Marginal Networks: The Virus between Complexity and Suppression

Roberta Buiani
robb@yorku.ca

[Article originally published in the *Fiberculture Journal*]

> 'What is a Margin?' I asked a friend recently. "You know what a margin is" she replied "It's outside the body of the text. It's what holds the page together." "Also," she added, "It's where you write your notes." (Berland, 1997)

Introduction

In a recent article, Sampson suggested that the metaphoric relocation of the contagious properties of biological viruses into viral technologies has produced the assumption that computer viruses are 'imbued with an alien otherness' (Sampson, 2004). However, it is arguable that such alterity can be ascribed to all viruses, as long as they are analysed as cultural notions or as discursive forms instead of being forced within clearly defined disciplinary boundaries, and being classified as separate and incompatible entities, organisms, or mere strings of code. Suspended between life and death, myth and reality, abstract and concrete, viruses are perfect candidate for the champions of marginality.

The margin is blurred, fuzzy, and flexible, it is unnoticed or ignored, it is irrelevant, it is other and abnormal. Nevertheless, it is an unavoidable presence. The margin often shows highly creative potentials, thanks to the rather blurry nature of its borders and the unpredictability of the entities that continuously move, modify and cross its peripheral space. Viruses, as discursive forms whose implicit creative potentials move from and through the margins, play a particular and privileged role in this discourse. In fact, it is when viruses are culturally defined, observed in relation to the surrounding context and submitted to a cross-disciplinary inquiry, that their complexity and subtlety become apparent.

The virus not only constitutes one of the most ancient discursive forms, but also one of the most widely spread cultural notions. Although its definition, classification and specifications change according to the discipline that examines it, the use of the term "virus" is always associated with a series of shareable perceptions, and carries a number of attributes and characteristics that can be found almost unchanged in many contexts. In historical accounts, medical treatises and chronicles, viruses and other infectious diseases are often described in similar, if not identical, ways. In these accounts, the molecular nature of the disease is not relevant. Although different agents could be the cause of an epidemic (such as bacteria, viruses or other micro-organisms), the descriptive patterns used to illustrate their physical and psychological effects over the population, as well as their diffusion, seem to coincide. Similar apocalyptic connotations and constant use of warfare metaphors are used to describe the spread of infectious diseases of various nature that affected either human beings or animals (as in Virgil's book III of "Georgics," which chronicles a devastating cattle epidemic) (Slack, 1992: 27; Longrigg, 1992: 45).

The very descriptive patterns produced and employed in the past persist today, be they used in popular culture, where the contagion could be the ultimate terrorist strategy, in science fiction, where the spread is often caused by pathogens escaped from secret government labs, or scientific and medical accounts, where metaphors of "the body at war" are pervasive (Martin, 1999: 366).

By sneaking inside our operating systems on a daily basis, computer viruses are the latest addition to the list of contagious threats. First, despite the visible discrepancies existing between them and their biological "relatives", computer viruses promise to spread through our intricately linked networks in a way that could be easily compared to that of human epidemics: file sharing and density of communications across networks cause computer viruses to spread. The busier is the network, the faster is the contagion. Second, although computer viruses have no physical consequences over carbon-based life, 'a sense of invasion and discomfort' usually unite computer users who receive an unexpected visit by such unwanted guests (Ducklin, 2002: 1). Third, metaphors, descriptive patterns and connotations employed to describe computer viruses' spread and effects appear to be the same used to describe biological viruses.

The above observations about the use of the term "virus" seem to suggest the existence of two paths. First, the term "virus" works within a specific field or discipline, to indicate and classify a range of distinct micro-organisms, or, in the case of computer science, a number of self-replicating programs. Second, "virus" acts as a much more generic notion that includes and expands well beyond the constraints imposed by the discipline of study. It is the very generic value carried by the term virus, and not its specific meaning as a field-related specific word that constitutes its cultural significance and discursive functioning.

Upon examining the virus as a culturally embedded notion, two elements in particular appear to emerge: first, whether analysed semantically, structurally or physically, the virus seems to have quite a dynamic phenomenology. It is incurably and uncommonly flexible and complex. Second, as mentioned above, in spite of the continuous morphing and reshaping of its meaning and significance, the virus maintains a number of discursive regularities that not only constitute its dominant accompanying attributes, but that also characterize it in a totalising way by establishing its negativity as an immanent and absolute element. In other words, whatever the historical period, or the disciplinary perspective (biology or computer science, popular culture or the arts) the virus is pervaded by a recurring rhetoric of

discourse that characterizes it as prevalently negative. This rhetoric of discourse constitutes the virus' "negative aura."[1]

Drawing from a series of considerations about the above two characteristics in both biological and computer viruses, I am led in this paper to the analysis of a marginal use of computer viruses by a marginal portion of creative individuals. However, the particular way computer viruses are exploited in such contexts, and the consistent relation existing between them and their biological ancestors reveal both the longevity of the discourse about disease, infection and fear as well as its tactical appropriation and overturning.

Fugitive definitions

Examined from a diachronic perspective, the notion of virus has undergone multiple mutations. As observed above, before the analysis of microbes and particles was possible, the term virus was rarely used. Chronicles, historical treatises, fictional accounts and pseudoscientific studies tend to assimilate what we define today as virus with a wide variety of diseases. Whether known as the Plague, the Black Death or Smallpox, the names assigned to epidemics of various natures normally designated the effects of a disease rather than the cause, the consequences that the virus had over the individual or a population, rather than the microbes responsible for provoking the outbreak. The notion then underwent several mutations due to the development of new theories that narrowed the semantic area of virus to a scientific or technical term. However, the initial assumptions and perceptions are far from having been forgotten or replaced by more specific notions: they tend to overlap and coexist with newly acquired meanings. To give an example, the tendency to conflate cause and effect still survives: the acronym AIDS is often used to designate both the disease and the HIV virus that causes it; the common cold, although provoked by a wide variety of virus-behaving microbes cultivated and circulating in the surrounding environment, is commonly referred to as virus, where "cold" and "virus" are basically interchangeable terms (Lederberg, 2001:3).

If observed from a synchronic perspective, the use of the term virus has crossed many disciplines and has become a flexible and dynamic signifier that now indicates a specific microbe's behaviour in science and medicine, now a technical nuisance that spreads through computers' operating systems. Today, the term virus is a generic definition that refers to a whole variety of micro-organisms with a specific mechanism of reproduction and a peculiar set of characteristics such as its capacity to transform by exploiting the hosts' resources and its necessity to spread through networks or human frequent contacts (Boase, 2001:67). For instance, the average computer user is often unable to distinguish between a Worm, a Trojan Horse (or logic bomb), or a Bug. For the user, they are all computer viruses.

Generally speaking, strikingly similar characteristics and comparable behaviours could be observed in phenomena originating from different contexts. The term virus has colonized those very phenomena that literally, or metaphorically manifest comparable behaviours and mechanisms of reproduction or that principally share with biological viruses similar or analogous structural composition (Wassenar, 2002: 335). For example, particular forms of marketing characterized by a word-of-mouth mechanism of diffusion have recently been labelled as "viral marketing" (Boase, 2001). Self-replicating programs have been only recently added to the list of

[1] "Negative aura," inspired from Benjamin, strives to underscore the characterization of "virus" as a Modernist term, and its almost ritualistic value.

available viruses that affect, this time, not our life as creatures made of blood and flesh, but our networks. It is not by chance that the application of the actual definition coincided with the increasing use of information networks and the realization of the potential damage they could generate. Since then, self-replicating programs have been re-baptised as the artificial intelligence version of their biological ancestors (Burger, 1989:10; Cohen, 1995:14)

The virus is one of the few discursive forms whose notion - by maintaining its description and definition almost unchanged - easily traverses the real or physically connoted world and the so-called digital domain. As mentioned above, computer viruses and biological viruses have analogous methods of diffusion through promiscuous human contacts and busy network communication flows.

In addition, it seems that the virus affects simultaneously, yet separately, nature and human beings, partially blurring the boundaries between carbon-based and digitally designed life forms, life and death, natural and artificial life. Simultaneously, but not identically. In fact, whether we refer to computer or biological viruses, the reaction or the response that different hosts give after having received one, are never identical. Reaction and response change in the human body as much as in computers. Responses by the human immune system change according to personal levels of stress and physical conditions, the surrounding environment, the mode of transmission (Lederberg, 2001:7). Standard medications don't always produce effective reactions.

In the case of computer viruses, a similar conclusion can be drawn. Forrest suggests that we shape computer security systems using the immune system model. This model prompts the OS to scan all external code, to keep the code recognized as "self" or familiar and to discard everything that might be identified as "non-self," that is abnormal or unusual. Forrest recognizes the complexity of computer viruses and the difficulty to constrict them within the same category. She observes that this structure does not strengthen computer systems and does not increase anti-viruses effectiveness. In fact, user habits, installation of new software and editing identify computers as unique environments that may not respond to foreign code identified as intrusive in an identically negative way. Therefore, viruses and security systems shouldn't be reduced to de-personalized and standardized identical unities: 'the concept of "self" likely needs to be presented in multiple ways to provide comprehensive protection' (Forrest, 1997: 90).

"Scary" networks...

It is no easy task to eradicate a tradition that has constantly perceived viruses as pure and absolutely negative entities. Because semantic additions tend to pay more attention to the virus' mechanism of reproduction instead of its static structure, a series of different microbes can now be potentially included and classified under the category of virus. This inclusive move admits that not only harmful microbes, but also similarly behaving particles necessary for organisms to work properly could potentially be listed under the general definition of virus. However, defining the above particles as viruses may be difficult to achieve. On the one hand, it would mean separating the notion from its most popular, deadly and fearful attributes. Viruses have been associated with human tragedy and suffering to such an extent that it is no longer possible to separate the word from any moral or subjective judgment. On the other hand, labelling non-dangerous particles as "viruses" would contradict Western biomedicine's claim that the human body is a self-contained and independent unit, or, to use a war metaphor, a citadel or a nation-state, whose fixed

boundaries, or borders, not only are rigidly separated from external agents, but they are also constantly threatened by potential foreign others, or armed enemies, identified with viruses, bacteria and microbes (Martin, 1990:365). There are no such things as "useful viruses."

This means that the transformation of the meaning of virus has not been accompanied by an equal change in the way it is popularly perceived. The notion still contains all the assumptions and attributes deriving from earlier interpretations. In other words, the conceptual transformation (from the disease to its cause to the behaviour of a microbe or a computer program) that the notion of virus has historically undergone is mainly a selective one. A number of discursive regularities have remained embedded within the original definition, while different applications were constantly acquiring new meanings. These regularities not only constitute dominant attributes that accompany the virus, but they also characterize it in a totalising way by maintaining its negativity as an immanent and absolute element (Foucault, 1989:159).

It is convenient then for both advocates and detractors to think of the virus as a substantially harmful organism: Media, political, artistic and medical excitement tends either to defend or to attack the virus by setting its negativity as the starting or central point around which is based the entire argument. The virus continues to be seen as "other," while any creative and innovative potential, instead of liberating the virus from its alterity, becomes part of a 'mythology of alterity, which simply opposes to reason a form of non reason (Rella, 1994, 1978: 22).' Representing the virus as subversive becomes part of an idealistic illusion that results in validating the old, popular syllogism 'that which is revolutionary is persecuted and repressed: therefore, that which is persecuted and repressed is revolutionary.'(Rella, 1994, 1978: 34)

Nevertheless, eliminating what makes the virus a controversial discursive form, ignoring its status and traditional roles, would belittle the interest and curiosity of many scientists, scholars and artists. The negativity of the virus holds the pages of the general discourse together; at the same time it annihilates any attempt to dismantle such discourse.

Contradictory terms

The two characteristics summarized so far seem to constitute the originality of the virus. However, such originality manifests itself in quite an ambiguous way. On the one hand, the assigned or imposed attributes of the virus always appear to prevail over its natural dynamic manifestation and flexibility. It is always its significance as a threat or as a dangerous entity that occupies people's first impressions, meaning that the virus responds to some given expectations. On the other hand, a distinct complexity potentially enables the virus to escape any stable definition, any static constraining, and turns it into a rather fuzzy entity. To use the initial metaphor of the book, although moving 'outside of the body of the text,' the virus participates, influences and 'holds its pages together.' Although being an outsider, an unwelcome presence within a normative situation (the so-called "healthy body" or the uninfected computer, the body of the text), the virus unifies people in their negative perceptions, moving through apparently incompatible realms, a physical and a perceptive one. The virus seems to be able to "float" in an in-between space, therefore creating new inclusive narratives. As a result of this disposition, the virus could easily coexist across spaces as diverse as the virtual and the real, the biological and the digital.

Trying to dismantle the century-old demonisation of the virus by focusing on its complexity has been on the agenda of a number of scholars and researchers. Research that studied the burden of mutual adaptation between virus and host has proved quite unpopular, as witnessed by the number of grants withdrawn because *the research has been* deemed marginal or risky (Epstein, 2001:416; Lederberg, 2000:290). Viruses are normally defined as types of microbes able exclusively to produce harm or annoyance to the human (and now to computer) immune system or as extraneous entities that generate negative reactions and malfunctions in the organism affected. Whether one refers to the human immune system or to the computer security system, prevention and removal are always identified as the two possible solutions to correct such malfunctions. When the existent immune systems are unable to eliminate the intruder, medications and treatments or anti-virus software and firewalls are often deemed necessary to help fulfill such a task. Once the virus is destroyed, the disease is believed to be no longer present in the immune system and the "normal" functions of the body are finally re-established (Epstein, 2001: 418).

Nobel laureate Joshua Lederberg points the finger at medicine's 'obsessive focus on extirpating the virus' as well as at its tendency to separate microbes from their external environment and to observe them in a condition of 'hypervirulence.' This notion has led to both medicine and computer science employing analogous aggressive strategies against viruses, principally aiming at their discarding and suppression. Lederberg disagrees with these strategies. Despite their general acceptance, he notes that such methods have not always led to satisfactory results: 'In the case of new endemic diseases such as AIDS traditional practices have often proved unsuccessful 'and therefore, they should not be left unquestioned (Lederberg, 2000: 288). This lack of success could be ascribed to the very exclusive, univocal and unidirectional notion of the virus. Although viruses 'have a knack for making us ill' Lederberg suggests that we 'Drop the Manichean view of microbes – we good, they evil—In the long run microbes have a shared interest in their hosts' survival: a dead host is a dead end for most invaders too' (290).

Lederberg's above statement illustrates the impossibility of separating human beings from external agents and viruses, as humans and their others are substantially co-dependent. Suppressing the latter means condemning human species on the Earth. In addition, his assertion underscores the constructiveness of the current medical and immunological practices. Perceiving viruses as the enemy forces us to treat them using the most aggressive techniques.

In computer science, more examples report similar conclusions. Ray and Ludwig directed their research towards demonstrating that computer viruses could be conceived as electronic organisms subjected to the laws of evolution. As such, they cannot and shouldn't be eradicated from the "wired jungle" (Ludwig, 1995: 215) as they constitute essential elements of "network-wide biodiversity' (Ray, 1999).

Validating the possibility that viruses are complex organisms embedded in a particular environment integrated with their surrounding contexts would partially dismantle the traditional belief that understands them as absolutely antithetical to other living forms and would make room for research previously classified as marginal. Moreover, examining biological and computer viruses in conjunction with the surrounding environment and the organisms they affect means refusing to agree with a notion of normality as a rigid and arbitrary given (Canguilhem, 1994: 360). This opens up a new, dynamic and moderated understanding of viruses and, consequently, fosters new multidisciplinary and multi-angled research.

A change of perspective?

The contradictions generated by contrasting and incompatible attributes can be detected even more clearly within the arts. In their contribution to the discussion about viruses, a number of artists, especially those operating in the more general field of the electronic and interactive arts, have concentrated their practices on finding, exploiting and defending the creative potentials of computer viruses.

In the artistic practices encountered, the peculiar complexity of the virus seems to be relegated to the background. Needless to say, the negative connotations of the virus are always the first elements brought to the attention of the audience, whatever the artistic intervention, and even when there is no intention in doing so. Normally, the beholder is somehow compelled to connect viral elements inserted in the artwork with her cultural, collective and personal experience of the virus: this experiential apparatus automatically pushes to the background any sign of complexity that the virus might manifest as if it were a secondary or irrelevant element.

The artist or the creator, then, does not appear to be particularly disappointed to see how the notoriously negative characteristics of the virus are most often responsible for the popularity of the artwork.

Since the first wide-scale plagues caused by the first generation of hackers and the spread of the 1988 Robert Morris' 'spectacularly malfunctional worm' (Denning, 1990) computer viruses have been adopted by young hackers as their favourite and most used tool. According to Thomas such choice is the expression of a "boy culture:" young virus writers want to be noticed, to establish a unique reputation among their peers and to easily embody the "noise" in the system that they had often fantasized about (Thomas, 2002:13). Thus, it is no surprise to know that a number of hackers normally interpret computer viruses not as a nuisance, not as a threat or as an offence but, as Hellraiser comfortably affirms, as 'an electronic form of graffiti.' Hellraiser's very career path went from graffiti writing to virus writing. The same can be said about many other North American hackers who established their underground viral activities in the nineties. Dibbell demonstrates how these two activities are in principle compatible, as they are both the expression of similarly conceived subcultures, whose activity consists in constantly subverting, challenging and disturbing that mainstream culture from which the members of these groups normally feel excluded. Virus writing 'asks us to recognize that viruses, like graffiti, are just as much signal as noise; by definition, they are information that subverts control' (Dibbell, 1995). Therefore, such activity appears very desirable for a category of young creative minds willing to scream their presence by challenging the established order, before expressing their very creativity.

The above example illustrates how viruses have been adopted by a particular category of marginal users mainly because of their negative reputation and their assumed characteristics, the possible malicious intentions as the cause of their spread and the association between their use and graffiti writing. Were computer viruses not identified in this way, young hackers would have probably turned to other more appealing forms of expression and practices. Young hackers have contributed to enhancing, instead of eliminating or modifying, an already affirmed myth of the virus as "other."

The collective imaginary surrounding viruses and their producers, enhanced by a rich literature that portrays hackers on a par with heroes and saints, has fostered the production of a series of mythologies that depict both viruses and hackers as icons of digital culture. Consequently, a number of artists constructed their artworks by exploiting not only the technical and structural features of viruses as their model, but also the vast number of stereotypes used before them by the hackers.

Often, the viral component contained in many artistic practices acquires a political value. This element can be observed in those artworks where the very same connotations assigned to the virus are transferred to the artefact and appropriated by the artist or the creative collective, who achieve this goal by describing their work with the same vocabulary used to describe viruses and by conceiving their artworks as "other" in the same way as one would perceive the virus. Whether the goal is to dismantle or to confirm viruses' bad reputation, to include them as starting points of a wider metaphorical content or to exploit them literally, focusing on their alterity and absolute negativity has become a quite effective means to attract quick and easy attention from the audience. A number of questions immediately arise: is artistic use and exploitation of viruses truly succeeding in investing them with a new positive value? Is - as the artists themselves claim - the exploitation of the perceived and established attributes of the virus helping to emancipate it from its "negative aura" or will it rather perpetuate and reinforce it? Does, then, the complexity and flexibility mentioned above get completely lost or hidden in the artefacts produced?

Apparently, the immediately noticeable negative connotations of the virus are always prevailing over other possible characteristics. However, it is its complexity that ultimately realizes the connection, the intertwining and interdependence between the virus itself and the elements or the space with which it is associated or by which it is surrounded. Despite appearances, the virus' complex nature is inherent and it is never eliminated. On the one hand, an observer trapped in and influenced by her cultural and historical assumptions holds it back and fails to perceive such complexity as a strong element. In addition, and for the same reason, an equally powerless creator is faced with the impossibility of preventing such an outcome. On the other hand, the temptation to accept the otherness of the virus as a subversive and, therefore, an irresistible sexy component immediately reinforces the virus' negativity and conceals any other possible characteristics.

An Epidemic and 0100101110101101.ORG joint project, Biennale.py , the first virus ever being exhibited inside an art institution, represents one of the first cases of incorporation, appropriation and clever exploitation of the entire apparatus of stereotypes produced by viruses. Hosted by the Slovenian Pavilion during the 49th Venice Biennale, the project has promptly helped the art collective to gain abundant media attention (Epidemic, 2001).

A printed copy of the virus code was hanging on the wall of the Pavilion, while several other copies were printed on t-shirts and worn by the audience outside and around the gallery. Simultaneously, the "real" virus was released online. Despite the existence of these three versions, it was the first visual display of the code that attracted immediate attention and gathered a curious audience during the day of the opening. The virus' code was displayed in a conveniently pleasant way, transforming a normally invisible and unnoticed entity not only into an immediately noticeable and somehow concrete object, but also into one with an aesthetic value. In addition, the virus was strategically written in Python, a language that 'looks more artistic', (Deseriis 2001; my translation) because it allows

the code to be constructed as a coherent narrative (in this case the text narrates the progression of a party, where the moment of infection is identified with a key action during the party represented by the verb “fornicate”).

On more than one occasion, Epidemic spokespersons declared that ‘ Biennale.py is an aesthetic experiment to demonstrate our capacity to create beauty by using programming code’. Exposing a computer virus is a ‘tribute to more than fifty years of creative code work performed by programmers but mostly not recognized as such and often gone unnoticed’ (Deseriis 2001, my translation). This idea is one of the main postulates upon which Epidemic’s interventions are based.

On another occasion, Luca Lampo cited the text of the notorious worm “I Love You,” and compared the ‘great drama contained in the code sequence’ to a few lines of Dante Alighieri’s first book of the Comedy (Epidemic, 2000). This new aesthetics allowed by viruses was made the subject of a poetry reading/performance at the Digital-is-not-Analog Festival. On the one hand, treating the virus code as an aesthetic object appears to be a mere provocation. On the other hand, reading or displaying its code turns it immediately into a more mundane entity. Thus, the virus acquires a more innocuous and familiar value. Reading the code reduces the distance existing between men and machines. A juxtaposed and artificial visual interface (windows, for instance) usually facilitates and creates a barrier between the user and the computer. The average user is unable to decipher or understand what lies behind the interface, while the code is increasingly enveloped in a halo of secrecy. The virus code, in this context, seems to re-establish, for a few moments or the length of the exhibition or the performance, a lost contact between the user and the code in a reassuring way, as it is now extracted from its usual context and domesticated as a series of words and numbers.

In the above interventions, whether the virus is interpreted as an element with an intrinsic aesthetics or an instrument that attracts attention on either the art group or the labour of the programmer, it is clear that a denial and a rejection of its negativity is somehow implicit. Epidemic/01.org are fully aware that such denial won’t suffice to mitigate the virus’ reputation, but will definitely succeed in popularising the artwork and its creators and to invest both art collective and artwork with a subversive edge.

The strategies of display used in Biennale.py confirm the immediately visible alterity of the virus. However, the project, as a whole, is certainly more than just a playful and ironic intervention. As mentioned above, the virus was also released online and a number of copies were printed on T-shirts. One could argue that the multiple displays are part of a clever marketing tactic and could note that once the virus is abstracted from its “natural” environment and it is transformed into an artwork, it immediately loses its pristine characteristics and functions becoming an empty commodified object. However, it is in this particularly ambiguous situation that the complex nature and dynamics of the virus clearly manifests itself.

Interestingly, Biennale.py is interpreted by Symantec and Norton as a virus when it spreads through the Web, while it becomes a work of art when it enters the gallery space, as if its threatening components were neutralised and its disruptive and transformative power ceased to exist. Despite the virus’ capacity to cross both spatial and disciplinary boundaries, its mode of reproduction and diffusion still remain. The virus enters the gallery space in the same way, as it would penetrate the host or the OS. Once inside, it undergoes a transformation by incorporating elements belonging to the infected host. In the case of Biennale.py, the virus puts on a nice dress and adapts to the environment in a parasitical way, by becoming an

apparently innocuous art object. The presence in the gallery does not prevent the virus from reproducing and transforming, as it is reinserted back into the Web as an "artistic virus", and it is spread by the art goers in the same way as it is transmitted online through our busy networks. In fact, it is thanks to the visitors that the virus is carried around and further spread, this time printed on T-shirts distributed during the exhibition.

Although the virus is not able to ever infect carbon-based organisms, its presence as a symbolic and visual form easily crosses spaces and invades both physical and digital realms. The continuous physical and contextual shift cannot but unveil the ductility and fuzzy nature of the virus.

In the last example the virus is portrayed as living across and dissolving the borders between the inside and the outside space, the virtual and the real domains, the public and the secret, undergoing a process of demystification through its reading as a poem and its display in the gallery space as a narrative. "Infrasense," a work in progress co-produced by KIT and Robert Saucier, brings the process a step further (Infrasense, 2004). The installation represents Trojan Horses and bugs as entities that belong simultaneously to the digital space and the physical realm, that confuse the borders between two apparently incompatible spaces, show the intertwining and smoothness of such dynamic articulation and underscore the way the users become, in this context, also active carriers, transmitters, witnesses and narrators of the virus.

Instead of making a clear statement in defence of or as a commentary to computer viruses, "Infrasense" explores their very process of transmission and diffusion. This could unveil and eventually defeat the amount of prejudices and assumptions that undermine not only the way we perceive and construct it, but also the way we interpret the space that surrounds it.

The interactive installation, which at first sight seems to be constituted by a quite straightforward physical and animated reconstruction of different kinds of viruses, fighting for the survival in the gallery space, or a room-size rendering of a videogame, proves itself much more interesting. A series of mechanical horses, moving back and forth on a grid, immediately remind the audience of the Internet Trojan Horses, inspired from the epic wooden animal fabricated to deceive the Trojans and directly deriving from their computer-based heirs. Three Bugs constantly challenge the Trojan horses. They are controlled randomly by the gallery user through a handheld device located inside the space or from a website (Infrasense, 2004). Each Trojan Horse carries a backpack that looks like a hard drive: this element produces a certain curiosity in the visitor, who wonders what surprise or what threat the mysterious boxes could possibly unveil.

Disappointing as it may be, the boxes don't contain any virus or any noxious device. On the contrary, they release recordings by local users who narrate their experiences with and personal stories about computer viruses. The volume of the speakers that deliver the narration is kept low, so that the gallery is filled with almost imperceptible but continuous noise, as if they reproduced the busy white noise of random networks in constant dialogue with each other. Once a bug, triggered by the user, approaches one of the horses, the volume of the speakers immediately increases and one of the voices becomes clear and starts narrating her story.

The voices of the narrators represent a quite interesting blurring of the assumed roles played by user and virus. In fact, the first is normally considered the victim of

the latter, although in this case not only does she seem to be immune to the bug's spell, but she also appears to reside inside the horse itself. In addition, the user appears to be responsible for receiving and, simultaneously, sending viruses, as she is actively operating behind both the handheld device and the website that trigger the bugs.

The ambiguous relation between the virus and its host clearly contests the widely-held assumption that in the case of a computer virus epidemic, the user affected tends to consider herself the sole innocent victim of an attack by an absolutely evil entity (the computer virus) equipped with an autonomous and independent agency. The victim, in this way, denies any responsibility, and refuses to admit not only that it is thanks to widely spread and busy networks that the diffusion of computer viruses is possible, but also that she might have participated, at least once, in such diffusion, by sending an innocuous e-mail or opening the wrong attachment.

The smooth and almost ubiquitous presence of the virus now rendered inside the gallery, now moving online, now psychologically internalised by the user shows the reciprocity between space and viruses. On the one hand, the space itself is able to unveil the complexity and almost fugitive nature of the virus. On the other hand, the virus itself reveals the intertwining and inseparability of differently perceived and usually separated dimensions of space. It is only with the thorough exploration of the installation that the user becomes gradually aware of such complexity.

The multifaceted nature of computer viruses, as well as their smooth and almost imperceptible movement across physical, virtual and psychic spaces is confirmed by the very format of the exhibition. Unlike most small (or non-mainstream) exhibitions, Infrasense is a touring show. Such decision has been necessary not only to show the nomadic and ubiquitous nature of the virus, but also to collect a rich database of experiences and stories narrated by a culturally and linguistically diverse crowd (Infrasense has already reached Canada, England and Belgium).

No clear statement is made on the danger or the benign nature of viruses: they seem to be portrayed as a substantial and naturally embedded presence of our daily life, something we cannot avoid facing. Viruses prove themselves to be inseparable from human beings (physically, and, in the case of computer viruses, psychologically), from OS, they are produced by and affect human beings, they are suspended between real and virtual in a space apparently free from any cultural hierarchy of location.

Conclusion

Foucault once affirmed that 'Contradiction is the illusion of a unity that hides itself or is hidden: in any case, analysis must suppress contradiction as best as it can' (Foucault, 1989, 1969: 168). In the case of the virus as a discursive form, admitting the existence of elements that contradict its intrinsic danger is not an option: once detected, such elements will be denied or hidden. Assigning the status of virus to entities that could potentially be ascribed to this category but would not manifest identical negative attributes is not allowed. When any possible positive aspect of the virus is eliminated, one is left with an absolute, yet coherent notion that only carries danger, fear and hazard. This set of attributes becomes the principle of cohesion that organizes the discourse about viruses and restores to it its hidden unity and internal order.

Artificially reducing the notion of virus to the above unity means validating a way of thinking where antithetic terms lie separated and confront each other. This mentality automatically deprives the virus of any positive connotation, therefore denying the existence of any kind of benign virus. In addition, as Franco Rella puts it 'to read the immediate true expression of a totality beyond contradictions means thinking that certain subjects exist which are immune from contradiction, subjects which precisely because of their "purity" (or impurity, the insane, the marginal) are other from the society in which we live, bearers of values and needs that are inevitably incomprehensible to many forms of reasons' (Rella, 1994, 1978: 15). Thus, the virus is, in this context, recognized as other, marginal and outside the norm established by a dominant social discourse.

However, if we accept the extreme complexity manifested by the virus in the above artistic interventions, we also admit the possibility of a formulation of a discourse that bypasses and goes beyond the usual categories and dichotomies intrinsic to and embedded in our language. The result could be a language potentially capable of expressing difference without naming it, of 'knowing' without 'strangulating,' (Deleuze, 1990) and without imposing a default 'relation of forces' (Foucault, 1980). Admitting a definition of virus as an unstable, undefined and somehow fugitive notion therefore would force us to reformulate old and worn-out postulates. For instance, the division between human beings, nature and technology would cease to exist, giving space to more pluralistic, non-hierarchic new articulations.

Currently, it seems very difficult to underscore what is culturally hidden or suppressed. Despite the innovative potential shown by the structure and phenomenology of computer viruses, the gallery goer or the observer will be always immediately attracted to the given notion and by the fascinating way in which such notion is apparently being subverted. What lies beneath is always left over or barely noticed. This constitutes an obstacle that still hasn't been overcome. The cases examined clearly demonstrate the difficulty of viruses' complexity to stand out.

Viruses, as I see them, are to human beings what the handwritten notes are to a book. Once you write them, they become part of the book. If you run out of space, you write between the lines themselves.

Author's Biography

Roberta Buiani is a PhD Candidate in the Graduate Programme in Communication and Culture at York University (Toronto, Ontario). Her research is located at the intersection between arts, science and technology. She is currently working on a dissertation about computer viruses.

References

Berland, Jody. 'Space at the Margins: Colonial Spatiality and Critical Theory After Innis'. *Topia* 1 (Spring 1997): 55-82.

Boase, Jeffrey and Barry Wellman. 'A Plague of Viruses: Biological, Computer and Marketing.' *Current Sociology* (2001).

Burger, Ralf. *Computer Viruses: A High-Tech Disease* (Grand Rapids, MI: Abacus, 1989).

Campanelli, Vito. 'Epidemic: Interview.' *Boiler Magazine* (2001).

Canguilhem, George. 'Normality and Normativity.' In *A Vital Rationalist: Selected Writings from George Canguilhem* (New York: Zone Books, 1994).

Cohen, Frederick B. *Protection and Security on the Information Highway* (John Wiley and Sons, 1995).

Deleuze, Gilles. *The Logic of Sense*. (New York: Columbia University Press, 1990.)

Denning, P. J. *Computers under Attack. Intruders, Worms and Viruses*. (ACM, 1990).

Deseriis, Marco. 'Un virus contamina la Biennale.' Interview. Rai Smartweb http://www.rai.it/RAInet/smartweb/0,2736,,00.html

Dibbell, Julian. 'Viruses Are Good for You.' *Wired Magazine*, (February 1995).

Ducklin, Paul. "Is Virus Writing Really Bad?" Paper presented at the Fourth Anti-Virus Asia Researchers (AVAR) Conference 2001 (Hong Kong 2001).

Epstein, M.A. 'Historical Background.' *Philosophical Transactions of the Royal Society of London*, 356 (2001): 413-20.

Forrest, Stephanie, Steven A. Hofmeyr and Anil Somayaji. 'Computer Immunology.' *Communication of the ACM* 40.10 (1997): 88-97.

Foucault, Michel. *The Archaeology of Knowledge*. (London-New York: Routledge, 1989, 1969).

Foucault, Michel. *Power/Knowledge: Selected Interviews and Other Writings*. (New York: Parthenon Books, 1981).

Lederberg, Joshua. 'Infectious History.' *Science* 287.5464 (2000): 287-98.

Longrigg, J. 'Epidemics, Ideas and Classical Athenian Society' In T. Ranger and P. Slack (Eds.), *Epidemics and Ideas*. (Cambridge, UK: University of Cambridge Press, 1992).

Ludwig, Mark. *Computer Viruses, Artificial Life and Evolution*. (Tucson, AZ: American Eagle publications, 1995).

Martin, Emily. "Toward an Anthropology of Immunology: The Body as Nation State." In Mario Biagioli (ed.) *The Science Studies Reader*. (New York: Routledge, 1990): 358-70.

'Native Digital Art: Interview with Luca Lampo (Epidemic).' (Sept. 2000) http://epidemic.ws

Ray, Tom. 'Evolution as Artist.' In Christa Sommerer and Laurent Mignonneau (eds.) *Art and Science*. (Wien, New York: Springer, 1999): 81-91.

Rella, Franco. *The Myth and the Other*. Trans. Nelson Moe. (Washington, DC: Maisonneuve Press, 1994, 1978).

Sampson, Tony. 'A Virus in Info-Space. The Open Network and Its Enemies' *M/C journal* 'Open' 7.3 (2004), http:://journal.media-culture.org.au/0406/07_Sampson.html

Saucier, KIT. *Infrasense* (2004)
http://www.infrasense.net

Slack, Paul. 'Introduction.' In *Epidemics and Ideas*, edited by Terence and Paul Slack Ranger. (Cambridge, UK: University of Cambridge Press, 1992).

Thomas, Douglas. *Hacker Culture*. (Minneapolis: University of Minnesota Press, 2002).

Wassenaar, T., and Blaser, M. J.. Contagion on the Internet. *Emerging Infectious Diseases*, 8.3 (2002), 335-336.