William Gibson in his story "Burning Chrome" (1982) and fully explored in his debut novel *Neuromancer* (1984) has provided a more lasting imaginary of IT systems: the city grid. Sabine Heuser has pointed out how Gibson is inspired by the way that skyscrapers allow for a "vantage point for surveying the 'city as a vast map,' with its various networks of streets and traffic patterns forming an abstract grid."[43] It is this grid and its conception as abstracted geometry that shapes the way computer systems are imagined and represented. While Disney visualized computer-generated game grids in TRON (Lisberger, 1982),[44] Gibson coined the term "cyberspace" for a much broader concept with a similar visual:

40 B. Rehak, "Playing at Being," p. 107.

41 Pesce, Mark: "True Magic," in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 221-38, here p. 230.

42 J. Abbate: "True Risks?," p. 193.

43 Heuser, Sabine: *Virtual Geographies: Cyberpunk at the Intersection of the Postmodern and Science Fiction*, Amsterdam: Rodopi 2003, p. 52; Heuser here quotes David Nye from his book *American Technological Sublime* (1994).

44 While TRON seems like a strong influence on cyberspace, Gibson could not have seen the film before writing "Burning Chrome." But the connection between video games

"A consensual hallucination experienced daily by billions of legitimate operators […] A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding."[45]

In *Neuromancer*, Gibson describes the economic and political infrastructure (the databases of Vinge's Other Plane) as geometrical shapes creating a cityscape of digital architecture: "the stepped scarlet pyramid of the Eastern Seaboard Fission Authority burning beyond the green cubes of Mitsubishi Bank of America, and high and very far away he saw the spiral arms of military systems."[46] In another scene, this metaphor is extended to all of the Eastern US and information as traffic, as data packets become pixels on a digital map: "At a hundred million megabytes per second, you begin to make out certain blocks in midtown Manhattan, outlines of hundred-year-old industrial parks ringing the old core of Atlanta."[47] The idea of representing global information networks via grids and geometric objects speaks to our cognitive limitations in grasping the complexity of these systems—mathematics suggests rules, control, and ultimately power over data, thus pushing the idea that users are fully aware of how these systems work.

By mapping the digital onto a city grid, Scott Bukatman argues, Gibson reveals the "need for new cartographic strategies, as well as new sources of vision"[48] to make sense of a world in which digital data and materiality are connected. The extended metaphor of a world beyond the screen, of city- and cyberspace overlaying each other, is probably Gibson's most important observation of our lives becoming digital. In one of the most quoted remarks in all of cyberpunk culture, Vint has noted how "the material and the simulated are intertwined like a Mobiüs [sic] strip: they each have distinct identities, but we never inhabit a moment that is

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and virtual worlds has persisted, making the grid one of the most important visual representations of cyberspace in gaming. Cf. Johnson, Mark R.: "The History of Cyberspace Aesthetics in Video Games," in: Murphy, Graham J./Schmeink, Lars (eds.), *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 139-54.

45 Gibson, William, *Neuromancer*, New York, NY: Ace 1984, p. 51.

46 Ibid. p. 52.

47 Ibid. p. 43.

48 Bukatman, Scott: *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*, Durham, ME: Duke University Press 1993, p. 149. For an extended discussion of this new visuality and its political implications, see Schmeink, Lars: "Afterthoughts: Cyberpunk Engagements in Countervisuality," in: Murphy, Graham J./Schmeink, Lars (eds.) *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 276-87.

purely one or the other."[49] The Metaverse, as it is imagined shaping our future lives, is a direct evolution from Gibson's cyberspace Möbius strip: "The Metaverse becomes more real every time we replace a physical habit with a digital equivalent. We, the digital citizens of the Internet, are manifesting the Metaverse by trading time in meatspace (the physical world) for time online."[50] Both Vinge and Gibson thus provide key elements in the cultural imaginary that surrounds the Metaverse, most importantly highlighting the ubiquitous nature of cyberspace and its omnipresent interconnection with the material realm.

III 1990S CYBERPUNK: COMMERCIALIZATION

While early cyberpunk explored the interconnection of worlds and the political and social potential of global networks, it fell to later cyberpunk fiction to expand the idea of cyberspace critically and to reflect on the individual fallout of this global technological change. In her novel *Synners* (1991), Pat Cadigan, for example, comments on Gibson's imagining of the (male) user projecting a "disembodied consciousness"[51] into the matrix of cyberspace and thus claiming "male-fantasy wish-fulfillment" by escaping the "vicissitudes of the body [… to] occupy the place of self-mastery."[52] Cadigan's characters are instead very much embodied during their move into cyberspace. The virtual here does not offer an escape from the real.

The story revolves around a new interface technology for users to access virtual reality: 'sockets' that allow complete immersion into cyberspace, with a full-body sensorium. Cadigan is riffing off the central metaphor of 'jacking in' to the matrix popularized by Gibson but makes it literal by having users install sockets into the skull: "Injected through the scalp and bone," "a hollow tube only a few

49 Vint, Sherryl, "Afterword: The World Gibson Made," in: Murphy, Graham J./Vint, Sherryl (eds.), *Beyond Cyberpunk: New Critical Perspectives*, New York, NY: Routledge, pp. 228-33, here p. 229.

50 Terry and Keeney, *The Metaverse Handbook*, p. 20. Note the reference to 'meatspace' in the quote, which links Terry and Keeney's unreflected, entrepreneurial vision of the Metaverse to Gibson's critical, dystopian rendering of disembodied existence, ignoring how the transhumanist trope has been problematized by posthumanist scholars (cf. Vint, Sherryl, *Bodies of Tomorrow: Technology, Subjectivity, Science Fiction*, Toronto: University of Toronto Press 2007).

51 W. Gibson, *Neuromancer*, p. 5.

52 S. Vint, *Bodies of Tomorrow*, p. 104.

molecules wide"[53] that receives a connector and allows direct access to the brain. Cadigan's sockets are an important change to the imaginary in that this interface imagines a direct link between the brain and the data of cyberspace.[54] The novel shows this link not as the transhumanist ideal of a disembodied mind living in cyberspace but reimagines 'jacking in' as creating "an experience of the entire body, including emotions; therefore, while the eight connections *do* penetrate into the organic female sheaths that reside in the brain, the connection ultimately provides a full-body, corporeal-digital experience."[55] Not only does *Synners'* representation thus expressly queer the existing straight, masculine imaginary of cyberspace, it also emphasizes how the digital realm feedbacks on the embodied reality of its users. As Narula has emphasized in his reading of the Metaverse as culturally imprinting on our social lived reality: "Meaning flows directly from the other world to the real world—and, in turn, back from the real world to the other world."[56]

The direct physical link to the brain is one of three main hardware technologies that could deliver the Metaverse to users, next to skull-attached electrodes and fully external sensory devices such as goggles, gloves, and suits. It is the most bodily invasive, the most science-fictional, and thus the most unlikely of the three options to be realized, requiring medical procedures to install. The jack represents a visceral connection to the body, the spinal nervous system, and the brain stem and has become iconic through Lily and Lana Wachoswki's MATRIX film series (1999-2021). As discussed above, the jack is very much an embodied experience and thus stands in contradiction to the idea that in virtual reality, your physical body is superfluous and left behind as 'meat.' As a cultural image, it represents

53 Cadigan, Pat: *Synners*, SF Masterworks Series, London: Gollancz 2011 [1991], p. 69.

54 Cadigan is not the first to imagine such a connection, though she is the first cyberpunk fiction author to use it to connect a human brain to cyberspace. Again, the sf megatext provides similar concepts: Samuel Delany's *Nova* (1969) describes plugs and sockets for pilots to connect with a spaceship, in Robert Silverberg's *The Tower of Glass* (1970), androids 'jack in' to computer systems to control them, and James Tiptree Jr.'s novella "The Girl who was Plugged in" (1973) describes such an interface to control a surrogate body. Gibson uses the term 'jacking in' to describe how his EEG interface is connected via a (male) jack to the computer deck, thus popularizing the image, especially in connection with the novel's rather masculinist prose of conquering the (female) cyberspace that is referred to as "matrix" (i.e., meaning 'womb').

55 Calvin, Ritch, "Pat Cadigan: *Synners* (Case Study)," in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk Culture*, New York, NY: Routledge 2020, pp. 41-47, here p. 43.

56 H. Narula, *Virtual Society*, ch. 5.

the most direct link between user and system, suggesting an unmatched level of control but also a breach of the body. While users can gain control over data, the body is made vulnerable to attack from within the system. Consequently, jacks are often depicted not as desirable but as a necessity to gain full power over a system. And accordingly, any repercussions brought against the user by the system are somatic—most famously shown in THE MATRIX (Lana and Lilly Wachowski, 1999), when Neo's body in the material world suffers the blows that his virtual body receives from the agents in the Matrix. David Cronenberg explores this relation of an embodied experience of virtual reality furthest in his film EXISTENZ (David Cronenberg, 1999), where both the machines running the system as well as the sockets are biological, not mechanical. The film makes literal the idea of viruses and bugs in the system by showing both machine and human as prone to infections—an image that reverberates with issues of hacking and malware, which Metaverse technologies must deal with.

As we have seen, Gibson and Vinge represented the connection to be made by electrodes attached to the skull like an EEG, a technology that is less invasive but relies on electrical signals to be transmitted. It is also depicted in STRANGE DAYS (Kathryn Bigelow, 1995), where the technology is used to record and replay a full sensory experience of another person. Any event can thus be vicariously experienced once it has been recorded. In the film, the technology is used by criminals to record rape and murder, as well as accidentally recording police brutality witnessed nearby. In sum, the film foreshadows the use of Metaverse technologies in live-streaming violent acts, most prominently the Christchurch terror attacks that were streamed to Facebook Live. Wearable (and possibly disguised) technologies allow the recording of the wearer's interactions—and incidentally of people in the vicinity of a person recording. The growing presence of digital experiences parallel to physical live events and the sharing of life via technologies thus makes necessary policies to safeguard privacy and other personal rights. The film makes prominent these issues surrounding ever-present media technologies, as well as highlighting their abusive potential.

Today's technologies for access to an extended reality (XR), to 3D virtual realms, and thus potentially to the Metaverse (i.e., Google Glass, Microsoft Hololens, or Meta's Oculus Rift) are closer to the technology that Weinbaum suggested in his story. Goggles for visual presentation, in combination with other sensory devices (headphones for acoustic sensation, gloves or suits for tactile experiences, and even gyroscopes, treadmills, etc., to allow movement), are the most common technology represented in current sf for use with the Metaverse.

Stephenson, in *Snow Crash,* writes of a form of laser projection generated by the computer and shot at the screens of the goggles:

"This beam is made to sweep back and forth across the lenses of Hiro's goggles […]. The resulting image hangs in space in front of Hiro's view of Reality. […] So Hiro's not actually here at all. He's in a computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones. In the lingo, this imaginary place is known as the Metaverse."[57]

In her later work, *Tea from an Empty Cup* (1998), Cadigan describes the technology as a "headmounted monitor" which was "connected to the lightweight, translucent hotsuit"[58] that is laced with sensors and makes possible tactile experiences such as heat, cold, touch, impact, or movement.[59] In the novel, most people come to special service parlors where the hardware needed to run virtual reality can be rented, and padded rooms be used for privacy and full-body experiences. In Ernest Cline's *Ready Player One* (2011), the Metaverse is called the OASIS, and you need a computer console to use it with "elastic haptic gloves" and a "visor" that fits "snugly around my eyes like a pair of swimmer's goggles […] Small earbuds extended from the visor's temples."[60] This is the minimum equipment, but with more money, better access (i.e., better sensory feedback, better immersion) is possible with an "immersion rig," including a "fully adjustable haptic chair" that simulates motion, a "full-body haptic feedback suit," "haptic datagloves," a "virtual retinal display" that uses projection onto the eyes instead of screens, a wall-mounted audio system, a "smell tower," and an "omnidirectional treadmill."[61] And while most of these descriptions from novels have been smoothly wearable, small lenses with projection abilities or finely framed glasses, films such as THE LAWNMOWER MAN (Brett Leonard, 1992) have been showing bulky and heavy wrapping displays more akin to real technological developments of the time. The film adaptation of READY PLAYER ONE (Steven Spielberg, 2018) also uses a bulkier display than described in the novel, with glasses the size of diving and not swimming goggles. The film also shows the IOI corporation's indentured workers trapped in isolated cells, strapped into a fixated rig, and using massively bulky equipment, while the CEO has a seated rig and glasses akin to wrap-around ski goggles.

57 Stephenson, Neal: *Snow Crash*, New York, NY: Penguin 1992, p. 22.

58 Cadigan, Pat: *Tea from an Empty Cup*, New York, NY: Tor 1998, p. 62.

59 There is also mention of one character feeling "the nasty sting of the needle sliding […] into the base of her neck" while using virtual reality, but it is never quite explained to what effect this needle is used and why others do not use it (ibid. 68).

60 Cline, Ernest: *Ready Player One*, London: Random House 2011, p. 26.

61 Ibid. pp. 191-93.

What is noticeable from these examples is that any form of Metaverse will have distinct hardware components (from global infrastructure to individual devices or implants) that are imagined in most sf (and currently, in reality) to be ruled by capitalist interest. Accordingly, access to and quality of use in the Metaverse will, depending on the distribution model of processing power, rely on either a "small piece of consumer hardware" that each of us owns individually or on a "multi-million-dollar […] server stack owned by the company that operates the virtual world."[62] Either way, access to the Metaverse will not be democratic but strongly stratified depending on wealth. Stephenson, for example, points out that out of ten billion people only "a billion of them have enough money to own a computer" and only "sixty million" of those private computers are "powerful enough to handle the Street protocol."[63] This already restricts the simplest access to the Metaverse, which is problematic in that both tech companies and sf authors have imagined it to be ubiquitously interwoven with our reality. Not having access to Metaverse technology might limit your possibility to hold a job (remember Vinge's prediction of 98% of jobs done in the Other Plane) or to engage in any form of social interaction (thinking of Forster's warning about social evolution).

Moreover, the capitalist stratification might not be limited to general access (which could be addressed through public terminals/hardware) but might extend to interpersonal interaction through avatar representation, thus ultimately entrenching social hierarchies and inequalities. Stephenson, for example, explains that the appearance of avatars in the Metaverse depends on both hardware (i.e., processing power) and software (programming). Depending on your resources and skills, you can present as anything you like. The limited processing power of "cheap public terminals," though, forces users into "jerky, grainy black and white"[64] versions of themselves that repeatedly freeze due to connection issues. Similarly, Cadigan explores the idea of every item, avatar skin, or accessory being available at a "surcharge."[65] The whole experience of being in the Metaverse is extremely costly. Consequently, marginalization (of race and class, filtered through access to technology) is entrenched in the Metaverse, limiting its potential

62 M. Ball: *The Metaverse*, ch. 6.

63 N. Stephenson: *Snow Crash*, p. 25. In the novel, the Street refers to a central space in the Metaverse, a kind of hub of economic and social activity with lots of users, 'the Street protocol' thus describes the code (and technical protocols, memory, processing power etc.) necessary for the hardware to display the Street.

64 Ibid., p. 38.

65 P. Cadigan, *Tea*, p. 99.

to be a democratic and free space and ultimately not allowing it to "benefit society as a whole"[66] but only a small group of shareholders.

IV POST-CYBERPUNK: CRITICISM

The aspect of control and stratification becomes even more essential when thinking about privatized worlds, similar to game worlds such as FORTNITE, for example. Since these are privately owned worlds, their owners basically determine the laws, not just judicial but also physical. In Stephenson's *Snow Crash*, The Black Sun is such a privatized world, and its rules and laws are made by its owner, Da5id. It restricts access to only those individuals that Da5id allows in and then changes the general physics protocols so that "avatars are not allowed to collide,"—further restricting how many avatars can be in the limited space—finally ejecting any "undesirables,"[67] meaning users that act inappropriately or are infectious. What is considered 'inappropriate' behavior is determined solely by the owner of the private space and can be arbitrarily determined—something we can already see in the terms of service of many social media platforms.[68] In combination with strongly stratified access to Metaverse worlds, these become highly undemocratic spaces in which individual corporations get to dictate the laws governing, for example, how their worlds are accessed or what behavior they deem appropriate. Effectively, the Metaverse turns into an assortment of dystopian dictatorships, each individually secured in their walled-off spaces.

For many cyberpunk authors, corporations were the source of this imbalance of power, but a few also imagined governments as equally destructive and dystopian to the rather anarchic tendencies of the Internet.[69] An important aspect to the existing representation of the Metaverse was added by queer cyberpunk author

66 M. van Rijmenam, *Step into the Metaverse*, p. 16.

67 N. Stephenson, *Snow Crash*, p. 51.

68 Inappropriate behavior on social media can range from sexual content to violence and harassment to political dissidence. Thinking of the way that Meta handles the depiction of 'nipples' in images, i.e., female breasts being censored for sexual content, while male breasts are fine. Or the limitations to sexual, violent, or political content placed on TikTok by adherence to Chinese standards of behavior (and/or state censorship).

69 See Vinge's "True Names," which imagines the US government as the villain that created the rouge AI Mailman in the first place and then goes on to blackmail the hackers Mr. Slippery and Erythrina. For a discussion of the anarchic tendencies of the Internet, see M. Pesce: "True Magic?"

Melissa Scott with her novel *Trouble and her Friends* (1994), who, like Vinge, rather saw nation-states and governing bodies as impinging on the freedom of information. In *Trouble and Her Friends*, the US government passes legislation that ultimately criminalizes a specific body modification for hacking—a body modification embraced especially by a community of queer hackers that use its embeddedness in the brain in order to "become technology" in the posthuman sense of Donna Haraway's becoming-with,[70] giving them an edge over (mostly) male hackers that refrain from changing their embodiment.

"These untested and potentially deadly implants—far more dangerous than the common dollie-slots, because the brainworm requires placing hardware in the brain itself—have contributed to the spread of the cracker culture by giving these hard-line criminals access to new technology that is unbeatable by people equipped with only ordinary, and legal, implants."[71]

In the novel, the government's attempts to police the hacking community are revealed as censorship and a struggle over control of newly created virtual spaces affecting marginalized groups disproportionately more than the dominant group. It is a power struggle over who keeps control of new technologies that we also currently see enfolding regarding social media and governmental agents.[72] As Graham J. Murphy points out, the brainworm technology makes hacking explicitly corporeal "by sustaining a sense of the tangible body"[73] and feedback looping

70 Haraway, Donna: *When Species Meet*, Minneapolis, MN: University of Minnesota Press 2008. Haraway discusses "becoming with" as a central tenet of her posthumanism, commenting on the "foolishness of human exceptionalism" and remarking "that becoming is always becoming *with*" (p. 244). Similarly, Rosi Braidotti uses the concept to describe "affirmative transformations of both the structures of subjectivity and the production of theory and knowledge" and link the posthuman with other subjectivities as "becoming-animal, becoming-earth, and becoming-machine." Braidotti, Rosi: *The Posthuman*, London: Polity 2013, p. 66.

71 Scott, Melissa: *Trouble and her Friends*, New York, NY: Tor 1994, p. 35.

72 An example of this would be the European GDPR and its regulation of new media markets (for example, YouTube, Google search engine) benefiting old-economy material publishing houses as opposed to creative content creators that rely on remixing of available material.

73 Murphy, Graham J.: "Penetrating the Body-Plus-Virtualisation in Melissa Scott's *Trouble and Her Friends*," *Foundation: The International Review of Science Fiction* 34, no. 95 (2005), pp. 40-51, here p. 43.

emotions into the digital system. Those already vulnerable (politically, bodily, i.e., the LGBTQ community or racialized minorities) thus have less to lose and embrace the technology as a means to change oppressive systems. Those same systems then enact policies of control to mitigate their loss of power. A similar criticism, leveled not against an authoritarian government but against autocratic corporate control, can be found in Cline's *Ready Player One*.[74] In the novel (and film), IOI, a "global communication conglomerate" and the "world's largest internet service provider," is "selling goods and services"[75] in the OASIS. They believe that the open-access software of the OASIS was "never properly monetized" and plan to give it a neoliberal make-over:

> "They would start charging a monthly fee for access to the simulation. They would plaster advertisements on every visible surface. User anonymity and free speech would become things of the past. The moment IOI took it over, the OASIS would cease to be the open-source virtual utopia I'd grown up in. It would become a corporate-run dystopia, an overpriced theme park for wealthy elitists."[76]

What both novels criticize then is that a Metaverse needs to be "Community-driven" and have "Self-Sovereignty,"[77] as van Rijmenam argues. As a social space, different worlds in the Metaverse will find together around communities of interest, and among those can and should be those that gather to criticize and ultimately hold accountable those in power. A truly democratic Metaverse thus cannot be created if either governments or corporations control and police communities, entrenching power structures and oppressions. Similarly, an open Metaverse relies on the idea of "self-sovereignty" and that the "individual remains in control of their online identity and data"[78] and does not hand those over either to an overbearing government or a data-greedy corporation. Since online profiles and data are part of our intertwined identities and subjectivity, these should not be in control of the platforms. In *Trouble and Her Friends*, Scott discusses this idea through

74 It needs pointing out that Cline's hero, though working class, is a typical white savior and conforms to cyberpunk's male-centered individualism as well as a current stereotype of the idealist, utopian, liberal-minded tech-bro. Like Vinge's Ery and Mr. Slippery, Wade 'Parzival' Watts does not want to take control of the OASIS for his own capitalist gain, but rather wishes to democratize access to it.

75 E. Cline, *Ready Player One*, p. 33.

76 Ibid.

77 M. van Rijmenam, *Step into the Metaverse*, p. 17.

78 Ibid., p. 26.

identity theft by another hacker, while *Ready Player One* pushes the idea of IOI taking over the online identity of their employees, forcing them to use standardized avatars and claiming any productivity as their own.

So, to sum up, science fiction has been involved in exploring the Metaverse through different incarnations way before transhumanists and tech-entrepreneurs like Mark Zuckerberg discovered it for themselves and their plans to exploit it for personal monetary gain. What sf has been exploring is varied and brings with it some interesting possibilities. How will we access the Metaverse? Will it be through our bodies' nervous system when reality and virtuality blend in our minds? Or through haptic interfaces like goggles, suits, and rigs? In either case, sf warns us that we should be aware of who owns the infrastructure and determine the laws that govern the virtual spaces created. What will it cost us to go into the Metaverse? Will we be able to afford everything we want and need to compete in this new economy that is driven by the Metaverse? Will these spaces offer more or less freedom? And finally, the ultimate question: who is in control?

From the social community of hackers and the wildly customizable avatars in "True Names" to the grid structure of data and its metaphor of city geography in *Neuromancer*, from the sockets linking the Metaverse directly to the user's brain in *Synners* to the highly stratified access in bandwidth demonstrated in *Snow Crash*, from governmentally restricted technologies of embodiment in *Trouble and Her Friends*, to the corporate exploitation of former open-source systems in *Ready Player One*. Science fiction might not be able to answer all of the questions we have about the Metaverse, but it can help keep the questions themselves on the map while we explore the new realities that are awaiting us.

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