DANDELION
postgraduate arts journal & research network

VOLUME 5 NUMBER 2 SPRING 2015

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Article

Incandescent:
Light Bulbs and Conspiracies[1]

Grace Halden

Light bulbs are with us every day, illuminating the darkness or supplementing natural light. Light bulbs are common objects with a long history; they seem innocuous and easily terminated with the flick of a switch. The light bulb is an important invention that, as Roger Fouquet notes, was transformational with regard to industry, economy and the revolutionary ability to 'live and work in a well-illuminated environment'.[2] Wiebe Bijker, in *Of Bicycles, Bakelites and Bulbs* (1997), explains that light bulbs show an integration between technology and society and how these interconnected advancements have led to a sociotechnical evolution.[3] However, in certain texts the light bulb has been portrayed as insidious, controlling, and dehumanising. How this everyday object has been curiously demonised will be explored here. Through looking at popular cultural conceptions of light and popular conspiracy theory, I will examine how the incandescent bulb has been portrayed in dystopian ways.[4] By using the representative texts of *The Light Bulb Conspiracy* (2010), *The X-Files* (1993-2002), and Thomas Pynchon's *Gravity's Rainbow* (1973), I will explore how this commonplace object has been used to symbolise the malevolence of individuals and groups, and the very essence of technological development itself.

'Natural light'

> Into his soapy big hygienic hands
> And I myself came to, blinded with sweat
> Blinking and shaky in the windless light.[5]

Light, as a concept, is often linked to positive ideas of creation, of birth, and of beginnings. Such connections between light and creation are perhaps unsurprising, given that Genesis from the Hebrew Bible tightly links light to goodness and daytime, in juxtaposition to darkness and night-time:

> And God said, 'Let there be light,' and there was light. God saw that the light was good, and he separated the light from the darkness. God called the light 'day,' and the darkness he called 'night.' (Genesis 1. 3-5).

God's satisfaction with light and the separation of this 'good' quality from the darkness implies that the darkness is inferior. At the extreme, the implication is that light is goodness itself and enshrines righteousness and morality; this is in parallel to the implied negativity of darkness, which is segregated from light and not described in positive terms.

Light technology – candles, lanterns, lamps, bulbs – is a way to create and harness light; for many thinkers light technology is an act of innovative freedom. As Fouquet states, 'industrialized societies have been freed from dependence on the sun and moonlight for illumination'.[6] Thus, the light bulb has inherited many of the metaphors associated with light itself. For example, in modern theology the bulb is often linked to ideas of divinity and is frequently employed as a metaphor to convey how divinity works. Texts such as *A Handbook for Heretics: From Religion to the Kingdom of God* (2002) by John W. Sloat use the bulb as a metaphor for the working of God within the human body, in which the 'hardware is dead' and the illumination comes from 'invisible energy':

> Just so, God and we are part of the same energy system. I may be as tiny compared to God as my light bulb is compared to the generator's output, but the same energy flows through both of us.[7]

Further, in popular culture, ideas of 'light bulb moments' refer to sudden bursts of illumination and clarity and even the harnessing of energy and power. Texts such as *The Art and Science of Light Bulb Moments* (2011) use the metaphor of the light bulb through a self-help guide to explain the mind and to encourage inspiration.[8]

However, the light bulb as an artificial vessel and creator of light does not only have positive connotations. The first example of artificial street lighting (with gas) was in Pall Mall in the early nineteenth century (1807). Although not the first artificial public light, it was the most efficient so far.[9] While the artificial light was rumoured to keep dangers away (from witches to muggers) through the mere process of nocturnal illumination, it also had a massive impact on more pleasurable pursuits – namely outdoor romantic liaisons.[10] Artificial lighting made it difficult for lovers (married or unmarried) to have physical intimacy. At the time, indoor spaces were often cramped with extended families or lodgers and outdoor spaces afforded more privacy. Artificial street lighting changed this, and made it difficult for liaisons to continue outdoors. This also affected work including prostitution and illegal trading, and it limited the secret meeting of other groups such as homosexuals.

Further, the light bulb – through the harnessing of electricity – was also linked to dystopian and even apocalyptic fears that are associated with technology itself as looming, controlling, manipulative, and dominating. Concerns over artificiality are often linked to paranoid anxieties over technology. Yet, technological paranoia is not always a reaction to actually existing dangers, such as those associated with war weaponry capable of causing destruction on a mass scale. Through examining general technology (such as machines), anxieties surrounding 'modification, transformation and replacement' emerge despite the technology being traditionally associated with protection and assistance.[11] So even rudimentary and banal technologies can become fodder for paranoid thoughts:

> Think about all the light bulbs you use every day. You probably don't pay much attention to them. They are just there. There may be light beside your bed. In fact, there are lights all over your home.[12]

While the above quote derives from an educational text and is intended to be innocuous, through a paranoid perspective the tone can potentially seem sinister.

Limited evolution: conspiracy and control

Lightbulbs are not only grist for the paranoid mill: some are celebrated objects of affection. The 'Centennial Light' in Livermore, northern California, was manufactured in 1895 and has been burning since 1901 – outlasting two webcams.[13] This light bulb, which has become a national sensation, has been anthropomorphised to the extent that a birthday party was thrown in 2001 for its centennial – complete with a birthday song: 'Happy birthday, dear light bulb.'[14]

However, this longevity is atypical as most light bulbs are in fact highly inefficient. Large corporations have actively discouraged the longevity of the light bulb. Kate Polle's *Watt's Up?* 'exposes' how incandescent light bulbs are less efficient than other lighting options today – a fact many are apparently unaware of. According to Polle, lightbulbs are 'a product that has not been improved upon for over 100 years, [and] are only 10% efficient. 90% of the electricity, the wattage used by these bulbs, is lost as heat'.[15] The documentary film *The Light Bulb Conspiracy* depicts vulnerable members of the public as 'victim[s] of planned obsolescence'. The title refers to the conspiracy of large corporations to deliberately limit the life expectancy of everyday technologies to ensure constant sales. Such a conspiracy has been in place, they argue, since the 1920s.

Planned obsolescence, as the title suggests, is a feature of the 'light bulb conspiracy'. The documentary argues that the light bulb was the first technology to feature planned obsolescence. This is despite early recordings of bulbs burning for over 2000 hours and Thomas Edison's bulb demonstration lasting 1500 hours in 1881. Cartel documentation reveals rules limiting the life expectancy of future light bulbs, with fines incurred for bulbs that exceeded the limit imposed by the cartel: 'The average life for general lamps for lighting service must not be guaranteed, published or authored for another value than 1000 hours'.[16] A patented bulb with a life of 100,000 hours was not adopted commercially: 'Ironically, the light bulb has always been a symbol for ideas and innovation and yet it's one of the early and best examples of planned obsolescence.'[17] The conspiracy of the light bulb, as well as other technologies including printers and computers, is that they are 'designed to fail'.[18]

Yet, the idea of conspiracy seems to go deeper than economic concerns of cartels. Peter Knight, in *Conspiracy Culture* (2000), speaks of conspiracy as a series of clues, theories, and connections.[19] For Knight, the new millennium is fertile ground for conspiracy theory: 'At the turn of the millennium in America it seems that conspiracy theories are everywhere.'[20] Fears often surround 'sinister enemies, both real and imagined, both external and internal' and are fuelled by 'a routinized air of cynicism'.[21] Although *The Light Bulb Conspiracy* employs the term 'conspiracy' with all the connotations mentioned above, planned obsolesce is well documented and pursued in court.[22]

Daniel Pipes, in *Conspiracy: How the Paranoid Style Flourishes and Where it Comes From* (1997), helpfully distinguishes between conspiracy and conspiracy theory: 'Conspiracy refers to an act, conspiracy theory to a perception.'[23] Conspiracy theory is an interesting route to follow here, as it seems that general technology, in this case the light bulb, has a place in conspiracy theory and perception. Richard Hofstadter, in 'The Paranoid Style in American Politics' (1964), argues for the need for the term 'paranoid' to describe extreme concerns often associated with conspiracy *theory*: 'I call it the paranoid style simply because no other word adequately evokes the qualities of heated exaggeration, suspiciousness, and conspiratorial fantasy that I have in mind.'[24]

There can be a dangerous nature to conspiracy theories when combined with general paranoia – especially group paranoia, as Pipes demonstrates, arguing that conspiracy theories bloom from the 'politically disaffected and the culturally suspicious'.[25] Knight notes that approaching the new millennium many conspiracy theories revolve around 'uncertainty about even the most fundamental assumption of What is Really Going On'.[26] Michael Barkun defines conspiracy theory as 'the belief that an organization made up of individuals or groups was or is acting covertly to achieve some malevolent end', and adds that 'a conspiracist worldview implies a universe governed by design rather than by randomness'.[27] The main facets of conspiracy theory are the ideas that 'nothing happens by accident', 'nothing is as it seems', and 'everything is connected'.[28] However, I argue that conspiracy theory need not involve suspicion of individuals or groups of *people*; rather, especially in the new millennium, the conspiring entity can be a nonhuman entity such as a machine. This is something *The X-Files* draws upon in episodes such as 'The Ghost in the Machine' (1993) where artificial intelligence plots against the human characters: 'The machine's a monster, Scully.'[29] Yet as sceptic Dana Scully points out, demonised technology often acts as a scapegoat for human action: 'Mulder, don't you see, blaming the machine is an alibi, and a bad one.'[30]

Fictional bulbs and paranoia

The X-Files, a television series created by Chris Carter, is often viewed as 'a symptom of a recent turn to paranoia in American society'.[31] *The X-Files* was popular in part because its mantra 'Trust no one' – as well as Fox Mulder's 'I want to believe' ethos – 'encapsulates the conspiracist's limitless suspicions'.[32] What is interesting about *The X-Files* is how the show, which focuses on government and alien conspiracy, uses rudimentary technology to propagate a general anxiety towards artificiality, mechanisation, systems of control, and silent sentience plotting against the human. Rudimentary, everyday technology here can include the insidious, thinking computer ('Ghost in the Machine' (1998), 'Kill Switch' (1998)), robots (robotic insects in 'War of the

Coprophages' (1996); problematic polygraph devices ('Paper Hearts' (1996)), and – of course – light bulbs ('Shadows' (1993), 'Darkness Falls' (1994), 'E.B.E.' (1994), 'Soft Light' (1995), 'Arcadia' (1999)).

Light, in *The X-Files*, features in conflicting ways: it is presented as a lifesaving and positive force in episodes such as 'Shadows', yet most alien abductions in the show feature the fearsome bright beam from the sky which engulfs and vanishes its victim (for example, 'Pilot' (1993), 'Little Green Men', (1994), 'Ascension' (1994), 'Duane Barry' (1994), 'Patient X',(1998), 'The Red and the Black' (1998), 'One Son' (1999)).

Figure 1. Eight-year-old Samantha Mulder is levitated into the light in 1973; she is experimented upon and murdered as part of the government 'Syndicate' and alien conspiracy ('Little Green Men' (1994)). Mulder's memory of the event (often challenged as unreliable) consistently involves an unexplained beam of light that transports the child away.[33]

In season one, the episode 'Darkness Falls' explores the danger of threats hidden in darkness. The episode examines industrialisation through the lens of eco-criticism by pitting the artificial against nature. The episode revolves around an unknown threat targeting loggers in the Olympic National Forest in Washington State. Ancient insects, we discover, attack and kill in the darkness. Thus, as the character Spinney says: 'Darkness is our enemy.'[34] The insects are repelled by light: 'It's the light, they don't like the light.'[35] Consequently, most of the episode revolves around the characters attempting to secure, protect, and find artificial light sources – light bulbs: 'We'll be safe, as long as we stay in the light.'[36]

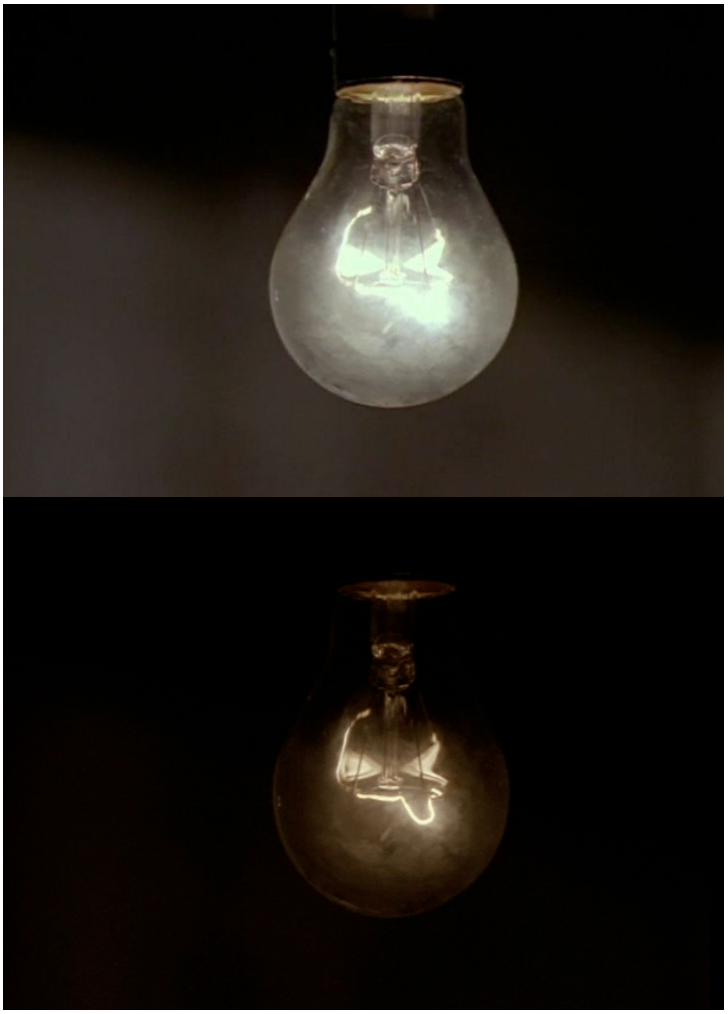

Figure 2. Dying light bulb in 'Darkness Falls'.

'Darkness Falls' contrasts dangerous natural darkness with the saving power of artificial light. Yet it complicates this dichotomy by having nature under threat from mechanisation. Ultimately, the episode examines the desecration of the wild by resource plundering. The humans are saved by the very artificiality that provoked the violent retaliation of nature; humans are aligned with the artificial and thus must depend on technologies, such as the light bulb, to arm them against nature. The light bulb has the power to illuminate the darkness after natural light has diminished, yet due to planned obsolesce the light expectancy of the bulb is short, leaving the human characters vulnerable. The simultaneous power and fragility of the light bulb creates dramatic tension in the episode – the fear is not of the murderous insects but rather of the death of the bulb, as John Kenneth Muir points out:

> The single light-bulb dangling from a ceiling string is prominent in several shots, flickering and winking out. In fact, the single-most anxiety-provoking shot in the entire episode doesn't involve the bugs swarming and attacking their prey. Instead, it involves a panicked Scully – fearing the bugs are on her body – accidentally striking the swinging light-bulb. In that moment of hysteria, it looks like she will break the bulb and destroy her only chance of survival. The episode's focused direction establishes beautifully how this bulb is the only life line inside that cabin … and once it is gone, it's game over.[37]

Light bulbs are diversely used in *The X-Files*. In 'Shadows', exploding light bulbs act as a warning for building psychokinetic power, while in episodes such as 'E.B.E.' light bulbs are used to contact Mulder's informant known as Deep Throat.[38] The episode 'Soft Light' opens with a light bulb-lit hotel hallway, and after the spontaneous combustion of Patrick Newirth, a dead light bulb directly outside the door signals to the FBI agents that something supernatural may be occurring. The episode is plagued by disabled light bulbs and as Scully remarks, 'Darkness masks a multitude of sins.'[39]

Figure 3. Dead bulb in lit corridor after death in 'Soft Light'.

However, darkness is actually a saving force in this episode, as light created shadows are causing the death of the numerous victims of 'spontaneous human combustion'.[40] In 'Soft Light', artificial lighting must be avoided. In this episode, a scientist, Dr Chester Banton, was involved in an accident with dark matter that rendered his shadow 'like a black hole' which reduced 'matter into pure energy'.[41] Living in soft lighting is the only way to avoid death as soft light prevents the casting of shadows.

Theoretical physicist Stephen Hawking notes that dark matter cannot be seen but 'we know it must be there'.[42] Hawking explains that many types of dark matter theorised to exist have not been detected yet; however, dark matter 'exceeds the amount of ordinary matter in the universe' and may form 90 per cent of the universe's mass.[43] Dark matter is also called 'missing mass' and 'shadow matter' due to the inability to detect and observe it.[44] *The X-Files* suggests figuratively that we live in soft light where we are unable to see the shadows of conspiracies and the darkness of machination. Like dark matter itself, it is the unknown, the unseen, and the hidden that is the most threatening in *The X-Files*. It is up to Mulder and Scully to illuminate the darkness and reveal what we suspiciously think 'must be there', or to show us what we have not been able to detect for ourselves.

Mulder and Scully promotional image.

The repetition of the light bulb throughout the series further presents light as a medium through which to expose the conspiratorially hidden. In fact, it is often through artificial lighting (torches) that Mulder and Scully can literally penetrate the darkness when infiltrating secret government institutions under the cover of night.[45] Yet, the paradoxical nature of the show simultaneously reveals that while technology – such as the light bulb – represents the human ability to challenge the natural world through ingenuity, there is a danger that technological advancement can be negatively mechanising. Often, in *The X-Files*, small, seemingly innocuous issues (such as extinguished bulbs at murder sites in 'Soft Light') eventually expose large problems. For example, in 'Soft Light', Banton's dark matter experiment has made him vulnerable to other forces:

> Banton: All I can do is study it, try and divine its true nature before they do.
> Mulder: They?
> Banton: The government. They're after me.[46]

Banton's paranoia is warranted in this case – the government is attempting to capture and experiment on him: 'Just because you're paranoid, doesn't mean they aren't out to get you.'[47]

Concern over grand control by large groups – such as the government and corporations – is central to the show. Literary critic John Kenneth Muir describes how 'Darkness Falls' highlights the war between 'commerce and environmental stewardship'.[48] The tension between economic growth and environmental ethics is an issue that arises throughout *TheLight Bulb Conspiracy*, in which planned obsolesce leads to a booming economy but creates a heavy and unnecessary draw on natural resources. Essentially, progression in both cases, as represented through technological production, results in damage to the environment. Both the documentary and the science fiction series do not merely comment on pertinent environmental concerns; rather, they use technology – such as the rudimentary light bulb – to make a broader point regarding the impact of technological innovation on the natural.

This is a fundamental examination of basic binaries such as natural/unnatural, and artificial/indigenous.

Conspiracy theory emerges when the binaries start to collapse and groups (such as government and corporations) are blamed for the trespass of the unnatural and artificial into natural and indigenous spaces – a trespass seen as an insidious invasion or significant detriment to the 'real world'. Such conspiracy theories are further complicated as we can connect the 'invisible' technologies – such as the overlooked light bulb – to large, powerful cartels as part of a web of suspicions. The conspiracy therefore becomes a chain in which everything is connected to an unknown plan.

This is the situation in *The X-Files* episode 'Arcadia'.[49] In 'Arcadia', a light bulb is intentionally broken on Big Mike's porch to cause the Ubermenscher (demon) to punish Mike for failing to adhere to the community's rules, which are overseen by the Home Owners' Association. This episode is from season six, which features the ongoing themes of military conspiracy, government cover-ups, and a battle to prevent an alien invasion. 'Arcadia' highlights that even small communities, which are aesthetically 'perfect', are masks for local conspiracies. In 'Arcadia', mechanising control comes from more than one angle. Although a broken light bulb provokes Big Mike's murder, it is the rules outlined in the Contracts, Covenants and Restrictions (CC&R) document which oversee the running of the community. Thus, here the light bulb and CC&R form part of a conspiratorial control system which jointly act to keep the inhabitants 'in line'.

Anxieties about large conspiracies linked to smaller (often overlooked) schemes are articulated in Thomas Pynchon's *Gravity's Rainbow* (*GR*). As the character Pig Bodine claims, 'Everything is some kind of a plot.'[50] Pynchon is, in Knight's description, 'America's foremost novelist of paranoia'.[51] Although the main apocalyptic force in *GR* is the V-2 rocket, Pynchon also describes the insidious and dangerous nature of seemingly banal technologies that are conspiring against the human race. One such technology is the light bulb.[52] Midway through the novel, the reader is introduced to the sentient, immortal light bulb Byron, an incandescent Osram bulb. Byron is often viewed as a monument to Pynchon's concerns over light companies (such as Phoebus Cartel) which, as previously noted, were accused of limiting the life of light bulbs for financial gain.

However, concerns over Byron the Bulb are not limited to the contextual history of conspiracy among manufacturers: in Pynchon's text, there are additional fears expressed over the hidden dangers of advancing technology. In Byron's case, the bulb is attempting to organise a revolution against the human race by connecting to light bulbs throughout the globe. Byron's dangerous sentience is hidden from the characters in *GR* who focus on the V-2 threat and are oblivious to the artificial intelligence literally looming over them.

One of the main apocalyptic concepts behind Byron the Bulb is the fact that he is described as having lit the notorious Nordhausen rocket factory (known as Mittelbau-Dora/Camp Dora) which produced the V-2 and has been described as a place of 'barbarism, slavery, and mass murder', having produced 'six thousand V-2s in sixteen months but also dead bodies'.[53] The light bulb is presented as a collaborator in these atrocities because manufacturing in the underground factory was only possible through artificial lighting. The Camp Dora rocket factory was in operation between 1943 and 1945 and, according to Guy Hartcup, was 'infamous for the cruelty to which the workers were subjected and the atrocious conditions in which they worked'.[54] When the Americans located Camp Dora, they were horrified to discover malnourished

and tortured prisoners and mounds of dead bodies; the scene was described as 'ghoulish' and 'subhuman'.[55] Yves Béon, in his first-person testimony, described fellow prisoners as 'the living dead'.[56] All these atrocities, in the context of *GR*, were overseen by the light bulb.

In *GR*, the link between the light bulb and dangerous technology occurs chiefly through the relationship between the bulb and artificial intelligence and the bulb and the V-2. The bulb is also linked to the V-2 through imagery. Firstly, the incandescent bulb has a similar shape to the V-2. This is something artist Zak Smith (who sketched an image for every page of *GR*) accentuates in his piece entitled 'Byron the Bulb', which depicts the Bulb facing downwards like a falling V-2. A rather oblique reference to the V-2 occurs with light itself represented primarily through the rainbow. There are many types of light waves that form an electromagnetic spectrum; however, rainbows and light bulbs are often understood as visible light waves.[57] In the visual representation of lights waves on an oscilloscope, the crest and trough of each wave traces a similar pattern to the trajectory of the V-2. This shared imagery presents all technology as fundamentally similar.

The ability of an anthropomorphised bulb to switch sight on and off is perhaps a subliminal reference to binary code and also positions the bulb (and by extension all technology) as controlling and deceptive. This idea of control and deception found in texts such as *GR* is compounded with the knowledge that light is both visible and invisible in its various forms. The invisibility of the Bulb is accentuated in the text through its silent sentience, hidden from the characters yet visible to the reader. The invisibility and control of the Bulb becomes even more insidious when it reveals an intense dislike towards the human race:

> Glowing feebly at the bewildered roach sitting paralyzed and squashable out on the bare boards, rushing, reliving the terror of some sudden blast of current out of nowhere and high overhead the lambent, all-seeing Bulb.[58]

The human is the roach, the vulnerable creature, which basks in (yet fears) the power of the overhanging light.

Conclusion: Seeing is not Believing

Artificial lighting reveals what is concealed by darkness. However, conspiracies linked to the cartels and governments responsible for controlling light technologies suggest that there are dangers hidden within illumination – that we cannot trust what is revealed to us. In the modern world, many paranoid anxieties surround the development of technologies. Philip K. Dick once argued that paranoia is at its 'ultimate' when 'Instead of "My boss is plotting against me," it would be "My boss's phone is plotting against me"'.[59] Here Dick speaks of being paranoid about 'everything', but also makes an interesting link between moving from paranoia over human actions to paranoia over technology in which even the mundane technology of the phone is cast as potentially catastrophic (capable of destruction and harm to the individual). Thus the light bulb, like the mobile phone, is just an object on which to pin apocalyptic concerns; it is a familiar object through which to articulate obscure concerns over 'the enemy'. In conspiracy theory, the 'enemy' – as Robert Allen Goldberg explains – can be 'chameleon like, pervasive, and opportunistic'.[60]

Yet, if Knight is correct and conspiracy theory 'provides an everyday epistemological quick-fix to often intractably complex problems',[61] then

demonising objects, such as the light bulb, enables a 'quick-fix' of social concerns over 'the enemy', often without dealing with the root problem of the conspiracy – the feelings of control and manipulation by large groups. Perhaps this is why the light bulb problem is solved in 'Soft Light', but the governmental conspiracy is not adequately dealt with for another eight seasons. The light bulb is therefore a mere representation of low-level conspiracy theory: a small problem with which to contend and an easier problem to 'fix'.

However, anxieties over rudimentary technologies are more than 'quick-fixes' to intractably complex problems. In all the examples in this essay, from documentaries to science fiction, the ubiquity of the lightbulb is of interest precisely because it enables a vital transition from small 'everyday concerns' to less localisable problems which pose a greater threat. *TheLight Bulb Conspiracy* seems to warn us that by ignoring the 'small' issue of replacing light bulbs, we are missing the greater issue of planned obsolescence. *The X-Files* warns us to 'trust no one' – from rudimentary technologies to large control structures. What is interesting in *The X-Files* is that by focusing on the 'small stuff' the agents are able to see the bigger picture (from light bulbs to grand conspiracies). However, *The X-Files* also draws attention to the fact that the mass population seemingly has no idea of the conspiracy around them. While it is a series which straddles the boom of the Internet (Web 2.0.), the show itself acts to communicate fears of mass networks which connect everything in a dystopian web of control: 'It's a global conspiracy, actually, with key players in the highest levels of power, that reaches down into the lives of every man, woman, and child on this planet, so, of course, no one believes me.'[62]

In *The X-Files*, the light bulb becomes just one type of 'everyday' technology that articulates this dystopian chain. *The X-Files* uses mobile phones (which are often bugged) in a similar way. However, in general terms the light bulb, with its links to complex debates on artificiality, divine goodness, and illumination, enshrines how objects, which are usually taken for granted, can be complex and full of meaning. In this respect, the light bulb is never just a light bulb – not just a remarkable (if limited) invention; it has its own rich narrative and cultural history. The bulb then, like Pynchon's Byron, speaks to us about Pall Mall, immortality, divinity, cartels, shadows, science fiction … if we stop to listen.

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Notes

1 This paper is a longer version of a conference paper delivered at Birkbeck College, University of London for 'Holding Things in Common' (Monday 12th May). Thanks to Paul Ingram and Robert Stearn for advice and suggestions.

2 Roger Fouquet, *Heat, Power and Light. Revolutions in Energy Services* (Cheltenham: Edward Elgar, 2008), p. 216.

3 Wiebe E. Bijker, *Of Bicycles, Bakelights and Bulbs: Towards a theory of sociotechnical change*, 4th edn (London: MIT Press, 2002), p. 208.

[4] In this paper, I will be focusing on the incandescent bulb due to its historical relevance and due to the phasing out of the incandescent light bulb in recent years. Notable points in the history of light bulb development are Sir Humphry Davy's 1809 arc light research; gaslights, kerosene lamps, and nineteenth century research into generators. Note that Bijker records that 'the first observations of light phenomena in "exhausted" glass vessels were already made with electrifying machines before 1700' (*Of Bicycles, Bakelights and Bulbs*, p. 208). The invention and patent of the incandescent light bulb involves the competition between Joseph Swan and Thomas Edison. On this, see: John Otten, *Death of a Light Bulb* (Cambridge: Blue Ocean Publishing, 2012).

[5] Seamus Heaney, 'Out of the Bag', in *Electric Light* (London: Faber and Faber, 2001), pp. 6-10 (p. 8).

[6] Fouquet, p. 191. For a history of lighting technologies from candles to electricity, see Fouquet and William T. O'Dea, *The Social History of Lighting* (London: Routledge and Kegan Paul, 1958).

[7] John W. Sloat, *A Handbook for Heretics: From Religion to the Kingdom of God*, 2nd edn ([n.p.]: CCB Publishing, 2009), p. 47.

[8] Tom Evans, *The Art and Science of Light Bulb Moments* (Hants: O-Books, 2011).

[9] Jon Henley, 'Life Before Artificial Light', *Guardian*, 31 October 2009 <www.theguardian.com/lifeandstyle/2009/oct/31/life-before-artificial-light> [accessed 11 May 2014].

[10] Ibid.

[11] Stella Pierides, 'Machine Phenomenon', in *Even Paranoids Have Enemies. New Perspectives on Paranoia and Persecution*, ed. by Joseph H. Berke, and others (London: Routledge, 2001), pp. 177-88 (pp. 177-8).

[12] John R. Matthews, *The Light Bulb* ([n.p.]: Scholastic, 2005), p. 5.

[13] *The Lightbulb Conspiracy*, dir. by Cosima Dannoritzer (Article Z, 2010).

[14] Ibid.

[15] Kate Polle, *Watt's Up?* (Kindle eBook, 2013).

[16] *The Lightbulb Conspiracy* , dir. by Dannoritzer

[17] Ibid.

[18] Ibid.

[19] Peter Knight, *Conspiracy Culture* (Oxon: Routledge, 2006), p. ix.

[20] Ibid., p. 1.

[21] Ibid., pp. 2, 3.

[22] For example: *Westley v. Apple Computer, Inc.* (San Francisco County Superior Court, filed December 26, 2003).

[23] Daniel Pipes, *Conspiracy: How the Paranoid Style Flourishes and Where it Comes From* (New York: Simon and Schuster, 1999), p. 21. Interestingly, the first known usage of the phrase 'conspiracy theory' is from the 1920s (Knight, p. 16), which ties in with early planned obsolescence evidence surrounding the light bulb.

[24] Richard Hofstadter, 'The Paranoid Style in American Politics', in *The Paranoid Style in American Politics and Other Essays* (Cambridge: Harvard University Press, 1964), pp. 3-40, p. 3.

[25] Pipes, p. 2.

[26] Knight, p. 10.

[27] Michael Barkun, *A Culture of Conspiracy. Apocalyptic Visions in Contemporary America* (London: University of California Press, 2006), p. 3.

[28] Ibid., pp. 3-4.

[29] 'The Ghost in the Machine', *The X-Files*, Fox, 12 October 1993.

[30] Ibid.

[31] Knight, p. 17.

[32] Barkun, p. 2.

[33] Image: 'Little Green Men', *The X-Files*, Fox, 16 September 1994.

[34] 'Darkness Falls', *The X-Files*, Fox, 15 April 1994.

[35] Ibid.

[36] Ibid.

[37] John Kenneth Muir, 'The X-Files 20th Anniversary Blogging: "Darkness Falls" (April 15, 1994)', 14 March 2014 <http://reflectionsonfilmandtelevision.blogspot.co.uk/2013/03/the-x-files-20th-anniversary-blogging.html?m=1> [accessed 27/07/2014].

[38] Mulder screws in a blue bulb and positions it near his window to signal his need for information.

[39] 'Soft Light', *The X-Files*, Fox, 5 May 1995.

[40] Ibid.
[41] Ibid.
[42] Stephen Hawking with Leonard Mlodinow, *A Briefer History of Time* (London: Transworld Publishers, 2005), p. 65
[43] Ibid., pp. 65, 150
[44] Stephen Hawking, *The Universe in a Nutshell* (London: Bantam Press, 2001), p. 188.
[45] The lighting of the show itself is very atmospheric. The location of the X-Files department is in a basement with no natural light source. Mulder and Scully's apartments are darkly lit with several episodes featuring threats lurking somewhere in the shadows (in 'Blessing Way', Melissa Scully is accidentally shot to death in Scully's apartment by contract killers waiting in the darkness).
[46] 'Soft Light', *The X-Files*, Fox, 5 May 1995.
[47] Ibid.
[48] John Kenneth Muir, 'The X-Files 20th Anniversary Blogging: "Darkness Falls" (April 15, 1994)', 14 March 2014 < http://reflectionsonfilmandtelevision.blogspot.co.uk/2013/03/the-x-files-20th-anniversary-blogging.html?m=1> [accessed 27/07/2014]
[49] 'Arcadia', *The X-Files*, Fox, 7 March 1999.
[50] Thomas Pynchon, *Gravity's Rainbow* (London: Vintage Books, 2000), p. 714.
[51] Knight, p. 57.
[52] *GR* is set during the Second World War but was written in the 1970s. During this period the lighting industry went through substantial changes: 'low electricity prices, coal shortages and cold weather after the Second World War helped electricity consumption to rise to three times higher in 1948 than it had been in 1938' (Fouquet, p. 210). This led to the nationalisation of electrical production; the increase of light consumption contributed to a sense of a 'rise' in electrical and lighting technologies and the rise of industry (Ibid.).
[53] Michael J. Neufeld, 'Introduction', in Yves Béon, *Planet Dora: A Memoir of the Holocaust and the Birth of the Space Age*, trans. by Yves Béon and Richard L. Fague (Westview Press: Colorado, 1997), pp. ix-xxviii (pp. ix-x).
[54] Guy Hartcup, *The Effect of Science on the Second World War* (London: Macmillan Press, 2000), p. 156.
[55] Deborah Cadbury, *Space Race* (London: HarperCollins, 2005), p. 30.
[56] Béon, *Planet Dora*, p. 2.
[57] For the purposes of analysing *Gravity's Rainbow*, I am looking at light waves. However, light can be understood as particles as well as waves. On wave/particle duality, see Hawking, *A Briefer History*, p. 76.
[58] *Gravity's Rainbow*, p. 767.
[59] *The Best of Philip K. Dick*, ed. by John Brunner(NY: Ballantine Books, 1977), p. 447.
[60] Robert Allen Goldberg, *Enemies Within. The Culture of Conspiracy in Modern America* (London: Yale University Press, 2001), p. x.
[61] Knight, p. 8.
[62] *The X-Files: Fight The Future*, dir. by Robert Bowman (20th Century Fox, 1998).

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