"THE FORCE IS GREAT"

ENCHANTMENT AND MAGIC IN SILICON VALLEY

by

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In the social sciences, magic and technology are generally depicted as incompatible. Challenging this claim and, more specifically, the assumption that technological experts are at the frontier of a progressive 'disenchantment of the world', this contribution presents a strategically selected case study of renowned programmers in Silicon Valley who refer to themselves as 'technopagans'. These specialists conceive of the act of programming as magical, because they feel they interact with a technology-based reality that can no longer be completely understood and controlled. Technopaganism can thus be explained by classical theories of Marett and Malinowski in which they connect magic to feelings of insecurity and impotence vis-à-vis the (natural) environment. Paradoxically, it is concluded, the modern process of rationalization produces a re-enchantment of digital technology.

KEYWORDS

Magic, computer technology, technopaganism, Silicon Valley .

1. INTRODUCTION

More than a decade before the emergence and widespread application of the Internet, the mathematician and computer scientist Vernor Vinge published his influential science fiction novel True names (1981). Like other authors in the so called 'cyberpunk genre' – William Gibson, Neal Stephenson, Rudy Rucker and others – he envisioned a computer-mediated, disembodied space called the "other plane". Although this other world was the product of science, Vinge described it as a deeply enchanted world inhabited by mysterious monsters, god-like creatures and wizards. "The wheel has turned full circle", Vinge comments (2001[1981]: 241). Society returns

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from an "age of reason" to an age of "magic" in his book: the protagonists fall back on magical means, models and rituals to control their digital environment:

> *Sprites, reincarnation, spells, and castles were the natural tools here, more natural than the atomistic twentieth-century notions of data structures, programs, files, and communication protocols. It was, they argued, just more convenient for the mind to use the global ideas of magic as the tokens to manipulate this new environment (Ibid.).*

According to many social scientists from the 19th century, such as Frazer, Tylor and Levy-Bruhl, magic can essentially be understood as a 'primitive', 'irrational' and 'premodern' method to control the natural world – a world, they argued, that thoroughly mystified the 'premodern' mind. Modern 'rational' science and technology would logically replace these   worldviews and methods. One of the first authors to de-construct such stereotypical, typically modern and evolutionary schemes was the anthropologist Bronislaw Malinowski. In *Magic Science and Religion* (1954[1925]) he criticises Levy-Bruhl, who supposes that 'the savage' – as opposed to modern man – was completely immersed in a mystical frame of mind, filled with superstition, mystic participations and magic. On the basis of his ethnographic fieldwork on the Trobriand islands, Malinowski opposed that pre-modern people used both magic and technological knowledge. For mundane activities such as building canoes, fixing a fence or sowing, cultivating and harvesting the land, Malinowski argued, pre-modern man relied primarily on past experience and technical knowledge.

Malinowski's position, in short, differentiates the stereotypical image of pre-modern man as being completely immersed in a magical frame of mind. In this contribution I will use a reverse strategy. Not only will I demonstrate that contemporary 'technological society' (Ellul, 1967[1954]) is not devoid of magic and enchantment, but, moreover, that we are witnessing an 'elective affinity' between modern computer technology and magic. This affinity counters the modern assumption that magic and technology are mutually exclusive and that the influence of the latter instigates a progressive "disenchantment of the world" (Weber, 1948 [1919]: 139). I will therefore first assess such an affinity and will furthermore explain the convergence of magical and digital models by focussing on a group of ICT specialists in Silicon Valley: they refer to themselves as 'technopagans'.

2. MAGIC AND COMPUTER TECHNOLOGY: AN ELECTIVE AFFINITY

The emergence and growth of the neopagan movement since the 1970s shows that magic has not disappeared from Western society (e.g., Adler, 1997[1986]; Berger, 1999; Hanegraaff, 1996; Luhrmann, [1991]: 1989; York, 1995). Neopaganism consists of many branches, sub-currents and communities, but is essentially an animistic and polytheistic 'nature religion'. Nature (the clouds, mountains, trees and sea) is seen as a vital and sentient environment. In addition, neopagans worship various gods and goddesses, like the goddess of fertility and her male counterpart the horned God in Wicca.[1] Magical practices, rituals and spells are probably most important in the neopagan milieu, since, as one of Adler's respondents says: "It's a religion of ritual rather than theology. The ritual is first, the myth is second." (1986: 170). Like many other contemporary spiritual movements, the neopagan movement is motivated by a critique on modern society, especially on scientific and technological 'progress' that has alienated modern man from himself and his natural environment (e.g., Aupers and Houtman, 2006; Houtman and Aupers, 2007; Berger, 1999). Through magical rituals neopagans seek for a 're-enchantment of the world' because, as Hanegraaff notes, "neopagan magic indeed functions as a means of invoking and reaffirming mystery in a world that seems to have lost it" (1996: 84).

Given the goal of pagans to re-enchant the western world through their magical practices and beliefs, it is remarkable that science and technology are predominantly positively valued in the milieu. A survey by Adler in 1985 among American neopagans showed that "a surprisingly high percentage" was employed in the scientific and technological branches. No less than 16 % of the respondents were working as programmers, software engineers or were otherwise employed in the computer industry (Ibid., 446). Luhrmann, who conducted her research in Great Britain, notes that about one out of five of the neopagans she interviewed was working with computers in some way or the other (1989: 106). Aside from professional occupation, both Adler and Luhrmann found that neopagans are great fans of science fiction literature. In the United States there is even a large community, 'The Church of All Worlds', based upon Robert A. Heinlein's science fiction novel Stranger in a Strange Land. This group refers to science fiction as "the new mythology of our time" and as "religious literature". Adler (1986: 285) therefore concludes that "science fiction and fantasy prob-

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[1] Wicca is the largest current of the neopagan movement and was founded by in the 1950s by Gerald Gardner - a British soldier who published on secret, pagan "covens" and communities.

ably come closer than any other literature to systematically exploring the central concerns of Neo Pagans and Witches."

More recent studies indicate furthermore that pagans are more active on the Internet than other religious groups (Brasher, 2001). According to Erik Davis, neopagans are "one of the first religious subcultures to colonize cyberspace" (1999[1998]: 184). Other researchers state that neopaganism "is the fastest growing religion in North America with the Internet being the prime means of proselytizing".[2] And indeed: many pagans form communities and covens online to exchange information and to affirm and strengthen their pagan identity. As one pagan comments:

> *The Net: there is a large community out there. A very active pagan community. The only way to get to them is on the Net – they are all over the world. So now your society expands again, it takes a big jump. You talk to people who work with different traditions, are from different countries. There is something spiritual about that. A feeling of support. Of mutuality. Like: I may be crazy but I have a lot of company (personal interview, December 2001).*

The Internet, another pagan holds, is "a 'church', for lack of a better word" whereas yet another writes about pagans as "people of the web" (Nightmare, 2001). That their affinity with computer technology and the Internet goes further than instrumental motivation and practical use is expressed in many pagan books. One encounters titles like The Cyberspell book: Magick in the Virtual World (Knight and Telesco, 2002),The Virtual Pagan: Exploring Wicca and Paganism through the Internet (2002, McSherry), Witchcraft and the Web: Weaving Pagan Traditions Online (Nightmare, 2001) and Penczak's City Magick. Urban Rituals, Spells, and Shamanism (2001). Whereas magic is generally performed in nature – in face-to-face gatherings, many of these authors write about the performance of online magic and rituals. Such rituals, Radde-Antweiler (2006) has argued, exemplify a sort of privatized 'cut and paste' mentality that radically transgresses existing traditions and dogma's; they can best be understood as "Patchwork Rituals" (Ibid., 68). The advantage of these online rituals lies primarily in their scope: pagans around the globe can easily log on and participate from behind their computers. By doing so, pagans turn the Internet into a sacred space – in their online rituals they transform the technical medium into a magical message:

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[2]   Quoted in: 21st *Century Challenges to Separation of Religion and Government*, Jefferson 21st Century Institute. www.j21c.org/challenge.htm

> *We create this circle across the Web to protect us from all forces coming to do harm. We ask that only those energies coming in perfect love and perfect trust, in complete harmony with our magical intentions, enter this circle. We create a sacred temple beyond time and space, between the worlds, where our magical intentions will manifest. (...) Visualize the circle of light moving across the Web that connects all. Feel yourself connected by the ring of light, stretching across the world to envelope all members, stretching across the world (Penczak, 2001: 269).*

That we are indeed dealing with an elective affinity is furthermore indicated by the fact that digital technology itself is often related to magic. This happens, first of all, in the public discourse. The sociologist William A. Stahl conducted a content analysis of 175 Time Magazine articles on computer technology, demonstrating that 36% of these used explicitly magical vocabulary. He concluded: "Magical discourse seems alive and well in industrialised North America" (1999: 80). Notwithstanding the fact that ICT experts are generally depicted as standing at the frontier of processes of rationalisation, secularisation and disenchantment (e.g. Wilson, 1976) they are often referred to as 'magicians', 'wizards' or 'the sorcerers apprentices' (e.g., Levy, 2001 [1984]). This discourse is even common among technicians themselves. Kevin Kelly considers religious and magical talk about computers characteristic of contemporary culture in Silicon Valley and calls it "nerd theology" (1999). John von Neuman, Norbert Wiener and Marvin Minsky – three main pioneers in the field of Artificial Intelligence – consider themselves the heirs of Rabbi Low, the medieval alchemist who, as the story goes, created a golem, by breathing life into dead matter (Noble, 1999[1997]: 173).

Probably the most clear-cut example of the affinity between pagan magic and digital technology is a group of contemporary ICT specialists who explicitly refer to themselves as 'technopagans' (Davis, 1995, 1998; Dery, 1996; Rushkoff, 1994). Davis (1995) – who calls himself an 'observing participant' – describes technopaganism as "A small but vital subculture of digital savants who keep one foot in the emerging technosphere and one foot in the wild and woolly world of Paganism (...) they are Dionysian nature worshippers who embrace the Apollonian artifice of logical machines." Many websites can be found on the Internet that, part jokingly and part seriously, explain what a technopagan is or does. One example is the following fragment of a website text:

Signs that you may be a technopagan
If the address of your covenstead begins with http://…
If you calculate the phases of the moon with software…
If you do most of your correspondence by email and sign off with Blessed be…
If your Book of Shadows is online…
If you participate in online rituals…
If you've ever invited the God and Goddess to come online…
If your patron deity has a homepage…
If you tap into the collective unconsciousness using newsgroups…
If your altar has a keyboard…
If your daemons collect news for you…[3]

It can, in short, first be concluded that magic and technology are not as incompatible as modern theories about a progressive rationalisation, secularisation and a 'disenchantment of the world' account for. On the contrary: the studies and empirical illustrations discussed indicate an unacknowledged elective affinity between magic and digital technology. This development is in line with the theoretical framework developed by Bruno Latour (1993[1991]). In We Have Never Been Modern (1993[1991]) he argues that modernization is above all about constructing a distinction between nature and culture, objects and subjects and, essentially, constructing an artificial gap between 'civilized' society and 'primitive' premodern society. Despite the relentless modern enterprise of "purification" - to establish and legitimate this asymmetrical relationship between the modern and the premodern - we are increasingly confronted with "hybrids", "in-between categories" and "monsters" that defy the modern disenchanted worldview (1993[1991: 115).

Latour mainly refers to the proliferation of "quasi-objects" in laboratories - the development of weird technological creatures like robots, cyborgs and the like. The case of technopaganism may provide yet another case study: as a "hybrid" it disturbs the carefully constructed "modern divide" between 'primitive' / 'irrational' magic on the one hand and 'progressive'/ 'rational' technology on the other – a distinction that is at the very heart of a modern 'disenchanted world'. In the next section I will therefore study the worldviews and practices of technopaganism in more detail and, by doing so, try to explain the assessed affinity between magic and computer technology. The analysis is based on qualitative in-depth interviews with approximately 20 technopagans – mostly ICT-specialists, programmers and software engin-

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[3]   http://3.avatarreview.com:8081/dragoncave/stories/storyReader$68 (date of retrieval, March 2004).

eers employed in Silicon Valley (US, California) at the time of the interviews. The fieldwork was done in 2001 (between August and December).[4]

3. ENCHANTING DIGITAL TECHNOLOGY

Max Weber famously argued that technology robs the world of its mystery because it "can, in principle, master all things by calculation" (1948[1919]: 139). In this section I will demonstrate that technopagans hold a radically different view: they all think of digital technology as a mysterious and enchanting entity. Mark Pesce, certainly one of the most vocal technopagans in Silicon Valley, is one of them. He is an MIT 'drop out', a programmer, a filmmaker and writer and developed Virtual Reality Modelling Language (VRML) in the early 1990s – the first computer language to design three dimensional images on the Internet. Pesce tells in a personal interview (September 2001), that in his technical practice he is inspired by the work of cyberpunk writers like Vernor Vinge, Neal Stephenson and William Gibson. In the 1990s he made it his personal goal to turn the emerging Internet into a parallel universe with sheer unlimited possibilities. Pesce grounds his worldviews in a historical-sociological perspective: he is convinced that after a period of three centuries of rational, technical and analytical thinking, we are re-entering an age of magic. According to Pesce, mechanistic models of modernity are no longer applicable to the new digital realities of the Internet and Virtual Reality. Until further notice, our rapidly emerging digital environment can only be captured by ancient magical concepts. Technological and magical ontologies thus converge in his worldview.

It is important to note that Pesce did not start out as a pagan and – from this perspective – then interpreted technology as enchanting. It was rather the other way around: it was mainly his interaction with computer technology that set him on the trajectory of technopaganism:

> *I went to San Francisco and started working in Virtual Reality. This is a weird thing and it is very hard separating elements right now. But thinking about Virtual Reality and now starting to work in it as a programmer and designer and trying to create it, I now start to see correlations between what we would call "magical thinking" and what we would think of it as the designer: the ontology of cyberspace (..) And it starts changing the way I think the world is constructed. This starts to have an influence on my technical practice. It starts to feedback on my ontological understanding of the*

world. And that just became a feedback. Until I ended in this place which you can call technopaganism (personal interview, September 2001).

Pesce's story of 'conversion' to technopaganism is no exception. Various respondents argue that their interaction with digital technology transformed their ontological understanding of technology. They speak of a gradual, but unmistakable shift from understanding the technological environment in only technical terms to seeing it as deeply enchanted. How, then, can this technopagan perspective on digital technology be characterised? This will be demonstrated in the following three sections.

3.1. "WHERE THE ZEROES MEET THE ONES"

Modern pagans generally see their natural environment as imbued with mystery and spirituality. The interviewed technopagans in Silicon Valley, however, consider our digital environment as a fundamentally mysterious realm. Most respondents agree that there are various elements in contemporary technology that contribute to its mysterious nature. They point out, to begin with, that technology is rapidly becoming smaller, less tangible or even invisible. Working on hardly tangible material such as complex computer programs, electromagnetic waves or microchips apparently forms a fertile breeding ground for interpreting and framing it as a mystery. "Software", one respondent says, "is completely symbolic. It doesn't exist." Another states that "the program itself is an abstraction, it doesn't exist in any form anywhere".

The technopagans often refer to 'technology of the future', like nanotechnology and quantum computers. Both developments – grounded in the field of quantum physics – are indicative of technology becoming smaller and smaller and yet more powerful: quantum computers promise to bypass the 'crude' binary 0-1 logic of today's computer and supposedly yield endless possibilities in the analysis of data. Nanotechnology raises the promise of full control over the material world on an atomic and molecular level. The mystery of technology is therefore not only fed by small technology already developed, but also – and maybe even more so – by not yet produced or not yet 'domesticated' technologies. Such technicians, one respondent claims, are "working on a mystery" and this turns them in to "magicians" or "wizards". As Brenda Laurel - a renowned specialist in the field of Virtual Reality argues:

Unexpected transformations occur. I mean it approaches alchemy. There are a lot of parallels here. There are only a few people who understand the deep

'arcana' of the frontiers of for instance computation from cryptonomy to na-
notechnology. These are wizards to the rest of us (..) There are gigantic
transformations involved, transformations that are much less clear to the
person than industrial transformation. It is the Arthur C. Clarke thing: far
advanced technology can no longer be distinguished from magic (personal
interview, November 2001).

Many technopagans use the latter quote of science fiction writer Arthur
C Clarke that "advanced technology can no longer be distinguished from
magic". The word magic, in this context, is not applied to magic as a ritual
but mainly used to express the mystery of intangible, opaque, digital tech-
nology. This applies especially to contemporary software or futuristic
devices built on nanotechnology. But even the personal computer is some-
times the object of mystical speculations. As Jennifer – a programmer – says:
"There are levels in computers that most people have never seen." Others,
such as Lorry Wood, point out the mystery of the zeroes and the ones that
meet each other in the deeper layers of the computer:

They put a silicon wave on top of it: now it became a lot harder to see the in-
side of it and see how it worked. When you don't know how it works it gets
the black box label. Magic! I can describe it in overview terms and I can de-
scribe it down to most of what's going on inside your PC, but I can't do it to
where all the zeroes meet the ones. I have to stop several levels before that
(personal interview, September 2001).

3.2. "THINGS GREATER THAN THOU"

The mysterious nature of technology is thus attributed to technology be-
coming smaller and intangible. On the other hand, technopagans argue that
technological systems are also becoming larger and thereby literally tran-
scend individual human beings. The Internet is, of course, the paradigm ex-
ample here: since the 1990s it has rapidly grown into a world wide digital
realm that interconnects almost every personal computer on earth. Like
Mark Pesce, many technopagans point out the similarities between magical
realities and the ontology of the Internet.

Different enchanted perspectives on the Internet can be distinguished.
According to most technopagans the Internet can no longer be understood
in a mechanical way since it 'grows' and 'behaves' in an organic fashion. It
should therefore be understood and studied as a natural environment.
Moreover, the Internet actualises an ancient holistic claim about the uni-
verse: like in the cosmos as a whole, everything and everyone is "connec-

ted" on the Internet. This perspective is illustrated by Gwenny – a female programmer:

> *I think that like me a lot of computer pagans view the internet as a model of the universe. That we are all connected on a spiritual level and that we are all connected on the internet level. That appeals to me very much: the idea that we are all interconnected. The internet is kind of organic, just like the universe is. And you can grow your little servers, realities and universes; they spring up all over the place. (...) The universe is ever-changing just like the internet is* (personal interview, November 2001).

The Internet is thus depicted as a space were all is 'connected'. Moreover, like the natural world, it is considered to be fundamentally complex and consequently out of control. The World Wide Web as a whole can therefore never be grasped or mapped by humans in an empirical sense. Technopagans hold that its chaotic nature undermines a rational, mechanical or technical perspective. The Internet transcends human understanding. This is the reason why programmers Gwenny and K.C. Anton celebrate its mysterious nature:

> *Just the idea! How my webpages link to others, because I have hundreds of links on my webpages and that means that they are linked to hundreds of others and it creates this huge multidimensional reality that you cannot visualise because it is way too complex. That's why it resembles magic; magic is so multidimensional. It goes beyond the realm of our senses. We can't even begin to fathom how complex it is now* (personal interview, November 2001).

> *Where there is too much information to be downloaded, so to speak, like when you hit a website and there are six hundred thousand pages on it and twenty two million links, you are just blown away (...). Why it becomes magical is because you have the unknown quotient. Mystery. (…) Many pagans will say: the more technology you got, the more mystery you're going to have* (personal interview, October, 2001).

3.3. "A SPIRIT OF ITS OWN"

Finally, not merely the complexity of the Internet causes some programmers to regard it as mysterious but mainly its – apparent – autonomy. Though man-made, the Internet possesses its own, internal logic and dynamics, thereby escaping the control of human action. According to Erich Schneider, contemporary computer technology has a "spirit of its own". He writes:

Magic has long been associated with the making of precision tools, axes, swords, goblets, fire.

But the new techno-magic is different ... it no longer is simple, serving us in the fields or in battle (...) The force is great, and especially the programmers, laser jocks, scientists, and silicon architects can feel it. The technology has a spirit of its own, as valid as the spirit of any creature of the goddess. This is the spiritual force we, those who are called technopagan, feel and must express. Not surprisingly, we find ways of bringing technology into our worship.[5]

Statements such as these seem to go a step further than vaguely portraying contemporary technology as mysterious; they raise an animistic perspective on digital technology (Aupers, 2002; Davis, 1998). Inspired by premodern worldviews, contemporary pagans perceive of their natural environments as alive and sentient. Trees, rocks and rivers are not just objects, but are meaningful entities – sometimes depicted as having a 'soul' or 'spirit'. Technopagans project such animistic views not (only) on nature, but (also) on digital technology. They contribute subjective, life-like qualities to the Internet, software programs and computer viruses. In personal interviews, René Vega commented about complex programs that he "(..) treat[s] it as a living entity"; Larry stated "I give it life in my mind" whereas programmer André held that "it has a scrap of a soul for me".

As with the Internet, mystifying statements like these are tied to the fact that devices transcend human understanding; they are man-made but 'behave' in complex, autonomous ways. Especially the development of Artificial Intelligence, Artificial Life and the emergence of 'bots' and 'viruses' on the Internet, feeds animistic ideas and sentiments (Aupers, 2002). As Deborah notes dramatically: "The ghost in the machine has made itself evident again." Such developments seduce one technopagan called "Reason" to speculate about the future:

The future will look very much like the way our ancestors thought their world looked like (..) Artificial Intelligences: those will be our spirits. Because once we've built them, they will be too complex for us to understand. And you will deal with an Artificial Intelligence, the same way you deal with a spirit. You make bargains. You talk to it. Try to understand it. But it will always have that greater advantage over you. These are things that are 'greater than thou' (personal interview, October 2001).

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[5]   http://technopagan.dhs.org/oldworks.html (date of retrieval, August, 2004).

To conclude, on the one hand technopagans point out that the artefacts they work with become smaller, intangible and opaque while on the other hand they emphasise the fact that our expanding digital environment becomes larger – a 'second nature' that is complex and autonomous. These are the main reasons for understanding computer technology as a mystery.

By doing so, they turn the standard image in the social sciences on its head. Half a century ago, Jacques Ellul wrote in "The Technological Society" that "The mysterious is merely that which has not yet been technicized" (1967 [1954]: 142). In our time, technopagans in Silicon Valley consider computer technology itself a thoroughly mysterious and enchanted realm.

4. THE MAGICAL CRAFT OF PROGRAMMING

4.1. BEYOND INSTRUMENTAL REASON?

Enchanted perceptions of technology, as expressed by the technopagans, are not born in a vacuum. More than that: these abstract, philosophical speculations on the ontology of computer technology are firmly grounded in the experiences and practices of everyday life. Concrete experiences with technology bring these programmers to their worldviews and newly acquired worldviews, in turn, validate and strengthen the experiences. Luhrmann calls this gradual conversion in the religious field an "interpretive drift": "Intellectual and experiential changes shift in tandem, a ragged co-evolution of intellectual habits and phenomenological involvement" (1989: 315). Worldviews can in the end thus be depicted as rationalisations and legitimations of concrete experiences in the field – experiences that are more fundamental. Hamilton notes therefore: "To understand religion one has to analyse first and foremost what people do and not what they believe. Practices are primary and beliefs secondary" (1995: 97). What, then, are the concrete practices and experiences of these technicians that have lead them to their technopagan worldviews?

Almost all of the respondents point to their experiences with programming. Programming is, of course, a setting where humans and computers interact and technopagans feel that the act of programming has in many ways been decisive in the perception of themselves as technopagans and computer technology as mysterious and enchanted. "The programmer", one respondent summarizes, "is the magician of the modern age". How do they come to draw such conclusions? First of all, many argue that programmers are, like magicians, involved in "arcane knowledge" inaccessible to laymen and they demonstrate extreme control and power over the world. This line

of argumentation links magic simply with strong feelings of scientific superiority: the technicians consider themselves the elite of the high tech industry in Silicon Valley and stress their 'deep' knowledge and radical control over matter. In magic, Sigmund Freud (1999[1913]) commented, the 'omnipotency of thought' occupies a central place. The magician believes himself to be almighty and – by means of his thoughts, ideas and imagination – capable of influencing external reality.

Most technopagans, however, do not consider themselves and other programmers magicians because they are fully in control, but because they lack full control. These specialists point out that programming can no longer easily be framed in scientific terms: they experience in their practice a breakdown of technical causality or instrumental rationality. Although one is trained as a scientist and knows exactly how to program, one is often surprised about how relatively minimal means (entering codes) can yield unpredicted, yet miraculous results: a computer screen brimming with vivid images, a virtual world, a digital life form. On this matter the philosopher Slavoj Žižek rightly observes: "When we successfully produce an intricate effect with simple program means, this creates in the observer (…) the impression that the achieved effect is out of proportion to the modest means, the impression of a hiatus between means and effect" (2001[1996]: 19)." In such instances, Žižek follows, "the computer as a medium of mastery and control (..) is countered by wonderment and magic" (Ibid.).

As will be demonstrated in the next two sections, this is exactly what happens according to the technopagan programmers.

4.2. "A DELIGHTFUL SENSE OF ELEVATION"
The breakdown of instrumental reason in their own practice is the main reason programmers give for their general point that programmers are magicians and that writing a program is like creating a spell. The activity of programming causes miraculous – and sometimes completely unforeseen – results. This unpredictability, in turn, raises feelings of 'awe' - a mixture of fascination, delight and excitement on the one hand and fearfulness on the other hand. After all, I was told, one never knows exactly what to expect. According to several respondents this already goes for creating quite simple websites using HyperText Markup Language. Simplistic codes are 'magically' translated and transformed into images on the screen and this raises – even with such simple activities – feelings of fascination and bafflement:

When I write HTML codes, (…) I get a delightful sense of elevation, a 'high' when I open up the browser and my images, animations and links appear

'like magic'. I can well see how primitive culture would view a higher tech culture as 'gods' for this reason (…). It's the feeling of programming an action, casting a spell if you prefer, and the results coming to fruition on demand (e-mail interview, September 2001).

Programmers create change. You can create something from basically nothing. We put these little words together, these little characters together, and create these magical things (…) I do webpage design. It's magic to me: I tie these little characters in and this other piece of software translates it into this beautiful page with colours and words and ideas that I can share with other people; that's very magical to me. It's like saying 'abracadabra' and – poof! – it's there, without having to have paint or paper or anything like that (personal interview, October 2001).

The experience that one creates an advanced world with simple means, just like magicians do, is apparently already evoked by creating two-dimensional websites. They create "something from basically nothing" and this raises fascination, delight and excitement. This applies even more to the creation of three-dimensional, imaginary, virtual worlds. Experiences such as these were especially noted by renowned specialists in the field of Virtual Reality, such as Mark Pesce, Bonny De Vargo, Brenda Laurel and Bruce Damer. Bonny de Vargo, for instance, who teaches at Stanford University and is an outstanding specialist in creating virtual worlds on the Internet, comments:

Every time you create something out of nothing, something beautiful, something powerful, it is the closest thing to a religious experience. I do develop worlds. I am a creator, and artist. I don't see that as secular (…) There's this feeling of awe of your creation; that it's better than you thought; that it's bigger than you thought; that it's more autonomous than you thought. It will become something that you would never ever imagine. I have built websites. But it didn't feel the same. (…) For me, I love the god thing of creating and actually creating something that's as big as where we're sitting in. I mean, I built a virtual university [Stanton University]. And it feels just like the real thing and it looks just like the real thing (personal interview, November 2001).

De Vargo's remark that the result of her programming is always "better", "bigger" or "more autonomous" than she thinks in advance is indicative for the lack of control – the breakdown of instrumental reason in programming. Like with the practice of magic, an action can yield unexpec-

ted results that are better than expected. But it can also yield unexpected results and effects that are undesired. Hence this "feeling of awe of your creation" – which indicates both fascination and fear for something beyond our understanding and rational control.

4.3. "THE FRANKENSTEIN FEAR"

Bryndis, a female programmer, dubbed this fear of undesired creations the "Frankenstein fear" – a sentiment that is, she argued, common even among the most skilled programmers in Silicon Valley. After coding, in a rational, technical and mundane fashion, the programmer experiences in one moment whether he or she designed a miraculous thing or a monster. Bryndis comments:

> *There's the moment where you push the button and you wait to see what happens. You've done everything you can. Now all you can do is hope, is pray. Push the button. And is it going to work or is it not going to work? Is it going to spiral into a destructive mess, is it going to blue screen and lock up your computer? What is it going to do? (…) Of course there's always the Frankenstein fear. That you'll create a monster, a bastard child. You just don't know. All the time there are things happening and people say: wow, how did you make it to do that? It shouldn't be able to do that. Or: I wrote that but it shouldn't be able to do that. You know. There's a lot of that. Than there's a feeling of 'awe' (…)* (personal interview, October 2001).

Another programmer adds:

> *You know, there's 10% that we don't even know why it is happening. That doesn't matter. But we're getting to a point that program assemblages become far more than we intended. (...) There's so much that you're not going to be able to figure it out. You're going to have to step back. What is this thing I have created? This life form?* (personal interview, September 2001).

The fact, in short, that the result of programming is often unpredictable generates fascination and fear for the creation. This, in turn, leads to the interpretation that it's essentially a magical activity, a magical ritual or spell. Technical language, after all, is considered inadequate and technical skills deemed useless in such situations. Many programmers therefore differentiate between simple technical activities and complex 'magical' activities. Andre Mendes, a 'senior programmer', says for instance:

> *The less deterministic a device is, the more I think of it as a magical thing. Something that is mechanical and will operate the same way every time to*

me is very low magical. Something like the inner operation of complex sys-
tems, like the CPU, is highly magical. Because it's not predictable, you can-
not always predict the outcome. (…) There are too many factors to exactly
analyze what is going on (personal interview, December 2001).

René Vega, employed as a computer programmer at Apple, is another
good example of this contextual approach. Through his interaction with
computer technology, he came to see himself more and more as a magician.
The main reason for this, he argues, is the complexity and unpredictability
of current computer programs: "My spirituality blossomed in the digital do-
main, where strange, complex things occur." "Fifteen years ago", Vega adds
to this, "computer programs were still simple", whereas now far more com-
plex programs are used in various combinations. In his technical practice he
therefore combines the rational, technical approach with a magical one, be-
cause in some situations and contexts the latter is better suited to the com-
plex, unpredictable and unfathomable 'behaviour' of new technology. He
legitimises this magical approach by saying: "It's not as precise in many
cases as looking at it mechanistically, but then again, looking at it mechan-
istically may just be too complicated." Vega clarifies this statement in the
following description:

There's a point where I applied all these methodical, very rational efforts to
something. Create this unit, this program, this thing. And there is a point
where all these pieces just lying there, they are all tested; this works, that
works etc. And then comes the integration of all these things where once the
perfect interconnection software-wise gets done. And then on its own it be-
gins to work, it begins to react and to behave; I'm talking about the more
complex sort of things. I created things which you make and it does this one
thing and it's done. Very simple. But complex systems where all these differ-
ent things come together, it behaves in an extremely complex way. It reacts
to its environment, its digital environment. When that happens, especially
when it happens that everything just clicks. At that moment what I get is
that experience that I created something. In its definition: it's alive! It's do-
ing what it's doing. Or what it's not supposed to do. Really eloquently it's
behaving as what it wasn't supposed to do in terms of the specification. It
goes beyond that. At that point I say: that's profoundly spiritual (personal
interview, September 2001).

5. MAGIC AND THE OPACITY OF LATE-MODERN MACHINES

Technological progress is generally considered to be an important force in the erosion of mystery and magic or, in Max Weber's famous terms, the 'disenchantment of the world'. While technology is considered more effective than magic – in Weber's view – he did not argue that modern technology itself was comprehensible for anyone. To the contrary: "the savage knows incomparably more about his tools" than modern lay people do, so that "intellectualization and rationalization do not (...) indicate an increased and general knowledge of the conditions under which one lives. It means something else, namely, the knowledge or belief that if one but wished one could learn it at any time" (1948 [1919]: 139). Disenchantment thus assumes division of labor and specialization of knowledge: moderns lack the knowledge to fully understand how a streetcar, an elevator or a computer operates. To them, it might as well be 'magic' but they trust that the experts know. But do they?

The interviewed ICT specialists working and living in Silicon Valley paint another picture: they all emphasise the opaque and unpredictable nature of contemporary digital technology. Their stories converge strongly with contemporary theories about the transference from modern transparent technology to post-modern opaque technology. Digital technology, Sherry Turkle (1995) holds, has surpassed the modern ideology of calculation and transparency, which was basically "analyze and you shall know", and turned it into a "culture of simulation". People nowadays interact "on the surface" of the screen with virtual realities, icons and images. This makes computers more user-friendly but paradoxically holds the "inner working" of the machine invisible to the user: "In contrast to a mechanical machine", Slavoj Žižek comments, its internal action is 'nontransparent,' *stricto sensu* unrepresentable" (2001: 19). This apparently does not only apply to lay people but also to technical specialists and experts. According to Bruno Latour (2002) every new generation of technicians builds upon the creations of former generations – seemingly – without appropriating the original technical knowledge and know-how. Because of this, they are increasingly dealing with an accumulation of "technical layers" that does not decrease but increases the opacity of our surrounding devices. Contemporary technology, Latour argues, is essentially a "black box" – even for technicians themselves. Erik Davis writes about the consequences of such increasing opacity of our digital environment: "The logic of technology has become invisible – literally occult. Without the code you're mystified. And no one has all the codes anymore" (1998:181).

Other authors, like Kevin Kelly (1994) and Donna Haraway (2001[1985]), make similar claims but emphasise instead the autonomous character of post-modern high-tech, Artificial Intelligence programs, viruses and other forms of digital 'life'. Whereas modern mechanical machines were still under human control, this may be different today:

> *Now we are not so sure. Late-twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert* (2001[1985]:30).

Theories such as these turn the modern Weberian perspective up-side down: technology, supposedly a driving force behind the "disenchantment of the world", can no longer "master all things by calculation" since it has become a "mysterious incalculable force" itself (1948 [1919]: 139). Moreover, such 'etic' theories converge with the 'emic' accounts of the technopagans who point out the opacity, autonomy and fundamentally mysterious nature of computer technology.

In answering the question why programmers in Silicon Valley come to embrace distinct magical models and pagan rituals we can apply classical theories of Robert Marett (1914[1907]) and Bronislaw Malinowski (1954[1925]). They proposed that the rise of magic in premodern and 'primitive' society was not so much a primitive intellectual technique, but above all an emotional response to the riddling character of nature. The 'primitives', Marett held, were confronted with a natural environment they could neither understand nor control; it was therefore experienced as an overpowering, mysterious force ('mana') that invoked the basic religious emotion 'awe' – a combination of fascination and fear: "(..) of all English words awe is, I think, the one that expresses the fundamental religious feeling most nearly" (Marett, 1914 [1909]:13). This feeling of awe, then, is held to give birth to the first 'nature religions' (like animism) and magical rituals. The analysis in this article demonstrated that it is exactly this same feeling of "awe" – triggered by the unpredictable, mysterious results of programming, that brings these technicians to their animistic worldviews and magical claims.

As noted in the introduction, Malinowski argued that the 'primitives' were not completely immersed in a mystical worldview. To control the natural environment people used magic and technical knowledge. Whether one uses the latter or the former, Malinowski states, is fully determined by context. In his study of the inhabitants of the Trobriand islands, he illus-

trates his contextual perspective on magic with the case of fishery. Fishing in the lagoon nearby, he demonstrates, is a pure technical matter: the waters are shallow, every possible obstacle is charted and fishermen therefore completely trust their experience and technical skills. Fishing at open sea, however, is an activity suffused with magic: the deep ocean is unknown, literally nontransparent and obscure, and technical skills are therefore inadequate. In such situations, Malinowski tells us, the 'primitives' fall back on magical models and means:

> *Man, engaged in a series of practical activities, comes to a gap; the hunter is disappointed by his quarry, the sailor misses propitious winds, the canoe builder has to deal with some material of which he is never certain that it will stand the strain (..) Forsaken by his knowledge, baffled by his past experience and by his technical skill, he realizes his impotence* (Malinowski, 1954[1925]:79).

Magic, Malinowski holds, emerges primarily in situations where technical knowledge and skills loose their value. This is exactly what happens to the technicians in this study – during the activity of programming they experience a breakdown of instrumental reason. Something unintended or undesired happens or there may be simply "too many factors to analyze what is going on". At such moments, in such specific contexts were feelings of "impotence" emerge, magic substitutes technical knowledge. These concrete experiences, in turn, bring them gradually to a more generalised, philosophical pagan perspective on digital technology. For the technopagans our technological environment is a veritable mysterious world or – to elaborate on Malinowski's example – a virtual ocean brimming with unknown and incalculable forces. The analysis in this article thus calls for a refinement of the all too bold theory of a progressive "disenchantment of the world". Magic and (computer) technology are not mutually exclusive and, more than that, technological progress may paradoxically be responsible for the growth and flowering of mystery and magic in the late-modern world (e.g., Aupers, 2002, 2004; Aupers et al., 2008). Jacob Nielsen, chosen by The New York Times, Business Week and Internet Magazine as one of the most influential Internet specialists, is quite sure: "In the future, we'll all be Harry Potter!"[6]

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[6]   http://www.useit.com/alertbox/20021209.html (date of retrieval, September 2004).

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