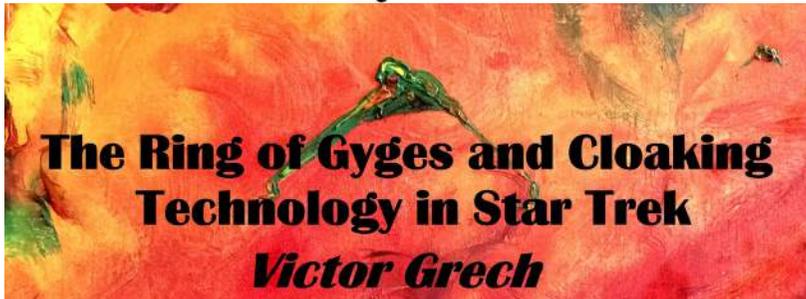


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Introduction

No human has ever been invisible, a power that in legend is only attributed to gods and spirits. However, the possibilities inherent to the potential human acquisition of invisibility have been explored in several narratives. Plato (427-347 BC) reviewed this in the story of the Ring of Gyges. The myth recounts that Gyges was a shepherd in the service of King Candaules of Lydia. An earthquake exposed a cave mouth which Gyges stumbled upon. He discovered a tomb which contained a giant who wore a golden ring. This gave Gyges invisibility and he used this power to seduce King Candaules' queen. She then aided him in regicide, whereupon he became king of Lydia.

Satanically induced invisibility naturally also leads to wrongdoing. Christopher Marlowe's *Mephistophilis* and *Faustus* become invisible, visit the Vatican, shout insults at the pope, box his ears, beat friars, throw fireworks among them and exit laughing. More recently, Herbert George Wells in his *The Invisible Man* described a scientist who studied optics and invented a way to change his own refractive index to that of ambient air, thereby becoming invisible. He unfortunately failed to reverse the process, was betrayed by an acquaintance, and embarked on a reign of terror.

Even more recently, J. R. R. Tolkien's *The Hobbit* depicted a

person who, like Gyges, discovers a ring that confers invisibility. The three sequels (*The Fellowship of the Ring*, *The Two Towers* and *The Return of the King*) showed that the Ring progressively corrupted its bearer, regardless of the purity of the bearer's original initial intentions. And most recently, an invisibility cloak is also seen in the *Harry Potter* series (Rowling).

In these narratives, it is almost as if the attainment of invisibility, a superhuman power, is a Faustian hubristic desire that deserves the punishment of the gods, resulting in tragedy. This essay will explore invisibility in the *Star Trek* canon and will show that overall, the same tropes and outcomes are portrayed.

Narratives

The first time that cloaking technology is mentioned in the franchise is when a Romulan warship encounters the *Enterprise*. The ship's captain orders: "We grow visible. Attend the cloaking system" (McEveety, "Balance of Terror"). Earlier in the timeline, the Xyrillian race also use a cloaking device for their ship, which is referred to as a "stealth device" (Vejar, "Unexpected"). The *Enterprise's* science officer notes that "invisibility is theoretically possible, Captain, with selective bending of light. But the power cost is enormous" (McEveety, "Balance of Terror"), thereby conferring advantages to its users, and also disadvantages.

The early cloaking devices developed in the 22nd century did not completely cloak ships as these could still be detected as "a blip on the motion sensor" (McEveety, "Balance of Terror") or through the detection of "gas [...]. Under impulse power she expends fuel like any other vessel. We call it 'plasma' [...] it is merely ionised gas" (Meyer, *Star Trek VI: The Undiscovered Country*). Earlier in the *Star Trek* universe's timeline, Suliban ships are detected using information that is imparted to the *Enterprise* crew from the 31st

century, well in their future. They are shown how to construct “quantum beacons [...] positron-based and have an output of two hundred gigawatts”

This technology is almost incomprehensible to the ship’s chief engineer who has to “isolate the sub-assembly tolerances from the emitter algorithms” since the “assembly’s independent of the emitters” and he must also “generate a stable flux between the positron conductors. Then all you’ll have to do is renormalize the tertiary wave functions” (Kroeker, “Shockwave”). The engineer is equally baffled by the cloaking technology itself, and when a Suliban ship falls into his hands, he experiences significant difficulties in activating its cloak in order to attempt to rescue captured crewpersons. “We’ve still got that Suliban cell-ship, [...] I’ve been working on it in my free time. I’m pretty close to figuring out how it works. If I can bring the cloak on line, we can get past their defences, grab our people, and no one will see a thing.” Tinkering with the system is initially fruitless. “I don’t get it. The power converter is engaged. Juice is definitely flowing through these relays. So why can we still see the ship?” When he succeeds, a power overflow of some kind makes his right arm disappear for several hours. The doctor fails to sort out this problem since “quantum physics is hardly my speciality, but I’d guess that you received an intense dose of whatever particle radiation that ship uses to conceal itself. [...] I suspect your appendage will eventually re-materialise on its own,” which proves to be the case (Contner, “The Communicator”).

However, even this early in the timeline, Romulan ships were undetectable with “quantum beacons” (Contner, “Minefield”). A crude expedient allowing the exposure of cloaked ships is shown in the 24th century using a group of ships as a form of blockade. “Each ship will send out an active tachyon beam to the other blockading ships [...], any cloaked vessel that attempts to pass between our

ships must cross that beam and be detected” (Carson, “Redemption Part 2”).

In the Delta Quadrant, the alien species known as “the Swarm” used a similar technique to monitor the borders of their own territory, consisting of a series of interlaced tachyon beams. However, the *Voyager* crew devised a way to elude this grid by modifying their shields to refract the beams around the ship in an uninterrupted manner. “Their sensor net uses a series of interlaced tachyon beams. If we adjust our shields to refract those beams around the ship we can slip across without appearing to have disrupted the net” (Singer, “The Swarm”).

But later in the 24th century, cloaking technology had been perfected. “No way of penetrating his cloak [...] he could pass within ten metres of every ship in Starfleet and they’d never know” (Baird, “Nemesis”).

Cloaking Technology on the Large Scale

Several races are shown to have developed cloaking technology that encompasses entire vessels. These include the Romulans, Klingons, Suliban and Xyrillians. Species that run cloaked ships are often depicted as shifty and treacherous and this particularly applies to Romulans, whose very “heart itself is grey” (Livingston, “Inter Arma Enim Silent Leges”). Indeed, “Earth believes the Romulans to be warlike, cruel, treacherous” (McEveety, “Balance of Terror”).

The technology itself has also been shown to cause problems even to species that are accustomed to using it. For example, the *Enterprise* crew discover an invisible ship trailing them in close proximity, “a hitchhiker [...] using some sort of stealth technology

[...] long enough to throw half our systems out of whack [...] disrupting a number of [...] systems.” The alien Xyrillians apologise and explain that their “engines are malfunctioning” and they therefore used Enterprise’s “plasma exhaust” and shared its warp field. When their systems malfunction again and they try the same tactic on a Klingon battleship, the same temporary havoc is wreaked with “unusual malfunctions [...] problems with [...] gravity plating, propulsion, environmental controls.” The wrathful Klingons almost destroy the Xyrillian ship and it is only with the *Enterprise*’s intercession that they eventually stand down (Vejar, “Unexpected”). Similarly, several cloaked ships are suspected to be trailing the Enterprise when the crew’s sensors show “strange readings” and, “trouble balancing the warp field [...]. It’ll be stable one moment, and then, for no reason, it’ll go slightly out of alignment. [...]. We’ve had to realign the field a dozen times over the last hour” (Kroeker, “Shockwave”).

The largest cloaked object in the canon is an entire planet, Aldea, the wondrous mythical world [...]. Advanced culture, centuries old. Self-contained, peaceful. Incredible technical sophistication providing the daily needs for all the citizens, so that they could turn themselves over to art and culture [...]. Somehow, as the legend goes, the Aldeans were able to cloak their planet in darkness and go unseen by marauders, and other hostile passers-by who might rob and plunder.

This awesome feat is facile, theoretically speaking! “The theory is simple. The shield bends light rays around the planet’s contour, similar to the Romulan cloaking device. But the implementation is quite difficult.” It turns out however that the Aldeans

need help from the Federation to rebuild [...] heritage.
We need a younger generation, strong and healthy,

following in the Aldean traditions [...]. Because we have no children, [...] medical community can do nothing [...]. We propose a trade. One which will solve our problem and give something back to the Federation [...]. We need some of your children. In payment, we will give you information that would take you centuries to acquire.

The *Enterprise* crew naturally refuses

That might be acceptable to some other races, but humans are unusually attached to their offspring [...]. Our children are not for sale at any price [...]. We sympathise with your situation, but what you ask is not possible [...]. That's my only answer. Now if there's some other way we can help you...

The Aldean spokesman regretfully states: "I am sorry you are intransigent" and the children are taken by force. "Captain, your children are with us. My word of honour, no harm will ever come to them [...]. Let us begin discussions regarding appropriate compensation."

Picard is rightfully incensed, "Compensation? You have stolen our children away from their classrooms, away from their bedrooms and you talk about compensation? You claim to be a civilised world and yet you have just committed an act of utter barbarity!" Fortunately, the *Enterprise* crew discover the cause of the Aldean infertility.

The radiation levels on Aldea have been building up over a long period of time. It is similar to what was experienced on Earth in the twenty-first century. When the ozone layer had deteriorated and the surface of the planet was flooded with ultraviolet radiation [...]. The shield that protected your world in one way is

weakening it in another. It is the radiation of your own sun that is destroying you [...]. You're all suffering from radiation poisoning. Sterility is only the latest symptom. If the children remain, they will be affected as well.

The Aldeans therefore realise that “the very thing which has given us this wonderful world is what has caused this tragedy,” and deactivate Aldea’s cloak (Manners, “When The Bough Breaks”).

Cloaking Technology on the Small Scale

A personal cloak is very similar to the examples given in the introduction of this essay, that is, to the rings of Gyges and Mordor, and to Wells’ inventor’s technological breakthrough. In *Star Trek*, cloaks are used by individuals to spy on the *Voyager* crew (Livingston, “Distant Origin”), to perform medical experiments on this same crew (Livingston, “Scientific Method”) and to create surprise attacks in personal, hand-to-hand combat (Brooks, “The Abandoned”). The latter was shown to be a genetically created ability, known as a shroud, in an artificially engineered race of warriors, the Jem’Hadar. Yet another type of genetically engineered stealthing is shown in the Suliban cabal species who manage to evade detection through chameleon-like skin pigmentation changes (Conway, “Broken Bow”). The latter are also depicted as being evil and shifty, scurrying on all fours along walls and roofs. Mines are also cloakable, making them particularly devastating weapons. Early in the timeline, these are detectable using the abovementioned “quantum beacons” (Contner, “Minefield”).

Discussion

Many researchers have acknowledged that

[i]nvisibility has been a source of fascination and an inspiration of myths, novels and films, from the mythical magical artifact Ring of Gyges mentioned by the philosopher Plato in *The Republic* to the Cheshire Cat from *Alice's Adventures in Wonderland* and the ships in the *Star Trek* universe equipped with hardware known as cloaking devices that conceal them from most varieties of scans (Brun 1).

The story of the Ring of Gyges was narrated by Glaucon, a student of Socrates, who then asked:

Suppose now that there were two such magic rings, and the just [person] put on one of them and the unjust [person] the other; no man can be imagined to be of such an iron nature that he would stand fast in justice. No man would keep his hands off what was not his own when he could safely take what he liked out of the market, or go into houses and lie with any one at his pleasure, or kill or release from prison whom he would, and in all respects be like a god among men. Then the actions of the just would be as the actions of the unjust; they would both come at last to the same point. And this we may truly affirm to be of a great proof that a man is just, not willingly or because he thinks that justice is any good to him individually, but of necessity, for wherever any one thinks that he can safely be unjust, there he is unjust (Plato lines 360b-d).

In brief, Glaucon elaborates Baron John Emerich Edward Dalberg Acton's more succinct maxim, "power tends to corrupt, and absolute power corrupts absolutely" (Rawson 611).

Cloaking therefore encourages the manifestation of the Jungian

shadow, since the “the seed of violence remains within each of us” (Wiemer, “Violations”). In the canon, the United Federation of Planets and Starfleet are depicted as the enlightened exemplars that humanity could and should aspire to emulate in a utopian future. It is as if for this very reason that humanity is denied cloaking technology, despite having stolen a device during an audacious raid on a Romulan vessel (Lucas, “The Enterprise Incident”). In Gene Roddenberry’s own words, “our people are scientists and explorers – they don’t go sneaking around” (Okuda 80).

It is later shown that the “Treaty of Algeron” (a peace accord between the Federation and the Romulan Empire) included the prohibition of the development or use of cloaking technology by the Federation (Burton, “The Pegasus”). This agreement is rarely infringed or circumvented. When the Federation is *in extremis*, with its very existence threatened by a powerful enemy (“The Dominion”), a specifically designed starship is shown to be able to cloak through the use of a Romulan-donated cloaking device (Friedman, “The Search”), with the stipulation that its cloak is only activated in Dominion territory, a clause which is occasionally broken with impunity (Conway, “The Way of the Warrior”). However, the ship’s cloaking device does cause problems, and on one occasion, a transporter accident due to particle residue buildup from cloak use sends the transporting crewmembers back in time (Badiyi, “Past Tense, Part I”)

Moreover, during the Dominion war, the Federation liberally used space mines that are cloaked (Kroeker, “Call to Arms”), and this does not result in any ill-effects to the Federation. Thus, *inter arma enim silent leges*, a Latin maxim attributed to Cicero that is commonly translated as “in times of war, the law falls silent.” This is acknowledged within the canon, to the extent that it also constitutes the name of an episode (Livingston, “Inter Arma Enim

Silent Leges”).

However, when Starfleet covertly creates a cloaking device and tests it on the starship *Pegasus*, an explosion in main engineering results in heavy casualties. Several members of the crew, including senior officers, mutinied during an attempt to shut down the test device. Despite the escaping crew witnessing an explosion, the ship drifted through an asteroid in a semi-dematerialised state and then rematerialized inside the asteroid. Despite efforts by Starfleet intelligence to hush up these events, the *Enterprise* crew discover the *Pegasus* and the surviving perpetrators are court-martialed (Burton, “The Pegasus”).

Entire ships with cloaking technology have also been stolen by Starfleet officers, but are eventually returned to their owners (Nimoy, *Star Trek III: The Search for Spock*). At this juncture, it must be pointed out that as a corollary to Arthur C. Clarke’s third law which states that “any sufficiently advanced technology is indistinguishable from magic,’ ‘any sufficiently advanced technology is indistinguishable from a completely ad-hoc plot device” (Langford). In other words, cloaking technology as evidenced in *Star Trek* is, as yet, unrealisable.

The only comparable technology is that of stealth, which is currently standard on virtually all new military aircraft by a combination of dark and radar-absorbing paint, optical camouflage, cooling the outer surface of the aircraft in order to minimize electromagnetic emissions, particularly infrared (heat) and the minimisation of all other electromagnetic and particulate emissions. Jamming technology for remote sensing devices is also utilised.

However, there may be science-fictional properties in metamaterials, artificial materials designed to have properties that are not normally found in nature. These may provide the

theoretical possibility of allowing electromagnetic radiation to appear to pass freely through a cloaked object by going seamlessly around it, and are currently being studied (Service), and deemed theoretically possible (Petit).

In conclusion, if and when cloaking technology becomes available, “we must recognise that, because [...] violence is capable of consuming each of us” (Wiemer, “Violations”), this knowledge must be handled carefully lest we abuse it, as many other scientific discoveries have been abused.

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About the Author

Victor Grech was a science fiction (SF) fan from a young age. Although he studied medicine and became a pediatrician, he remains a physicist at heart, with an enduring interest in astronomy, astrophysics and cosmology. The allure of SF eventually led to his reading for a Ph.D. in the University of Malta's English Language Department entitled "Infertility in Science Fiction." The thesis was completed in 2011. Several scholarly publications have arisen from this work, as well as other publications that deal with various aspects of SF. The thesis classified infertility in SF according to theme, for example, after warfare, terrorism, state inflicted, alien inflicted, affecting aliens or animals etc. Over three hundred primary texts were considered and the one commonality that ensued was SF's inherent optimism. SF is the modern replacement of the fairy tale, and therefore, almost invariably terminates in a happy ending, just like a fairy tale. Instead of monsters, we have aliens. Instead of magic, one finds advanced technologies. The end result is the same, the willing suspension of disbelief and an abiding sense of wonder. Subsequent papers have mostly focused on Star Trek, since this provides an enormous corpus of material for potential study. He continues to read SF in his spare time and greatly enjoys watching SF films and series (such as Star Trek) with

his two children who have also become enamored of the genre.