**Ted Chiang and the Deferred Effect: ‘Afterwardsness’ in the Science Fiction Worlds of “Exhalation” and “Story of Your Life”.**

 In the field of science fiction short stories, Ted Chiang is a master practitioner. A self-proclaimed “occasional writer” (Rothman, 2017) Chiang is, nevertheless, widely regarded amongst his peers as one of the field’s most exceptional thinkers, challenging perceptions of not only our reality but also what constitutes the science fiction short story as a form. He has just one published collection, *Stories of your Life and Others* (2002) and in a 25 year career as a writer has published only fifteen short stories. However, despite this small amount of output, his effect on the science fiction community has been phenomenal, his stories winning twenty-seven science fiction awards in total, including four Nebula, four Hugo and four Locus awards. The science fiction critic John Clute describes Chiang’s work as moving ‘Beyond the immediate pleasures of a style so tight-hewn and lucid that it gives the impression that the truth about complex issues can in fact be told... Each Chiang story is constructed around similar fixities of attention. His stories are ways of paying attention’ (Clute, 2017). Chiang’s short stories focus on complicated concepts – such as quantum mechanics, high mathematics and robotics - all of which force the reader to speculate the direction of mankind’s development. However, these intellectual concepts are delivered to the reader in an accessible manner due to Chiang’s ability to place them in the context of human experience. Although “alien” and “other” lifeforms are considered in Chiang's work, it is always through the perception and understanding of his human characters.

“Tower of Babylon”, Chiang’s first published story, focuses upon a world dominated by the eponymous mythological structure, its protagonist’s understanding about their place within the physical and spiritual world increasing as the never ending work at the top of the tower continues. His life and the nature of the world combine. “Hell is the Absence of God” describes Fallen Angels appearing on Earth as destructive meteorological events. Chiang strikingly shows the psychological effect that such phenomena would have on humans. “Seventy Two Letters” touches on the power of language through an interesting interpretation of Hebrew Golem mythology and genetic manipulation and preformation. “The Lifecycle of Software Objects” explores the use of AI technology as manufactured pets in online gaming, simultaneously examining the developing connections between technology and consciousness. Chiang’s stories shift between different modes of the fantastic, using mythology, theology, fantasy and science fiction to ask questions regarding human existence and to speculate on the possible answers.

One interesting concept which Chiang explores on more than one occasion is the perception of temporality and time. In the sphere of science fiction it would be tempting to use time travel to develop and explore this idea, and Chiang does indeed use this motif in his 2007 work *The Merchant and the Alchemist’s Gate,* albeit in the unexpected context of an Oriental Fantasy. However, in his stories “Exhalation” (2008) and “The Story of Your Life” (2002) Chiang examines our perception of time from a more psychoanalytical perspective.

In psychoanalysis, *Nachträglichkeit,* “deferred effect”, or what can also be labelled as “afterwardsness”, is, in loose terms, a memory which has only become a trauma after the event. Jean Laplanche explores Sigmund Freud’s application of the term in *The Language of Psychoanalysis*, characterising deferred effect as comprising ‘experiences, impressions and memory-traces [which] may be revised at a later date to fit in with fresh experiences or with the attainment of a new stage of development. They may in that event be endowed not only with a new meaning but also with physical effectiveness’ (Laplanche, 2006 [1973], 111). In *Studies on Hysteria* (1895) Freud first publicly explores deferred effect in some of the case studies examined in this volume, including that of Frau Cacilie M., who, according to Freud’s notes, ‘had experienced numerous physical traumas and had spent many years in chronic hysteria which was attended by a great variety of manifestations... Her remarkably well-stocked memory showed the most striking gaps. She herself complained that it was as if her life was chopped in pieces. One day an old memory suddenly broke in upon her clear and tangible and with all the freshness of a new sensation’ (Freud, 2000 [1895], 69-70). Freud’s application of deferred effect is in connection with sexual maturity, with memories of traumatic events resurfacing and manifesting retrospectively as child patients reached a new level of sexual development. This is most famously represented in Freud’s case study of “The Wolf Man”, the Russian aristocrat Sergei Pankejeff, whose lupine-infested dreams Freud interpreted as being deferred manifestations as a result of witnessing the sexual activity between his parents as a young child. The trauma of this “primal act” manifested through his dreams.

In itself, deferred effect is an interesting concept which warrants fictional attention, yet it does not seem the kind of muse that science fiction writers such as Chiang would naturally embrace. The role of sexuality which Freud brings to the concept of deferred effect, although interesting from a psychological point of view, lends itself more naturally to fairy-tale, mythological and fantasy story-telling, such as witnessed in Angela Carter’s dynamic re-interpretation of the Red Riding Hood mythology in the short story “In the Company of Wolves”. However, a letter from Freud about his theory of deferred effect, which he wrote to Wilhelm Fleiss in 1896, does posit an interpretation of the concept which holds more appeal to the science fiction writer:

I am working on the assumption that our physical mechanism has come into being by a process of stratification: the material present in the form of memory-traces being subjected from time to time to a *re-arrangement* in accordance with fresh circumstances - to a *re-transcription* (in Laplanche, 2006, 112, original emphasis)

This *re-arrangement* and *re-transcription* of memories that Freud describes is a much more interesting definition of deferred effect for science fiction writers to interpret. The fluidity of memory and the portrayal and perception of memories as intangible and prone to disrupted order encourages imaginative extrapolation. One such example is Philip K. Dick’s popular short story “We Remember It for You Wholesale”, adapted into film twice as *Total Recall.* In this story Dick explores the concept of memories being created and implanted, blurring the lines between what memories are real and which manufactured.

 It is this secondary interpretation of deferred effect which Chiang embraces in his short stories. In “Exhalation”, Chiang posits a world inhabited by humanoid, yet mechanical, beings, made with titanium bones and with replaceable lungs of solid aluminium. Indeed, the opening visual of the ‘filling stations’ which tap into ‘the reservoir of air deep underground, the great lung of the world, the source of all our nourishment’ (Chiang, 2008) instantly brings this physiological uncanniness into stark reality, transferring these modified bodies into the domestic locale of the cafe or other similar public spaces. The protagonist of the story is an unnamed “mad scientist” who, upon hearing rumours of slowing clocks, begins to theorise that the true nature of his world is not what it seems. Instead of an eternal supply of air created by the presence of an ‘infinite expanse of solid chromium’ at the edge of the world, the slowing clocks instead indicate that the chromium walls ‘must curve inward to form a dome; our universe is a sealed chamber rather than an open well’ (Chiang, 2008). The only way to test his theory is to dissect his own brain in true Dr. Frankenstein fashion. As Gary K Wolfe highlights: ‘Chiang is meticulous in describing the assemblages of prisms, mirrors and mechanical hands that permit the narrator to disassemble his own head, where he finds “a dozen or more subassemblies”, which he begins to displace by connecting them to air tubes that permit them to continue to function remotely’ (Attebery and Hollinger, 2013, 238). Our mad scientist soon discovers the true nature of memory from his initial dissection: the original hypothesis that memories are engraved on tiny gold leaves (exposed on the rare occasion that someone’s skull has been accidentally smashed) soon becomes disproved. Instead, memories are created not by engraving but by the positioning of the gold leaves in a particular formation due to flow of air. Thus, when someone forgets to refill, or is unable to replace, their mechanical lungs and somehow they survive, their memories become lost forever.

 Chiang’s creation, as bizarre as it seems, is a perfect manifestation of a *posthuman* body. Neil Badminton describes posthumanism as ‘A cultural direction which strives to move beyond archaic concepts of ‘human nature’ to develop ones which constantly adapt to contemporary technoscientific knowledge’ (Badminton, 2000). Here, Chiang is mixing the technological - almost steampunk - aesthetics and visuals of assemblies and subassemblies with contemporary knowledge of neuroscience and corresponding psychoanalytical theories regarding the production of memories. The mechanical bodies of Chiang’s creations are undeniably posthuman: conscious of their own existence but moving beyond our own perceived concept of ‘human nature’ through the application of technology. Chiang’s production of memories is mechanical, as suggested by Freud’s reference to the ‘physical mechanism’: memories are created under specific physical and natural conditions and are affected by the ‘fresh circumstances’ of external, physical, stimuli.

 However, it is in the final moments of “Exhalation” that the “afterwardsness” of Freud’s deferred effect comes into sharp focus. It is revealed that the text the reader is engaged with is actually a recording of the mad scientist’s experiments. After concluding, correctly, that their world will become ‘motionless... we will be surrounded by motionless air and unable to dérive any benefit from it’ (Chiang, 2008) the narrator imagines beings from another universe visiting their world and discovering the motionless bodies and artefacts of his people. It is to these future visitors that the scientist’s words are addressed. We, as the reader of the text, become those visitors. We are the ones who have broken through the chromium walls and into this motionless world. The text, therefore, is a thought experiment conducted by the scientist. Instead of being in the present, this recording is an afterwardsness, a memory constructed for the benefit of those that will find it. The long-dead narrator’s final words to his future audience become prophetic with this realisation: ‘contemplate the marvel that is existence, and rejoice that you are able to do so’ (Chiang, 2008) “Exhalation” is not only an interesting commentary about the mechanical nature of memory, but also a creative interpretation of temporality and our perception of time.

 This afterwardsness of deferred effect is more clearly seen in Chiang’s “The Story of Your Life”, adapted into the film *Arrival* in 2016. The protagonist of this story, Dr Louise Banks, is an acclaimed linguist who is called upon to establish contact with an alien species by using communication devices referred to as ‘looking glasses’. At first, Chiang’s story seems to be a creative examination of linguistics and semiotics, using the scenario of alien visitation as a means of accessing these high concepts. Dr Banks works closely with members of one of the looking glass teams, encountering the alien Heptapods with their seven tentacle-like appendages, grey skin and seven eyes ‘on all sides, any direction might as well be “forward”’ (Chiang, 2015 [2002], 117-118). Progress is made in trying to communicate with this alien species and Chiang speculates, correctly, that trying to establish common linguistic links would be an extremely difficult process. This in itself is an interesting concept for a story, and is one valid reading of Chiang’s text. However, the other aspect of the narrative creates a much more interesting interpretation.

 As Dr Banks becomes proficient in the Heptapod language, her perception of time begins to dramatically alter as she becomes more attuned to Heptapod consciousness:

My worldview is an amalgam of human and heptapod.

Before I learned to think in Heptapod B, my memories grew like a column of cigarette ash, laid down by the infinitesimal sliver of combustion that was my consciousness, marking the sequential present. After I learned Heptapod B new memories fell into place like gigantic blocks, each one measuring years in duration and though they didn’t arrive in order or land contiguously, they soon composed a period of five decades... But occasionally I have glimpses when Heptapod B truly reigns and I experience past and future at once; my consciousness becomes a half-century-long ember burning outside time. I perceive - during those glimpses - that entire epoch as a simultaneity. It’s a period encompassing the rest of my life, and the entirety of yours.

(Chiang, 2015 [2002], 166-167)

This revelatory moment comes towards the end of Chiang’s short story and provides a new context for everything that has come before. This lengthy section clearly aligns itself with Freud’s second interpretation of deferred effect, with Dr Banks’ memories being *re-arranged* and *re-transcribed* by the effect of Heptapod consciousness and language. To refer to Laplanche’s definition she has achieved a new stage of development. Memory and temporality are no longer linear but are a series of interweaving moments from past, present and future, constantly overlapping and affecting one another. However, it is the character that Dr Banks refers to at the end of this passage that is the most significant factor in Chiang’s story.

 The entire story is narrated to Dr Bank’s child and it is quickly established that the encounters with the Heptapods happened a few years in the past. The recollection of the looking glass encounters are interspersed with perceived “memories” of her daughter: moments from her life, her eventual death and reflections on things said or done. Indeed, the story starts with a “memory” of the day her daughter is conceived: ‘Your father is about to ask the question. This is the most important moment of our lives, and I want to pay attention, note every detail’ (Chiang, 2015 [2002], 111). However, further into this first “memory” there is a sentence which suggest that all is not what it seems: ‘I’d love to tell you the story of this evening, the night you’re conceived, but the right time to do that would be when you’re ready to have children of your own, and we’ll never get that chance’ (Chiang, 2015 [2002], 111). Initially, this seems to suggest that these interjections are past memories, before the Heptapod arrival, that her daughter’s death has already occurred. However, after the final revelation that Dr Banks can experience past and future events simultaneously thanks to Heptapod B, these memories are brought into sharp focus as actually being glimpses of “afterwards”. The reader’s perceived linearity of time is completely shattered and we are forced to reassess everything we have read before. The “present” for the character of Dr Banks is actually the day her daughter is conceived, and the “memories” of her daughter are actually “afterwards” glimpses of what is to come.

In this new conceptual framework, the story becomes a thought experiment regarding free will, as Chiang himself explains in a 2014 interview:

I think free will is what underlies most everything interesting about time travel. And when I say time travel, I’m including receiving information from the future, because that’s essentially equivalent to someone traveling from the future. The idea that you can create a paradox assumes that you have free will; even the idea of multiple timelines assumes it, because it assumes that you can make choices. There have always been philosophical arguments about whether we have free will or not, but they’re usually kind of abstract. Time travel, or knowing the future, makes the question very concrete. If you know what’s going to happen, can you keep it from happening? Even when a story says that you can’t, the emotional impact arises from the feeling that you should be able to. (Solomon, 2014)

This is the emotional core of “Story of Your Life”. Even knowing that her marriage - to her fellow looking glass scientist - will ultimately fail and that her future daughter will die young, Louise Banks accepts this pre-ordained destiny at the end of the story:

From the beginning I knew my destination, and I chose my route accordingly. But am I working toward an extreme of joy, or of pain? Will I achieve a minimum, or a maximum?

These questions are in my mind when your father asks me, “Do you want to make a baby?” And I smile and answer, “Yes”, and I unwrap my arms from around me, and we hold hands as we walk inside to make love, to make you.

(Chiang, 2015 [2002], 172)

The playful examination of memory and temporality in “Story of Your Life” creates a strong, emotional conclusion to the narrative. In Denis Villeneuve’s *Arrival*, this deferred effect is portrayed through the filming of the “afterwards” glimpses in softened colours and slightly blurred focus, scenes shot in striking hues of yellow and blue to create a sense of memory. This is reinforced by cutting to present scenes of Dr Banks waking from sleep or rousing from a daydream. Villeneuve’s technique firmly aligns Chiang’s concept with the psychoanalytical practice of Freud’s dream-analysis and makes the revelation at the end of the film even more powerful.

 Chiang’s work plays with temporality in a manner which forces the reader to ask philosophical questions regarding their own existence in the world. Freud’s theory of deferred effect, or afterwardsness, allows Chiang to explore memory as a playful device for challenging the linear perception of time. The glimpses of Dr Banks are presented as deferred effect manifestations of trauma past, the grief of losing her child clearly expressed. Yet, in actuality, the speculative psychoanalytical conditioning Chiang presents is a playful development of Freud’s concept, more accurately described as *“before-nesses”*, exhibiting the same psychological trauma as deferred effect but actually manifesting *prior* to the event itself, rather than after; as a precursory glimpse rather than a recalled memory. The interweaving of memories is important here, as it reinforces the concept that time is *not* linear but is, in fact, a collection of interweaving moments. The Heptapod’s ocular anatomy, it’s seven eyes looking in every direction, always forwards, becomes a striking metaphor: their ability to see every direction at once symbolising this fluidity of time and memory that Chiang posits; as Dr Banks says in the opening voiceover of *Arrival*: ‘Memory is a strange thing. It does not work like I thought it did. We are so bound by time’ (Villeneuve, 2016). Being Heptapod is to be free from these restrictive bonds which temporality places on the production of memories. Through witnessing these “before” glimpses Dr. Banks is able to demonstrate her own free will to continue with her life regardless. She discovers that knowing how your life will proceed does not make you want to change it. Instead, it makes you more determined to recognise the joyfulness of existence regardless of what happens in your life, just as the narrator posits at the end of “Exhalation”. Joshua Rothman in *The New Yorker* describes Chiang as ‘a writer of “humanist” sci-fi; many readers feel that his stories are unusually moving and wonder, given their matter-of-fact tone, where their emotional power comes from’ (Rothman, 2017). For me, this emotional power resides in his ability to make his readers speculate about their own existence, recalibrate their understanding of what makes them human. The final words must go to Chiang himself who declares in the same interview that: ‘My primary goal has to do with engaging in philosophical questions and thought experiments, trying to work out the consequences of certain ideas’ (Rothman, 2017). What more could you ask from a writer of speculative fiction?