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The Source of Magic

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# The Source of Magic - Rediscovered[1]

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**ABSTRACT**

This paper is an attempt to show that a large part of Western society no longer operates on the rationalist principles that most of us thought it did, but that it instead runs by magic more akin to that in fantasy works. The term 'magic' is not meant metaphorically or in science fiction author Arthur C Clarke's sense that 'Any sufficiently advanced technology is indistinguishable from magic' (Clarke 1962), but is meant literally in the sense that Frazer (1890, republished 2003) used the term. This means that instead of trying to understand the present and near future by looking at the works of science fiction creators who put forth a rationalist and technological view of the world, we would understand the future better by looking to the fantasy of authors such as Jack Vance, Matthew Hughes, Ursula Le Guin, Piers Anthony and Michael Moorcock.

This magic is manifested through magical thinking and irrational behaviour, where the majority of us use literal spells and incantations in our daily interactions with each other in the networked world, and where we worship capricious gods; most importantly, those spells, incantations and worship actually work, and those gods have actually come to exist.

This paper will also show just how the spread of the computer technology propounded by scientists, technologists and SF writers has inevitably led to the creation of this irrational and magical world. This is partly because of limitations built-in to the formal systems on which these systems are based, leading to an extreme example of the law of unintended consequences. Finally, the paper will explain the mechanism by which magic is *literally* becoming real by reference to Frazer's two laws of magic: the Law of Similarity and the Law of Contagion.

**KEYWORDS**

**Fantasy, Science fiction, Spimes, Law of Contagion, Law of Similarity, Infrastructure of Reality**

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[1] We are inviting short responses to this article – please see *Letter from the Editors* for further details.

**LITERARY MAGIC VERSUS REAL WORLD MAGIC**

Science fiction writers once promised the shiny technological future of jetpacks, robot butlers and cities on the Moon, what William Gibson simultaneously summarised and critiqued as the Gernsback Continuum Gibson (1981). This is the rational future, the consensus future, as discussed by Westfahl (2008).

> This consensus future was probably best articulated in Donald A. Wollheim's The Universe Makers: Science Fiction Today (1971), and has been most vigorously promoted by various incarnations of Star Trek — so much so that one might describe it today as the "Star Trek future." It's what I've been talking about all along — the idea that humanity will, in relatively little time and with relatively little effort, expand first throughout the solar system and then throughout the cosmos to inhabit thousands of worlds, bond with generally humanoid alien species, build a Galactic Empire or a Federation of Planets, and keep advancing toward an ultimate encounter with God Himself.

Alongside science fiction runs a parallel genre of the imagination, fantasy, a different and less rational way of looking at and exploring the world. Tolkien had his Middle Earth, Michael Moorcock his Multiverse inhabited by different incarnations of his Eternal Champion. Fantasy covers everything from the writings of Lord Dunsany to Robert Jordan and George R R Martin. Some authors straddle both genres, such as Moorcock and Martin, while still being largely known for their fantasy.

Another is Jack Vance, who has written many novels, but is most famous for his stories of the Dying Earth. In this future, billions of years hence, the sun has become swollen and red, and is in danger of winking out any moment, but more importantly magic has become real and science is a dim memory. Magicians cast spells or manipulate non-human entities called *sandestins*, similar to djinns, to give them magical power. Another author, Matthew Hughes, has written books set in the period just before the Dying Earth, where science is giving way to magic. This paper will show the similarities between the Dying Earth and current Western society, more similarities than many of us might believe, and we are actually living through Matthew Hughes's transition into it.

There are also more traditional sources of fantasy: folklore and tales of Elfland. Elfland is a world sitting alongside our own, inhabited by ethereal creatures that have magical powers. If a mortal strays into Elfland, he is liable to wake up with an ass's head, or find that a single night has passed to him, but a century has passed in the outside world. Time is subjective in everyday life, as who hasn't looked away from the screen to realise that a whole day has passed in what seemed to be just ten minutes at the keyboard?

One thing you may note about all these different stories is that they do not have a consistent explanation across them of how the magic works or where it even comes from. Some authors do try to show how magic works, such as Lyndon Hardy in 'Master of the Five Magics' and 'Secret of the Sixth Magic'[2]. Ben Aaronovitch's Peter Grant books show a policeman inducted into a magical investigation unit run by Britain's last magician[3], and trying to understand magic through experimentation. J K Rowling in some of the Harry Potter books explained the workings of magic in classroom scenes. However, in the vast of majority of works, magic is handed down to humans, or used by humans, without there being any great understanding of how it works or how it is most effectively used. Gandalf never explained how entropy was suspended and reversed to allow him to return from the pit in Moria.

Walton (2009) has similarly categorised magic in fiction as being of two types: the numinous, where the emphasis is on magic as something incomprehensible that creates awe in the reader, and the realist-magicism approach where the emphasis is on world-building and rules.

In Western society, we have now created the infrastructure of magic, a parallel reality that sits aside our own world: in effect, an electronic Elfland. You might call this the Arthur C Clarke version of magic already alluded to: a sufficiently advanced technology (Clarke, 1962). This magical world that sits alongside the physical world is currently called the Internet or the World Wide Web, but there is more to it than superficial resemblances between programming and spells.

For instance, objects can now be created at will in the form of 'spimes', as posited by Sterling (2005, quoted in Doctorow (2005)). Basically, spimes are objects that have a part-real world and part-virtual existence. Examples might include buying an e-book (software) to install on your e-reader (hardware), or a bespoke physical object that has its details stored in an online database.

> "You first encounter the Spime while searching on a Web site, as a virtual image. The image is likely a glamorous publicity photo, but it is also deep-linked to the genuine, three-dimensional computer-designed engineering specifications of the object -- engineering tolerances, material specifications and so forth.
> "Until you express your desire for this object, it does not exist. You buy a spime with a credit card, which is to say you legally guarantee that you want it. It therefore comes to be. Your account information is embedded in that transaction. The object is automatically integrated into your spime

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[2] Hardy (1985) and Hardy (1986). If works have become part of the canon of fantastic literature, such as those by Tolkien, Moorcock and Vance, and there are innumerable editions, they will only usually be referenced when quoted directly.
[3] EG Aaronovitch (2011).

management inventory system. After the purchase, manufacture, and delivery of your spime, a link is established through customer relations management software, involving you in the future development of this object. This link, at a minimum, includes the full list of spime ingredients (basically, the object's material and energy flows), its unique ID code, its history of ownership, geographical tracking hardware and software to establish its position in space and time, various handy recipes for post-purchase customization, a public site for interaction and live views of the production change, and bluebook value. The spime is able to update itself in your database, and to inform you of required service calls, with appropriate links to service centers.

"At the end of its lifespan, the spime is deactivated, removed from your presence by specialists, entirely disassembled, and folded back into the manufacturing stream. The data it generated remains available for historical analysis by a wide variety of interested parties."

That physical and non-physical duality is quite clearly very similar to the duality of materialism and immaterialism in philosophy, religion and magic.

Cyberpunk author William Gibson similarly noted in an interview that:

For the past twenty years or so, I think the big thing has been the end of the clear distinction between the digital and the "real." I think the digital is now real enough to kill you. Like, somebody getting blown up by a Predator drone is dying in a complexly seamless interaction between the digital and the real. Roy (2014)

As noted above, there is no consistency about the source of magic across the many literary representations of magic. It doesn't matter how the magic is created; what does matter is how we interact with the world. At the moment we interact by using incantations, spells and strange patterns of hand waving – think of pinching or dragging objects on a touch screen. At the most trivial, we use smartphones and tablets much like magical fetishes to conjure up objects we want – think of spimes. This is what you might call the overt evidence for the existence of magic – the use of artefacts for magical purposes.

It doesn't matter what the source of magic is, whether it's a demon deep underground leaking magical energy as in Piers Anthony's The Source of Magic, or if it's the result of a god/demon scattering objects across the earth (sources too numerous to list), what matters is our relationship to the world. _In fact, there is nothing that says that magic has to be supernatural in origin;_ it merely has to be beyond normal human inspection or comprehension. As this paper shows, we have already created this type of magic.

As Jack Vance wrote at the start of Rhialto the Marvellous, one of his Dying Earth books:

> "Magic is a practical science, or more properly, a craft, since emphasis is placed primarily upon utility, rather than basic understanding. This is only a general statement, since in a field of such profound scope, every practitioner will have his individual style, and during the glorious times of Grand Motholam, many of the magician-philosophers tried to grasp the principles which governed the field.
> "In the end, these investigators, who included the greatest names in sorcery, learned only enough to realize that full and comprehensive knowledge was impossible. In the first place, a desired effect might be achieved through any number of modes, any of which represented a lifetime of study, each deriving its force from a different coercive environment.
> "…For this reason, magic retains its distinctly human flavour, *even though the activating agents are never human.*" [Emphasis added]

And also:

> "A spell in essence corresponds to a code, or set of instructions, inserted into the sensorium of an entity which is able and not unwilling to alter the environment in accordance with the message conveyed by the spell. These entities are not necessarily 'intelligent', nor even 'sentient', and their conduct, from the tyro's point of view, is unpredictable, capricious and dangerous." Vance (1985)

It would be very useful, when reading the following sections, to bear this imagery in mind.

**LESS OVERT MANIFESTATIONS OF MAGIC**
Technology is often obsolete as soon as it's available and used – something known as planned obsolescence - which implies that magic is only magic while it is at a distance from us. Distance creates magical feelings about objects and processes. As soon as we get hold of something, it's no longer magical; it's just boring tech when you are using it and it's everywhere. The physical manifestations of 'technologically derived' magic given above are rather trivial; it's the forces that alter the human mindset that matter more.

In other words, the current physical manifestations of 'technologically derived' magic given above are not as important as those things in the environment that alter

the human mindset, which will be detailed below, starting with the more superficial and moving to the more fundamental.

**INTERFACES AND INTERNAL MODELS AS MAGIC**

There is a trope in modern science fiction called The Singularity, The Technological Singularity, or The Singularity of Intelligence. Popularised by SF author Vernor Vinge, it postulates a time when developments in Artificial Intelligence will lead to the creation of a first artificial entity, which will be clever enough to create its own successor, even more intelligent than it is; this second intelligence will then also create its own more intelligent successor, ad infinitum in a runaway reaction, until we can no longer predict what the outcome will be for either the AIs or for our world (Vinge 1993).

This process is derived from the strong AI argument that intelligence can be duplicated in computerised systems, but the result is supposedly a world that we could *never* predict, not just that we incidentally *haven't* predicted it yet. The word *singularity* is used as a metaphor and refers to part of a black hole where the pull of gravity is so great we can never see inside it – light gets pulled into the black hole and never escapes and reaches us outside. Just as we can never see inside a black hole, we can never predict or understand what will happen once we have developed our first artificially intelligent entity.

Will the Technological Singularity come about as envisaged by science fiction writers? This is not certain, or even probable. As VR pioneer Jaron Lanier pointed out in his 'One Half of a Manifesto' there is no sign yet that experts are able to create any artificial intelligences even at the first level.

> "If computers are to become smart enough to design their own successors, initiating a process that will lead to God-like omniscience after a number of ever swifter passages from one generation of computers to the next, someone is going to have to write the software that gets the process going, and humans have given absolutely no evidence of being able to write such software."Lanier (2000)

However, we are just as likely to have another type of singularity. This would be created not by the intellectual ability of a system, but the complexity of the systems, and especially the interfaces. The speed of development of internet based technology has led to increasingly new applications and interfaces. Partly due to planned obsolescence, as the applications change (EG Facebook), new facilities are offered to the user, and new data is gathered by the provider, leading to ever changing interfaces for the user when interacting with the system, then more facilities, 'ad infinitum in a runaway reaction', to quote this paper from a couple of paragraphs back.

Similarly, businesses constantly strive for new techniques to make money, such as Coercive Monetization (Shokrizade, 2013). This is when the user is convinced to buy credits or power-ups in a game, for example, often without realizing that they are purchasing anything at all.

All of this leads to the conclusion that it's not that we won't understand the concepts of these new facilities in society, but that their combinations and the interfaces to them are becoming ever more complex so that you have to be constantly on your guard, just as in the Jack Vance example quoted at length earlier. If you aren't careful, you are in danger of revealing your private details because, say, you haven't attended to Facebook's new system for altering your security settings. We could call the logical endpoint of this phenomenon – when there are so many new systems to learn, with so many ever changing interfaces to grasp and so many internal models to grasp in ever-shorter time spans – the Singularity of Unusability.

The point here isn't just that an individual website or online system will individually become unusable (some might and some might not), but that, firstly, the internal models and interfaces the different systems work by will become ever more disparate as companies try to differentiate themselves (something covered in cognitive complexity theory in Human Computer Interaction), and secondly, the way the systems interact will be so confusing that the overall network will become more unusable. Usability guru Jakob Nielsen talked about this in reference to the way that users have assumptions about how websites work as the move from site to site:

> Consistency is one of the most powerful usability principles: when things always behave the same, users don't have to worry about what will happen. Instead, they know what will happen based on earlier experience. Every time you release an apple over Sir Isaac Newton, it will drop on his head. That's good.
> The more users' expectations prove right, the more they will feel in control of the system and the more they will like it. And the more the system breaks users' expectations, the more they will feel insecure. Oops, maybe if I let go of this apple, it will turn into a tomato and jump a mile into the sky.
> Jakob's Law of the Web User Experience states that "users spend most of their time on other websites."  (Nielsen, 2011)

This ever changing nature of interfaces and the facilities that run under them means that you can never quite get a handle on them – you have to be intuitive rather than rational in your approach to them. In other words, people have to indulge in non-rational thinking due to the Singularity of Unusability.

**LANGUAGE AS MAGIC**

Language is powerful in both magic and the real world. In Jack Vance's Dying Earth books, magicians can only remember a handful of spells at a time. Compare this with how many passwords you can remember easily. In fiction, magicians typically keep a record of their spells on aged, curling yellow scrolls. Think of how many times you've seen computer monitors with aged, curling yellow Post-It note stuck to them with passwords written on them.

There is a power to names. In a lot of fantasy, most notably Ursula Le Guin's Earthsea books names are a potent force. If you know the real name of a magician you have power over him, and magicians only trust their real names to their closest friends. In the first book, A Wizard of Earthsea, the protagonist Ged, a powerful but immature young sorcerer, is chasing a shadow beast, one that he unleashed, across the world.(Le Guin 1976) The story ends when he finally learns the true name of the shadow beast, confronts it and banishes it by speaking the name aloud. Think also of Rumpelstiltskin in the fairy tale and the power his name has over him. The name of God is often considered taboo or is written in an incomplete way – YHWH instead of Yahweh, for instance. The boxer originally called Cassius Clay declared that this was a slave name and changed it to Muhammad Ali (EG BBC, 2013a). This was a powerful way of recreating himself. Consider artists such as David Bowie who've used chameleonic aliases like Ziggy Stardust and Aladdin Sane.

Now consider the use of names on the internet. People are often anonymous or use pseudonyms. The username and password combination is a powerful example of 'true names' in the modern world. This is an example of a 'fake' or virtual true name being as powerful as a genuine true name, especially if it allows access to your bank account. Names and unique/identifiable information are in effect part of the essence of the self. Identity theft becomes the equivalent of stealing part of someone's soul.

**MAGIC THROUGH DUALISM: THE SOUL ON THE INTERNET**

This all boils down to a form of spiritualism and the ability to take control of someone's soul. If you are religious, the soul most likely refers to a part of yourself that has a relationship to a god beyond this mortal world. To an atheist and extreme AI proponent what would be equivalent of the soul? It's all the information about one's self, all the information that makes up one's online presence/self, or 'the algorithm' that summarised all that you are as in Salt and Threadgold (1998). The idea of storing and recreating oneself is a common trope in much modern SF – from Ian Creasey's Erosion[4], where memorial benches respond in simple ways as a memorialized individual would have done, through to decanting your mind into a fresh young body, as in just about any SF story or TV show you can name over the

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[4] Creasey (2009)

last decade.

The immaterial soul is immaterialism, which is the same as the computer model. The software (the algorithm/stored data, the soul) is pure concept that runs on physical hardware (the computer, the brain) and it doesn't matter if the hardware is a silicon chip or a magnetic head moving across a tape. This is sometimes called the ghost in the machine, which actually derives from the god in the machine of classical Greek literature (deus ex machina).

When it comes to the material/immaterial axis, the migration of our world online leads to the ultimate in Thatcherism, removing any need for physicality, for manufacturing or physical content, instead turning everything into an immaterial service. Unlike Thatcherism though, on the internet there is a danger that you won't get paid for opening the door for someone or parking their car, but if you are lucky someone will drop something in the tip jar on your website.

**MAGIC BY THE DISINTERMEDIATION OF HUMANITY AND THE CREATION OF DAEMONS**
Or, in other words, getting rid of the human connection, or dehumanising the processes. Making people go online is an increase in the magical way of behaving because it increases the gap between the user (person) and the source (possibly not a person).

In the past we had systems that were relatively simple and all the parts were staffed by humans. Now, we have longer supply chains with automated sections. In the past there were human beings you could appeal to in the middle – nepotism, favouritism and charisma were positive – but you can't do that so easily now. You can't appeal to a mortgage algorithm's sense of pride. There are too many layers between you and the decision making process. The decision making process is not even amenable to inspection – there is often no way to work out why an automated system has made the decision it has.

As science fiction author and online activist Cory Doctorow has said:

> "We've had bureaucracies and forms for a long time, of course, but human-powered bureaucracies and computerized ones differ in important ways. A bureaucrat can always choose to write a very long name in very, very small letters in order to fit it on an important form, or draw an arrow in the margin and continue it on the other side. But when a programmer instructs a computer to reject, or disregard, all input longer than 64 characters, she effectively makes it impossible for a bureaucrat - however sympathetic – to accommodate a name that's longer than she's imagined names might be. With a human bureaucrat, there was always

the possibility of wheedling an exception; machines don't wheedle."
(Doctorow, 2013a)

It's not even that the formal systems are infallible – they will inevitably lead to magical systems, magical interactions because of the flaws that will be mentioned below. It is the human systems, such as legal and governmental proceedings, which are more amenable to inspection and validation. Debates and decision making in the Houses of Parliament are open and accessible, but where is the equivalent of Hansard for the algorithm that denied you credit?

## MAGIC DUE TO THE COMPLEXITY OF JURISDICTIONS AND THE GLOBAL NATURE OF ORGANISATIONS

Different jurisdictions and different online services mean different laws, terms of service etc. For example, when communicating across the web, which libel laws apply – strict UK laws or the more lenient US ones? This is akin to the prevalence of different gods for different cultures. Which gods do we worship, which pantheon holds sway where we are now, and how do we appease them? In Robert Graves's Claudius the God, at one point the Emperor Claudius sends his troops to a foreign country, and he instructs one of his generals to make a sacrifice to the gods of the country he's in if he has to. The general does and he's victorious. [Graves Ref]

Without the globalisation/liberalisation of the finance system, would we even have the technological (ICT) revolution that we apparently have? Without the ability to transfer money easily across national boundaries, would Amazon or Google exist? Would they be *able* to exist?

Given this globalization and the consequent ease with which you can move money so easily from one country to the next, there are no longer any national currencies, unless you live somewhere like North Korea. When buying a book from the American version of Amazon, it's priced in dollars, but a user in the UK will likely pay using a UK account which is in pounds, and the payment is made almost instantaneously from the user's point of view. In that situation, how can we say that these are two different currencies here? We are living in a world which has two nations (UK and US) with two different legal systems, but simultaneously one global nation of finance.

## MAGIC DUE TO FUNDAMENTAL LIMITATIONS

Here we come to one of the deeper issues, one of the causes of the unpredictability of the networked world.

There are various fundamental limitations to computation, starting with Godel's Incompleteness Theorems. These state that in any formal system there are true statements which cannot be proven to be true and that the system cannot prove itself to be consistent. In 1936, Alan Turing showed that it's impossible for one algorithm

to predict whether any given computer program with known input will end, for all possible programs. This is known as the Halting Problem. What Godel and Turing boil down to is that complex systems are fundamentally unpredictable. Chaos theory tells us the same – there is a sensitive dependence on initial conditions, sometimes known as the Butterfly Effect, where we can't predict outcomes even if we know all the relevant information.

All of these lead to increasing complexity without necessarily leading to improved performance or clarity or usability. Godel, Turing and chaos theory are the worms at the core of the apple of formal systems. Relying on formal systems is therefore flawed and will always lead to uncertainty. Formal systems with all their uncertainty, plus increased competition/speed in the marketplace lead to more complexity and hence more uncertainty and unusability.

The start of this paper described how we live on the Dying Earth, where sorcerers live in danger of being enslaved by demonic beings from dimensions beyond the ken of man. Those dimensions actually exist, but they are mathematical dimensions within the mathematical models used by traders and others on computerised systems.

Imperfections in algorithms can lead to the ludicrous situation where a textbook can be listed on Amazon for literally million dollars:

> "A few weeks ago a postdoc in my lab logged on to Amazon to buy the lab an extra copy of Peter Lawrence's The Making of a Fly... [Amazon listed 2 new copies] from $1,730,045.91…Amazingly, when I reloaded the page the next day, both priced had gone UP! Each was now nearly $2.8 million…As I amusedly watched the price rise every day, I learned that Amazon retailers are increasingly using algorithmic pricing (something Amazon itself does on a large scale), with a number of companies offering pricing algorithms/services to retailers. Both profnath and bordeebook were clearly using automatic pricing – employing algorithms that didn't have a built-in sanity check on the prices they produced."(Eisen, 2011)

**THE EXISTENCE OF 'GODS' AND NON-HUMAN ENTITIES**
What did Arthur C Clarke actually mean with his 'Any sufficiently advanced technology is indistinguishable from magic'? (Clarke, 1962). It could be that he was referring to the pure functionality of magic, but there is more to it than that. There is a big difference between what you can *do* with magic (EG cast an invisibility spell/use advanced science to create a light-bending cloak) and the *beliefs* we have about magic and our relationships to it.

J K Rowling's Harry Potter magic is quite rational and lawful, if we can categorise

magic according to the system used in games like Dungeons and Dragon; that is, there is no obvious relationship between Harry and any demons or gods. However, Jack Vance's magic is much more irrational and chaotic. That's the difference: the former is implicitly functional, so that once you learn the forms, it's easy to use. It's push-button magic, to a large degree. In the latter there are entities to placate, terms to negotiate.

Once upon a time, we would go to an altar in the corner of our homes and pray to a god or the gods for a good harvest, and at least we could see the sun shining and the rain falling on the crops. Nowadays, we go to an altar in a room in our homes, or get out our shiny magical talisman or fetish, and commune with the god Tesco or Walmart, and he sends one of his demonic minions in a unwinged chariot to our homes with a cargo of processed crops for us, and we never need see the supply chain or understand it. From a purely solipsistic, individual point of view, you have cast a spell, or made a prayer, or invoked a demon, and your desires have been met. However, who amongst the bulk of the population understands the supply chain that creates the magical objects we use? Where do we get our smartphones and tablets from, and that doesn't just mean which store, but what elements are dug out of the ground to manufacture the chips? Who knows where any item in their weekly food shop truly comes from, with the supermarkets' and manufacturers' global reach and smorgasbord of ingredients from each continent? What happens when the magic goes wrong, as it inevitably does somewhere along the supply chain of djinns and sandestins? We end up with horsemeat burgers.

What are gods? As far as this paper is concerned, it's any entity bigger than yourself that you have to appease and which is incomprehensible to humans. (This definition will be revisited later in the section on Frazer's Golden Bough.) That could apply to any large organisation. You have to appease the gas company otherwise they withdraw their favours. A god is also anything which provides or maintains 'the infrastructure of reality' or 'the infrastructure of existence' – the environment in which we live.

Believers of the Abrahamic religions say that Jehovah, God or Allah created the universe in which we live. To the Greeks, the environment came from Gaia but was eventually maintained or ruled by the Olympian Gods: Zeus, Hera etc. That is an accurate description of the set-up on the internet and the web, with the various networking companies, giants like Facebook creating a new social reality, Google its utilities (Gmail, Google Drive, Google Books, Google Maps etc)? Some universities have a strong reliance on Google services (Gmail for students, Google Drive for sharing registers amongst staff etc). Companies such as Google are providing the infrastructure of our reality; they are creating part of our new electronic Elfland. Remember, though, all gods eventually ask a price.

There are two main types of commercial relationships on the internet:
- Monetary – paying the gas company or buying something from Amazon.
- 'Free' – services such as those offered by Google.

We have a large measure of indirect control over gas companies through regulation, ombudsmen services, contract law etc. We have much less control, direct or indirect, over internet based companies such as Google and Facebook, especially as they are transnational, as pointed out above. To get the 'free' services, you have to appease them by letting them have access to information about yourself: intangible but vital essences such as your likes and dislikes, your favourites, who you communicate with and so on. You could call this type of information your soul or your spirit, as it is a non-corporeal part of you that has value to yourself and others. There is even a crime called *identity theft*, and in a religious or spiritual sense there is nothing as unique an identifier as your 'soul'.

In other words, you could almost say that you have to make sacrifices to these 'gods', not payments to service providers. This is more akin to the relationship that people have with gods. The regulators of these 'free' services appear to be weak. Relationships are governed by terms of service which are ever changing. Consider Facebook's privacy settings that barely stay the same from one session to the next.
If you think about a concrete example concerning music, LPs have been replaced by CDs, which have themselves been replaced by MP3s, with each 'object' progressively more ethereal and ephemeral than the last. The mediation for these ethereal representations, the way to access them and get them to work, is itself like witchcraft or communing with spirits or demons - iTunes, playlists, there are so many different ways to interact with the songs, and if you look under the hood rather than remain satisfied by pushing buttons, they all defy understanding unless you are a programmer. To be anecdotal for a moment, I thought that when I saved a folder of MP3s to my computer, it would pick up the song titles from the file names I had given them, but no, of course that would be too easy. There was a process for obtaining the song titles from the internet, and generating a playlist, but for all its comprehensibility I might as well have sacrificed a chicken and read its entrails.

It is important to re-iterate here that these systems aren't just magical in the functional Arthur C Clarke sense or that individual items are magical, but they are magical in the way that we relate to them - more the mystical and Hermetic. There's something magical, in the sense of using spells, and not rational in the way that we interact with virtual items. As Cory Doctorow said when reviewing the book Big Data,

> But they also talk about the fact that these algorithms are likely to be illegible -- the product of a continuously evolving machine-learning system -- and that no one will be able to tell you why a certain person was

denied credit, refused insurance, kept out of a university, or blackballed for a choice job. (Doctorow, 2013b).

Even the terminology has religious overtones – consider the word 'cloud' of cloud computing, with its historical association of angels sitting on them, playing their harps as the souls of the dead flit about using their new wings. 'Daemons' are processes running in computers, especially Unix.

In multitasking computer operating systems, a **daemon**…is a computer program that runs as a background process, rather than being under the direct control of an interactive user.  (Wikipedia 2013)

## FRAZER ON MAGIC AND RELIGION

### *The Laws of Magic*
So far, some of the content of this paper could all just be written off as metaphorical, but now it;s time to consider the most fundamental cause of magic through computing.

Frazer, in his famous work The Golden Bough, has much to say on the supposed laws of magic:

"IF we analyse the principles of thought on which magic is based, they will probably be found to resolve themselves into two: first, that like produces like, or that an effect resembles its cause; and, second, that things which have once been in contact with each other continue to act on each other at a distance after the physical contact has been severed. The former principle may be called the Law of Similarity, the latter the Law of Contact or Contagion." (Frazer, 1890, republished 2003, chapters 3 and 4)

If you think of the Google cache, the NSA's PRISM project and countless other databases, supermarket loyalty card schemes and mailing lists, where what you have done in the past can be linked to every other thing you have done, you can see that we are truly living in the age of the Law of Contagion, where things which have once been in contact remain in contact, at least in some big database somewhere.

I'll give an anecdote to ground this. At home, I once looked up the details of a car, and days later, at work, Google suddenly started showing me sponsored ads for the same make of car even though I was doing something completely unrelated. I was on a different computer at a different IP address with a different ISP, and not currently logged into a Google account as far as I was aware, but somehow Google

had used cookies and possibly other technologies to link the two computers together. It was unnerving.

When Frazer said "…contagious magic commits the mistake of assuming that things which have once been in contact with each other are always in contact", he might have been correct at the time of writing, but no longer. Believers in contagious magic are not making any mistake. As [my Google example and] many examples show, those things which have once been in contact in our electronic Elfland remain in contact forevermore. The Law of Contagion, one of Frazer's founding laws of magic, works.

It's not just the Law of Contagion that has become real. As Frazer states,

> "PERHAPS the most familiar application of the principle that like produces like [the Law of Similarity] is the attempt which has been made by many peoples in many ages to injure or destroy an enemy by injuring or destroying an image of him, in the belief that, just as the image suffers, so does the man, and that when it perishes he must die."

If we look at the use of web forums, Twitter etc then the Law of Similarity does now work. The image of a person now includes the internet persona or representation of the person, not just a wax doll or a drawing on a piece of paper, and this representation can be attacked far more effectively. There was the Lord McAlpine case (BBC, 2013b), where unfounded attacks were made via the web, mainly Twitter, on the public perception, the public image, of a man, and his reputation was very nearly ruined. Young people especially are noted for committing suicide after being bullied in the virtual realm, and not necessarily in real life. It is easy for the reader to find other examples at will.

Computers can find similarities between dissimilar things by trawling through databases. Marketing works by something like the Law of Similarity – different people are similar enough to market to if they have enough in common. That is how Amazon's recommendations system works ('People who bought this also bought that').

If you are an identity thief, once you have enough information about a person to simulate them, you can take over their bank account, their email, everything that allows them to live and prosper in a networked society. The simulacrum, which is *similar* enough to a person to pass tests far feebler than the one proposed by Alan Turing, becomes that person – at least as far as the systems are concerned. The Law of Similarity holds. It's voodoo, and it's technological. Stick a few feathers together, mutter a few incantations over it all, throw it in the air and it flies. It would do if it was on the internet.

In the modern world, the map very nearly is the territory, and the map definitely IS the territory for those people who conduct their lives online, for those people who live in our new electronic Elfland. In fact, the more that systems move online, the more that we rely on spimes or purely online objects, the more that our real world activities migrate online, then the more that the Laws of Similarity and Contagion will hold. By the very way it works, computing technology contains these laws within itself even more strongly than a seed contains the instructions for growing the flower.

*The relationship between magic and religion*
On magic and religion, Frazer makes the following points.

> "There is probably no subject in the world about which opinions differ so much as the nature of religion, and to frame a definition of it which would satisfy every one must obviously be impossible. All that a writer can do is, first, to say clearly what he means by religion, and afterwards to employ the word consistently in that sense throughout his work. By religion, then, I understand a propitiation or conciliation of powers superior to man which are believed to direct and control the course of nature and of human life. Thus defined, religion consists of two elements, a theoretical and a practical, namely, a belief in powers higher than man and an attempt to propitiate or please them."

Also,

> "At an earlier stage the functions of priest and sorcerer were often combined or, to speak perhaps more correctly, were not yet differentiated from each other. To serve his purpose man wooed the good-will of gods or spirits by prayer and sacrifice, while at the same time he had recourse to ceremonies and forms of words which he hoped would of themselves bring about the desired result without the help of god or devil. In short, he performed religious and magical rites simultaneously; he uttered prayers and incantations almost in the same breath, knowing or recking little of the theoretical inconsistency of his behaviour, so long as by hook or crook he contrived to get what he wanted."

We now live in that world, the world of telecommunication companies, the NSA, ISPs, Google and Facebook, amongst many others: organisations that have created and maintained, or co-opted, the modern infrastructure of existence, our new electronic Elfland. Instead of sandestins, angels or djinns, we use so-called Intelligent Agents or online services such as www.comparethemarket.com. Computer programs carry out financial transactions in milliseconds, leading to

market fluctuations, the occasional stock market crash and books that cost $1million. The gods that we have to propitiate exist on the internet as transnational organisations.

## CATEGORISIATION OF THE DIFFERENT ELEMENTS

We can categorise some of the different aspects above in a simple way:

| The state of mind: enforced non-rational ways of interacting with the environment | The situation: an unbridgeable gap in the relationship between people and environment |
|---|---|
| *The Singularity of Unusability* | *The disintermediation of humanity* |
| *Dualism* | *The existence of gods and non-human entities* |
| *Language as magic on the web* | *The global nature of organisations* |
| | *Fundamental limitations(Godel/Turing, chaos etc)* |

**Table 1: The human mind versus the technological environment**

If the online world forces us to behave non-rationally by, for example, constantly shifting and changing its mode of operation, and if there is a gap between ourselves and the environment that we cannot bridge, then we are in a mental state where historically we have two options: the 'non-sensible' response is madness, whereas our only 'sensible' response has been to start appealing to the gods or other non-human entities for help, as in Frazer's arguments – unless we can tackle one or both of these two categories: the state of mind or the situation.

Today, the natural world of sun and stars, as far as our mundane lives are concerned, is understood. However, there is now a new environment for us to comprehend – the technological, computerised, networked environment – and to a large extent it is incomprehensible. There is a gap in our relationship to it, a gap in our understanding, and we are in danger of filling this gap with magical thinking and appeals to gods.

Science and fantasy aren't even two sides of the same coin here – fantasy comes rather ironically from the massive use of science, in the form of technology; it comes about when we concentrate on developing the computing model in society. We have three elements that come together like cogs in a deus ex machina: first, the human state of mind which is being coerced into behaving irrationally because there is no rational way to respond; second, the situation in which magic thrives, where people can't bridge the gap between themselves and the environment; and third, the fundamental mechanisms of the environment (IE computing) that produce Frazer's

laws of magic.

It's not that the computer model facilitates this magical world, that we <u>can</u> use it to play World of Warcraft, that we <u>can</u> create *sort-o*f magical environments. The argument in this paper is that computing makes this magical world inevitable. *We can create no other types of world using computer systems, except **literally** magical worlds*. Computers work by data storage, and in our PRISMed and Googlised world, that data can be inspected willy-nilly, allowing random access to and manipulation of everything down to the level of the individual bit and byte, and through this random access producing the Laws of Similarity and Contagion.

The fundamental limitations and the way computing works, especially when yoked to human nature and the way we conduct business in Western society with its need for ever-greater expansion, mean that it cannot create anything other than an electronic Elfland, where anything that was once connected remains forever connected in a giant Google-ish database, where things that are alike turn out to be identical and that manipulating one affects the other. We have organisations that are creating the infrastructure of existence, which they control and whose rules they play with as they wish like the Gods of Chaos in Michael Moorcock's Eternal Champion books.

The more that we migrate our world online, the more that real objects are twinned with data to become spimes (a mix of real world objects and virtual objects), *the more that human beings themselves become spimes, which they already have, with virtual components like 'account number' and 'password'*, and the more that we rely on virtual objects, the more this will be self-evident.

**CONCLUSION**
The conclusion, therefore, is that for an understanding of the present and the near future, we would be better off looking to the fantasy works of authors like Jack Vance, Matthew Hughes, Michael Moorcock, Ursula Le Guin and their ilk, and not so much to science fiction. The rational or 'Star Trek' consensus future discussed by Westfahl and Wollheim will not come to pass if we are literally living in a fantasy world that runs by magical principles and where the human mind is conditioned to accept a non-rational environment and magical relationships.

Science fiction author Charles Stross, in The Atrocity Archives[5], put forward the idea of a government agency that used abstruse maths to control or fend off demonic entities from literal other dimensions, but he didn't need to look any farther than our own universe for examples of ravening creatures from the mathematical dimensions that are inherent in computer programs. We were promised the Gernsback

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[5] Stross (2007)

Continuum, the future of cities on the moon, personal jetpacks and robot butlers, but instead we have entered a transitional period into the Dying Earth, of capricious gods and unreliable non-human spirits.

The fundamental limitations due to Godel, Turing and chaos theory, and the use of computing technology which embeds within itself the Laws of Similarity and Contagion - the technology that is becoming our dominant metaphor for thinking about our world and our means of controlling it – none of these lead to a rational world; they lead, have led, to an irrational and literally magical one instead.

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