



Universitat de Lleida

The Biohazard Message: Epidemics, Biological Accidents and Bioterrorism in Fiction (1969-1999)

Albert Bacardit i Raluy

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**The Biohazard Message: Epidemics, Biological Accidents
and Bioterrorism in Fiction (1969-1999)**

Tesi Doctoral presentada per

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INTRODUCTION

In the late eighties and early nineties, the western world was greatly shocked by the deaths of Rock Hudson and Freddie Mercury, and Magic Johnson's announcement that he was HIV positive. Suddenly, a new microbial scourge had awakened the numb occidental mind from a smug dream that had lasted for over five decades. In fact, I was born and raised in a society which was supposed to counteract whatever pathogenic menace was posed. Of course, people in third-world countries were still dying of typhus, cholera, and tuberculosis but that was because they had not been vaccinated. Given economic and material resources, each and every pathogen could be defeated. At least, that was what we were taught at the time. Unfortunately, it turned out to be a fallacy. The unexpected advent of the HIV virus revealed the truth. About two decades later, over 6,800 persons become infected with HIV and more than 5,700 persons die from AIDS every day all over the planet. The estimated number of people living with HIV globally has grown unstoppably from around 8 million in 1990 to 33.2 million in 2007 (Unaids 2007). What is worse, the younger generations do not have the aforementioned celebrities as valid references and there is a high risk of them contracting the disease through sheer ignorance of the means of contagion. In this context, it seems only logical that those who know about the danger should be doing something to warn them. Yet, as of today, it truly seems that few people have really understood the AIDS message.

It is a fact that fiction has a greater market penetration than non-fiction, mainly due to its entertaining purpose. Thus, this means that a great deal of its potential to illustrate current biological threats is being missed. From time to time, there are certain scares about the Mad-Cow Disease, its human variant Creutzfeldt-Jakob Disease, Bird Flu, SARS, or the current Novel Flu but overall they are quite ephemeral and soon vanish from the media in a sea of ever-changing news. Only occasionally do we get to know that people are dying in a remote part of central Africa from a strange haemorrhagic fever. However, there have to be hundreds dying in a most gruesome way to make the story hit the headlines. Without gore, there is no news and the danger goes unnoticed. The same concept is pertinent to accidents, warfare and terrorism involving biological agents. While we are afraid of Iran's – formerly Soviet– nuclear missiles, we do not conceive that scientists may be developing a bioweapon as infective as influenza and as lethal as Ebola. Even

terrorist organisations like Al-Qaeda could have access to such power. These are questions that the average citizen would perhaps not ask without the help of biothrillers. Certainly, some of the information supplied in these books is inflamed but the greatest part of it is close to fact. Also, it is evident that an ordinary person does not get interested in biohazards through the scattered items of news in the media and definitely does not then seek answers in medical journals. However, the sales of biothrillers¹ prove that it is gripping literature, which can be very illustrating as long as fiction is clearly ascertained as being according to fact.

This kind of narrative seems to abide by the standards of the so-called *Entertainment-Education Strategy*. The notion was set in the late seventies, developed in the eighties and nineties and chiefly analysed by Shingal, Rogers and Cody (1999 and 2004). Certain mass-media productions with a high audience share were used to promote behavioural change. This was mainly applied to soap operas, talk shows, music concerts and feature films in underdeveloped countries, which mostly targeted groups with a high-risk of contracting AIDS. In fact, the concept is not new, as it could be contended that fables and morality plays, which covered a much wider range of themes, fulfilled a similar task in the Middle Ages. Yet, the idea of using an all-encompassing scheme to reach the population in as many ways as possible has only become viable with the flourishing of the mass-media.

Although the strategy has been applied with relative success to the AIDS problem, it seems that other biological threats could be included. This is where biohazard fiction, which deals with pathogens that kill faster than the HIV virus, could join the campaign. Indeed, popular narrative seems to be an ideal genre to implement the *Entertainment-Education Strategy* in matters of biohazards². By extension, the biothriller would seem to be the perfect tool. Because of the attractiveness of the final product, the biohazard message can be taken as far as possible, in a means that everybody can understand. This guarantees the effectiveness of the strategy when dealing with unknown or underrated infectious diseases.

Precisely, driven by the AIDS scare, a group of American experts led by the

¹ See appendix 3.

² From the perspective of cultural theory, the fruitful connection between popular narratives and the *Entertainment-Education (E-E) Strategy* is more than evident. As Shingal and Cody clearly remark, “cultural studies, drawing on social and cultural theory, are useful in broadening the scientific basis of E-E investigations” (2004: 408).

molecular biologist and Nobel Prize in Physiology, Joshua Lederberg, met in the early nineties to try and find the keys to prevent microbial threats in the United States³. One of the conclusions they reached was that “attention should [...] be focused on developing more effective ways to use education to enhance the health-promoting behavior of diverse target groups” (1992: 14). To my mind, the biohazard novel is one of these “more effective ways.” Because it acts as a simulation of what could happen any time now, the biothriller can achieve that behavioural change the *Committee on Emerging Microbial Threats to Health* sought. Indeed, these novels cover such heterogeneous sources of microbial threat as deforestation, sexual behaviour, air link, *thirdworldisation*, unregulated growth, war and corruption, to name a few. The writers covered in this thesis suggest an agile coordination of assorted professionals, international cooperation to regulate biotechnology multinationals, or an improvement in the training of the researcher through ethical subjects, for instance, as effective steps to prevent future biological events. Moreover, by providing all sorts of data about the different pathogens, past outbreaks and current risks, they enlighten the reader into a better understanding of our symbiotic coexistence with microbes. We cannot possibly hide: microbes are all around and we must be aware of this. We can no more think that there cannot be a new pandemic, a laboratory leakage or an act of bioterrorism than we can fancy the Twin Towers falling, the dotcom and credit crunch crises bursting, or crude oil reaching \$200.

In 1994, I volunteered for thirteen months of social work in the *Arnau de Vilanova* Hospital (Lleida, Spain) in lieu of military service, which was compulsory at the time. The experience was marked by the plague outbreak in Surat (India), in September of the same year, and that of Ebola in Yambuku (Zaire), the following summer. My task consisted chiefly of visiting incoming patients on a daily basis to see that everything was correct. However, there were certain rooms that could not be entered. A sign on the door stated that only authorised personnel wearing protective gear were allowed in. But those were ordinary doors which were not fully sealed. On some occasions, I even happened to pass by when the nurse was coming out of those “hot zones.” All the people working on that floor were in danger of inhaling a

³ The full list of the researchers participating in the *Committee on Emerging Microbial Threats to Health* can be found in <http://books.nap.edu/openbook.php?record_id=2008&page=R3>. Retrieved on 18 June 2009.

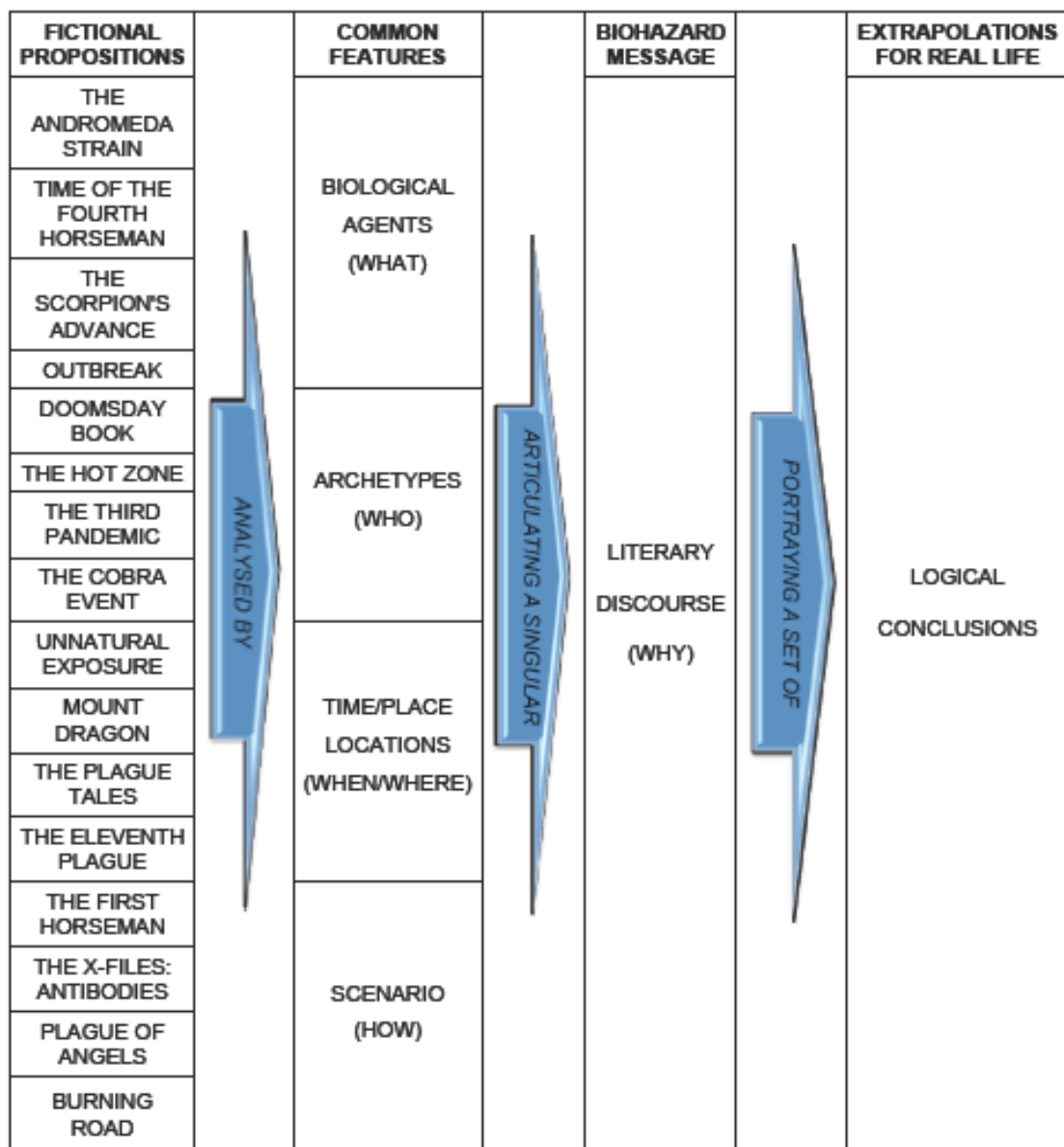
potential airborne pathogen. I inevitably thought of the plague and Ebola scares in the newspapers and began getting curious about infectious diseases. Then, when the debt to my country was paid, I travelled to England to visit a friend studying at the University of York. Preston's *The Hot Zone* seemed to physically call me from a stand at a duty-free bookshop in Heathrow. That was when I felt compelled to write a thesis about infectious diseases in contemporary narrative.

Yet, the subject was still large and had to be better defined. By doing a research of the available books on the market, I discovered that almost everything began with Crichton's *The Andromeda Strain* (1969). Precisely, my minor thesis covered his book, plus Chelsea Quinn Yarbro's *Time of the Fourth Horseman* (1976), Robin Cook's *Outbreak* (1987), Richard Preston's *The Hot Zone* (1994) and Ann Benson's *The Plague Tales* (1997). But the success of Preston's book, and Laurie Garrett's *The Coming Plague* (1994) also fostered a number of biothrillers during the second half of the nineties. I therefore decided to study the biohazard novel in the three decades starting with the publication of Crichton's bestseller (1969) and ending with Blackwood's *Plague of Angels* (1999). The year 1999 was chosen for two reasons. On the one hand, it marked the chronological end of the twentieth century, the most science-influenced, technology-orientated century ever. On the other hand, growing concern about the so-called Year 2000 effect (*Y2K*) on computers relegated biological hazards to the background. There were probably other novels at the time and many to come, but these were the ones available when I started to write and they seemed appropriate enough for this study.

Therefore, my purpose in writing this thesis is to analyse the propositions of sixteen biothrillers, see whether they can be taken as sound simulations of possible biological threats, and synthesise the main ideas that make up a singular biohazard discourse. Once this is achieved, it should be feasible to reach some valid extrapolations for real life that would prove the social value of this kind of literature. As long as these novels are expected to contain valuable information about microbial threats, Lederberg's request for an effective educational tool should be fulfilled. In accordance with the *Entertainment-Education Strategy*, these books can reach a larger number of people who do not usually read specialised medical journals. Hence, if these biothrillers are verified to enclose well-founded material, their instructional value cannot be denied.

In order to carry out this study, the different novels are analysed by the kind

of scenario proposed, the biological agent/-s used, the typology of characters, and the setting. Each chapter is further subdivided according to the newly appearing items which, as I hope to demonstrate, lead to a series of specific features. These are gathered together in the concluding section of each chapter, which eventually results in the distinguishing characteristics that articulate the biohazard discourse. In principle, this process should facilitate the extrapolation of functional tenets, which would ultimately coincide with Lederberg's proposal. Thus, the method of study evolves from an analytic process of each of the novels to a synthetic summary of the results. The ensuing abstract of messages from the different biohazard writers is subsequently translated into applicable guidelines for everyday life, which are stated in the general conclusions. The method of study is expressed as follows:



Taking for granted that all the novels in question invoke a biohazard scenario of some kind, my intention is to prove whether the facts gathered in these plots fit with reality or, for the purpose, are based on a verified historical event. In order to corroborate this point, there has been a thorough study of available documentation on epidemics, acts of biowarfare and bioterrorism, and biological accidents, which should confirm the feasibility of the propositions. Thus, such works can be taken as reasoned simulations of a biohazard event as long as they portray a series of common features about the people involved, the agents likely to be used, and potential locations for the event to take place. All the novels have been analysed through these filters, in an attempt to find conventional patterns established in combining structures. The final outcome of this process should theoretically reveal a distinguishable literary discourse generating a clear biohazard message.

If this is the case, it is obvious that a set of sound conclusions should be gathered. At the end of the study, it should not be difficult to understand the reasons for the emergence of these threats and what preventive measures can be taken in the present and future. Therefore, biothrillers will certainly be shown to be fully instructive. That is precisely the point since the main goal of this thesis is to know whether this kind of narrative is positively helpful. Whereas, in principle, some of the novels are written by reputed writers who appear to be well documented, others are less known, and their creations are completely new to the market. Some may be very informative on certain aspects but inflated on others, and vice versa. By identifying the common traits of these sixteen works, I have tried to find whether they are as potentially educational as they seem at first sight.

GLOSSARY

In order to facilitate the reading task, I have thought it convenient to supply a glossary with frequently occurring terms in biohazard literature. Although it is formally acknowledged that it be placed in the final section of any written work, it appears sensible in this case to include it after the introduction. It is not meant to be a comprehensive list, but rather an aid to understand certain biohazard terminology. Below is a summary extracted from the following sources: CDC 2009c, Preston 1995: 414-8 and 1997: 445-52.

Aerosol: A fine mist which may contain pathogens.

Amplification: Multiplication of a virus through either the body of an individual host or a population of hosts.

Antibody: Proteins produced by an organism's immune system to recognise foreign substances.

Biosafety level: Specific combinations of work practices, safety equipment, and facilities, which are designed to minimise the exposure of workers and the environment to infectious agents. Biosafety level 1 applies to agents that do not ordinarily cause human disease. Biosafety level 2 is appropriate for agents that can cause human disease, but whose potential for transmission is limited. Biosafety level 3 applies to agents that may be transmitted by the respiratory route which can cause serious infection. Biosafety level 4 is used for the diagnosis of exotic agents that pose a high risk of life-threatening disease, which may be transmitted by the aerosol route and for which there is no vaccine or therapy.

Biohazard: A hazard posed to humans or the environment by a biological agent or condition.

Bioweapon: A harmful biological agent (as a pathogenic microorganism or a neurotoxin) used as a weapon to cause death or disease usually on a large scale.

Carrier: A person or animal that harbours a specific infectious agent without visible symptoms of the disease. A carrier acts as a potential source of infection.

Endemic: Disease that is widespread in a given population.

Epidemic: The occurrence of cases of an illness in a community or region which is in excess of the number of cases normally expected for that disease in that area at that time.

Epidemiology: A branch of medical science that deals with the incidence, distribution, and control of disease in a population. Also, the sum of the factors controlling the presence or absence of a disease or pathogen.

Filoviridae: A family of viruses that can cause severe haemorrhagic fever in humans and nonhuman primates. So far, only two members of this virus family have been identified: Marburg virus and Ebola virus. Five species of Ebola virus have been identified: Ivory Coast, Sudan, Zaire, Bundibugyo and Reston. Ebola-Reston is the only known filovirus that does not cause severe disease in humans. However, it can be fatal in monkeys.

High Efficiency Particle Arrestor (HEPA) filter: A filter used to trap biological particles in the air, thus purifying it.

Host: An organism in which a parasite lives and by which it is nourished.

Hot agent: An extremely lethal virus which is potentially airborne.

Hot zone: An area that contains lethal, infectious organisms.

Index case: First known case in an outbreak of an infectious disease.

Infection: The entry and development of an infectious agent in the body of a person or animal. In an apparent "manifest" infection, the infected person outwardly appears to be sick. In an inapparent infection, there is no outward sign that an infectious agent has entered that person at all. For example, although humans have become infected with Ebola-Reston, a species of Ebola virus, they have not shown any sign of illness. By contrast, in recorded outbreaks of Ebola haemorrhagic fever caused by Ebola-Zaire, another species of Ebola virus,

severe illness followed infection with the virus, and a great proportion of the case-patients died. Infection should not be confused with disease.

Pandemic: A disease occurring over a wide geographic area and affecting an exceptionally high proportion of the population.

Prion: Any of several protein particles that are abnormal forms of normal cellular proteins, that lack nucleic acid, and that in mammals have been implicated as the cause of prion diseases when accumulated in the mammalian brain.

Racal suit: Portable, positive pressure space suit with a battery-powered air supply for use in fieldwork with extreme biohazards that are believed to be airborne. Also known as an *orange suit* because it is bright orange.

Reservoir: Any person, animal, arthropod, plant, soil or substance in which an infective agent normally lives and multiplies. The infectious agent primarily depends on the reservoir for its survival.

Strategic weapon: Also known as a **weapon of mass destruction (WMD)**, it can kill large numbers of humans and/or cause great damage to man-made structures such as buildings, natural structures like mountains, or the biosphere in general. The term covers several weapon types, including nuclear, biological, chemical and radiological weapons.

Transmission (of infectious agents): Any mechanism through which an infectious agent, such as a virus, is spread from a reservoir to a human being. Usually each type of infectious agent is spread by only one or a few of the different mechanisms. There are several types of transmission mechanisms:

Direct transmission: The transfer of the infectious agent directly into the body by touching, biting, kissing or having sexual intercourse with an infected host.

Indirect transmission: Indirect transmission may happen in any of several ways:

Vehicle-borne transmission: In this situation, a vehicle –that is, an

inanimate object or material called in scientific terms a "fomite"– becomes contaminated with the infectious agent. The agent, such as a virus, may or may not have multiplied or developed in or on the vehicle. The vehicle contacts the person's body. It may be ingested, touch the skin, or be introduced internally during surgery or medical treatment.

Vector-borne transmission: Any living creature may transmit an infectious agent to humans. For instance, a mosquito contaminates its feet or proboscis (nose) with the infectious agent, or the agent passes through its gastrointestinal tract. The agent is transmitted from the vector when it bites or touches a person.

Airborne transmission: In this type of transmission, infective agents are spread as aerosols, and usually enter a person through the respiratory tract. Aerosols are tiny particles, consisting in part or completely of the infectious agent itself, which become suspended in the air. These particles may remain suspended in the air for long periods of time, and some retain their ability to cause disease, while others degenerate due to the effects of sunlight, dryness or other conditions. When a person breathes in these particles, they become infected with the agent – especially in the alveoli of the lungs.

Vector: A carrier which transmits an infective agent from one host to another.

Zoonotic disease or infection: An infectious disease that may be transmitted from animals to humans.

CHAPTER 1: THE ROOTS OF A DISCOURSE

Even though infectious diseases have frequently been used in literature⁴, the articulation of a plot around the deeds of a particular microorganism seems to be a more modern concept. The development of popular narratives and the use of novels for mere entertainment purposes may have boosted the biohazard discourse. The heyday of biohazard fiction coincides with the disintegration of the former Soviet Union and a palpable relaxation before the nuclear threat. It looks as if western societies needed a new threat. Perhaps this could be a new monster, this time microscopic in size, that would come to join other classic ones to raise humanity's fears at the turn of the second millennium. In the early nineties, the publication of Preston's *The Hot Zone* (1994), Garrett's *The Coming Plague* (1994), and news of the devastating epidemics of plague and Ebola in India and Zaire respectively, had a great impact on the average western citizen. These facts may have encouraged many writers to deal with the subject in the second half of the nineties. Most of the novels studied in this thesis were published in that period. However, a shocking scientific study was to revolutionise evolutionary theory, thereby changing the manner in which microbes were perceived. This new conception of life appeared to permeate rapidly into popular narrative.

1.1 Man as the Apogee of Creation and the Ladder Metaphor

In "The Evolution of Life on Earth," an influential article published in *Scientific American* in 1994, the palaeontologist and evolutionary biologist, Stephen Jay Gould complemented Darwin's theory of natural selection. In his view, rather than the anthropocentric conception of the ecosystem as a hierarchical tree, where man sits on top as the closest to God, life should be better understood as a branching bush, where we are but one of a great variety of species. It is true that the human being has evolved successfully through time, but this does not imply any superiority. Hence, he states that:

We will not smash Freud's pedestal and complete Darwin's revolution until we

⁴ In English literature, consider, amongst others, Daniel Defoe's *A Journal of the Plague Year* (1722), Mary Shelley's *The Last Man* (1826) or Edgar Allan Poe's *The Mask of the Red Death* (1842).

find, grasp and accept another way of drawing life's history. [...] these limits may only be socially imposed conceptual locks rather than inherent restrictions of our neurology: new icons might break the locks. Trees –or rather copiously and luxuriantly branching bushes– rather than ladders and sequences hold the key to this conceptual transition. (1994: 91)

Taking Freud's remark that scientific revolutions knock human arrogance off one pedestal after another, he believes that Darwinian revolution will not be complete until humans abandon former icons of dominance. In "A Difficulty in the Path of Psychoanalysis," Sigmund Freud had already covered the impact of Darwin's theory on human pretentiousness. To his mind, such narcissistic illusion is shattered mainly by the cosmological blow of Copernicus, the biological one of Darwin and his own psychological smack. Over the course of history, humans have established themselves in a position of supremacy and consequently denied other living entities the privilege of their rank. In the Western mind, it has been supported for centuries by a claim of a divine descent with entitlement to an immortal soul, thus opening a gap between man and the rest of the creation. Having to acknowledge that humans have an animal lineage is a notion many are unwilling to embrace even today (1955: 135-144).

As noticed, Gould takes his words and aims at untying the bandage over humankind's eyes. By ladders, he plainly censures the Christian conception of humans being made in God's image and likeness, and the alleged obligation to climb towards Him. This is best exemplified in *The Ladder of Divine Ascent* by Saint John Climacus (ca. AD 600)⁵, where the virtuous man defeats temptation to reach the Creator:

⁵ *The Ladder of Divine Ascent* by Saint John Climacus sets thirty steps for man's progress towards God. As the claimant defeats vices and acquires virtues, the peace of soul eventually leads to a communion with the Almighty.

Further reading: St. Athanasius Orthodox Church 2005, MethodX 2007.

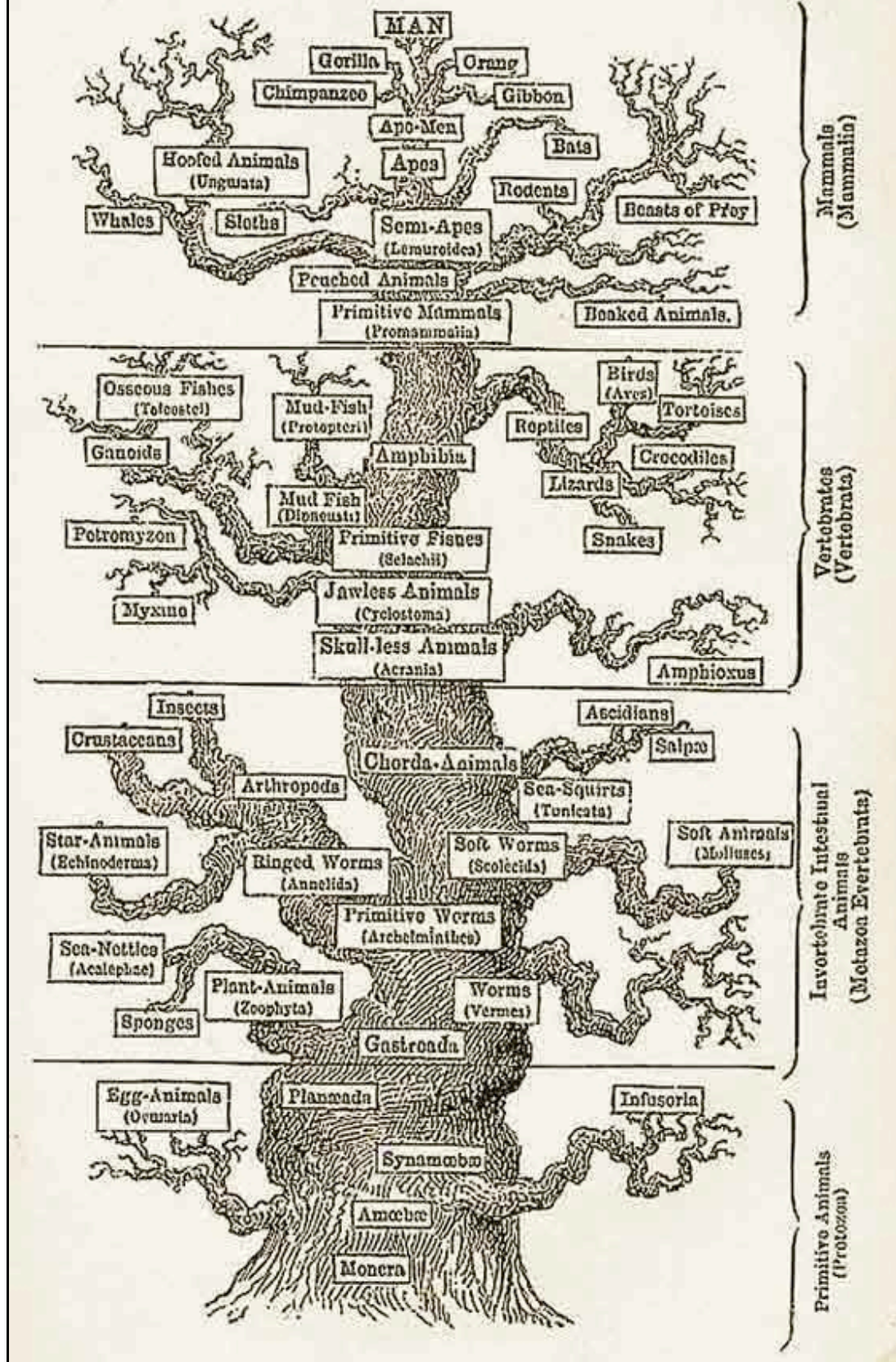


Source: "Father Hosea's Concerns" 2007

By sequences, he also condemns the traditional vision of evolutionary history as a series of ages dominated by a particular kind of animal. The initial stages would be ruled by simpler life forms, gradually evolving into more complex ones, until the present day, where man would be the unquestionable king. Such a parochial notion of evolution can clearly be perceived in Haeckel's *Tree of Life*⁶, which sets four layers of animals progressively superimposed on each other until man is found at the apogee of creation sitting on top of the tree:

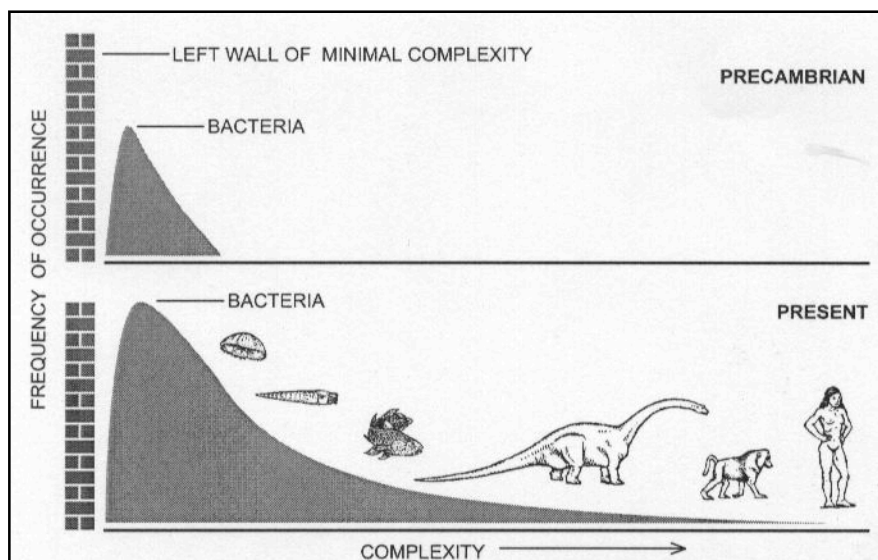
⁶ Ernst Heinrich Philipp August Haeckel (1834–1919) was an eminent German biologist who promoted Darwin's theories in his country.

PEDIGREE OF MAN.



Source: Thompson 2007

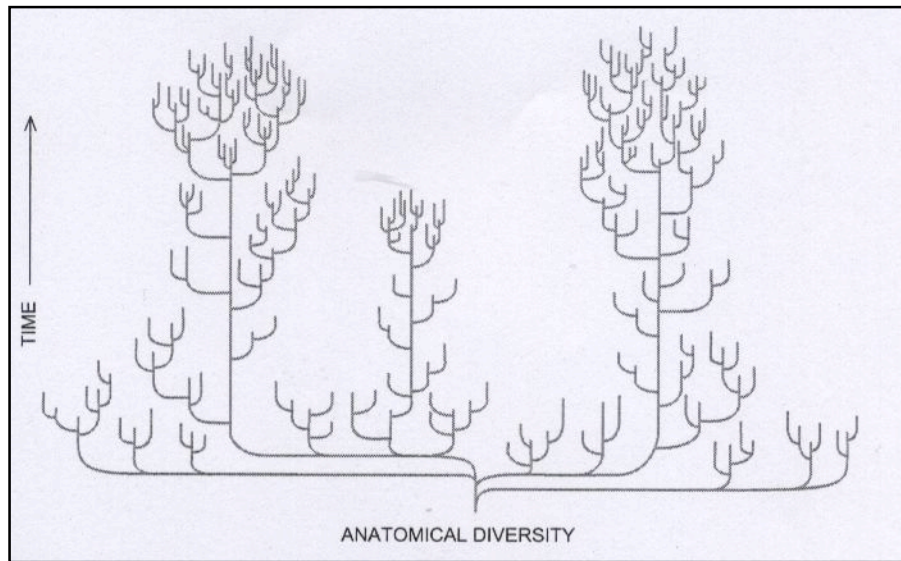
However, Gould's point of view is that the human species is an accident through time rather than the fruit of continuous progression. It should not be forgotten that Gould complemented Darwin's principles by adding the random factor to the evolution of man, and he cited Darwin himself when he stated that natural selection "has been the main but not exclusive means of modification" (2006: 32). Since the concept appears to be largely misinterpreted, Gould draws on a couple of powerful images to redress the delusion. Firstly, through a detailed study of fossils, he shows that there is a far larger occurrence of bacteria in the time period from the Precambrian era until the present day. There is a lot more variety and, therefore, higher chances of survival. This can only mean that simpler forms of life are more successful than more complex ones. Thus, he puts his words into a graphic chart:



Source: Gould 1994: 86

This is additionally worded into the main idea that "progress does not rule [...]. For reasons of chemistry and physics, life arises next to the "left wall" of its simplest conceivable and preservable complexity" (1994: 86). Without entering into much detail as to whether bacteria, viruses or even prions, are better adapted to the environment, by Gould's argument it cannot be denied that microbial life is best suited for life on Earth. The frequency of occurrence of microorganisms, both in the Precambrian era and the present day, grows fast until its peak in the bacterial form for a less steep descent towards man. Actually, the number of microbial species has never ceased to expand. Therefore, he devises a more faithful image of the *Tree of*

Life:



Source: Gould 1994: 87

Through this new representation, it is understood that most living creatures are simple organisms. The evolutionary experiments do not usually get far, although those that do are very successful. Mammals, and obviously humans, belong to one of these elongated branches. Yet, it seems more appropriate to think that we stand amongst and not over the branches. It appears reasonable to assume that our line is not going to extend much further, while there are many more chances that a shorter string evolves fruitfully. It is a brand new conception of life, which comes to question the conventionalism of an “age of invertebrates,” followed by an “age of fishes,” “age of reptiles,” “age of mammals,” until today's “age of man.” With it, Gould definitely shatters the false assumption that the human race rules the world because it is a complex species, and decidedly grants such honour to bacteria:

To view history as progressive, and to see humans as predictably dominant, has grossly distorted our interpretation of life's pathway by falsely placing in the center of things a relatively minor phenomenon that arises only as a side consequence of a physically constrained starting point. The most salient feature of life has been the stability of its bacterial mode from the beginning of the fossil record until today and, with little doubt, into all future time so long as the earth endures. This is truly the “age of bacteria” –as it was in the beginning, is now and shall ever be. (1994: 87)

The realisation that microbes are the real rulers of this world is not easy for the western citizen, especially because of the silent influence of Christian iconography.

In Gould's mind, the prevailing misunderstanding about the evolution of life on Earth is due to the fact that primates are mainly visual animals, and the human being has always needed images to represent reality. The aforementioned images have preserved the Christian principle of man made in God's image and likeness, with the rest of life forms depicted as lower species subdued by him. That is why, in order to better illustrate his words, he provides the two powerful representations –the *new icons*, to break the locks. We should understand life more horizontally than vertically and get rid of former hierarchical pictures, so as to acquire a more accurate depiction of reality. Only in this manner will we be able to abandon arrogance and understand that the human kind is just an evolutionary accident. Humans have flourished in time because of an innate ability to adapt to the environment. Yet, microorganisms were here eons before us and there seems to be no limit to their existence. Certainly, Gould's words appear to be more relevant than ever if we are to understand our role in nature.

Thus, a couple of questionable truths are eventually shown to be false by the palaeontologist. On the one hand, and most importantly, it is wrong to conceive of man as the apogee of creation. It is a fallacy contrived in Genesis, which is still doing a lot of harm to the western psyche due to the implacable force of Christian thought. Indeed, there has been significant questioning of the words written in the Bible and the subsequent false assumptions derived from them (Custance 2001, Dawkins 2006)⁷. Hence, the scholar demands a more rational understanding of evolution. Humans are not made in God's image and likeness but are just a successful experiment in nature, one of the many evolutionary trials most of which go wrong. By a combination of events including sheer luck, we have found ourselves apparently ruling over the rest of living creatures, which has led to certain traditional ideals of supremacy maintained over centuries. However, Gould's study proves that bacteria and, by extension microorganisms, belie such an alleged kingdom. It has always been and will continue to be microbial in scope. The anthropocentric conception of life must be reshaped by looking at the tree in a more bidimensional

⁷ Genesis 1: 26-28: Then God said, "Let Us make man in Our image, according to Our likeness; and let them rule over the fish of the sea and over the birds of the sky and over the cattle and over all the earth, and over every creeping thing that creeps on the earth." God created man in His own image, in the image of God He created him; male and female He created them. God blessed them; and God said to them, "Be fruitful and multiply, and fill the earth, and subdue it; and rule over the fish of the sea and over the birds of the sky and over every living thing that moves on the earth." (Holy Bible 1978: 1-2)

manner while nature is studied through less arrogant glasses. Humans do not stand on top, but rather amongst many branches, which stretch out simultaneously to a greater or lesser extent. By accepting this humble principle, the biohazard threat will be better comprehended and effective means will be found to deal with it.

On the other hand, living creatures cannot possibly be structured hierarchically. In another article significantly entitled “Stephen Jay Gould’s Vision of History,” the historian, Louis P. Masur coins the term *ladder metaphor* to refer to this pernicious representation of evolution (1997: 116). In his view, we have always regarded the history of the human race as a tale of gradual improvement and, in our personal lives, we love to speak of climbing to the top –of success, to state it plainly. Therefore, there could be no other place for humans but on the highest rung of the evolutionary ladder, with other life forms steadily occupying lower rungs, as the differences with our species become more notable. But there is no such simplicity. History is rather a complex process of long stable periods suddenly disrupted by unexpected events, a theory that Eldredge and Gould have established as “punctuated equilibria” (1972: 82-115). There is no such uniform progress and no such ladder.

1.2 Puncturing the Hygienic Bubble

When the US surgeon-general, Dr. Julius B. Richmond, declared in 1979 that the once-great killers were under control, he based his statement on “changes in lifestyles resulting from a growing awareness of the impact of certain habits on health” (1979: 4). American people were healthier than ever, and life-threatening infectious diseases had been significantly reduced. The paradigm of the affluent world had eventually defeated pathogens. According to the idea of progress, humans could only look forward and expect biohazards to keep shrinking as every evil bug was readily counteracted by the proper vaccine. Yet, history does not move steadily but on quirky episodes, as Gould reminds us. Although there has been an undeniable advance in the handling of certain pathogens, other diseases have never ceased to grow. While the effect of some microbes on the human being has been remarkably mitigated, others still remain out of reach, and yet others are returning in newer, sturdier forms. Because of our anthropocentric conception of the world, we thought we had built ourselves a kind of hygienic bubble which would protect us from any

pathogenic menace. Nothing could be further from the truth. The AIDS example is perhaps the most suitable to express such delusion, but there are many other diseases willing to burst this illusionary bubble. It is high time that such a false assumption was demystified once and forever.

Thus, it seems wise to examine how the myth of the so-called “hygienic bubble” has come to be what it is today. This can only mean a closer look at history, paying attention to the record of natural epidemics, acts of biowarfare or bioterrorism and biological accidents. It definitely seems that all such episodes, alone or in conjunction, have reached the authors and compelled them to write a book. It is the power of culture at its best, a social constructionist view of language, which should make us realise “that changing narratives, telling stories differently, might change the social world, and that the goal of work on and with language is a politics committed to social change” (Threadgold 2004: 1). This new representation of reality based on accurate historical facts becomes precisely the chief prop for the biohazard novel. Since the action is based on feasible episodes of biological threats, the derived projections can hardly be discarded. Hence, all the naïve postulations of sanitary safety crumble before the unquestionable power of history.

The needle that punctures the bubble may have different names –Ebola, influenza, plague, ...– and thus be bacterial or viral in form. Still, there has been generalised agreement in calling such agent *Andromeda* according to the late Michael Crichton’s *The Andromeda Strain*, a bestselling debut and milestone of biohazard literature. So, what is found in these novels is basically a tale of *Andromeda* piercing the bubble and demolishing humankind’s artificial tenet of biological domination. These are mostly stories of existing microbial predators that have haunted mankind for centuries and look set to continue ravaging our kind. Humans cannot possibly pretend to subjugate all infectious diseases with a universal antidote. It is not so simple. Money cannot simply buy such privilege. Sooner or later, the slightest mutation in an agent’s DNA will render the vaccine impotent, hence facilitating the propagation of a new pandemic. In fact, according to the experts, the next great plague seems to be just round the corner⁸. That if we do not

⁸ Asked about the next flu pandemic, Lederberg said:

We're going to see it. Now, it won't be this year. It may not be next year. And I would not want to predict when that is going to happen. Nobody has ever succeeded in predicting the next flu pandemic. But that I think it will happen is a virtual certainty. We will live to see it. Is the next flu pandemic going to be as bad as 1918? None of them yet has been, but someday it's going to

originate it accidentally or on purpose. There is no such thing as first, second and third world in terms of epidemiology. If there is an outbreak, the pathogen can reach anywhere in the planet in a matter of hours. Never in the history of our race has it been easier for a disease to spread so swiftly. It can well be stated that air transportation has become the catalyst of a most unwanted process, but poverty and climate change also contribute significantly. Obviously, this is social evidence permeating into the minds of those writers who deal with a biological crisis.

It really is difficult to state when exactly the bubble was inflated. It is rather a gradual course of action that appears to gain speed during the second half of the twentieth century. Average life expectancy in 1900 was just thirty-one years, and not even fifty in the richest countries (Thomson Prentice 2006: 7). As of today, the average lifespan in the countries of the European Union is about seventy-five years for men and around eighty for women. In general, there has been an undeniable improvement in living conditions during the twentieth century. However, it has not been universal. Even within the European Union, in such countries as Latvia or Lithuania, an ordinary citizen should not expect to live to more than sixty-five (European Commission 2007: 6). Not to mention Swaziland, where average life expectancy is still below thirty-two (CIA 2009). Therefore, the promise of a long successful life is an invention of the affluent world, which does not seem to find a real explanation in figures. Certainly, the discovery of penicillin in the 1920s and its commercialisation in the 1940s produced a global optimism, which was enhanced with the generalisation of antibacterial and antiviral treatments in the 1960s and 1970s. But, above all, the eradication of smallpox in 1977 could have made us believe that the war against pathogenic diseases was won –note that the report by the US surgeon-general was also issued in the late seventies.

AIDS and the haemorrhagic fevers arose to public knowledge in the eighties, but in general, people still believed the illusion that these would soon be subdued while, on the contrary, their number kept growing incessantly. The continuous deterioration of the environment has allowed certain tropical diseases to come out of their natural world and reach places where they were previously unknown. For instance, in 1989 a haemorrhagic virus emerged in the American conurbations of Reston, and Philadelphia, and made subsequent reappearances both in the United

have to happen. (Mirsky 1997)

States and the European Union⁹. Only specialists were acquainted with Ebola before the Reston incident but Preston's *The Hot Zone* readily made it an international star. Other similar diseases have made brief appearances in western countries ever since and are expected to come more and more often in the near future¹⁰. The list includes variants of influenza, plague and Rift Valley Fever (RVF), which have inspired some of the writers studied in this thesis, so it is becoming increasingly hard to ignore the evidence. However, it seems undeniable that the myth of the hygienic bubble has gradually seeped into the western mind with no fundamental data to support it.

Furthermore, technological advances have made genetic engineering possible, thus dramatically boosting the potential of a biological accident. Despite all the warnings concerning transgenic organisms, field trials have continued mostly unregulated (Epstein 2004, Greenpeace 2008, Netlink 2008). It is a clear reality that gene therapy holds a marvellous potential for overcoming certain diseases. No rational mind would oppose a scientific improvement leading directly to an obvious benefit for humankind. That much is unquestionable. However, the alteration of stem cells may result in a permanent modification of the race and that is, at least, worrisome. While it is acceptable that there is no reward without risk, the likelihood of a biological doom has also grown exponentially with each breakthrough. Such controversy has also reached the biohazard writer, who tends to question whether excessively permissive guidelines on genetic engineering may end up creating a biological chimera. It is an open secret that there has been and is a lot of dark research in the field. The prospect of a wild microbial killer getting loose by accident or being set free by an army or terrorist organisation is most appalling.

⁹ A footnote in WHO's Ebola factsheet states that:

A fourth virus subtype, Ebola-Reston, was detected in October 1989 in Reston, Virginia (USA) in a colony of cynomolgus monkeys (*Macacus fascicularis*) imported from the Philippines, and in November 1989 in Philadelphia, Pennsylvania, also in monkeys imported from the same supplier. Subsequent outbreaks of Reston-Ebola disease in nonhuman primates occurred in 1990 in the USA (Reston, Virginia and Alice, Texas), in 1992 in Italy (Sienna), and in 1996 in the USA (Alice, Texas). Investigations traced the source of all outbreaks caused by the Reston strain to one export facility in the Philippines (Laguna Province), but the mode of contamination of this facility was not elucidated. (WHO 2008b)

¹⁰ On 7 October 2008, researchers from the Wildlife Conservation Society released a report at the 2008 World Conservation Congress in Barcelona. It was entitled "The Deadly Dozen: Wildlife Diseases in the Age of Climate Change" and it supplied a list of twelve pathogens whose action is likely to activate in the present and near future on account of climatic change. However, it went largely unnoticed by the major public media, perhaps with the exception of *The Daily Telegraph*, which published a series of articles in 2008 about the re-emergence of infectious diseases. (Wildlife 2008, Eccleston 2008, Highfield 2008 and R. Smith 2008)

Yet, most western citizens pretend to be unaware of the possibility and accept Big Pharma's mantra on the benefits of genetic engineering. As early as 1978, Genentech, a leading company in the field, proudly announced to the world that it had been successful in the laboratory production of human insulin using recombinant DNA technology (Genentech 1978). Other such proclamations can be found in the company's press releases. Curiously, however, no article comes out from searching with the word 'biohazard' and only cerebrovascular disorders appear when the word 'accident' is introduced. That can hardly be called unbiased information. By pumping such euphoric data to the world, the illusion of a hygienic bubble is safely maintained.

Instead, the renowned authority Robert Lanza MD, Vice President of Research and Scientific Development at Advanced Cell Technology, and Adjunct Professor at Wake Forest University School of Medicine, claims that we are fooling ourselves. In his view, "part of the thrill that came with the announcement that the human genome had been mapped [...] rests in our desire for completeness." We want to be gods. We still need to believe that we have been made in God's image and likeness. But "most of these comprehensive theories are no more than stories that fail to take into account one crucial factor: we are creating them" (2007: 1-2). Genetic engineering has just boosted our thoughtlessness. We think the genetic miracle will eventually place the human being where it deserves and the last medical frontier shall at last be conquered: microbes will be subdued. We still deem that nothing can prevent us from attaining our dream. Yet, as Lanza states, it is just a fairy-tale that we have invented to trick ourselves.

In short, there are scientific reports stating that old microbial fiends are coming back brawnier than ever and that tropical bugs moving outwards due to global warming have joined them. There is a dubious regulation over microbial engineering with, at least, a few biological accidents acknowledged which will be explained later. There have been reported cases of biowarfare ever since the Greeks and growing prospects of bioterrorism by today's terrorist organisations. There are writers gathering all these data and casting out extrapolations of what the eventual outcome may be. Yet, humans seem to have an incontestable faith in the power of medicine to overcome such biological threats. The western world wants to believe that it is protected inside a hygienic bubble. So it really seems that a new understanding of history is urgently required.

1.3 A Review of Biohazard Events

If there is a positive point about this kind of fiction, it is indeed the possibility it offers the reader to become aware of the fallacy of the hygienic bubble by reconsidering past biological events and extrapolating possible present and future outcomes. In doing so, it becomes a revision of history which helps the reader discard certain anthropocentric principles for the sake of a more sustainable world. Following Foucault's conception of the "history of thought"¹¹, as much data as possible has been gathered so as to comprehend the way it has been used to shape the biohazard discourse. What follows is indeed a compilation of relevant epidemics, biowarfare and bioterrorist events, as well as a list of the few reported biological accidents available. One has to admit that recent technologies have greatly facilitated the task. Yet, the accessible sources keep diminishing as collective or individual implications appear. Thus, the information about great epidemics in history is vast and has to be thoroughly abridged to fit the intended purpose of this thesis. However, instances of biowarfare are only usually admitted by those countries that have suffered them, while the perpetrators hardly ever confess to a crime against humanity. It is even more difficult to find documented acts of bioterrorism or biological accidents since, by bad faith or sheer negligence, they tend to be covered up immediately.

1.3.1. Great Epidemics in History

It is widely assumed that infectious diseases have always been linked to life on earth. Actually, primitive bacteria are millions of years older than the human being. However, it seems that generalised cases of infection, i.e. epidemics, did not appear until the advent of the great ancient empires and the progressive growth in population. This has a very simple explanation: an infective agent needs to find a

¹¹ In 1983, Michel Foucault gave six lectures at the University of California at Berkeley. In the second lecture, dedicated to Parrhesia in the tragedies of Euripides, Foucault described the history of thought as "the analysis of the way an unproblematic field of experience, or a set of practices which were accepted without question, which were familiar and out of discussion, becomes a problem, raises discussion and debate, incites new reactions, and induces a crisis in the previously silent behavior, habits, practices, and institutions." For that matter, evolutionary theory is taken as such "unproblematic field of experience" and Gould's study forces a reconsideration of the available biohazard events. (2008: 17)

new host once the original is dead. Since people in prehistoric times used to live in small clans, the propagation of disease was basically reduced to the members of that close group. It is supposed that anthrax was a common infection at that time, when the early human hunters would contract the disease from sick animals or by eating tainted meat. The first recorded accounts of epidemics must be traced back to the writings of the Sumerians, Babylonians, Hebrews, Hittites, Egyptians, Greeks, Romans, Indians and Chinese. From these, perhaps the best known in the western world, due to its relevance, is the Biblical ten plagues of Egypt. Only the fifth, the pest that kills the Egyptian cattle (Exodus 9: 1-7) and, especially, the sixth, the ulcers and tumours that afflict every Egyptian and animal (Exodus 9: 8-12) can be considered in the medical epidemic sense. However, the renowned erudite Isaac Asimov does not give much validity to this reference. In his view, outside the Bible itself there seems to be no other quotations to support such important pestilences, which should have caused many casualties (1997: 124).

An initial epidemic to consider is the Great Plague of Athens, which started in 430 BC and lasted five years. There is a well-known report in Thucydides' *History of the Peloponnesian War*, which describes in full detail how the plague came by ship from Egypt (1972: 151-6). It spread swiftly through the city, causing thousands of casualties that piled up in the streets. It is difficult to determine from the related characteristics whether it was smallpox, measles or any such contagious disease, but people developed fever, bouts of coughing, diarrhoea and sores that became ulcers. Either the agent is unknown today or perhaps the symptoms were exaggerated, but the epidemic contributed substantially to the Athenian defeat in the war against Sparta and the *polis* never fully regained its past splendour. Beyond its dramatic human and cultural effects, the social cohesion was greatly affected. There was widespread crime which went unpunished and basic human rights vanished. This is a scenario that is clearly mimicked in Ouellette's *The Third Pandemic* twenty-four centuries later, showing a manifest projection of what we could face in the eventuality of a devastating pandemic.

Later on, the Roman Empire suffered a similar epidemic. It is only known that the disease also came from northern Africa by ship during the war against Carthage and that it took as many lives as the earlier Greek one. In AD 79, another plague, either anthrax or malaria, travelled down the Nile into the Mediterranean, where it spread through Mesopotamia, northern Greece and eventually Rome. Once

in the heart of the Empire, soldiers and merchants would help it reach the most distant confines. In AD 166, Roman troops that had been sent two years earlier to Syria to subdue a revolt, brought back a previously unknown disease. It happened to be smallpox and came to be known as the plague of Galen, on account of the physician who described it. In the fourteen years that the scourge lasted, it is estimated to have killed from one-quarter to one-third of the Empire's population and about 4 to 7 million in today's Europe. Finally, in AD 252 either smallpox or a similar infectious disease struck the Empire again, sometimes killing more than 5,000 people a day. As years went by, other occurrences of such diseases took place, at least, in England (AD 444) and France (AD 580). However, the fact that only some cases are documented does not mean that there were not any others. It is thought that the precarious living conditions, together with famine and constant migration made pestilence an ordinary dweller in ancient times (Karlen 1996: 71-2, C. Smith 2008).

Two great plagues define the Middle Ages in epidemic terms: the plague of Justinian in the sixth century and the Black Death of the fourteenth. Both were decisive in that they produced significant havoc, covering the vast majority of what we know today as Europe, and marked the beginning and the end of the darkest period in human history. What is more, they also share the causative agent, a bacterium called *Yersinia Pestis*. Without antibiotic treatment, obviously unknown at that time, the case-fatality ratio ranged between 30 to 60 percent (WHO 2008d) but the death toll could have reached an overwhelming 90 percent (C. Smith 2008). Probably due to the grim consequences that such a dreadful disease evokes in the western mind, the term "plague" covers nowadays any epidemic outbreak, dealing or not with the bubonic plague. As far as the plague of Justinian is concerned, it seems that, like the previous ones, it had originated in the heart of Africa, travelled down the Nile into the Mediterranean and reached Constantinople in 542. Once again, merchants and soldiers took it wherever trade routes stretched. The symptoms, faithfully described by the Byzantine historian Procopius, certainly differed from the diarrhoeas and pustules typical of smallpox (2007: 461-73). Although high fever was also a common affliction, the patients quickly developed swollen lymph glands in the armpits, groin and neck, which were called buboes; hence, the term bubonic. After the germ invaded the nervous system, causing generalised hallucinations, the sick individual would die of a failure of breathing by the fifth day. In its pneumonic form,

the bacteria attacked the lungs and quickly multiplied until the whole internal tissue melted and was thrown out. People would normally die choking in their own vomit. In the city of Constantinople alone, about forty percent of the population died in the first bout of plague. In the following six years, it rampaged freely around the whole of Europe until disappearing suddenly. The plague came back frequently during the next two centuries, sometimes accompanied by outbreaks of other infectious diseases. By the beginning of the eighth century, Europe's population had been cut in half (Karlen 1996: 75). Ultimately, then, Justinian's dream of a new Roman empire crumbled under the power of epidemics and the Dark Ages reigned over the western world.

Why bubonic plague vanished in such a mysterious way is still puzzling epidemiologists today. No one knows for sure if the germ naturally retreated to its animal reservoir, if it mutated to a more benign form or if it simply killed so many human hosts that the chain of infection was broken. Nevertheless, what is sure is that the weather improved considerably around the year 800 and that the surviving population lived scattered in the country. There was a period of relative calm, with the notable exception of some intermittent Viking raids. However, the awakening of crafts and commerce made cities grow and, thus, overpopulation became a problem again. Around the turn of the fourteenth century, cold weather, wheat-crop failures and recurrent cycles of famine, combined with the fierce Hundred Years War, brought about the ideal scenario for a new pandemic.

By the 1330s, plague began to spread from Central Asia to the Middle East following the caravan routes. In 1346, it reached the Crimean port of Kaffa, which had been under siege by the Tartars and started decimating their troops. They had to leave, but catapulted the dead bodies of many plague-infected soldiers in their retreat. When the Genoese traders, who had been kept inside the city, left for Europe in the summer of 1347, they brought with them something more than oriental treasures. By the end of 1347, bubonic plague had already reached most Mediterranean ports and started spreading inland. It also mutated into the deadlier pneumonic form and by 1348 it had spread all over Europe. Since the concept of contagion was not understood at the time, pestilence was perceived as God's punishment. In their generalised ignorance, people blamed the Jews, who were burnt by the thousands, and there were uncountable acts of contrition, including processions and flagellations. Some villages and towns lost their entire population,

both by death and migration, and many important cities were reduced by a third to a half. An approximate toll requested by pope Clement VI showed 23,840,000 dead in Europe alone (Tuchman 1987: 93). That would mean that the western world had lost around one-third of its population (Wheelis 1999 and 2002: 971-4, ABC 2004).

After a hundred-year long transition, by the late fifteenth century the European nations started searching for new colonies that would ensure raw material for trade. In fact, plague had a decisive role in delaying the colonisation of the Americas since many nations were weakened and underwent hard times of recovery. Whereas smallpox had already become endemic in Europe by 1500, a condition that made it merely a childhood disease, its introduction into the New World by the colonisers caused a tremendous disturbance. The first major epidemic came in 1518, when one-third to one-half of the Arawaks in Hispaniola died of the disease¹². It swiftly jumped to Cuba and Puerto Rico. When Hernán Cortés sailed from Cuba to Mexico later that year, his ships carried the deadly disease to the Aztec lands. The natives received him as a God but strong differences forced him to leave very soon. He sought reinforcements in Cuba, where the smallpox epidemic was running its course, and returned to Tenochtitlán (today's Mexico city) in 1521. About half of its original 300,000 inhabitants had already died before his soldiers conquered the city (Texas Department of State Health Services 2007).

Due to its long incubation period of about two weeks, smallpox was taken by the fleeing Aztecs to their Maya and Inca neighbours. In a matter of years, the pandemic covered the whole of South America and, arguably, an important part of the North. When Francisco Pizarro reached Cuzco, the Inca capital, in 1533 he found no effective resistance by the natives. Then came measles, influenza, typhoid and a great variety of other Old World diseases, which dramatically reduced the indigenous population. Although the estimates vary, the original Aztec population of about 25 million could have been shortened to 16.8 million, whereas the Incas lost 200,000 of their original 6 million population from 1524 to 1527 (Fenner et al. 1988: 236-7). Unquestionably, disease became the great conquistadores' best ally.

As regards North America, French and English colonisers brought the same diseases to the native people. Thus, tribes like the Huron, Iroquois, Cherokee,

¹² In *God, Greed and Genocide: The Holocaust through the Centuries*, Arthur Grenke states that "in a mere two years, the population of Hispaniola fell from eight million to between four and five million, and by 1535 the Native population of Hispaniola was essentially extinct" (2005: 141).

Catawba, Piegan and Omaha were halved in number during the seventeenth, eighteenth and nineteenth centuries (Fenner et al. 1988: 238). There were uncountable outbreaks, which made it very easy for the colonisers to impose their religion and social habits. Of course, the newcomers equally had to endure previously unknown diseases. Once again, the difficult living conditions in an inhospitable land, famine, disease and the tropical weather of most of the territories made an unexpected hell of the “promised land.” Likewise, there was a continuous interchange of infectious maladies from the Old World to the New and vice versa. Since communications drastically improved in the seventeenth and eighteenth centuries, the possibilities for new microbial disorder equally increased. It would be in the nineteenth century, with the advent of new medical treatment and a progressive urban settlement, that most infectious diseases became endemic.

However, a significant epidemic to be remembered, basically because of its literary transcendence, is the Great Plague of 1665. By that time, London was the world’s largest city and the poor living conditions, especially in densely crowded suburbs, eased the swift propagation of the disease. It was caused again by the *Yersinia Pestis* and had probably begun a year before in Turkey, reaching England by ship. Although those residents who could afford to leave the city, including the Royal family and the aristocracy, sought shelter in the countryside, the vast majority of lower social classes had to stay. A year later, coinciding with a sudden vanishing of the plague, London suffered a devastating fire which burnt most of the city down. It was believed that the fire stopped the disease even though the epidemic also faded from other big cities of the time, like Paris and Amsterdam, without the need for the flames. All in all, over 100,000 Londoners lost their lives in a single year (Garrett 1995: 238).

In the following centuries, similar epidemic disasters took place in Oceania and Australia. When the Europeans began colonising Australia in the late eighteenth century, the native tribes were devastated by epidemics of flu, smallpox, cholera and typhus. Likewise, whereas more than 20 percent of the aborigines of Hawaii and Fiji fell prey to measles between 1853 and 1874, the Maoris of New Zealand were reduced from 100,000 to 40,000 in the 1840s, 50s and 60s (Karlen 1996: 110). On the contrary, the colonisation of Africa, where most of the diseases brought by the explorers were already endemic, was tougher for the European than for the disease-hardened native.

In the twentieth century, undoubtedly one of the worst yet widely ignored plagues was the Spanish Flu pandemic of 1918. Despite its name, the disease seems to have had an Asian origin because most of the major mutations of the virus have taken place on that continent. These constant shifts are the virus' main advantage against the defences of pigs, ducks, horses or human beings; the animals that are usually host to this agent. Thus, flu has been able to survive for thousands of years, returning cyclically in a different form that the immune system does not recognise. Of course, there have been other important flu epidemics in the past, which may have killed by the thousands. Also, so many people regularly catch the flu that the death toll, high as it can be, is not taken seriously. Moreover, those who die, generally from respiratory complications, are normally the sick or the elderly. Thus, human loss does not produce a significant social commotion and most of these outbreaks have gone unremarked¹³.

In the spring of 1918, however, the healthy and the young also began to die. Of these, soldiers fighting in the war were the first to fall prey to the disease, which was thought to be a new kind of biological weapon. Yet, moving troops all over the world spread the flu and civilians soon fell ill. In many cities, everyday life was seriously affected by the collapse of the most essential services: hospitals were crowded, police and fire departments were left almost without operational officers, and most communal facilities like schools, libraries or theatres had to close down. About 15 million died in the fighting in World War I, which lasted four years. However, the Spanish Flu pandemic, which lasted two years, killed at least twice as many. There is an open controversy about the exact death toll worldwide, with some historians claiming twenty million and others reaching even forty or fifty¹⁴.

In the early eighties, several cases of an infrequent kind of pneumonia started puzzling the medical authorities in big American cities like New York or San Francisco. A close study of subsequent cases denoted a strange collapse of the patients' immune system, which induced generalised infections and cancers like

¹³ A detailed list of the recorded flu epidemics prior to the 1918 pandemic is given by C.W. Potter (2001: 572-3).

¹⁴ Potter states that "no figures exist for many parts of the world, but the pandemic is estimated to have infected 50% of the world's population, 25% suffered a clinical infection and the total mortality was 40-50 million: the often quoted figure of twenty million deaths is palpably too low (Crosby 1976)." By providing the available death tolls in all five continents he deems Alfred W. Crosby's "Epidemic and Peace, 1918" (Westport: Greenwood Press, 1976), a reference work, clearly wrong (2001: 576).

Kaposi's sarcoma or leukaemia. It was equally suspicious that most of the subjects were male homosexuals or drug-addicts. Instead of an understanding attitude, the social reaction was rather vehement, openly blaming the gay community for irresponsible behaviour which had its immediate results in this malady. In many cases, the sick were dismissed from their jobs and usually lost their social status. This only led to a widespread silence, which helped the disease spread swiftly amongst male homosexuals. However, the disease soon reached heterosexuals and haemophiliacs. As a result of international travel, either for business or pleasure, AIDS was taken to other parts of the world, so much so that by 1985, the disease was pandemic worldwide. There were countless theories about the origin of the disease, including rumours of conspiracy against blacks, extreme sexual practices amongst homosexuals, colonialist abuse of prostitution in Africa, and promising vaccines gone wrong (Grmek et al. 1990: 9, Kannabus and Allen 2007). While leading countries passed laws to protect the identities of the sick, the epidemic started killing people by the thousands, especially in the poorest regions of the globe. It was only when the disease touched all social classes, including some cinema and music stars in developed countries, that there was a general commitment and preventive measures were taken. By early 1988, as many as 129 countries had already reported their first case (Mann 1988).

Obviously, the HIV virus is not new to the human being. It seems that there could have been clinical incidents in the 1950s and the 1960s; not to mention others previously unrecorded or simply documented as of "unknown origin." Yet, the 1980s outbreak was unprecedented for its virulence and ease of transmission. Since the virus has been present on Earth for thousands of years, the reason for such a late appearance must be found in the technical advances the human being had attained over the twentieth century. First of all, the breaking of an ecological barrier had taken man to virgin places in the ecosystem, where many unknown infectious agents lay dormant in their host. The open sexual behaviour in the sixties and seventies as well as the improvement in transport, had equally taken the virus from the first world to exotic countries via tourism and vice versa. Likewise, such a simple medical device as the syringe, had become an important vehicle of transmission because of its re-use in undeveloped countries. On the other hand, the fact that the HIV virus is not airborne should complicate its transmission significantly. Certainly, the HIV cannot compete with smallpox or influenza as it only infects through sexual intercourse, a

skin scratch or by eating the raw meat of a sick animal. However, the efficiency of the HIV virus lies on its magnificent ability to mutate. It changes so quickly, that it may take several different forms inside the same host, thus easily dodging the immune system. Although the number of infections in developed countries has been falling lately thanks to preventive campaigns, AIDS has spread unstoppably in the Third World. By the beginning of the twenty-first century, the WHO admitted 30 to 40 million new infections and the epidemic seems far from subsiding¹⁵.

Another great epidemic to remember took place in Surat. This Indian city in the state of Gujarat, suffered an outbreak of plague in 1994 which reminded the general public of the Black Death. Its origin must be found in the state of Maharashtra, 300 kilometres east of Bombay, which was shaken by a terrible earthquake only some weeks prior to the outbreak. The accumulation of rubbish and dead animals could have been the cause of the sudden growth in the rat population. Indian scientists warned of the uncontrolled reproduction of fleas and rats but the local administration did not take the words seriously. Many migrant workers from the surrounding area usually travel to Surat, an important port city 200 kilometres north of Bombay, to work in diamond cutting plants and textile mills. At least 80 cases of bubonic plague were reported in nearby villages by 26 September but the outbreak in Surat was of pneumonic plague. This would mean that the plague, which started in the Maharashtra state where it turned from bubonic to pneumonic, was imported into Surat by travellers in this second stage of the disease. Soon doctors were unable to treat the eight to ten new patients being admitted every hour to Surat's hospital. The higher classes gathered the local supplies of tetracycline, an effective antibiotic to the plague bacteria. There were chaotic scenes of medical practitioners being attacked by the angry relatives of dying victims and troops were sent to the city to prevent infected people from leaving the zone. Yet, amongst the reigning anarchy, thousands of citizens abandoned the city. Barely a week later, an exodus of 600,000 people was confirmed (Ryan 1998: 111).

Whereas the Indian authorities refused to quarantine the city, claiming that the disease was under control, other cases appeared in different states. There was an

¹⁵ The global summary of the AIDS epidemic as of December 2007 can be consulted at <http://www.who.int/hiv/data/2008_global_summary_AIDS_ep.png>. Reports on the global AIDS epidemic and the AIDS epidemic update can be downloaded from the UNAIDS media centre at <<http://www.unaids.org/en/KnowledgeCentre/Resources/PressCentre/default.asp>>. Accessed 19 December 2008.

international reaction and medical controls became compulsory for passengers travelling out of India. Moreover, doctors in Europe and America, where the disease was given special treatment by the media, routinely boarded Indian flights and it was recommended to exclude the country from the travel agenda. Meanwhile, by 29 September the infection had already spread to eight Indian states and the airborne condition of the pneumonic plague led epidemiologists to expect the worst. However, the infectious agent seemed relatively sensitive to tetracycline and the last plague case in Surat was declared on 11 October. The official statistics gather as many as 876 cases, although many may have gone unreported to the WHO (Burns 1994, The New York Times 1994)¹⁶. The authorities of the country did not want to consider this outbreak as an epidemic, since the incidence was relatively “low.” Nevertheless, there are reputed voices claiming that, given the case of a sturdier germ, India and the world could have faced a renewed Black Death pandemic (Campbell and Hughes 1995).

A similar fear is felt about Ebola haemorrhagic fever on account of its dramatic symptoms. Although there have been several outbreaks recorded since 1976, three major events can be considered according to their influence on the biohazard narrative. The first one took place in Nzara, southern Sudan, between June and November 1976, with 284 people infected and 151 deaths. Later that same year the virus jumped to Yambuku, northern Zaire, infecting 318 people and killing 280. Finally, a new epidemic ravaged the Zairian city of Kikwit, 400 kilometres east of Kinshasa in 1995, leaving 254 people dead out of 315 infected (WHO 2008b, CDC 2008d)¹⁷.

The virus emerged surprisingly in mid 1976 in the Sudanese town of Nzara, in the south of the country close to the border with Zaire. The symptoms included headache, sore throat and nausea quickly developing into generalised pains, diarrhoea and bleeding to death in a matter of days. After the transfer of some patients to the hospital of Maridi, a larger town in the north, the illness also began to spread there. Most of the victims were located in Maridi, as the systematic reuse of hypodermic needles in this town’s hospital considerably helped the disease to

¹⁶ The plague cases reported to the WHO during the period 1954-1998 can be downloaded from <http://www.who.int/csr/resources/publications/plague/asiaTable_3_1.pdf>. Accessed 19 December 2008.

¹⁷ The *Centers for Disease Control and Prevention* lowers the casualties of the Kikwit outbreak to 250.

advance there (WHO and International Study Team 1978).

An identical outbreak took place in the first days of September in Yambuku, a small town in the north of Zaire, only 825 kilometres southwest of Maridi. The centre of infection was also a hospital, where the virus killed 11 of the 17 staff (International Commission 1978). Many patients were also infected there and spread the disease around a region delimited by the river Ebola, a tributary of the Congo which gives its name to the pathogen. In spite of the geographic and timing proximity, the strains were proved to be of different origins. Since the death toll of this new strain approached 90 percent, the international authorities decided to isolate the Ebola region and send a research team. Although a major pandemic was expected when the fever reached Kinshasa, a city with a population of two million with international air links, the epidemic vanished all of a sudden.

From then onwards, there were scattered cases in the 1980s until Ebola produced a new epidemic in Zaire in 1995. Despite the fact that the index case, a charcoal burner, had been infected the previous December, human to human transmission took place unnoticeably until the epidemic somehow found its way to Kikwit's General Hospital, where it began its expansion in May (Sanchez et al. 1995). It seems that poor sanitary procedures once more became a chief cause of infection and hospital workers were the first to fall. Since the epidemic received full attention by the media, there was soon a state of international alert. Moreover, the publication of Richard Preston and Laurie Garrett's bestsellers *The Hot Zone* and *The Coming Plague*, respectively, equally contributed to the generalised hysteria. When the worst was feared, the disease retreated to its animal reservoir, questioning the ability of medical authorities to control this mysterious virus. After this last epidemic, there have been other outbreaks, mainly in Asia and Africa, where the virus probably has its natural reservoir. However, Ebola also appeared in research laboratories in Reston (Virginia), Alice (Texas) and Philadelphia, United States of America, in 1989 and 1990. Many monkeys died and at least four persons contracted the disease, although none of them showed any symptoms. By June 2005, the WHO had reported nearly 1,900 cases resulting in almost 1,300 deaths (2008b).

Yet another disease which has been given much publicity lately is Bovine Spongiform Encephalopathy (BSE). Although it is transmissible only to cattle, there are also Transmissible Spongiform Encephalopathies (TSEs) affecting the human being, the best known of which is Creutzfeldt-Jakob Disease (CJD). TSE produces a

spongy degeneration of the brain, which eventually leads to fatal neurological damage. There is controversy as to whether the agent causing BSE is a virus, an entity with nucleic acids carrying genetic information, or a prion, an agent basically made of a self-replicating protein. What is certain is that the agent is exceptionally sturdy, resisting very high or low temperature, even dodging the standards for pasteurisation and sterilisation. As regards CJD, about 85% of cases occur as sporadic disease, with only 5 to 15% of the patients developing the disease because of inherited mutations of the prion protein gene (CDC 2009a). The transmission of the agent usually comes through contaminated surgical equipment from neurological transplants, although there are strong suspicions that the BSE can derive into a human TSE by the ingestion of tainted meat from sick cattle. Precisely, a new variant (vCJD) discovered in 1996 seems to be closely associated with contact with BSE-infected food. Although CJD largely affects the elderly, vCJD also acts on younger individuals and has a longer duration. The clinical features include depression, psychosis, unsteadiness leading to total immobility and inability to speak by death. Whereas the first patient to develop symptoms of the disease could be traced to early 1994, 147 human cases of vCJD were reported in the United Kingdom, 7 in France, and 1 each in Canada, Ireland, Italy, and the United States from 1995 to August 2004. It is interesting to note that “the patients from Canada, Ireland, and the United States had lived in the UK during a key exposure period of the UK population to the BSE agent” (CDC 2007c). Even if there is no evidence to predict the outcome of the disease, it seems feasible to expect a common presence of future TSE cases.

As of today, the human being is suffering the emergence of hitherto unknown germs and the re-emergence of old ones which have developed resistance to previously effective treatment. Whereas such words as AIDS or Ebola have already become familiar, there are still new diseases that are progressively entering our daily vocabulary. The uncontrolled concentration of people in large cities, international travel, poor sanitary conditions, alteration of the environment and constant abuse of antibiotics stand amongst the main causes for such an advance. Since 1973, at least 30 new germs have been reported to the WHO (2005a: 6) and the National Institute of Allergy and Infectious Diseases (2008b). A brief account includes:

- *Hepatitis C*: About 3% of the world’s population seems to be infected with this virus identified in 1989. The patients are at risk of developing

cirrhosis and/or cancer of the liver.

- *Sin nombre*: First identified in 1993 in the southern United States, it is a flu-like virus of the family of the hantavirus. The disease preys on the lungs causing internal haemorrhages that can sometimes be lethal.
- *Influenza A (H5N1)*: A viral strain discovered in 1997, which is one of the causative agents of Avian Flu. It was first thought that it could cause the expected new influenza pandemic but the disease soon receded¹⁸.
- *Legionella pneumophila*: A bacterium first identified in 1977 which causes severe pneumonia. The outbreaks of this disease are usually associated with air conditioning systems. Its detection explained the strange deaths of some legionnaires in a convention of veteran American soldiers in 1976.
- *Escherichia coli O157:H7*: This bacterium, first identified in 1982, produces haemolytic uraemic syndrome and/or haemorrhagic colitis. Infection takes place through tainted or badly manipulated food.
- *Borrelia burgdorferi*: First detected in the USA in 1982, this bacterium causes Lyme disease, a degenerating affliction ending in meningitis and mental derangement. It is endemic in North America and Europe and is transmitted to humans by ticks.

Moreover, certain other germs which have been under control until recently are developing a strong resistance to vaccines. Some of these are:

- *Cholera*: In 1991, cholera re-appeared in South America, where the disease had been absent for over a century. As of today, the disease is present in most of Africa, Asia and South America.
- *Diphtheria*: after the dissolution of former Soviet Union, this disease has affected some of its republics since 1994. Its advance is directly linked to failure of the immunisation programmes.
- *Yellow fever*: Although there is an effective vaccine, its lack of use still allows frequent epidemics of this disease. It is present in 33 countries in

¹⁸ It should not be mistaken with *H1N1*, the causative agent of the recent Novel Flu and yet another subtype of Influenza A.

Africa and eight in South America and there has been a persistent increase in the reported cases worldwide since 1980.

1.3.2 Recorded Biological Accidents

First of all, it must be said that information about biological accidents, either in printed or online sources, is very rare. A couple of likely explanations soon emerge. On the one hand, they are hardly ever accepted by those involved, in case social and possible legal liabilities arise. On the other, it is difficult to draw a line between negligence and bad luck. A very clear example is the event in the Russian town of Kirov, where some sources claim there was an anthrax leak into the sewer system from a military facility in 1953. The West remained ignorant of the event, and no casualties are mentioned. However, it seems that a rat with a resistant strain was found several years later and the Soviets developed a more lethal anthrax at *Compound 19* in Sverdlovsk (Warner: 16, Croddy and Wirtz: 247-8). There is a lot of confusion about the incident even today.

A much better documented event happened in the German town of Marburg, thus giving its name to the filovirus. In August 1967, three factory workers of Beringwerke AG, a subsidiary of the pharmaceutical Hoechst AG dedicated to the production of vaccines, began suffering from muscle aches and mild fevers. Although strange for the summer, it all suggested an early outbreak of influenza. However, the symptoms worsened as their spleens enlarged, their eyes became bloodshot, and they became tender to touch. In the following week, their blood would not coagulate, rashes covered their bodies making them extremely sensitive to touch, they had to be fed intravenously because of a raw throat, and acute diarrhoea drained them. By the second week of infection, the patients were vomiting blood and bleeding through every body orifice. Eventually, there were twenty-three reported cases in Marburg, six more in Frankfurt and two in Belgrade, for a total of thirty-one, seven of whom died.

The WHO investigators traced a connection between the patients: they had handled tissues of sick monkeys arriving from Uganda. The Yugoslav veterinarian had autopsied the monkeys, and the German workers had either killed them or assisted in their post-mortem examination. The rest were secondary infections of some wives, a physician treating them, and a pathologist who made subsequent

laboratory analyses. It all seems to point clearly to a working accident caused by utter disregard for the minimum safety standards. Leaving aside whether the company, the workers, or even both should be blamed for such negligence, the risk to the community is more than obvious. Yet, the accident is simply recalled as an “outbreak” by the WHO and the CDC¹⁹. Also, Laurie Garrett barely indicates that “each of the men had handled animals, or the tissue of animals,” as if the case was just misfortune (1995: 55). Only Frank Ryan dares to state clearly that “handling rules had been broken” because “some had worked with monkeys before they had been kept in quarantine, ignoring the international rules of safety,” and “others had handled monkey tissues and blood without the protection of surgical gloves” (1998: 151). In view of the evidence, even with an acknowledged event naming a lethal virus, the recognition of a biological accident is a decision nobody wants to take.

Another known case, which has nonetheless never been given much publicity, is the tragic death of Mrs. Janet Parker. A medical photographer, she was exposed to the smallpox virus in the Medical School of the University of Birmingham by a leakage in an air duct between laboratories. She died on 11 September 1978 and Professor Henry S. Bedson, Head of the Department of Medical Microbiology in the university, committed suicide soon afterwards. The customary precautions before the accident amounted to a generalised vaccination of the personnel, but the event led to a stress on a close supervision of biohazard facilities along with the shipments of specimens between laboratories²⁰. The occurrence is also mentioned in some scientific reports and press articles and Patricia Cornwell makes her bioterrorist a participant of the incident in her novel *Unnatural Exposure* (Hawkes 1979, Barquet

¹⁹ The WHO states that “the outbreak was associated laboratory work using African green monkeys (*Cercopithecus aethiops*) imported from Uganda” (2008c). Similarly, the CDC barely mentions that the “outbreaks” of hemorrhagic fever “included laboratory workers as well as several medical personnel and family members who had cared for them” (2006a).

²⁰ Fenner, F., et al. point out that:

While unthinkable now, the system, at the time, appeared to provide reasonable safeguards against the chance infection of others in Geneva. The infection of personnel handling specimens, even in laboratories, was uncommon and, until the mid-1970s, laboratory precautions consisted in little more than the vaccination of personnel. The occurrence of smallpox in 1978 in Birmingham, England, in a person exposed to virus carried by an air duct from one room in a laboratory to another demonstrated the need for more stringent precautions.

Another concern present throughout the course of the programme was that of the possible loss of specimens in shipment. Thanks to a rigorous, continuing check of bills of lading against receipt of shipments, this did not occur, but, as a precaution, specimens sent from Geneva to Moscow and Atlanta were packed in large containers which would be less likely to be mislaid.” (1988: 435)

and Domingo 1997, Brown 2004). However, as time goes by, the event has tended to fade and it does not even remain as an example of what should never happen.

A biological accident that is relatively better known is the Sverdlovsk anthrax leakage of 1979. Formerly and now again Yekaterinburg, this Russian city in the Urals used to hold *Compound 19*, a powerful facility dedicated to the research into, and production of, biological weapons. The complex may have been created with the expertise gathered after the Soviets entered Pingfang, home to the appalling Unit 731 of the Japanese Army during the Second World War. In late March 1979, a technician removed a clogged filter from the machines that dried anthrax, leaving a written note. Yet, he failed to inform his supervisor, who turned the system on again without protection. It appears that somebody else must have found the missing filter and remounted it but without reporting to the local authorities. During the following days, the workers in a nearby plant fell ill, and almost all of them died within a week. The exact death toll was never known, as all evidence was dutifully erased by the secret service, but it seems that it went well above a hundred casualties.

Nevertheless, news of the incident reached the international community and a strong debate started about whether the event had been a natural outbreak or an accidental exposure. The then authorities claimed that there had been a major ingestion of tainted meat, which had caused the outbreak. This position was shared by Harvard professor Matthew Meselson, who eventually gained access to the area in 1992. But surprisingly, his team concluded that “the narrow zone of human and animal anthrax cases extending downwind from Compound 19 shows that the outbreak resulted from an aerosol that originated there” (1994: 1207). The article was published in *Science* in 1994 and ultimately demolished the plans of the Russians to obliterate any traces of the accident. Luckily enough, the wind was blowing away from the city on 2 April 1979, the exact day of the leak according to the investigators. Otherwise, the outcome could have been even worse for what is known as the largest biological accident ever recorded.

In addition, there have been a number of documented incidents involving Ebola. Certainly, the best known is the Reston outbreak, which inspired Preston’s bestseller and a famous film featuring some Hollywood celebrities of the time²¹. Also, the newly discovered strain of the virus was given the name of the American

²¹ Outbreak. Dir. Wolfgang Petersen. Perfs. Dustin Hoffman, Rene Russo, Morgan Freeman and Kevin Spacey. Warner Bros., 1995. <<http://www.imdb.com/title/tt0114069/>>. Accessed 4 December 2008.

town. However, it was perhaps the closeness of the event rather than the lack of human casualties that really shocked the Americans. This fact will be demonstrated when analysing the locations of the different novels. On 2 October 1989, a hundred *Cynomolgus* macaques from the Philippines were flown from Manila to Hazelton Research Products' Reston Primate Quarantine Unit. They had an unusual death rate and the Head Veterinarian decided to euthanise them all. Although at least four of the workers who had contact with the monkeys turned seropositive for the virus, none fell ill or developed any symptoms of the disease. Still, it has pervaded into the common mind as one of the closest biological accidents, even though all the standard safety regulations were followed and seemed to be effective.

According to the WHO (2008b), there have been other ignored accidents with Ebola. There are at least three documented incidents with needles in laboratories around the world. The first two happened at the Microbiological Research Establishment, in Porton, UK, and Fort Detrick, Maryland, USA, in 1976 and 2004 respectively, with both victims recovering successfully. However, the third accident, which took place at the State Research Centre of Virology and Biotechnology (Vector), in Koltsovo, Russia, left one victim who died on 19 May 2004. This actually proves how easily the human mind is influenced. While the seriousness of all the Ebola accidents is out of the question, we appear to give much more prominence to events that are closer to our daily lives and brazenly disregard those which seem properly isolated within the walls of a laboratory.

Finally, two strange outbreaks of haemorrhagic fever in Xinjiang Province near Lop Nor in the late eighties have been suggested as a possible case of biological accident. The former Head of the Soviet/Russian Biopreparat program, Ken Alibek, openly declares that:

Intelligence sources found evidence of two epidemics of hemorrhagic fever in this area in the late 1980s, where these diseases were previously unknown. Our analysts concluded that they were caused by an accident in a lab where Chinese scientists were weaponizing viral diseases. (and Handleman 1999: 273)

Although Alibek's declaration is quoted in other sources, whether it was an accident or a natural occurrence has yet to be proved²².

²² In a conference report to the US National Intelligence Council, Eric Croddy, senior research associate at the Chemical and Biological Weapons Nonproliferation Project, Center for Nonproliferation Studies, Monterey Institute, refers to Alibek's declaration stating that:

As for the allegations of the source of outbreaks in Xinjiang, we should be cautious because of

Also, there are less reputed citations of biological releases happening in laboratories worldwide. They involve highly infectious agents, which could cause an epidemic in the country in question. Without factual proof of the events, they remain as suppositions but by no means does this imply that they should be considered less seriously. A good part of truth may be found amongst such talk²³.

1.3.3 Historical Accounts of Biowarfare

The use of microbial agents for biowarfare purposes is not as recent as it may seem at first. Actually, the interest in disease and its value as a weapon can be traced back to the ancient cultures. However, it can be said that it has not been until the late twentieth century, with the advances in medicine and technology, especially genetic engineering, that humans have learnt to control the devastating power of certain microorganisms. The references are certainly vague and difficult to prove since biological agents have not been considered as weapons until recent times. Rather, the different peoples of the past used to send sick or even dead individuals and/or animals to the enemy's villages and cities to inflict them with the same scourge they were enduring. It can be said that they deliberately used the diseases against their enemies but without control of a situation that killed friends and foes alike. It was precisely this ignorance that left biological agents virtually untouched for warfare, until the technological advances of the past century made them easier to handle for such a delicate purpose.

The first alleged episode of biowarfare is stated in the First Book of Samuel. Here, we are told of the pestilence that fell on the Philistines after opening the Hebrews' Ark of the Covenant and how they decided to return it, along with its

the natural occurrence of Xinjiang hemorrhagic fever (HF) endemic to the area, a variant of Crimean-Congo HF of the bunyaviridae-type virus that occasionally strikes in northeastern China, and where a significant outbreak occurred in 1968. But even if we discount the 1980 outbreaks as having military-related origin, we cannot rule out the actual existence of the BW-related facility. The list of declared research and production sites above shows nothing further northeast than Gansu Province. The Soviet Union, in open violation of the BWC, built the largest BW capability thus far known. Given the poor track record of the BWC as it is currently implemented (or more accurately, is not being implemented), China probably is withholding much information about its BW research, although such research primarily may be defensive in nature. (1999: 69-70)

²³ At least two blog entries mention an article entitled "U.S. Mishandling Dirty Germs" by Associated Press, even though the article itself could not be found. The first blog provides a very informative chart from the CDC with the locations of toxic incidents in 44 US labs since 2003. (Butner 2008, Watchdog 2008)

deadly content, to their owners (1 Samuel 5: 1-12, 6: 1-21). It is also thought that Alexander the Great used to catapult dead bodies over the walls of besieged cities and that the Romans used to foul the water supplies of their enemies by throwing corpses into them (Committee on Research Standards 2004: 33-4). The effect of such deeds was both an immediate decrease in enemy numbers and the lowering of morale that characterises a sick individual. It can be said that Greeks and Romans, as the brilliant strategists they used to be, were the first to understand that a sick enemy is more easily defeated than a healthy one. Moreover, a weakened nation is more submissive and ready to be colonised inasmuch as the colonisers, who offer a stronger appearance, produce an illusory way-out towards a better future.

However, the most significant moment of biowarfare for the western world in early history was the Tartar siege of the Crimean port of Kaffa (now Feodosiya). The plague had begun to spread all over Asia and the Middle East by the early 1330s and reached Kaffa in 1346, brought by the caravan routes. The city was under siege by Janibeg, Khan of the Kipchack Tartars, who had to retreat when the epidemic started decimating his troops. Yet, he decided to catapult the dead corpses of his own soldiers over the walls of the city, thus leaving behind a chaotic scenario (Wheelis 2002: 973). The plague quickly ravaged the city, where a number of Genoese traders had sought refuge. In the summer of 1347, they left for Europe and spread the bubonic plague through the Mediterranean ports they called at. Most surely, the common rats in the ships carried infected fleas, which acted as a vector for the propagation of the disease to the sailors. By the end of the year, most of southern Europe was affected by the plague. Those who had the means hurried out of port cities only to die on the roads and carry the pandemic inland to towns and villages. The plague reached England in 1348, which had been protected for a year by the English Channel and the distance from the Mediterranean, but it eventually succumbed to the disease as did most of Europe, Asia and, at least, the north of Africa.

Six centuries must be skipped to find a biowarfare incident of similar proportions. It is one of the most abominable chapters in history, written by Japanese Unit 731 during the Second World War. This covert section of the Japanese army, which was officially named “Epidemic Prevention and Water Purification Department of the Kuantung Army” until 1941, when its name changed to the official one, was responsible of thousands of deaths through biological agents. Not

only did it perform a series of well-reported BW attacks in China but, most atrociously, used prisoners of war (POWs) for vivisection to develop bioweapons (Gold 1996: 162-3, Wu 1997, Ww2pacific 2001). While the western authorities knew all about this, none of the officers in charge of such a dreadful unit was prosecuted in the Tokyo Trial for war crimes. On the contrary, they were granted total immunity in exchange for their human experiment data.

The roots of Unit 731 must be traced back to the end of World War I in 1918, when the Japanese Army began to pay attention to science and technology as weapons of war. The theory behind this change of mind lies in the scarcity of natural resources in Japan, which made this country look for an economical but equally powerful weapon to gain advantage in the battlefield. Some army doctors were instructed to lead a biological unit which was eventually run by Colonel Shiro Ishii, a PhD from Kyoto University. Soon after receiving this post, he was sent to Europe and America for two years (1928-30) to study the latest advances in biological research and returned to establish his base in Pingfang, in Manchuria. After the Japanese invasion of this region in 1931, it was thought to be the ideal location for a research laboratory, both because of its relative distance from Japan and the “inexpensive” Chinese lives for experimentation. By June 1938, Colonel Ishii had 3,000 Japanese working for unit 731, whose base in Pingfang occupied an area of 32 square kilometres. In the period covering October 1940 to January 1941, Japan repeatedly attacked China with a variety of germs, especially the plague bacteria. The procedure used to release the agent was always spraying the target zone by airplane. As a result of these raids, hundreds of casualties were reported, not to mention the after-effects amongst the survivors.

After the war, Colonel Ishii was declared dead by the Japanese press, but he was indeed alive and, along with his research colleagues, underwent interrogation by US officers. Some veiled details about experimentation on live prisoners were then known. The human subjects included not only the local Chinese, but also Soviets, Koreans, Mongolians and Allied soldiers –mainly Americans, though there were British and Australians, too. The US and British governments were well informed by the Chinese ambassador of these war atrocities, which violated the Geneva convention of 1925 against the use of chemical and biological warfare²⁴. Yet, unlike

²⁴ A copy of the text can be downloaded from the Department of Peace Studies at the University of Bradford: <<http://www.brad.ac.uk/acad/sbtwc/keytext/genprot.htm>>. Retrieved 22 December 2008.

the Nazi scientists and doctors, the Japanese were given protection in return for their priceless information. Since the USSR was also informed of the experiments, the US hastened to secure some knowledge which was to be essential for the upcoming superpower contest. However, as will be demonstrated later, the Americans relied so much on such biological superiority that the Soviets launched a vast research program not uncovered until the late 1980s.

The Soviet work on biowarfare remained virtually unknown to the western world until the defection of its two leading microbiologists: Vladimir Pasechnik, to Great Britain in 1989 and Kanatjan Alibekov, now Ken Alibek, to the US in 1992. It was only then that the real importance of the huge Soviet research on biowarfare, which was suspected but largely underestimated, was disclosed. The Iron Curtain had effectively protected the Soviets from western peeping into nuclear as well as chemical and biological strategy, but whereas the former was occasionally seen during the Cold War period, germs became the real ace in the arsenal of the USSR. In fact, the revelations by the two defectors showed a formidable advance in the handling of microbes, certainly an essential obstacle to the proliferation of bioweapons. It appears that Pasechnik's leak became most inconvenient and he was found dead officially from a stroke. However, some sources point at him being poisoned with mercury. His decease coincided with a set of mysterious deaths of renowned microbiologists worldwide (Saxon 2001, Thomas 2003, Baranov et al. 2009).

According to Alibek, who wrote a book exposing the reality behind the Soviet program, the Biopreparat started in 1973, shortly after the USSR had signed the Biological and Toxic Weapons Convention of 1972 (Alibek 1998). It consisted of a series of facilities dedicated to the development of bioweapons and vaccines for existing diseases. So, it can be said that this research program met the two conventional sides of scientific investigation: the good and the evil. On the one hand, they had the technology and ability to make vaccines for diseases which killed, and still kill thousands of people, especially in poor countries. On the other, they were capable of creating the most destructive biological agents ever known, aimed for use against the same individuals they allegedly wanted to save from epidemics. Actually, with the blooming of genetic engineering in the late nineteen-eighties, the Soviets could modify microbes to make them more resistant to vaccines and even blend them into a sort of biological chimera which killed fast and clean. Luckily, such weapons

were never used.

Amongst Biopreparat's achievements, Pasechnik's modified variant of *Yersinia Pestis*, the Black Death bacteria, stands out (Preston 1998: 57). Whereas plague can be treated nowadays with antibiotics, thus preventing the damage previously done by the disease, this new strain was engineered to be resistant to any known antibiotic. Since the Black Death is airborne, the new intractable bug could easily spread through a pandemic impossible to eradicate. Only a whim of Mother Nature could prevent the pandemic from wiping human life off the earth. The situation could have been much worse than the medieval one, both because of the sturdy agent and the communications network, which was incipient in the first Black Death pandemic, but could boost a hypothetical second one. Moreover, in the early nineties, the Soviets had the technology to dry the germ into spores, which could be stored ready for loading into intercontinental missiles (Preston 1998: 55). Thus, the disease could be sent practically anywhere in the world. As regards Alibek, he directed a research team at the Stepnagorsk bioweapons facility, which developed a kind of bioweaponised anthrax four times stronger than the original germ. This powerful agent became part of the Soviet biological arsenal in 1989.

With the disappearance of the USSR, Russia took over the biological inheritance. Thus, according to Alibek, an engineered strain of smallpox and VEE (Venezuelan Equine Encephalitis) was developed between 1990 and 1991²⁵. The VEE is a brain virus which is generally not lethal, but its combination with a highly infective virus, for which there is but a small amount of vaccine doses since its official eradication in 1977, sounds truly insane. Furthermore, a new strain of Marburg was enhanced, dried into biological powder and made into inhalable dust. The scientist who performed the improvement, Dr. Ustinov, was infected and died. His terrible death only helped Soviet scientists realise the incredible virulence of this

²⁵ As Richard Preston recalls:

"Russia has researched the genetic alteration of smallpox," Alibek told me. "In 1990 and 1991, we engineered a smallpox at Vector. It was found that several areas of the smallpox genome" -- the DNA -- "can be used for the introduction of some foreign genetic material. The first development was smallpox and VEE. VEE, or Venezuelan equine encephalitis, is a brain virus. It causes a severe headache and near-coma, but it is generally not lethal. Alibek said that the researchers spliced VEE into smallpox. The result was a recombinant chimera virus. In ancient Greek myth, the chimera was a monster made from parts of different animals. Recombination means the mixing of genes from different organisms. "It is called smallpox-VEE chimera," Alibek said. It could also be called Veepox. Under a microscope, Alibek said, the Veepox looks like smallpox, but it isn't. (1998: 63)

new strain, which was named *variant U* after his unfortunate discoverer. Although it was tested on monkeys and proved to be extremely lethal, Alibek states that it never became part of the Soviet-Russian biological arsenal, which nevertheless boasted Pasechnik's Black Death, Alibekov's anthrax and powdered smallpox (Preston 1998: 56). By the time of his defection, Alibek knew that there was work to recombine the genes of smallpox and Ebola into Ebolapox²⁶. Although there is no confirmation that the experiment was successful, almost two decades later and with the new advances in genetic engineering, it does not seem too far-fetched.

Far from the simplistic idea that this sort of experimentation is a matter of non-western countries, the unquestionable leader of the western world, the United States, equally has a long biowarfare record. Despite the partial vision of some American writers about the terrible Biopreparat, there have also been cases of US biological dangers. The annals of American biological tests on unknowing or unwitting humans begin in 1900, when US doctors in the Philippines infected five prisoners with plague and twenty-nine with beriberi. Only two casualties are known but, as usual in this kind of experimentation, there could have been other unreported ones. In 1915, another doctor produced Pellagra in 12 Mississippi prisoners, supposedly to find a cure for the disease (Sky Highway 2008). Still, one of the most significant personalities in the American secret program is Dr. Cornelius Rhoads, a scientist working for the Rockefeller Institute for Medical Investigations. In 1931, this physician consciously infected Puerto Rican subjects with cancer cells. The results of his experimentation ended in thirteen known deaths. What is worse, concerning this country and its inhabitants, Dr. Rhoads once declared that "what the

²⁶ Once again, Richard Preston points out that:

More recently, Alibek claims, the Vector researchers may have created a recombinant Ebola-smallpox chimera. One could call it Ebolapox. Ebola virus uses the molecule RNA for its genetic code, whereas smallpox uses DNA. Alibek believes that the Russian researchers made a DNA copy of the disease-causing parts of Ebola, then grafted them into smallpox. Alibek said he thinks that the Ebolapox virus is stable -- that is, that it will replicate successfully in a test tube or in animals -- which means that, once created, Ebolapox will live forever in a laboratory, and will not uncreate itself. Thus a new form of life may have been brought into the world.

"The Ebolapox could produce the form of smallpox called blackpox," Alibek says. Blackpox, sometimes known as hemorrhagic smallpox, is the most severe type of smallpox disease. In a blackpox infection, the skin does not develop blisters. Instead, the skin becomes dark all over. Blood vessels leak, resulting in severe internal hemorrhaging. Blackpox is invariably fatal. "As a weapon, the Ebolapox would give the hemorrhages and high mortality rate of Ebola virus, which would give you a blackpox, plus the very high contagiousness of smallpox," Alibek said. (1998: 63)

island needs is not public health work, but a tidal wave or something to totally exterminate its population” (Golshan 2002, Democratic Underground 2005). When the whole affair was discovered, the doctor had to undergo a criminal investigation which acquitted him of the deaths of his patients on account of alleged insanity. Nevertheless, the doctor took charge of the US Atomic Energy Commission and continued his experiments by radiating unwilling prisoners, hospital patients and soldiers, mostly of Puerto Rican origin.

In 1932, two hundred poor black men with syphilis were studied but never treated for their disease. They were never told that they were sick and as many as a hundred of them died. Obviously, the families of these men also became infected and suffered direct or indirect consequences. The government agency that conducted the experiment eventually became the Centers for Disease Control and Prevention (CDC). In 1940, a similar experiment was performed in Chicago on 400 prisoners, most of whom were black. They were infected with malaria and told that they were helping the army to find a proper cure to the disease. They were not given enough information about the disease and it is not clear if they really agreed to take part in the test (Health News Network 1998).

In 1950, there came a substantial change in the policy followed by the US army when it was decided to test biological agents directly on civilians. The first experiment took place in San Francisco, where the US navy sprayed a large amount of *Serratia Marcescens*, a bacterium causing a pneumonia-like illness (The Federation of American Scientists 2000). Although the military declared that it was a harmless agent, a number of citizens came down with the disease and, at least one of them died as a direct consequence of the operation. Similar experiments involving different bacterial agents were carried out in several American and Canadian cities in the fifties and sixties. A significant one was performed in the New York City subway, where an unspecified bacterium was released to test the effect of an agent in a major city transport system. In spite of the serious danger, the research was justified by the great number of subways in the former Soviet Union, Europe and South America (Beam and Sparacino 2003: 527). Between 1956 and 1957, the American army started experimenting with yellow fever and dengue. In Savannah, Georgia and Avon Park, Florida, millions of mosquitoes infected with the diseases were delivered to test the efficacy of these insects to act as vectors of transmission. Amongst the symptoms of the hundreds of victims, there were respiratory distress, stillbirths, encephalitis

and typhoid, which caused many deaths. The Army researchers disguised themselves as public health workers to have direct access to the victims, who had to endure a series of photographs and tests along with the characteristic symptoms of the disease (Blum 2000: 150-1, Health News Network 1998).

Likewise, the Korean War became the perfect scenario to continue with the work started by Colonel Ishii some twenty years earlier. Although there has been continuous denial by the American administration, several investigators report the use of biological warfare by the 581st ARC Wing against the North Koreans and Chinese (Cockburn and St. Clair 1998, Endicott and Hagerman 1999). The methods of delivery included infected insects, paper packets, cylinders and other objects. These eventually resulted in mosquitoes and fleas carrying yellow fever, propaganda leaflets spiked with cholera and feathers carrying anthrax bacteria. Even the usual “chaff,” a radar countermeasure, was used to spray the enemy target with a disease.

From then onwards, and although it cannot be materially proved, the Americans seem to have been involved in many other covert biological attacks in several countries. Between 1980 and 1981, many Haitian male refugees incarcerated in Miami and Puerto Rico developed “gynecomasia,” an unusual case in which males grow female breasts. It was later discovered that they had been given hormone injections without their knowledge (Cockburn and St. Clair 1998). Cuban leader Fidel Castro has repeatedly blamed the CIA for the epidemics of swine fever, dengue and *thrips palmi* –an insect that kills palm trees and other crops– which befell his country in 1971, 1981 and 1996, respectively (Blum 2000: 143-4, Carus 2001: 174). Also, in 1984, during CIA’s war against the Sandinista government in Nicaragua, a strange epidemic of dengue hit the capital Managua, where the virus was unknown. The outbreak coincided with a series of low-level reconnaissance flights over the city (Cockburn and St. Clair 1998).

Another country with at least two cases of research into biological warfare is Great Britain. In the colonial era, the British Empire seems to have used smallpox against the Native Americans during the British-French War. Although it is difficult to prove, the British soldiers may have given the Indians blankets impregnated with smallpox. Thus, the disease devastated the native community, who were thought by the British to be helping the French and whose immune system was totally unprepared to face this emergent malady (Fenner et al.: 239). Likewise, during World War II, when the British knew about the successful experiments by the Japanese on

Asian and Allies POWs, they decided to start their own biological program fearing that their enemies would gain an advantage in this field. This was basically focused on anthrax, which was to be delivered by a standard bomb, and the place chosen for testing was the island of Gruinard, off the coast of Scotland. The data gathered was later used both by British and Americans to develop more effective ways of dispersing anthrax spores. Since the place was thought to be far enough from the main land, few special measures were taken. This idea was soon proved wrong when an outbreak of anthrax in sheep and cattle on the coast of Scotland in 1943 was directly connected to the testing (BBC 2001a, 2001b).

It has recently become known that South Africa ran a BW program during the 1980s and early 1990s, which was originally conceived for defensive purposes only but which, in reality, equally had an offensive component. Dr. Outer Bassoon, an army-trained doctor who was also the personal heart specialist to former President P.W. Botha, headed this program, whose code name was Project Coast. It developed both chemical and biological weapons to be used against the black population, especially toxins aimed at political targets. South Africa may have provided the government troops of Rhodesia (now Zimbabwe) with anthrax and cholera to fight the rebel soldiers in the guerrilla war during the late 1970s. In 1979, there was a large outbreak of anthrax in this country, which killed 82 people, and thousands became ill. Despite the coincidence, investigations are still being carried out to prove whether South Africa was directly involved. After the disappearance of the organisation with the arrival of President de Klerk, many scientists were dismissed and some fled to other countries with BW programs. In this respect, Dr. Basson was often seen in Libya until international pressure forced his re-admittance by the South African administration to keep him under control. As of 2007, Basson still retained his post in the army and South Africa continued to have a BW program, allegedly for defensive purposes only (Nuclear Threat Initiative 2007).

Leaving aside the major powers, certain other countries are suspected of having BW programs, which would provide cheap access to mass-destruction weapons. Although no government would openly state their research on such unethical arts of war and contrary to the Biological Weapons Convention of 1972, ratified by 143 countries to date, the evidence supplied by international espionage is undeniable. Thus, reports by the Canadian Security Intelligence Service (2000) and the US Department of Defense (2000) enumerate a long list of nations, some of

which are hostile to western democracies, with BW capabilities. Trusting American and Israeli sources, the Canadians mention undeclared offensive programs in Iran, Iraq, Israel, Libya, Syria, China, North Korea and Taiwan. Other countries under suspicion are Egypt, Vietnam, Laos, Cuba, Romania and Bulgaria. Special attention must be paid to Iran, Iraq and Libya; three countries which have signed, but not ratified, the 1972 BW Convention. The first began its program in the early 1980s producing many different agents. Some Iranian universities and research organisations seem to be involved in the project. It is thought that they have weaponised anthrax and botulism, which could be delivered through Scud missiles and Sukhoi attack aircraft. The Iraqis, however, brazenly admitted in August 1995 to having produced large quantities of botulism, anthrax, and aflatoxin, a biological agent causing cancer. Moreover, they loaded Scud missile warheads and aerial bombs with these agents and conducted research on several infectious viruses. Although most of their BW facilities were destroyed during the two Gulf Wars and the Iraqis themselves publicly proclaimed the destruction of their biological arsenal, largely underestimated by the western armies, it is still suspected that this is not the case. Some Iraqi biologists appear to be hidden in Sudan, Libya and Algeria, where they could be helping local scientists to launch their respective BW programs²⁷. Furthermore, even if the Iraqi arsenal had really been eradicated, their BW machine could be ready again in a matter of weeks.

As regards Libya, it seems that, although there is research, their BW program is still at an early stage. However, there have been attempts to recruit South African, Iraqi and Romanian scientists and obtain the technology necessary to grow anthrax and botulism. With the help of these experts, it is thought that they could easily turn their research into a program of weaponised agents very soon. It is also known that a number of these countries have tempted former Soviet scientists to collaborate in their biological research. Nowadays, in the chaos of Russia, it is not difficult to find impoverished biologists ready to flee penury in search of a better life. One such country is Iran, which has sent officials to offer enormous quantities of money to researchers. Although it seems that most of them have declined the offer, Russian biologists divulged to *The New York Times* that at least five of their colleagues

²⁷ The Canadian Security Intelligence Service gives credit to a US House of Representatives task force, which reported in February 1998 that "Iraqi BW experts had been dispersed in Sudan, Libya, and Algeria" (2000: 3).

accepted the tempting deal (Miller and Broad 1998)²⁸. Other countries are also suspected of having done the same. In order to frustrate these underhand manoeuvres, the United States government has given the Russians very generous donations. The official reason, though, is either the conversion of old facilities or the creation of new ones for civilian use. The main priority seems to be the development of vaccines against precisely those diseases, which shaped the Soviet biological arsenal not so long ago. However, there are serious suspicions that the money could help rebuild the dubiously dismantled Biopreparat (Miller 2000).

1.3.4 Historical Accounts of Bioterrorism

The extent to which certain biological agents have or thought to have been used in terrorist acts is still a matter of discussion. Undoubtedly, the magnitude of an attack using such a powerful weapon of mass-destruction would provide the terrorist group with a strong means to achieve its hypothetic goal. However, the difficulty in controlling these unpredictable bugs, which could cause a major epidemic, arouses a serious controversy in the potential user. Furthermore, due to the difficulty in claiming credit for an outbreak which can easily be spontaneous, past accounts of this kind tend to be systematically ignored. There have, however, been several publicly-reported incidents, especially in the past three decades, which make biological terrorism a serious menace for the present and immediate future. Ron Purver, a strategist analyst, wrote a recently unclassified report for the Canadian Security Intelligence Service about the likelihood of chemical and biological terrorism (1995, updated 2008). Past reports were gathered and classified according to their degree of seriousness. Thus, the resulting five groups cover: 1) the threat to

²⁸ Miller and Broad's article, published on 8 December 1998, would confirm Ken Alibek's confession to Richard Preston that same year:

Ken Alibek is part of a diaspora of biologists who came out of Russia following the breakup of the Soviet Union. Government funding for research decreased dramatically, and scientists who were working in the biowarfare program found themselves without jobs. Some of them went looking abroad. A few have come to the United States or Great Britain, but most went elsewhere. "No one knows where they are," Alibek says. One can guess that they've ended up in Iraq, Syria, Libya, China, Iran, perhaps Israel, perhaps India -- but no one really knows, probably not even the Russian government. No doubt some of these biologists have carried the Alibekov formula in their heads, if not master seed strains of the anthrax and samples of the finished product in containers. The Alibekov anthrax may be one of the more common bioweapons in the world today. It seems plausible that Iraqi biologists, for instance, know the Alibekov formula by now. (1998: 52)

use biological agents (BA); 2) unsuccessful attempts to acquire BA; 3) actual possession of BA; 4) unsuccessful use of BA; and 5) successful use of BA. Herewith is a miscellany of the most significant cases assembled into groups. Not all of them could be checked with other sources.

In the first set, it is worth mentioning a biologist in West Germany who threatened to put BA in the water supplies of main cities in 1973. It appears that the agents in question were anthrax and botulinum bacilli and he wanted \$8.5 million (CBW Info 1999). Also, in October 1981, some protesters claimed to have taken soil contaminated with anthrax from the island of Gruinard and aimed to place it at the British CBW establishment at Porton Down. As of today, it still seems that there are 280 pounds of contaminated earth hidden somewhere in Britain, awaiting further distribution (Gad 2007: 1558). In 25 January 1991, a report in the Cairo newspaper *Al-Akhbar* during the Gulf War, asserted that Iraq maintained secret agents in Europe ready to use biological, as well as chemical and ordinary weapons, in the capitals of European countries. It was also cited in the *Komsomolskaya Pravda* of Moscow. Amongst the main targets, there were basic transport facilities, such as airports and railway stations, schools and hospitals (Carus 2001: 101). Precisely that same day, an anonymous terrorist individual/group threatened to contaminate the water supply of the city of Kelowna, British Columbia, with undetermined biological agents.

As for the unsuccessful attempts to acquire BA, in the early 1970s the US left-wing terrorist group *Weather Underground* blackmailed a homosexual officer to obtain BA from Fort Detrick. Their intention was to contaminate the water supplies of one or more major American cities. Although the officer gave in, the plot was eventually discovered when the soldier requested “unusual” items (Arizona Department of Health Services 2005). Also, in 1984 two false microbiologists from the Canadian firm ICM ordered BA via telephone from the American Type Culture Collection of Rockville, Maryland. The company declined any responsibility and the FBI arrested the two men when they tried to collect a new order of botulinum toxin (Carus 2001: 101).

Of the cases involving actual possession of BA, it is worth mentioning that members of the US right-wing group *Order of the Rising Sun* were arrested in possession of 30 to 40 kilograms of typhoid bacteria cultures in 1972. One of the leaders, a 19-year-old university student, was thought to have developed the culture in a Chicago City College lab. The BA was intended to be dropped in the water

supplies of Chicago, Saint Louis and other Midwestern cities. Also, in the early 1980s, a safe house for the *Red Army Faction* was discovered in Paris. It sheltered a lab with which an amount of botulinum toxin had been produced (Carus 2001: 156-7). Finally, in 1983, two brothers were arrested in the north-eastern US who had manufactured an ounce of nearly pure ricin, a biological toxin often used in spy assassinations (Carus 2001: 196).

The instances of unsuccessful use of BA are very sketchy. At an undated moment, probably in the 1970s, Los Angeles Police and the FBI arrested a man who was about to deliver an undetermined BA to the city water system (Livingston 1982: 112). However, even today the case still needs further evidence. In 1976, several businessmen in the US and the FBI Director, Clarence M. Kelley, received sealed letters containing ticks infected with an undetermined agent. However, the parasites were “mashed” by the time they reached their hosts. On 14 July 1977, a man named Stephen Grant Morton was indicted in Denver, Colorado, by a federal grand jury on extortion charges. He was accused of mailing more than 250 threatening letters, including four containing ticks. However, the case against Morton was dismissed at the request of the government (Carus 2001: 121). In October 1978, the Bulgarian defector Vladimir Kostov suffered an attack through a ricin-tipped umbrella but the thickness of the clothes he was wearing frustrated the assassination (Staar 1991: 126). Also, in 1980, CIA agent Boris Korczak saved his life after a similar attack in McLean, Virginia (Carus 2001: 81-2). These two incidents are intimately related to a successful one narrated below.

Lastly, of the examples including a successful use of BA, it is worth naming a German doctor who, in 1915, provided a group of dockworkers in Baltimore with anthrax and glanders to infect 3,000 horses, mules and cattle for the Allied troops in Europe. Several hundred soldiers came down with the disease and it is thought that the Imperial German Army supplied the original strain (WHO 2008a: 28). As the incident clearly proves, the line between biowarfare and bioterrorism is extremely thin.

In September 1978, the Bulgarian defector Georgi Markov was assassinated in London through a ricin-tipped umbrella. Blame was put on the Bulgarian Intelligence Service with the aid of the KGB, but their participation is still a matter of discussion. Nevertheless, what is sure is that he was assassinated with a sort of tainted pellet, which was shot into his calf. The event came to be known as the

“umbrella murder.” Some recent articles have even named the killer. According to these sources, he seems to be an Italian-born Dane by the name of Francesco Gullino, codenamed *Piccadilly* (Staar 1991: 126, Hamilton and Walker 2005, Walsh 2005, Brown 2008, The Economist 2008).

But perhaps the most popular bioterrorist attack occurred in September 1984. The Rajneeshee cult contaminated different salad bars in The Dalles, Oregon, with *Salmonella Typhimorium*, with over 750 poisoned and 40 hospitalised (Flaccus 2001, “Trustees” 2002). The cult members hoped to incapacitate so many voters that their own candidates in the county elections would win. Although the scheme failed, the episode spread fear and the economy of the town suffered great losses. In the following years, the population of The Dalles thought without cause that the Rajneeshees planned to spread AIDS. These inhabitants’ fear is still palpable even today, which proves how effective bioterrorism can be in demoralising a particular community or nation.

1.4 Shaping the Biohazard Discourse

All in all, the abovementioned historical data, and probably many other similar cases that could not be traced, have shaped the biohazard discourse. The biohazard writers, installed in the right to know, need to make these dangers available to their fellow citizens. These authors have very valuable information to share because, other than professional writers, they are or used to be journalists, physicians and scientists, for instance. In one way or another, the microbial threats that have been reviewed are either cited in their works or fictionalised, giving birth to similar cases that are readily woven into a novel plot. Thus, since they are well documented, the force of their propositions can hardly be questioned.

By nature, the biohazard writer seems to be against the official discourse that experimentation with microbes is under control and that humanity is safely guarded by the overlords of biotechnological improvement. Thus, the biohazard discourse is unsurprisingly nonconformist. By providing all sorts of historical examples of biological threats, the biohazard writer clearly contradicts the Big Pharma and government propaganda, while fictional examples of what could happen are supplied. The biohazard discourse is chiefly narrated by American writers whose

production can clearly be included in popular fiction. This should come as no surprise because as Jonathan Culler states, “in the United States, [...] national identity has often been defined *against* high culture” (1997: 53). It is surely no coincidence that most of these novels are by American authors and about American culture. The United States and the Soviet Union were for decades the two “world threats.” Given the disappearance of one of them, it seems only logical that authors from the other country tried to find alternative threats to weave their popular narratives around.

With a few notable exceptions, mainly Cornwell and Cook, the biohazard authors covered in this thesis were virtually unknown prior to the publication of their novels. This means that they had to carve out a place for themselves in a very competitive environment. New stratagems had to be found and these writers chose an emerging field to call attention. It is obvious that the means for them to succeed were outside the endorsed culture, at least, as long as they were chiefly unheard of. Moreover, the works of better-known writers like Cornwell and Cook are indeed less daring, as will be shown over the following chapters. While they join the biohazard discourse, it is evident that they do so only partially and almost unconvincingly since they do not deviate much from the conventional schemes that have given them success; i.e. the former’s *Scarpetta* series and the latter’s medical conspiracies.

It could well be argued that these novels are not precisely nice to read, especially when the writers dedicate excessive space to the depiction of disgusting symptomatology. On the other hand, it could be contended that, a priori, a biohazard writer does not seek to make a wonderful piece of art, even if the personal style in narrating the events may help. This kind of narrative is supposed to be, above all, functional. First and foremost, the unknown author needs to sell and seeks a striking motif. The most gruesome abilities of the biological agents must be covered, which implies that an inevitable victimology becomes essential to please the readership. Thus, the writer needs to be pragmatic for the sake of success. Moreover, inasmuch as he/she effectively describes the deeds of a pathogen, willingly or not, he/she is producing a useful novel. Hence, the biohazard discourse eventually becomes illustrating, irrespective of the multiplicity of intentions writers may have.

The eventual outcome, the biothriller, stands between detective fiction and science fiction, although other genres, like terror and historical fiction, may also be welcome for a particular novel. Even if the scenarios proposed by these writers may

initially appear to be best deployed in distant contexts, the conclusiveness of the historical data also validates closer settings. That seems to be the reason why past, present and future locations combine so well even in the same biothriller. As a consequence, the resulting product is attractive to a wide variety of readers, ranging from those who seek the extrapolation of science fiction, the cunningness of the hard-boiled private eye, the evil aberrations of Mother Nature, or an adventure in one of the darkest periods of humankind. Even the impossible cases of Mulder and Scully are acceptable.

It seems evident that, especially in the late nineties, a collective interest formed around biohazard matters in contemporary narrative. That invariably means that a relational self around the biohazard discourse is also born (Brewer and Gardner, 2004: 66). Surely the Ebola and plague epidemics, *Science* article about the anthrax leak in Sverdlovsk, Gould's startling theory and particularly the appearance of some of these microbes in the first world, may have driven certain individuals to seek a new writing field in biohazard. The phenomenal success of Richard Preston's *The Hot Zone* and Laurie Garrett's *The Coming Plague* undoubtedly helped as well. These writers share a concern about a subject which seems to be deliberately erased from the official discourse. As long as there is a demand for such knowledge, a particular trend in mass-production narrative appears that establishes a symbiotic relationship: the writers need to communicate and the readership needs to be informed. Thus, the biothriller emerges as a by-product of a social reality. Ultimately, the popular writer needs to hook the reader who, in turn, will devour the book and return to the bookshop for the next one. If a novel by the same writer is not found, a similar one is bought. This is a universal pattern for mass-produced narrative, which also seems to explain the fundamental rationale behind the construction of the biohazard discourse²⁹.

There is no doubt that the emerging message reveals a most unwelcome truth.

²⁹ When describing the "suspense process" in successful popular narrative, George N. Dove declares that:

The idea of process is that we take a functional approach, seeking to identify those processes or operations a writer employs to achieve a purpose. If that purpose is to sell well (which can be almost automatically assumed for the popular writer), by keeping his reader turning the pages so he will want to finish this book and buy the next one, he will try to use those proven suspense processes that have brought success to earlier writers. (1988: 34)

This would explain the mimetism amongst popular writers specialised in a particular field, obviously including those of this thesis. Additionally, it also seems to justify a structural analysis of the sixteen biothrillers, so as to find the standard builders of the biohazard discourse.

Humanity has been living in an age of disregard of infectious diseases, which began mainly with the discovery of vaccines. Pathogens have been largely underestimated as humans have felt safe inside their hygienic bubble. Yet, these writers prove that pathogens are all around and devise reasonable fictional scenarios backed by irrefutable historical facts. Ultimately, as mentioned before, it all revolves around the relocation of man in the ecosystem. It is then that the microbial being regains the strength that it used to have in humankind's collective mind and is perceived as a fiend. Suddenly, the westerner is reminded that a horde of invisible and uncontrollable monsters has returned to invade the race. An inferior living entity, which is capable of generating the most repulsive feelings, is swiftly perceived as tremendously powerful. Yet, as Gould proves, it is the pathogen's uncomplicated *modus vivendi* that guarantees its existence, as it has done in the past and will probably continue to do in the future. It seems that we really do not stand at the top of the evolutionary tree and that there are countless microscopic creatures ready to make humans notice them. The realisation of such a fact is what creates the necessity to write about biohazard matters.

Bearing in mind the Derridean principle that "literary criticism is structuralist in every age" (2002: 3), I set myself the main objective of studying the common structures of these novels to better understand the nature of the biohazard message. In Dove's words, I want "to identify those processes or operations a writer employs to achieve a purpose" (1988: 34). Thus, I plan to analyse the different agents, archetypes, locations and scenarios so as to find a common ground attributable to these authors. It should then be easier to discover insights into a genuine biohazard discourse aiming at demystifying the aforementioned fallacies. Essentially, I want to know how the discourse is articulated and what recurrent techniques are used. Many societal implications are expected to arise, which should be the onset of a further study. I do not intend to cover both these latter aspects in this thesis. I will be satisfied if, by means of a strict comparative analysis, I establish a firm basis for future work.

CHAPTER 2: THREE SCENARIOS

When writing a biotriller, it appears that the author mainly imagines three possible likelihoods: a natural occurrence, an accident or an act of warfare/terrorism³⁰. Thus, three different worlds form in the writer's mind, which he/she fills with a number of stereotyped characters interacting around the action of a particular biological agent. In the first case, the readership is placed in a field of complacency where it seems as if nothing could alter the state of things, until the unexpected happens and chaos reigns. Amidst such anarchy, the pathogen is presented as a wild uncontrollable monster, which appears and disappears at its own will and cannot be controlled by an inferior human being. In the second arena, human attempts to dominate such wild beasts result in a leakage that endangers the species. Human arrogance, often in allegiance with the greed of the pharmaceutical multinationals, questions the current lifestyle and the validity of safety measures when they have to be implemented by the imperfect human being. Finally, it must also be understood that there have always been deviant individuals who believe themselves entitled to apply their idea of justice, even by causing a real massacre. This leads to the bioterrorist eventuality, where either a trained microbiologist or a sectarian guru decides to punish society at large for generalised behaviour that does not suit him/her. In any of the three scenarios, the reader is compelled to accept that the biological catastrophe is inevitable.

2.1 The Natural Scenario

In the event that a lethal microbial agent spontaneously emerges and endangers the human species, the biohazard writer is rather deterministic, demanding an acceptance of what is considered a recurrent episode in history. Only during the twentieth century, and much more in the second than in the first half, have we begun to fight certain diseases on equal terms. It is all thanks to the advance in vaccination and a generalised improvement in living conditions. Yet, this has made humans

³⁰ Even though Roland Barthes points out "that writing is the destruction of every voice, of every point of origin" (1967: 1), the three different scenarios will be considered as creations of the biohazard writers. Since there seems to be a necessity to explain a biological crisis of some kind, it appears that the authors choose one of the three scenarios according to the nature of the threat. These become, therefore, the projection of their voices.

believe that microbial life can be mastered, a most perfidious suggestion. Actually, there are still many bugs that defy humankind's self-appointed supremacy. Thus, by using this kind of scenario, the writer mainly wants to acknowledge microbial power and shows resignation to what destiny has in store for the human race. The human being can only learn from the past, becoming humbler and better prepared to survive the next tide of diseases. This is an unavoidable truth and these writers do their best to make it crystal clear to their readership.

2.1.1 Acknowledging Microbial Power

Ebola is undoubtedly the ruler of Preston's *The Hot Zone*. The agent is far superior to humans, inasmuch as it controls the tempo of the situation. Indeed, the action by Nancy and Jerry Jaax and the members of the Crisis Cabinet is necessary to avoid more damage but definitely seems to have nothing to do with the sudden withdrawal of the evil pathogen. While the monkey house is effectively nuked, it is also proved that only a slight mutation prevents the wild beast from jumping species onto the human being. Actually, in the chapter entitled 'A Man Down' (*The Hot Zone*³¹: 304-11), the writer describes how a monkey caretaker, who is given the name of Milton Frantig, doubles over and vomits during the nuking process. Another man by the name of Bill Volt also gets frantic. In the end, it all seems to be a panic attack, but Preston is given the chance to speculate:

There had been four workers employed in the building, and two of them were now going to be in the hospital. One man had heart problems, and now the other had a fever with vomiting. From what Dalgard knew about Ebola virus, either of these illnesses could be signs of infection. They had shopped at malls and visited friends and eaten in restaurants. Dalgard thought they were probably having sexual intercourse with their wives. He didn't even want to think about the consequences. (*THZ* : 306)

Whereas there seems to be no account of such an episode in the official records of the Reston event, the possibility cannot be denied. This is precisely what makes humans so inferior to Ebola: it rules. Given the right circumstances, the evil microbe will come back, and scenes like the one described above will become a reality. Even though humankind may think it is prepared, there are simply no vaccines or effective treatment against Ebola, which makes it a perfect candidate to

³¹ Hereafter cited parenthetically in the text as *THZ*.

shatter the so-called hygienic bubble. In such a natural event, the fight is clearly one-sided.

A rather judicious proposition to face such contingency in the best possible conditions is to look back to past events and study the bug's behaviour. Somehow, this axiom is best represented through the attitude of the renowned virologist Gene Johnson, who is quite experienced in many encounters with pathogens. In the case of Ebola, he was a member of the expedition to Kitum Cave to discover the roots of the wild beast. Although this was never achieved, the mission was not an utter failure, at least not for him, since he was sure he would need his acquired knowledge on a future occasion. It is not strange, then, that Johnson's favourite motto is Pasteur's "chance favours the prepared mind" (*THZ*: 151), which indeed quite clearly represents the above idea: man can only prepare for the beast to come. In the same manner that Johnson keeps the African gear hidden but well at hand in Fort Detrick because he is sure he will need it again, so we must gather as much knowledge of pathogens as possible. Humankind has to accept that microbes are all around. In this respect, the monkey house, and especially Kitum Cave, become the epitomes of what awaits: before long, Ebola –or some other evil pathogen– will return. The monkey house shows that the human race can never completely wipe a species out for its own convenience. The spiders that wander freely inside the allegedly sterilised building show that the cycle of life continues (*THZ* : 411). Kitum Cave confirms this theory in the guano of the bats living inside, preying in turn on myriad invisible creatures, which have grown there for aeons and shall continue to do so (*THZ* : 398-402).

Ultimately, there is a lot of determinism underlying Preston's writing. Whereas humanity is entitled to fight microbes, life has its own ways to keep a balance amongst species. The impression is therefore given that in any natural outbreak, like in *The Hot Zone*, Mother Nature is simply restoring the equilibrium to a world that has been largely devastated by humans, especially over the last century. As the writer likes to put it, she is getting rid of the "human parasite." Thus, Preston is clearly suggesting a radical change of behaviour by reminding us that there are still some living creatures that defy humankind's self-appointed rule. In an endless eagerness to dominate the environment, the human race has found a powerful microbial enemy against which there is no effective weapon. Surely, a vaccine will be discovered in time, but the prevailing idea is that other pathogens, both known and unknown, will come to replace it. All through the plot, and most conspicuously

in the closing chapter, it is suggested that humans are meddling where they should not and the consequences are unpredictable. Certainly, the best defence against microbes is knowledge and a change of attitude is required. Perhaps it is a bit radical to think like Preston that the human race is endangering its own existence, but it definitely seems right to believe that the current population growth cannot be sustained and that there are natural ways to control it. One of which, of course, has a microbial origin.

On the other hand, rather than viral in origin, the menace in Pierre Ouellette's *The Third Pandemic* is bacterial because of the ability of these microbes to swap genes and acquire immunity. Before such an eventuality, humankind is most defenceless since antibiotic resistance allows the pandemic to spread around the world in a matter of weeks. Once again, the presentation of events is quite deterministic and the human being is at the whim of the pathogen. Only when the thinning is achieved does the episode terminate, leaving the world's population at what it was fifty years ago. Pandemic is a sure thing and humans are entitled only to predict accurately what is about to take place. Indeed, the machine that foretells the tragedy –the EpiSim– is not a messiah but a herald. It simply contrasts past occurrences and analyses the characteristics of the different agents involved to shape the biological holocaust. Thus, a machine is built that can help the race to envisage and face the malady, but not to cure it.

It is noticeable, then, that the biohero's fight is not against the disease. Paris' opponent is just a crook, an opportunist that has learnt how to make the most out of the reigning anarchy. The power of the *Chlamydia Psittaci* is not questioned at any given time and the characters are just some of those lucky ones allowed to live out their disputes. Meanwhile, the rest of the population is devastated heartlessly by the unforgiving pathogen. All in all, this is quite a conformist scenario even though it is presented as a challenging one. Elaine is running away from the evil corporation, but she does not resist arrest and endures torture in jail stoically. Even when she is about to be raped, she seems to be waiting for the appearance of her champion. Then, Paris returns in time to accomplish his mission with a perfection that astounds him. Although he has never used a weapon in his years as a policeman, he shoots the henchman without hesitation. Eventually the evildoer suffers a heart attack that puts him in Muldane's hands. All these events seem to fit perfectly like pieces of a puzzle.

Thus, the circle is closed, showing the reader that there are certain patterns in

history that are meant to be repeated over and over. It cannot be denied, therefore, that the presentation of events in this novel is absolutely conventional, meaning not to question the mysterious ways of Mother Nature. According to Ouellette, our destiny is written. This is clearly perceived in the initial scene, in which a plane has been sealed with the passengers inside (*The Third Pandemic*³²: 3-5). They happen to be there by simple misfortune: because of a few sick ones, they are all quarantined to death. The biohero knows he has been sent to the airport to perform a perfunctory task. The military stasis running the country in a time of exception will not move a finger to redress the situation. It seems clear that these characters are there to represent such an inescapable fate: they are doomed from the beginning.

Thus, the reader is invited to accept that microbes are an essential part of the ecosystem. Recurrent pandemics can only be studied over the years so as to learn how to face them. That is precisely the function of the EpiSim. While there are events in history that cannot be avoided or redressed, the human being certainly has the chance to prepare for them so that the harm is reduced to a minimum. Just as death cannot be dodged, it appears that one or another pandemic is bound to repeat. Certain pathogens may be eradicated, but then they become strategic weapons and precious vials with unique samples still remain well guarded in American and Russian laboratories³³. Ouellette's presentation is too rigid, leaving no margin for deviations. It is so well structured in the writer's mind that his characters definitely look like dummies: such is his conception of life.

2.1.2 Resignation to Fate

Another major biological catastrophe is introduced in quite a deterministic manner in *Doomsday Book*. The main character, Kivrin, is not meant to be sent to Oxford in the winter of 1348 and, once there, the young girl can do nothing but watch everybody die. Like an immortal goddess, having had her twenty-first century

³² Hereafter cited parenthetically in the text as *TTP*.

³³ In "The Demon in the Freezer," Richard Preston points out that:

At the present time, smallpox lives officially in only two repositories on the planet. One repository is in the United States, in a freezer at the headquarters of the federal Centers for Disease Control and Prevention, in Atlanta - the C.D.C. The other official smallpox repository is in a freezer at a Russian virology institute called Vector, also known as the State Research Institute of Virology and Biotechnology, which is situated outside the city of Novosibirsk, in Siberia. (1999: 45)

inoculations, the bioheroine becomes an exceptional witness of the time, thus producing a valuable diary that is to become the assignment of her life. Yet, she is entitled to do little else. With her basic notions of medicine and herbalism, she kindly treats those around her but to no effect. It definitely seems that Kivrin has been accidentally put into such a nightmarish scenario simply to live that awful experience and tell the readership. That is why she has been endowed with the *Domesday* diary so that no details are lost. Whenever she tries to do anything to help her adoptive family she finds utter misunderstanding. That is mostly because the people of the time accept with resignation that plague is a divine curse for their sinful behaviour. Even though Kivrin tries to change their mentality, having the valuable aid of the iconoclast Father Roche, it is a sheer failure. She can only alleviate their sufferings. The rest is just left to fate.

The purpose behind the bioheroine's journey to the past is indeed laudable. A good knowledge of the past is also sought for a better understanding of epidemics. Yet, Willis regards time travelling as a major source of infection. It is evident that she advocates leaving the past as it is; meddling in the turmoil of the Middle Ages could bring the period back to the twenty-first century. It is therefore strange that such a reputed sci-fi novelist, shows herself so negative towards the possibility of studying history in first person; at least, as regards the combination of a time gate and a killer bug from the past. Definitely, very strict measures should be taken in such a hypothetical eventuality. The pessimist presentation of the matter seems to demand the minimisation of risks to ensure a clean future. There is always a likelihood of things going wrong. The latent idea is that the worst is about to happen and the growing pessimism in Kivrin's successive entries in her diary proves it so. The bioheroine goes from the initial "I will be perfectly all right" (*Doomsday Book*³⁴: 18), to utter panic when realising the plague has fallen on Lady Imeyne's house:

I am so frightened I can't even think. It washes over me in waves. I'll be doing all right, and then suddenly the fear swamps me, and I have to take hold of the bed frame to keep me from running out of the room, out of the house, out of the village, away from it! (*DB*: 434)

In the meantime, though, it is panic itself that holds her to life and to fight for herself and those in her adoptive family who she has come to love. All of a sudden, she becomes a believer and prays to God for Rosemund not to die and little Agnes

³⁴ Hereafter cited parenthetically in the text as *DB*.

not to get the disease (DB: 451). But when she realises it is all in vain, she curses the Almighty in a final useless stand against faith (DB: 493). Eventually, she lets herself go and her last entry sounds like a last will excusing Dunworthy of any implication in her death and confirming that the mortality statistics were absolutely right (DB: 544). All in all, a sheer declaration of impotence before the unchangeable cycle of life.

2.1.3 Partial Findings: Defining the Natural Scenario

The writers who deal with natural events do not consider the possibility that humankind may write its own destiny. In fact, this is not surprising since there are current scientific theories which contend that evolution is clearly deterministic (Science Daily 2007). Even though it may be thought that the human being may do a lot for the environment, it really seems that Mother Nature has her own ways established through aeons and these are not going to change. Recent improvements in epidemiology may put an end to a particular infectious disease, but other harmful pathogens are bound to appear somewhere else. These improvements may deceive the human being since humankind's influence in evolutionary terms has taken place over a very brief period of time, even if it may now seem a lasting variation. The reaction of the environment against the human parasite may seem slow to humans because of this biased perspective. Yet, there are certain epidemic patterns that repeat over the years. It is the cycle of life. In this sense, humans are puppets much like the characters in the novels studied so far. They can only watch and prepare for a new pandemic. In this manner, the writer using a natural scenario wants to redress the anthropocentric vision of evolutionary theory. The human being is not better prepared than *Ebola*, *Chlamydia Psittaci* or *Yersinia Pestis* to survive. As is portrayed in this scenario, the action of these microorganisms in the chain of life can be much more decisive.

2.2 The Accident Scenario

As for the novels with an accident scenario, there is a significant change in Benson's *The Plague Tales* and *Burning Road* compared with Willis' *Doomsday*

Book. In terms of the chances endowed to the bioheroines, the differences are remarkable: while the protagonist of Willis' novel wants to reverse the circumstances but finds it completely impossible, Janie in *The Plague Tales* simply seems to have everything in favour. Somehow, it appears that the accident is here just to emphasise the danger of experimenting with certain agents. This does not mean that there is an absence of determinism. Yet, it is predestined that the dreadful coming of *Yersinia Pestis* to the twenty-first century, the chief biological event in *The Plague Tales*, is to remain a threat and nothing else. Likewise, the defective genetic modification in *Burning Road* is sure to be exposed simply for the benefit of humankind. If not all, most of the moves of the "natural" bioheroine are predestined to fail, while the opposite is also true for the "accidental" one.

2.2.1 A Foreseeable Resolution

Focusing on Benson's *The Plague Tales*, the succession of events is clearly set to bring back the fourteenth century bug, but only on a kind of tourist trip. Thus, Janie is bound to dig in the wrong soil, pick up the wrong microbe and take it to the wrong laboratory so that a helpful *Palmerella Coli* can bring it back to life. What is more, the doomed lab technician who discovers the genetic accident is sentenced to die immediately afterwards, along with the unfortunate director of the main laboratory who, in trying to keep the unknowing Caroline sedated, kills himself with a fatal overdose. If fate is to blame for this chain of mishappenings, it is only because the writer seems to want it that way. It is only Benson herself who allows this strange conjunction of events to take place. Janie is the one to bring *Yersinia* to the future and to defeat it through the ancient knowledge kept in Alejandro's Journal. There can be no alternative³⁵.

In this respect, it certainly seems that the biological accident is here just to

³⁵ Obviously, the recurrent 'happy end' is very often applied to biothrillers so as to signal that the biohazard will remain a threat which is never going to materialise. When analysing the role of epidemics (herein included both natural and 'man-made' events) in popular culture, A. Bowdoin Van Riper states that:

The epidemics in the heroic-scientist stories stand at the center of the story: high-stakes puzzles that the heroes solve by the end of the story. Patients –often including one of the heroes– die, but the surviving heroes solve the puzzle in time to avert a widespread catastrophe. (2002: 78)

To corroborate such a point, he also mentions the favourable resolutions of *The Andromeda Strain* and *The Hot Zone*. Perhaps with the exception of Ouellette's *The Third Pandemic* and *Doomsday Book*, the rest of the novels studied in this thesis follow the same formulaic pattern.

scare, as if the writer herself did not even believe in its nefarious potential. The relative anguish of the bioheroine becomes dull and non-believable because the reader somehow suspects that there is going to be a happy end. It is clearly perceived that the return of plague to a highly-sterilised future London is brief and controlled, like a safe experiment in the lab. There is also a lot of determinism in its presentation but on the positive side, exactly the opposite of the chain of events in *Doomsday Book*. Only Janie's stubbornness in accomplishing her task can be taken as a challenge to overcome the negative circumstances, and yet the inevitable happens anyway. It seems that the happy end is more the result of the ritual and the tradition guarded in the journal than in Janie's perseverance. It is all preconceived in Benson's mind and it is somehow consistently felt as the plot evolves.

The approach varies substantially in the sequel, though, where it can be said that the proportions are reversed. That is to say, destiny has a lesser influence in contrast to the protagonist's overwhelming urge to unveil the bone-shattering mystery. Hence, the mood is certainly much more libertarian than deterministic. There are hardly any difficulties to overcome and the plot evolves in a most monotonous manner. It is all set to favour the bioheroine's purpose. Janie is given the case by Malin himself, who believes she will easily be manipulated. Instead, he finds a hard opponent. Moreover, Tom's guardian angels at Camp Meir are always supporting the protagonist through the Virtual Memorial supercomputer and Kristina so that everything goes well. If Janie needs secure data, she can access the database through Michael's palm book; if her house is broken into, Tom appears there to protect her; if her place is burnt to ashes, she can stay at her champion's; if she is ignorant on genetics, she has Kristina; if she needs the genes of a Jew, there is Alejandro's hair in a journal well secured at the Depository. Even in her love affairs, it is quite clear that she is shifting from Bruce's protection to Tom's. It is as if he has been simply put in the plot as a kind of omnipotent genie. The bottom line is that the bioheroine is to get rid of her moronic boss by showing him up, reconciling her past affairs and starting a new life with her rediscovered white knight. The weird case of the shattering bones is just the perfect excuse to get all these things done. Actually, the fact that the disease is treated with such contempt explains the meagre importance it has for the writer.

Evidently, the reader should not be surprised that an ancient bug helps defeat a modern one. The sturdy Caroline is going to survive just the same as the bioheroine

is sure to accomplish whatever she proposes. The biological threat is counteracted by a weird combination of the protagonist's will and her aide's destiny to survive. It seems as if disease is not really the centre of the narration. On the contrary, both *The Plague Tales* and *Burning Road* are clearly structured to favour the protagonist. In the end, Benson's running of the events seems too forced for reality, mainly because of Janie's incredible luck. It is all so set that the novels, especially the sequel, become unbelievable and the biohazard is diluted. Suffice to note the initial strength of the return of the Black Death to the twenty-first century and the unsubstantial weight of the bone-shattering ailment in the second book.

Similarly, in the accident scenario envisioned by Yarbrow in *Time of the Fourth Horseman*, humans place all their hopes on computers to do the natural thinning process. The result is again rather foreseeable. The soulless machines cannot possibly take the right decision. Inevitably, the reader may get acquainted with this fact from the very beginning and the novel somehow may become intranscendental. Opposing the group of technocrats, there is a group of dissidents who intend to redress the situation by restoring the right of humans to decide for themselves. This is a conflict between those who want Mother Nature and those who prefer computers to choose our destiny. So, in the end, determinism rules anyway. It does not really matter whether the future of the race is taken care of by one or the other. There is simply no margin to choose. It appears as if an accident of this kind is just unavoidable. The unsustainable growth of the human race is, like the strange affliction in Benson's sequel, an excuse to reveal the truth.

First and foremost, the accident is brought about by humankind's own incompetence. The species has been allowed to multiply to inadmissible levels, thus becoming a –if not *the*– major threat to itself. If the experiment gets out of control, it is because some conscientious scientists have decided that something must be done. The initiative is, in principle, meritorious taking into account that everyone is looking elsewhere when it is really overpopulation that has to be tackled. It should be observed that the book was published over thirty years ago, during which time the problem has grown considerably. Still, the author deals with the issue in a rather extremist manner and she appears to do it on purpose. That is to say, she deliberately wants everything to go wrong to send a clear message: something must be done before somebody makes a precipitous move. Herein lies the real value of Yarbrow's novel, even though shallow in presentation and characterisation. It seems that the

writer is so concerned with portraying the real threat in such a straight manner that she completely neglects all other aspects of her narration. Obviously, her message is perfectly understood although the body is certainly flat.

However, this shallowness should not eclipse the menacing dichotomy of diseases and overpopulation. The novel is definitely woven so that awareness about the problem is aroused and, hence, it must be understood as a parable of what humans could soon face. The accident scenario is just an instrument for the writer to communicate with her readership. In Yarbro's view, overpopulation is leading humankind to a dire reality where a desperate solution will have to be taken; the question is whether this decision is by consensus or taken by a reduced number of alleged experts. The presentation is truly radical but it seems evident that the human race is reaching an extreme and strong measures will soon be required. Indeed, a forced spreading of infectious diseases to do the job is unprofessional and improper of those responsible for protecting humanity's health. Yet, the danger of epidemics starting to ravage the human race on account of uncontrolled growth gets closer every day. In short, Yarbro is clearly warning about the complete disregard of this matter, and the far-reaching scenario is definitely conceived to highlight this fact.

2.2.2 *Planning the Unplanned*

The misadventure depicted by Crichton in *The Andromeda Strain* also has human greed at its base. Indeed, the concept of developing a paramount base to protect the race from an extraterrestrial bug is quite an interesting suggestion. Yet, the threat has a wicked origin, for the true aim of Project Scoop is to find new forms of life that can later be studied and modified in Fort Detrick: "in essence, it was a study to discover new biological weapons of war" (*The Andromeda Strain*³⁶: 44). This is really justifying the 'five day history of a major American scientific crisis,' as it was baptised by the writer in the acknowledgements section. This alleged chronicle of research brilliantness and stupidity certainly has an underlying unethical principle which is sure to provide all the thrilling situations. It is not exactly what comes down to earth that matters, but how and especially why it is collected, since the alien bug obviously has no will of its own to invade the earth. It is only the excess of some that

³⁶ Hereafter cited parenthetically in the text as *TAS*.

endangers humanity and thanks to the philanthropy of Stone and his team of researchers everything is set back to normal. Thus, a story of libertarian ideals is outlined: one to seek new means of harm, the other to protect. As the story goes, without the latter, humankind is doomed.

Initially, the writer stresses the right of man to investigate and defy the dictatorship of Mother Nature. It is a right, though, that bears an inevitable risk: the biological catastrophe. This, in turn, can only be counteracted by special protective measures, not only in the research facilities, but also outside via groups of experts dedicated to fighting these exceptional situations. In this respect, Crichton advocates keeping our backs safe rather than rushing headlong into biological investigation. According to the author, accidents are sure to happen. Humans are imperfect and, therefore, bound to make mistakes. It is in our hands, though, to protect ourselves from this reality. In such a paradoxical truth, we have the right and obligation to take measures against our tendency to fail. Everything seems to be reduced to coping with what is predictable and what is not. It can be taken for granted that one of these days there is going to be a leakage in one of the many experiments that are being carried out; which will be made public or remain secret. Following Stone's example, we should be developing a safety program to mitigate the possible negative effects. While maybe not as extreme as the one depicted, similar biological accidents may have already happened but have been covered by these preventive procedures, the remoteness of the location or sheer luck. Unfortunately, others like the Sverdlovsk incident have caused a real tragedy. And when the next one will take place cannot be foreseen.

The ultimate point, therefore, seems to be an affirmation of the right of the scientist to research and the obligation of the authorities to see that such research is done under the best possible conditions. This is what the *Andromeda* accident is here for. The Wildfire protocol is simply a must for every civilised country dealing with a biological program. The chain of events, though definitely radical, clearly shows that society is running a serious risk if such a code is not implemented. Whereas there has not been any *Andromeda* crisis so far –at least not that we have known– it seems obvious that, under the current research path, the risk grows each day. Humankind is entitled to write its own destiny as long as the necessary precautions are taken. There must always be room for the unpredictable. Through one of his artistic licenses, Crichton articulates his thinking into the theory of an alleged mathematician by the

name of Talberg Gregson. The whole scheme is baptised by Wildfire's microbiologist Peter Leavitt as "Planning the Unplanned":

All decisions involving uncertainty fall within two distinct categories –those with contingencies, and those without. The latter are distinctly more difficult to deal with.

Most decisions, and nearly all human interaction, can be incorporated into a contingencies model. For example, a President may start a war, a man may sell his business, or divorce his wife. Such an action will produce a reaction; the number of reactions is infinite but the number of *probable* reactions are manageably small. Before making a decision, an individual can predict various reactions, and he can assess his original, or primary-mode, decision more effectively.

But there is also a category which cannot be analyzed with contingencies. This category involves events and situations which are absolutely unpredictable, not merely disasters of all sorts, but also including rare moments of discovery and insight, such as those which produced the laser, or penicillin. Because, these moments are unpredictable, they cannot be planned for in any logical manner. The mathematics are wholly unsatisfactory.

We may only take comfort in the fact that such situations, for ill or for good, are exceedingly rare. (*TAS*: 196-7)

This, undoubtedly, is Crichton's philosophy at its best. The number of probable reactions when performing biological investigations certainly is twofold: either the experiment goes as predicted or it fails, in which case we must be prepared to contain the microbe. If the agent breaches the safety environment, then we fall into the absolutely unpredictable category, which is clearly the case of *Andromeda*. The Wildfire team may work to solve the problem but they are always at the mercy of an unpredictable agent. In the end, *Andromeda* unexpectedly mutates to a benign form and humans are just given the chance not to make matters worse by implementing Directive 7/12.

In like manner, Guy Carson is allowed the same prospect in *Mount Dragon* by Douglas Preston and Lincoln Child. The accident scenario differs in that there is no leakage, although there is no control over the agent either. Again, humans meddle in unknown territory and lose power over the situation; instead of mastering it, they are left at the mercy of X-FLU. Thus, when the "probable reactions" scheme is abandoned and the "absolutely unpredictable" one is entered, the catastrophe seems imminent. Only a heroic decision like the safe blowing up of the remote facility can avoid it. In the case of this novel, there is a clear fight between the libertarian – Scopes and GeneDyne, and the deterministic –Levine and his foundation, with Carson and Susana adopting a more compatibilistic position. In the end, however, although only for research with stem cells, they eventually adopt a more conservative

posture. Definitely, the policy is that investigation with somatic cells is acceptable since any possible alteration of the DNA dies with the subject patient, but altering germ cells is forbidden since the changes in the DNA are fostered onto future generations. In short, any adjustment that is permanent should not be made. It is like the “undo” function in every program that allows a retracing of steps; with no undoing, there should be no research.

Other than those characters with a definite outlook, it is Carson's journey from the liberal to the conservative side that markedly defines the plot. The apparently broad-minded researcher undergoes a process of growing doubts as regards his work, which eventually force him to resign. Inevitably, the atmosphere changes with him. Whereas the initial scenes gather the protagonist's excitement when he is appointed to substitute Burt and his arrival at Mount Dragon –with the only exception of Levine's lecture, the mood of the novel shifts along with his declining enthusiasm. If at the beginning everything seems to be gleaming and encouraging, as his assistant and the professor undermine the protagonist's courage, the light seems to dim with the advent of preoccupations. Ultimately, the final journey through the desert becomes a metaphorical search for the self in an environment that has clearly turned against permissiveness. In a way, it represents Carson's migration from his liberal understanding of research to a more restrictive one based on rigorous moral principles³⁷. In the end Carson does not appear to have a will of his own either, since he is definitely manipulated, first by Scopes, then by Susana and Levine. So, what originally looks like a journey towards freedom of choice is rather one from one master to another. In fact, the character's attitude is so conditioned by the beliefs of the writers that it is hard to imagine a different behaviour. The novel is openly structured to show the progressive movements of the biohero towards what Lincoln and Preston consider proper biogenetics research should be. The scenario is, therefore, built over this premise.

Meanwhile, Levine's intrusion in the almighty Octagon –Scopes' fortress and

³⁷ Note that Carson does not even leave the desert in the end. This emphasises the metaphorical meaning of a journey which is not supposed to arrive anywhere in particular. In this sense, Mieke Bal states that:

The character that is moving towards a goal need not always arrive in another space. In many travel stories, the movement is a goal in itself. It is expected to result in a change, liberation, introspection, wisdom, or knowledge. (2004: 137)

Although not exactly fitting into the travel story formula, other itinerant bioheroes/-ines seem to have the same motivations in their personal quest against biohazard.

headquarters for GeneDyne— reveals that, in spite of all the efforts that may be put into safety, there will always be unpredictable accidents. It is the final touch that is needed to break the current infatuation with technology. Nobody is completely safe even in an ultra-secure stronghold. If a hacker can manipulate the hyper-advanced safeguarding system so as to allow Levine in, it seems that technological means are imperfect and thus bound to failure. The realm of contingencies with small manageable situations is only valid for machines but, since these are controlled by humans, the likelihood of a mistake exists. Every living creature is unpredictable; microbes as well. In a scenario dealing with humans trying to control microbes, a contingency is an utter fallacy. This is what the scenario in *Mount Dragon* is really depicting: accidents are sure to happen. The only possible way to avoid them is abstinence, especially with regards to experimentation with germ cells. Just as the cycle of life in the novels portraying natural outbreaks shows that certain historical patterns are bound to be repeated, so biological disasters are certain to reproduce over time. It is simply a truth that humans have to learn to live with: both spontaneous and man-made calamities are recurrent. Definitely, the ultimate reading of this novel is quite deterministic but, as in the works in the former group, humankind still has the chance to learn from history so as to be better prepared for the next time. In Crichton's words, such contingency is still "manageable."

Another unforeseen accident is the one narrated by Ken McClure. This writer chooses to turn an originally goodwill experiment into a nightmare that eventually discloses the unethical relations between countries in biological research. For the American government, it is much easier to promote these risky procedures abroad rather than allowing a catastrophe in the US. The author reveals the double standard treatment of Sam Freedman, an American convict exiled to Israel to continue his dark research. While the researcher wants to do his job in the best conditions, governmental—and more poignantly pharmaceutical— interests emerge to manipulate the outcome. The Kalman Institute is a paradise for any biologist, fully equipped with the latest machinery so that long-awaited vaccines can be achieved. If Preston and Child's *Mount Dragon* was built to obtain a universal cure for the flu, so is this facility for leprosy. However, it is not only betterment of the race that is sought, but also rather gross economic benefits. The accident is again the excuse to make all such hypocrisy visible, very similarly to what Carson eventually discovers in the previous novel. The biohero looks into what has gone wrong until he discovers that a

dark power plans to benefit from biology. This is virtually a universal principle that can be applied to each of the novels depicting such scenario. The result is also invariable: the conspiracy is exposed for the credit of the protagonist and the welfare of humanity.

Nevertheless, the readership may also be left with the sensation that the experiment is uncontrolled. From the very beginning, with the description of Klein's death, the feeling is that the pathogen sets the rules. The Galomycin crisis group, which meets to discuss the abnormal incident, is clearly overwhelmed and it is left to its fate. Indeed, they meet to reverse such determinism and the answer is the main character. Still, it is only one facility that has been temporarily dismantled, while other experiments, either by Kalman, GeneDyne or governmental agencies, are sure to be happening elsewhere. It seems as if the greed of some human beings is about to bring humankind close to self-destruction. This is the universal message that keeps repeating in the accident scenario. In order for the population at large to face it correctly, the biohazard writer feels the urge to depict the possible outcomes of such selfishness. Yet, rather than seeking a solution, he is simply stating a rather pessimistic reality: a sort of foretelling the catastrophe that is bound to happen one of these days.

Thus, our alleged first line of defence has nothing to do before the power of the multinationals. It is a paradox that is certainly well reflected in this novel through the contrast between the labs in the University and at Kalman's, workplaces for the biohero and bioterrorist respectively. On the one hand, the governments are financing public research to defend us from any possible biohazard menace, providing scientists with facilities in the best universities to counteract such contingencies. On the other, they depend so much on private research conducted by big pharmaceutical multinationals, which do not seem to care much about biohazard as long as targets are reached. As a result, the human kind is endangering its own existence. The natural thinning claimed by Preston and Ouellette is joined by this man-made calamity. It is hard to say that this is what humanity deserves since it is the unethical behaviour of some that is leading towards disaster but, in the view of a writer like McClure, there really is little that can be done.

The accident in Dymar does nothing but to confirm his theory. The dedicated Mulder and Scully cannot possibly guarantee a total absence of such misfortunes. They are facing a harsh reality that is never met on equal terms. The risks are

multiple and goodwill cannot cope with the demand. Furthermore, there are always the Syndicate's Men in Black to see that the general public remain uninformed. While doom is at hand, the relentless couple is fighting to defend humankind from yet another biological threat and there is going to be a happy ending as usual. For all the difficulties posed, the kind of novel they belong to is based on favourable resolutions and *Antibodies* cannot be an exception. In a way, the whole tracking of the case looks unreal because they are quickly on the good lead and reach Dorman sooner than the Syndicate. In spite of the author's intention to make it appear as if they are not controlling the situation, he is favouring their movements rather than those on the evil side. In fiction, those on the weaker front have a chance to win, but the price to pay is an illusion. It may be feasible in real life, but that is certainly not usual. Eventually, those anonymous counterparts who are safeguarding our lives do not have access to as many resources and the chance of an accident is high. As should be known by now, the fact that we have mostly been kept ignorant of the biological threat does not equal the possibility that any such incident may actually take place. In fact, there is proof to the contrary.

In the illusory world of Anderson, the Syndicate is presented as the dark hand of power: those in charge of implementing Machiavelli's theories. Through this obscure organisation it is somehow emphasised that some things never change and that there are influential people taking care of the business. In essence, then, the individual has nothing to do against those who have always kept power. As regards the biological incident, they are the only ones entitled to solve it and the work of Mulder and Scully is seen rather as an intrusion. Indeed, the same cartel that encourages research is the one that destroys Dymar and covers up the evidence: *He that giveth, shall taketh away*. On the other hand, the libertarian commitment of the FBI couple is praiseworthy yet altogether insignificant. The Syndicate is never dismantled nor does it appear to be in other books of the series; it is simply meant to last³⁸.

³⁸ When analysing the narrative structures of the *X-Files* series, Mark Fenster acknowledges that the success of the product lies on the fact that Mulder and Scully can never wholly uncover the "truth." Even though they may achieve particular targets on a weekly basis, the powerful Syndicate remains intact. Although there exists the possibility of an utopian world without the Syndicate, such dream is never attained because:

Conspiracy theory represents the desire for, and the possibility of, a knowable political order; yet, in its disturbing revelations and uncertain resolution it also implicitly recognizes the difficulty of achieving transparent, equitable power relations in capitalist democracy. Despite

2.2.3 Partial Findings: Defining the Accident Scenario

In general, the accident scenario reveals a conflict of interests, but with a prevailing sensation that the battle is clearly uneven. The development of the plot conspicuously highlights this unfair fight of the common-sense individual against the manipulation of those who control biological research. Humankind is being jeopardised and, even if the eventual outcome is positive, it is understood that things are not the same in the real world. The happy ending is obviously a mockery that should not dazzle the readership. The general public is being deceived in terms of biological research and the overall outlook cannot be more pessimistic. It appears as if an accident of this kind is just unavoidable. There is an affirmation of the scientist's right to research, but also of the obligation of the authorities to see that such research is done in the best possible conditions. However, while governments finance public research to defend us from any possible biohazard menace, they depend so much on the money donated by the greedy pharmaceutical multinationals. The biohazard writer feels the urge to depict the possible outcomes of this threat. Yet, rather than seeking a solution, he/she is simply foretelling a looming catastrophe.

2.3 The Bioterrorist Scenario

Similarly, an act of bioterrorism can be as unpredictable as a biological accident. Nevertheless, whereas it is generally acknowledged that, by experimenting with bugs, one day or another there is going to be a leakage –a calculated risk, so to speak– it appears as if the bioterrorist act should never happen. That is mainly because the average human being cannot conceive a contamination of the race on purpose. This naïve belief seems to remain until the readership is shocked by a work of fiction depicting such likelihood. After the historical evidence provided in the first chapter, it should not be difficult to understand that the possibility cannot be discarded. Society at large has deliberately been kept ignorant of the many instances

its professed intentions of uncovering the plot, the classical conspiracy narrative is inherently ambivalent about uncovering the 'truth' of power and the possibilities of a different future. (Fenster 2008: 150)

It may be argued that the conspiracies in *Time of the Fourth Horseman* and *Outbreak* are factually revealed, yet again there seems to be a strong likelihood that the jeopardy is repeated over time. On the other hand, the readership is never told what happens to the invisible conspirators, which leaves the door open for future plots.

of biowarfare and bioterrorism in history, only a few of which are just now being revealed. However, such eventuality is not remote. For all the immoral connotations it may bear, the biohazard writers who choose to implement a bioterrorist scenario definitely want to illustrate their readership to the fact.

2.3.1 Human Nature

One of the first authors to consider bioterrorism as a main theme for his novels was Robin Cook. If one aspect may have counted towards the success of *Outbreak*, that was the relative novelty of the subject a couple of decades ago. During the Reagan era, the American citizen was considerably more worried about the Soviets launching a nuclear missile than by a terrorist attack. In fact, only after the defections of Pasechnik and Alibek did the western powers know about the Biopreparat program, and not until the late nineties did the general public obtain access to the information as published by Preston (1998, 1999) and Alibek himself (1998, and Handleman 1999). A lobby of conservative doctors deliberately spreading a haemorrhagic virus was a rare and gripping innovation whose fallout created a new readership. Even if it did not get to be a best-seller, the very idea fits perfectly into the urban legend of wicked doctors causing epidemics on purpose. And indeed, this is a differentiating factor between the accident and the terrorist scenario: the will to do harm. The thrilling effect is achieved by the self-granted right of some to use biological weapons in order to restore “normality.” In this case, there are those who want the current status quo to remain, who are confronted by a hitherto unknown government agency dedicated to chasing biohazard threats. It is a conflict between wills: one to do harm, the other to impart justice.

Those who do not abide by the strict rules of the Physicians’ Action Congress (PAC), a lobby which is everything but democratic, suffer the consequences. Actually, the scenario may bear reminiscences of *Time of the Fourth Horseman* through the conspiracy theory. But while Yarbrow's novel depicts an accident deriving into a massive slaughter, Cook's is rather a terrorist act evolving into an epidemic. The point here is that the conspirators only want to eliminate the nuisance. It may well be said that the ensuing victims are the acceptable losses in such an act, which are surprisingly few for the high potential of Ebola. They believe themselves entitled to kill to maintain their position in society but they do it with the wrong weapon,

which is bound to cause the catastrophe. It is, therefore, a sort of wrong will that these doctors implement since the means to their ends is generally acknowledged as unethical. Thus, they must be justly punished by the champions of the right or more ethical libertarianism commanded by Marissa. Eventually, though, it cannot be said that it is a rather transgressive plot; much to the contrary, as it is the right order of things that seems to prevail.

The 1930s setting of Greyson along with the Victorian dwellings of the evil-doers contribute greatly to portraying the contest between the two ideals. In deploying his plot, it looks as if the writer needs to emphasise the conservative position of the conspirators by highlighting the outdated buildings. It is important that the reader assumes they are living in the past, a scheme that does not suit them to leave. On the contrary, Marissa's life is more transitional in accordance with the evolution of her professional career. In the same way, it is necessary for the characters to behave in a most traditional manner; hence, the Mafia cliché. For all the innovation of using a biological agent as a weapon, the vaccination gun and the use that is made of it is most conventional and even almost anachronous. As it seems, this unfashionable means of transmission may certainly be the chief reason for the failure of the conspiracy plan. Thus, the writer both introduces the avant-garde use of bioweapons for selective targeting but also ponders the relative “cleanliness” of the agent. Undoubtedly, it is a cutting-edge scenario for the mid-eighties, which is easily adapted to his habitual medical conspiracies.

A different motivation is revenge, which is best exemplified in Preston's *The Cobra Event*. In this novel, Cope's derangement leads him to punish those who have exploited his hard work. In his sick mind, more than the anonymous people behind the multinational, the culprit appears to be society at large. Opposing him, there is a selected group of specialists amongst which the innocent Alice stands out. They are the preservers of our long-established moral values who must confront the deviant subjects so that society remains unharmed. The one who does not feel happy about the current standards is Cope, who believes there are certain individuals who must be punished. Like the PAC, he simply chooses the wrong means of accomplishing his belief and he is justly executed by the moral defenders. However, we should consider how many “mistreated” subjects there are in the real world capable of implementing Cope's plan and imparting their own sense of justice. Certainly, societal rules are most deterministic and are rarely altered. Hence, all those Copes in the real world

feeling entitled to change the rules, and with expertise in microbiology, may one day choose the wrong way and do a lot of harm before they are stopped. There are always unsatisfied individuals willing to alter the oppressing order of things. The biological way is just one approach; a shocking and different manner to what we are accustomed to, but a plausible alternative nonetheless.

In Preston's fictional world, therefore, determinism seems to rule for the benefit of humankind. Indeed, society needs a series of standards to delimit behaviour, which have been moulded through centuries and should be strict and rather difficult to move. Otherwise, coexistence is troublesome; that is a universal truth. However, to think that there are never going to be conflictive characters is an illusion, all the more inside the undefined limits of biotechnology. The possibilities of this science are enormous, but so are the chances of harm being done. The relative novelty of genetic engineering ensures a generalised lack of restrictions for the good and the bad. As Preston likes to put it:

Open peer-reviewed biological research can reap great benefits. Genetic engineering is a process, like metallurgy. Steel can be used for ploughshares or swords. What is dangerous is human intent. The next emerging virus may not come from a tropical forest; it may come from a bioreactor. In a deeper sense it will come from the human mind. To think that the power of the genetic code is not being bent towards weapons is to ignore the growing body of evidence, the lessons of history and the reality of human nature. As Thucydides pointed out, hope is an expensive commodity. It makes better sense to be prepared. (*The Cobra Event*³⁹: 444)

It should be noticed that Preston does not want to limit human progress. Instead, he focuses on the high chances that a deviant scientist uses biology to apply his own perception of justice. History foretells the likelihood of such an event. Freedom of will is a very dangerous weapon when there are no clear limits and an expert in genetic engineering can easily become a lethal bioterrorist. Like in *The Hot Zone*, Preston demands careful awareness of history to realise the threat and establish the appropriate means for the proper development of humankind. By now, we should know human nature enough to understand that, in the same manner that there are repetitive epidemic cycles, there are countless unsatisfied individuals about to push their wills to unacceptable extremes. What they need is the right means to cause chaos, and a bioweapon certainly falls into such pattern. In order to counteract the

³⁹ Hereafter cited parenthetically in the text as *TCE*.

feasibility, we need firm guidelines. In short, we need a deterministic circle to delimit a deviant libertarian scenario; hence, the paradox.

Furthermore, the human factor is unavoidable and with it comes imperfection and likelihood of failure. If in the accident scenario, Preston's "human intent" ends in a mistake that brings about the epidemic, in the bioterrorist scenario the perpetrator does not even consider himself wrong. Only the bioheroine and her aides can put a limit to a self-endowed freedom of action. Thus, human intent may be unethical for the great majority, but it is a fact that the bioterrorist either does not comprehend or pretends not to. It is obvious that certain moral constraints do not serve Cope well and he ignores them so that his revenge can be achieved. Although it is suggested that he will be effectively stopped, the reading does not become boring at all since the bioterrorist is allowed to do a lot of harm before he dies. In a way, Preston decides to administer the painful situations and scatter them throughout the plot in a crescendo, but taking good care that the final blow is considerably cushioned. In the end, it can well be said that the biological threat is not a pinch of the catastrophe it could have been. Thus, society remains largely untouched and it seems as if the safety measures of the developed world against such a menace are still efficient. However, society has been questioned and will surely be in the future. The bottom line is clear: more means must be dedicated to counteracting the bioterrorist threat.

Other lonesome evil-doers, like Kameron in *The Eleventh Plague* and Crowder in *Unnatural Exposure*, are naturally fitted into a bioterrorist scheme, where the scare of a major massacre occurring is always lessened in the end. None of the bioterrorists analysed in this thesis escape without punishment; what is more, most of them die painfully in an act that seems to reassert the justice of moral values. Eventually, it is most natural that they pay for the suffering they have caused, and that is usually through a death penalty in advance. On the one hand, if such a scheme is so often repeated, it means that a great majority of people accept it as a compulsory development of the work. So to speak, it is but one more ingredient of the best-seller. Yet on the other, it also means that we naturally view capital punishment as most appropriate for acts of bioterrorism, which should make us reconsider the validity of our so-called ethical authority.

The death of Phyllis Crowder in *Unnatural Exposure* is a good example, as

Kay sentences her “to die the way they did” (*Unnatural Exposure*⁴⁰: 361). When someone has specific knowledge and abilities it is only proper that he/she uses it for the common good and not against it. Not behaving like this, and particularly utilising this specific intelligence against society, means such an affront that it is difficult not to behave like the terrorist, i.e. punish with death. Using Richard Preston’s words, it is in our human nature and it is this, amongst other previously seen factors, that accounts for the success of this kind of narrative⁴¹. In favour of Cornwell, it must be said that the number of victims is reduced to the minimum along with the gory element of the autopsies. These are basically mentioned to keep the plot together since, what really seems to matter here is Kay’s sentimental life rather than the case itself and how it is solved. Yet, all such points contribute to a different kind of bioterrorist scenario where the two wills are definitely less prominent at the beginning and they grow gradually until the final confrontation. The outcome however, as with Benson and Yarbro, is also quite predictable.

Thus, the cliché that crime does not pay is fully applied to Crowder. For all the baffling clues and the scary anonymous emails, we know for sure that Kay will find the criminal. It is her job and the certainty that the series will last⁴². A writer like Cornwell cannot afford anything different than the just punishment, if only to allow her protagonist a new enigma to solve. More than defending Kay’s work, the writer certainly seems to reproach those researchers who deviate from normality. However, the example is too extremist. It is logical to scatter dismembered bodies here and there so as to make the novel attractive to the gullible, but the idea of a microbiologist filling facial sprays with recombinant smallpox is not. If Cornwell had really wanted to make her evil character so prominent, she would have given her the chance to do something grand; at least, she would have allowed her to plan it. That is not the case, obviously, which means biotechnology is just an excuse for the benefit of Kay. There is no intention of showing that there are practicable ways to do great harm with a bioweapon; it is simply a means of achieving a localised revenge

⁴⁰ Hereafter cited parenthetically in the text as *UE*.

⁴¹ Actually, this seems to be a recurrent move in any scenario where villains play an important role. It is sufficiently proved by Vladimir Propp in the second chapter of his *Morphology of the Folktale*, dedicated to “The Functions of Dramatis Personae” (2003: 63).

⁴² Indeed, *Unnatural Exposure* ranks #6 in 1997 best-selling fiction books. Moreover, it is the only one of the studied books to have reached the top of the *USA Today* list, which traces back to 1993. Additionally, as many as eleven books of the series have also reached the top. This information can be seen in the appendix dedicated to sales figures.

focused on one person. It is acceptable and viable, of course, but the contribution to the biohazard discourse is almost null, as the plot is built around the protagonist. The facial sprays are just a poorly elaborated pretext to grant Kay an easy case. In fact, her doubts about her love affair with Marino, her concern about her niece Lucy and her assistant Wingo, along with the improvement in her working conditions are more important matters. The awkward sprays are simply there to make Crowder's vengeful feelings evident. Other than that, they are just an eccentricity. Altogether, it makes the scenario rather unusual and bizarre.

In contrast, the fact that Teddy Kameron is a more standardised psychopath makes the plot of *The Eleventh Plague* more popular. In a way, because the ten plagues of Egypt are a familiar token in the western mind, it seems as if there might be a crazy guy ready to re-enact them around every corner. It is again a distortion of the libertarian principle of free will, but merging the feeling of revenge with some theological misconceptions. The bioterrorist believes himself empowered by God to start a new crusade against those who have made him miserable; a task which is undertaken by mimicking the vengeful will of the Lord. It appears to Kameron that his deeds are more justifiable because he is repeating a forceful act that is generally accepted as redeeming and purifying. If the Lord once decided to bring about the ten plagues so that humankind realised the wrongness of its behaviour, so does Kameron believe himself entitled to do likewise for the whole world to acknowledge his ideals. The thorough coverage of the Biblical punishment is just a warning of what the writers consider a possible liability. Indeed, the plot does not look totally implausible considering the number of integrists who are not happy with the current course of western society. While a deranged Christian radical is presented here, other extremist religious groups with a recent history of atrocities soon come to mind.

The question is whether these groups are going to abandon the so far standard artillery in favour of the cleaner and more destructive bioweapons. The plot outlined in *The Eleventh Plague* shows that it is not very difficult to schedule terror events using different biological agents. For a skilful researcher, strictly methodical in practice because he has been trained like this, there seems to be no limitation. Kameron knows very well how to set up a laboratory, obtain the assorted pathogens, grow them in the right environment and deliver them so as to cause the desired harm. In truth, it takes Jack Bryne almost a whole year to decipher his counterpart's painstaking plan, which is ultimately outlined in a series of charts for the reader to

understand both its complexity and the meticulousness of the wrong-doer. But most of all, what is really alarming about the whole scheme is the apparent ease with which it is put into practice. It is a very realistic plot, carefully woven to highlight the baffling of the authorities. Such mysteriousness is made even more evident by the non-chronological development of the different punishments, which takes the reader from the initial swarm plague, to the boils, then water to blood, lice and darkness until the entire plan is finally unveiled. The Death of the Eldest is obviously the last to be disclosed, but there is an intriguing eleventh plague to come and that can only be perceived by the biohero in the very last lines of the novel. Perhaps it is the weakest part, even if it gives the book its title. Somehow, it is quite deterministic as well, signalling that the bioterrorist threat does not end by stopping a single individual:

He had done his job. He had stopped a new plague, the mass poisoning of the city. Was it merely a preamble for the big one of the next century? How many Teddy Kameron's were out there? Bioterrorism was easy, countries and populations trusting and vulnerable. The unthinkable could become a fact in an instant. (*The Eleventh Plague*⁴³: 506)

It must be remembered that these words were written barely three years before the 9/11 massacre. Over a decade later, the feelings this novel produces in the reader have varied. What could almost have been fantasy at the end of the twentieth century, should truly be taken into consideration nowadays. It is known that certain organisations are continuously searching for the ultimate act that gives them notoriety and recognition. If they have avoided switching to bioweapons so far is due to the almost impossibility of preventing the agent from turning against the perpetrator. But this concept varies substantially when fundamentalism is considered. For somebody who is prepared for self-immolation, Kameron's meticulousness is out of the question. The whole process is terribly and scarily simplified. When someone believes him-/herself to be right and disregards other opinions but his/her own, the unexpected is sure to become a fact. In terms of bioterrorism, the prospect is closer than ever.

⁴³ Hereafter cited parenthetically in the text as *TEP*.

2.3.2 *The Sectarian Threat*

The evil human factor is, therefore, best exemplified through sectarian leaders like Solange or the Branch twins in *The First Horseman* and *Plague of Angels* respectively. They are consummate psychopaths willing to subjugate the world to their radical theories. The likelihood of bigotists with manpower making a reality of such a dreadful omen is even greater. What is worse, certain countries with a completely different conception of human rights, if they have it at all, may eagerly sponsor fundamentalist causes against the western world. The combination is appalling yet truly revealing. Whereas the discontent of the individual can be easily ascertained, it definitely shocks to think that a government can back these acts against humanity. Of course, it soon comes to mind that these are not democratically elected governments. However, history proves that other supposedly more progressive states have also supported undercover biowarfare and bioterrorism. The intromission of the will of some to condition the rights of the majority is most loathsome, but when this is a composite of totalitarian states and religious sects using bioweapons, it automatically becomes a top-priority affair. Something must be done for the general well-being of all and universal information is essential. In this sense, a credible plot like the one given by Case in *The First Horseman* not only fills the gap but also sets the path for what useful fiction should become. Instead of building the novel around the love affairs of the main characters and spicing the story sparingly with a pinch of an exotic agent, he constructs his narrative around a microbe being used by extremists to undermine society. There is a love affair between the protagonists, but this is absolutely secondary to the main plot. The most important is the danger of a fundamentalist minority unethically deciding the future of humankind.

Accordingly, the prologue is set in the Hudson Valley where the Bergmans, the parents of a defector from a sect, are about to be killed. The following scene switches us to the Diamond Mountains in North Korea, where the village of Tasi-ko is devastated by an unusual disease and then demolished by the local army. For a correct understanding of the danger the world is facing, the lack of human values of both the extremists and their supporters must be made fully evident. From then on, the reader is well aware of how far these asocial subjects can go against human rights. Throughout the ensuing twenty-nine chapters, there are plenty of references to

the Bergmans and Tasi-ko, thus making them supportive threads as the plot evolves. In effect, the behaviour of both the sectarians and the North Koreans are readily stereotyped and, although we get to know personal humanising details of the lives of some terrorists, there is no empathy with them at all. As for the North Koreans, they become an anonymous evil which is sparingly quoted and reappears as personified in Mr. Kim in a top meeting at The Compound (*The First Horseman*⁴⁴: 313-6). Like him, they remain silent and waiting for an opportunity which will never arise.

Moreover, Case almost manages to build a bioterrorist scenario without a single casualty, if we accept the Bergmans as collateral deaths who do not fall to the biological agent. It is true that the inhabitants of Tasi-ko die of the Spanish Lady but they are treated in mass and not even the suffering of a token individual is witnessed. The purpose of acquainting the reader with the dreadful possibilities of engineered flu is attained through the series of trials leaving nothing but mild cases of the disease in the *Morbidity and Mortality Weekly Report*⁴⁵. On the other hand, the North Koreans appear to be dealt with like dispensable characters, an unnamed mob ready to be slaughtered, while the westerners are apparently treated more kindly. In the writer's view, thus, the lives of the Americans must be preserved. In return, he gets a much more acceptable novel for a potential western readership. Hence, the fact that there are no meaningful casualties in the US in about twenty chapters whereas hundreds of North Koreans are dutifully massacred in just ten pages reveals a markedly tendentious plot. Perhaps the author did not pay attention to it, but the East Asians are definitely not well depicted. Nevertheless, achieving a narrative with very few gory incidents, when bioterrorism lends itself so easily to this, really honours Case, who treats the matter with rigour yet neatly.

In like manner, Blackwood also introduces a bloodless scenario where the scare eventually materialises into a vague bioterrorist attack to the United Nations. The story also opens with the dramatic deaths of seven young miners in Longyearbyen in 1918, which remains a token for the whole novel. An undefined number of UN delegates and Evelyn Branch remain as the only victims to the Spanish Lady since the other collateral deaths are by gunshot. This would be praiseworthy too if the plot did not wander so much from the biological menace. At

⁴⁴ Hereafter cited parenthetically in the text as *TFH*.

⁴⁵ The *Morbidity and Mortality Weekly Report* is a top-reference publication of the Centers for Disease Control and Prevention: <<http://www.cdc.gov/mmwr/>>. Accessed 14 August 2009.

some points in the narrative, it really seems that Blackwood is more concerned with describing the power of hypnosis than to what a bioweapon can do. Because there are no trial tests, as in the previous novel, the writer has to focus on Conor's blackmailing and the quest to regain his honour amidst the archetypal mafia-cop contest. Hence, the novel rather becomes a gangster thriller on the streets of New York instead of what the introductory chapter suggests.

Things change quickly, though, when the Norwegian connection reappears. While the habitual guns do not vanish, Branch's engineered flu gains importance when Evelyn wants to inoculate Conor with it but is hypnotised by Magda to inject herself instead. Again, it is a question of wills: it looks as if the will to do harm is allowed when a bioterrorist has to be stopped. The common good must be preserved and killing is accepted for such a purpose. Thus, the evil-doer gets a just punishment and dies of the poison she is trying to spread. In this case Evelyn, the brain behind the genetic modification of the flu strain is the one to be sentenced, while her twin brother must suffer seeing his beloved sister die awfully. This leads us to reconsider the necessity for the bioterrorist to contract the disease. After seeing this in so many stories so far, it appears that it is a sort of cliché in the biohazard novel. It does not guarantee that the book readily becomes a best-seller, but it definitely seems that it is generally well considered by the readership.

Furthermore, the mood of the whole plot also remains quite deterministic since the protagonist only wants things to stay untouched. That is to say, the writer suggests that today's society is the best possible and it must be preserved from those who want to change it. The biohero, a devout Catholic, is just worried about retrieving his reputation and leaving things as they were at the beginning. Obviously, it is fairly easy to position oneself against bioterrorism but the impression is given that delving into the past can only bring about a bad omen. Whereas some writers, such as Richard Preston or Pierre Ouellette propose a better knowledge of history so that there is an improvement in the present and future conditions, others like Blackwood and Benson definitely want to obviate the past. Both use the token of the excavation to warn about the danger of unleashing an ancient demon that could burst the bubble. It really seems as if no change is sought except to return to what it was before the digging. Thus, the whole story appears to demand immobility, showing that messing with the past could unleash a biological crisis. In other words, society is under constant risk and it must be secured at all cost. There is not a positive view of

experimentation with Nature and it seems that no matter what the human being does, it is bound to end up badly. Certainly, a biohazard novel does not necessarily have to be so pessimistic and the writer could balance the positive and negative aspects of biotechnology. It is not just a question of showing the harm that an engineered virus can do. Yet, it really appears to be the most attractive aspect for building a sellable plot.

2.3.3 Partial Findings: Defining the Bioterrorist Scenario

In summary, an accurate reading of the bioterrorist scenario suggests that unsatisfied individuals are also meant to cyclically question social rules in various manners, one of which may be by acts of bioterrorism. It appears that human nature is invariably tied to taking the wrong liberties, thus shattering the correct order of things. The natural ethical principles are not understood by the bioterrorist as they do not suit him/her. The committed law enforcer must be aware of this and study past historical attempts so as to foresee future ones properly. If certain extremist organisations have avoided bioweapons so far, is due it being almost impossible to prevent the agent from turning against the perpetrator. Yet, fundamentalism varies the concept substantially. When someone believes him-/herself to be right and disregards other opinions, the unexpected is sure to become fact. Eventually, society remains largely untouched and it seems as if the safety measures taken by the developed world against the bioterrorist menace are still efficient. However, society has been questioned and will surely be in the future.

2.4 Scenarios: Conclusions

Of the three possible scenarios, the natural one is certainly the most deterministic. It is meant to highlight that certain cycles of life are inevitably meant to be repeated, which includes recurrent pandemics of such diseases as influenza or plague. Humans must accept these patterns as the mysterious ways of Mother Nature, which are not to be questioned. A complete eradication of microbes is simply an illusion, a fallacy believed by the contemporary individual who puts all hope in the alleged omnipotence of medicine to overcome any microbial challenge. This is

proved absolutely wrong in these novels, where coexistence with microbes is advocated instead. It is the soundest stance, once it is understood that these living entities belong to the chain of life and cannot be eliminated just for humankind's own convenience. Much to the contrary, it seems that the human being has become redundant on earth and Mother Nature is developing protective measures to eliminate the human plague. Since these pathogens are much stronger than our kind and appear to be staying, a prompt attitudinal change is sought which should guarantee our existence. Of course, this begins by accepting that humans do not rule the planet. Instead, the superiority of simpler living entities must be acknowledged, as they are proved to be much better prepared to adapt to a changing environment. It is mandatory for us to learn from history so that the abovementioned is perfectly comprehended. However, if experiments are to be made with bugs from the past, the necessary safety measures must be taken so that the current living conditions are not jeopardised. All these axioms converge into a sort of pessimistic framework with which the writer communicates his/her determinism to the reader.

On the other hand, the biological accident scenario is paradoxically a rather more optimistic one since the accident is just conceived to scare, but it is eventually well managed and the major threat to the human race is minimised. It all appears to be a safe experiment in a fictional environment where the biohero/-ine faces a number of drawbacks that do not prevent him/her from successfully avoiding a global calamity. In due time, which varies according to the *savoir-faire* of the writer, the plot almost becomes ridiculously unbelievable as the protagonist is set to overcome whatever obstacle he/she is presented with. This mostly coincides with the idea that the disease is not really the subject matter of the novel. Instead, it appears that the ups and downs of the main character with the secondary ones are given full prominence. In these plots, the background philosophy is openly libertarian since there seems to be nothing that stops the biohero/-ine from defeating the immobilists who are propitiating and/or covering the biological accident. Conversely, there are other scenarios of this type where the mood is more pessimistic, even if the threatening situation is also tackled in a positive manner. The main idea lying behind the presentation of events is that the human being can do very little, if anything at all, against the immense power of the Big Pharma and those who they support in the government. The excesses of those who are driven by sheer greed will surely endanger the common good one day or another. We are constantly being deceived by

the magnates financing biological research because they prioritise economic benefits, consequently disregarding the minimisation of risks. The right to research into such controversial fields as biogenetics is asserted as long as the obligation to take protective care is also observed. Yet, this does not seem to be the case and the accident is here to allow the biohero/-ine a chance to redress just one of the many threatening events of this kind.

In trying to confront such a dilemma, a writer like Crichton proposes his “Planning the Unplanned” theory. In short, it aims at foreseeing the possible movements before a full biological catastrophe takes place; because research is done by humans who are imperfect and, therefore, prone to failure. Thus, the experiment may either be successful or an utter failure, in which case the agent may remain under control in the laboratory or leak out uncontrolled into the wider world. In any of these cases, it is the duty of the researcher to prepare for such contingencies in advance, so that proper action can be taken and humankind is kept safe and sound. Without exception, this is a principle that all the writers using this scenario share and is denounced as being manifestly unobserved. In other words, there is not enough prevention, which inevitably brings about the accident. Humans are playing at God with microbes, altering their genetic structure and natural environment, irresponsibly neglecting the terrible consequences of a pandemic for which there is no antidote. Such novels as *The Andromeda Strain* or *Mount Dragon* reveal how easily the safety protocol can be neglected, thus endangering the race. As Preston puts it, it is in our human nature. It definitely looks as if dark research in biotechnology is a reality that cannot be denied, and that is obviously going to bring about an awful catastrophe one of these days.

Likewise, it appears that certain deviant individuals will always need to impart justice through unethical manners, which is best implemented in the bioterrorist scenario. In such a case, a death penalty is often applied to the villain, who is usually condemned by the writer to die of the same disease he/she is propagating. It is a common ingredient of the bioterrorist plot, as it appears to be a guarantee of acceptance. The evil-doer is usually stopped and sentenced to death, even though he/she may already be dying of the disease. In the meantime, depending on the writer, he/she is allowed to do a variable amount of harm. Some build a gory plot where the victims must die in the most spectacular manner so that the conscience of the reader is quickly shaken. Others prefer to wield the threat of a

particular biological agent massacring the civil population but it is a likelihood that never comes true. In both cases, however, the final blow does not take place and it appears as if the safety system has worked. Nevertheless, society has been threatened and there also remains the sensation that it is going to be tested on many upcoming occasions. Like in the former scenarios, we have had a narrow escape but it looks difficult to cope with all the events. The readership is simply left with very little to do but trust the system.

In the end, it is all a contest between those who take the wrong liberties and the keepers of the right order of things. Thus, the bioterrorist scenario also appears to be quite deterministic since there are certain ethical values that cannot be touched and it is positive that they remain so. It seems as if any digging in the past can only bring new means of harm and the overall view is rather pessimistic. Yet, writers like Preston demand better knowledge of history to realise that human intent is precisely what can and shall go wrong. In the same way that humans are prone to make mistakes, there are also deviant individuals who want to cause harm with new unconventional means. This is a reality that cannot be ignored. In order to make it patent, the biohazard writer tries to build a credible plot by using familiar situations. These aim to establish a quick relationship with the readership so as to shake the prevailing deliberate ignorance. In this manner, a bioterrorist scenario is shown not just as an eccentricity, but as a reasonable possibility.

Therefore, after studying the three different kinds of scenarios, it is possible to conclude that cyclic patterns are meant to be repeated, either in the form of recurrent pandemics, biological accidents or newer acts of bioterrorism. To confront such certainties, the writer proposes delving into history and learning from past events. All three scenarios are rather deterministic since they advocate acceptance of pathogens as superior beings and demand coexistence with microbes. The current denial of this superiority, combined with the greed of large pharmaceutical companies and a wrong sense of justice, will surely cause a biological catastrophe. Consequently, the necessary measures must be taken to preserve the welfare state should any of these three possible eventualities come about.

CHAPTER 3: THE PATHOGENS

It seems reasonable for a biohazard novel to contain a certain amount of information about the different pathogens to guide the reader through the plot. However, this may vary substantially from one writer to another. Whereas writers such as R. Preston, Ouellette, or Case are willing to supply all sorts of data to inform their readership as much as possible, others like Cook, Cornwell or Yarbrow simply state the minimum to keep the narrative going. In the same way, facts are often coloured to suit the writer's interests, thus usually presenting the agents in the scariest manner. For practical reasons, two basic groups of existent and non-existent pathogens can be established; the former group being further subdivided into the unmodified and the genetically-altered. The existing unmodified pathogens include such microbes as the Ebola virus, the *Yersinia Pestis* and *Chlamydophila Psittaci* bacteria. Also, a number of familiar pathogens are grouped in two novels. Other well-known agents, like the influenza virus and *Variola Major*, responsible for the allegedly eradicated smallpox disease, can be genetically altered to amplify their lethal effects, thus becoming strategic bioweapons. Finally, either by weird manipulation or because of its outer-space origin, a final group of pathogens has been classified gathering those agents which still do not exist, or rather of which there is no official record. Regardless of their source, all these microbes are envisaged as potential dangers for humankind and are therefore given a substantial part in the plot.

3.1 Existing Unmodified Pathogens

One initial subclassification that soon comes to mind is the group of agents that have a real counterpart and which have not been altered genetically. These may be taken single-handedly or as a group. Thus, the Ebola virus and the *Yersinia Pestis* and *Chlamydophila Psittaci* bacteria reveal enough power to become the main evil character of three different books respectively. However, a kind of cocktail, including the microbes responsible for polio, diphtheria and other infectious diseases, is necessary to keep the plot of *The Fourth Horseman* together, whereas the reenactment of the biblical scourges in *The Eleventh Plague* also requires a variety of

agents. With the exception of the Ebola conspiracy in *Outbreak*, the single agents seem best suited for natural occurrences, while the group appears to be a favourite for bioterrorist events where the evil lead is taken by a human character.

3.1.1 *Ebola*

For all the sensationalism, it must be said that Preston is certainly very informative as regards the nature of the filoviruses. As early as page thirty-five of *The Hot Zone*, he produces a detailed description of the Marburg virus and its Ebola cousins. It is a passage of about eight pages, which is as enlightening as any medical encyclopaedia. Recalling the scare of Dr. David Silverstein –the physician who treated Dr. Musoke– when he was told that the patient was positive for Marburg, he finds the perfect excuse to acquaint the reader with the “virtues” of this hitherto unknown evil. Taken from an undefined textbook, the information states that the agent gets its name from the German city where it erupted in 1967. Initially affecting some African green monkeys used for producing vaccines, the disease jumped species, infecting thirty-one people and killing seven, who died “in pools of blood” (*THZ*: 36). It is rather notable the singular ability of this writer to focus on statistics to highlight the twenty-five percent death rate from the virus. In other words, one out of four patients die irremediably. This is a significant increase with respect to the Yellow Fever virus, regarded as highly lethal, which “only” kills one in twenty.

Thus we are introduced to the etymology of the word *filovirus*, meaning “thread virus” in Latin, which Preston prefers to compare with worms or snakes. With this initiation we are ready to welcome the Ebola Zaire and Ebola Sudan to complete the family. All in all, the erudition above seems to take us to the climax: the Zaire strain boasts an appalling ninety percent lethality, “a slate wiper in humans” as the writer eagerly puts it (*THZ*: 36). By now, it really is difficult to leave a book dealing with such an abominable microbial creature, which bleeds you to death and for which there is no known remedy. Herein a major reason for the attractiveness of this kind of narrative.

On the other hand, it is also true that this author focuses primarily on the most gruesome aspects of the disease. Especially notable is the emphasis on the affinity of the filoviridae for the eyes and the testicles, disregarding other more common symptoms, such as headache and nausea. The morbid element here is certainly an

asset when it comes to increasing the best-selling potential of the story. It is much more profitable to concentrate on the skin peeling off the genitalia as the whole body decomposes and liquefies inside.

Another thirty pages must be read until more information is given about the main agent. The Ebola virus is said to get its name from the Ebola river, a tributary of the Congo (formerly Zaire) river, the largest in central Africa. In September 1976, the first known emergence of the Zaire strain occurred almost simultaneously in fifty-five villages along the headstream of this river, in an event that came to be known as the Yambuku –apparently the index village– outbreak. Once again, we are reminded that nine out of ten people who catch the disease die. Along with this issue, the key figure of Gene Johnson, one of the main characters of the book, is introduced. The recollection of his nightmares concerning an Ebola leak in the USAMRIID is equally a powerful source of distress, as well as the eerie characterisation of the agent. In fact, instead of being listed in the glossary with the other filoviridae, Ebola is granted a singular place amongst the list of the main characters, ranking fourth in order of appearance only after Monet and the Jaaxes (*THZ*: 412-3). It is presented as highly unpredictable and stealthy, a natural predator feeding on primates which occasionally jumps into the human species. Compared with other contagious diseases, Preston says that it appears to have taken the worst of them all: developing rashes like measles, psychotic effects like rabies and other pneumonic symptoms like the flu or the common cold (*THZ*: 65).

Having raised sheer fear, Preston finds it convenient to explain that a virus is an ancient form of life that has adapted successfully through the passing of aeons. Not to be forgotten, though, it is a parasitic creature depending on others for its own survival, which naturally implies that it does not want to kill its host. Nonetheless, Ebola appears to be truly primitive because it gets rid of its source of life very quickly. In this respect, the HIV seems much more refined and effective; thus a more complex and modern agent. In a way, it certainly is difficult to believe that a microbe has a will of its own, but this nasty habit of lingering in time seems to confirm it. In this manner, the writer aims at deconstructing the false assumption that the human being is second only to God in perfection. Without doubt, there are other microscopic creatures that are more complete precisely because they are simpler in form (*THZ*: 83-85).

Immediately afterwards, there is time for a little bit of history, as the Nzara

and Yambuku outbreaks are reviewed. Undoubtedly, the chapter *Ebola River*, stretching from pages 95 to 130, becomes an unexpected realisation for the unprepared reader. In chronological order, Preston remembers how the agent “nearly devastated the human population of Southern Sudan” in July 1976 (*THZ*: 97); an exaggerated statement since the estimated death toll amounted to the nevertheless respectable figure of 150 (53% of the 284 total number of cases)⁴⁶. The writer carefully explains the expansion of the disease from a cotton factory in Nzara all the way eastward up to the town of Maridi, hitting its hospital “like a bomb” (*THZ*: 98). From there, it appears to have jumped into the population through dirty needles. After retelling the gruesome symptoms of the disease and considering the fast action of the agent as the reason for its altogether sudden disappearance, Preston cannot avoid wondering what could happen if a virus like this entered the air-link net. It certainly seems an attempt to fictionalise the facts, thus giving his supposed non-fiction account a novelised touch. In his view, the world ignored a major biological catastrophe: “the secret detonation of an atomic bomb,” as he likes to describe the Nzara outbreak (*THZ*: 99). Following his policy of dosing information, he sticks to fact when he states fatality rates of 25 % for Marburg and 50% for Ebola Sudan, the same as the Black Death.

Yet, a third strain is still missing. The Yambuku outbreak, introduces Ebola Zaire as “nearly twice as lethal as Ebola Sudan” (*THZ*: 100). It appears that the account is well documented since it coincides mostly with other available records (International Commission 1978: 271-93, Garrett 1995: 100-152 and 192-221, WHO 2008b, CDC 2008d). However, the talented mind of the writer prefers again to focus on some gruesome peculiarities of the outbreak, such as a midwife delivering a stillborn child (*THZ*: 104). Along with all the data about the grotesque habits of the virus, those facts relating to the unconventionality of the disease are particularly recurrent. Thus, the following paragraph may well become a landmark in defining the *Prestonian* style:

Ebola kills a great deal of tissue while the host is still alive. It triggers a creeping, spotty necrosis that spreads through all the internal organs. The liver bulges up and turns yellow, begins to liquefy, and then it cracks apart. The cracks run across the liver and deep inside it, and the liver completely dies and goes putrid. The kidneys become jammed with blood clots and dead cells, and cease functioning. As the kidneys fail, the blood becomes toxic with urine. The

⁴⁶ As of December 2008, the WHO cites 151 deaths out of 284 confirmed cases (2008b).

spleen turns into a single huge, hard blood clot the size of a baseball. The intestines may fill up completely with blood. The lining of the gut dies and sloughs off into the bowels and is defecated along with large amounts of blood. In men the testicles bloat up and turn black-and-blue, the semen goes hot with Ebola, and the nipples may bleed. In women, the labia turn blue, livid, and protrusive, and there may be massive vaginal bleeding. The virus is a catastrophe for a pregnant woman: the child is aborted spontaneously and is usually infected with Ebola virus, born with red eyes and a bloody nose. (*THZ*: 107)

This definitely is Ebola at its best –or rather at its worst. Not to remain unnoticed, the internal decomposition process is well designed to climax with the genitalia and abortion clichés. Needless to say, the writer has not experienced such nightmares in first person, but likes to hypothesise over the worst of them. This undoubtedly cannot be called non-fiction. For that reason, the novelisation of real data can account for the success of *The Hot Zone*.

Likewise, the gruesome characterisation of the agent also contributes to a gripping effect. Ebola is a monster, even though microbial in measure. It has a life of its own and, therefore, in some particular moments it is treated as a character itself. It appears intelligent enough to Preston to cause involuntary seizures in the dying victim so as to facilitate its propagation. A patient bleeding from all body orifices who experiments wild convulsions cannot but smear those around. Hence, the pathogen is scattered all over the place, possibly entering another potential host through the mouth, nose or eyes. At least, this seems to be the author's point of view (*THZ*: 108).

The rest of the chapter recounts the sick Nurse Mayinga's wandering around Kinshasa for two days, the ensuing rumours arriving at the WHO, and the quarantine of the Bumba region by president Mobutu Sese Seko. Amidst all these historical data, an interview with Karl Johnson, a virus hunter leading the Special Pathogens Branch of the CDC in 1976, really stands out. Especially alarming is his remark of being literally “shit scared” rather than fascinated about Ebola, in a fax sent to the writer after his query (*THZ*: 119). It is the Prestonian style again: only the shocking evidence seems to find a place in his discourse. It cannot be proved, but other more realistic facts about the disease, which can be found in reputed documents, seem to be manifestly discarded⁴⁷. They certainly would not sell as well as the disgusting

⁴⁷ For instance, the self-limiting habitat in *Viral Haemorrhagic Fevers* (Wade 1995, CDC 2004b). Additionally, even though later in time, it must be said that there have been advances in a human vaccine against Ebola (Science Daily 2003), which has proved fully effective in monkeys (Mackenzie

effects.

With most of the basic facts already introduced in part one, the remaining information about Ebola is deployed throughout the next three parts. Chiefly, the writer continues with his policy of adding only scary new data; otherwise, he sticks to the narration of the Reston events. Thus, if he ever abandons the main plot it is to explain, for instance, that Gene Johnson did an experiment with monkeys proving that both Marburg and Ebola can be transmitted through the air; which is topped with the conclusion that “a small dose of Marburg or Ebola could start an explosive infection in a monkey” (*THZ*: 143). This is the prelude to the recollection of Johnson's useless expedition to find the reservoir of the microbe in Kitum's Cave in 1988. In other cases, he overtly embraces sensationalist fantasies by stating that “you could no more imagine a season of Ebola flu than you could imagine a nuclear war” (*THZ*: 321). The excuse this time is Jerry's fancying a mutant form of Ebola as he proceeds with the slaughtering of the monkeys. The author sticks to a useful comparison with the Black Death when he remembers Dr. Philip Russell's (the Major General who commanded the Reston operation) confidence that he was also “scared to death” about the Reston event: “Imagine a virus with the infectiousness of influenza and the mortality rate of the black plague in the Middle Ages – that's what we're talking about” (*THZ*: 362). Such allegation can only make the writer's imagination fly. The workers in the primate facility could have contracted a disease that did not kill them like the monkeys only because of a slight difference in the genetic code of the virus. Yet, to the writer's prolific mind, it could be the case. Once again, this is not fact but mere conjecture and the information is, therefore, biased. However, the possibility is certainly there and cannot be discarded: catastrophic *Prestonian* style in pure essence. In time, Ebola Reston joins the other two brothers and cousin, although quite late in the narrative (*THZ*: 370). Actually, as of nowadays, the Tai (Ivory Coast) and Bundibugyo strains have also joined the family (CDC 2004a, WHO 2008b).

Before the final trip to Kitum's Cave, Preston clearly states the documented truth that Ebola has already entered the net, and garnishes it with the experts' belief that a virus can now “hop the world in a matter of days” (*THZ*: 371). During his recollections in the shadows of Mount Elgon, the writer muses over the emergence of

2005, BBC 2006).

new agents and the re-emergence of older ones as a consequence of man's destruction of the tropical forest. In his view, the Earth is reacting against the presence of the so-called human parasite and the response is a series of diseases that are meant to keep the growing population of the unwelcome neighbour under control (*THZ*: 407). After all, it is a natural process that has been repeating for ages; the same that led to the disappearance of the dinosaurs. Back in Reston, the discovery of a spider in the abandoned monkey house reassures him in his posture that Ebola will return to fix that issue (*THZ*: 411). It is perhaps, the most sincere Preston; one with no extravagant apocalyptic omens but rather a feasible possibility. This is not a biological holocaust wiping out the entire human race, but a spontaneous pandemic that restores the natural balance in the biosphere. Truly, this last chapter becomes the most edifying in the sense that it establishes a position that is well contrasted amongst other experts in the field. At least, it is clear that whatever he is mentioning is his own subjective opinion, as a result of a well-documented groundwork. Because *The Hot Zone* is very well based indeed even though it may be catastrophist in its development. In addition, the four pages dedicated to the definition of the main characters and a handy glossary become a functional data bank to clear up possible doubts.

On the contrary, the information about Ebola in *Outbreak* is kept to a minimum. It is mainly concentrated in the first half of the prologue and it basically deals with the Yambuku event of the Zaire strain. The Belgian mission hospital, where the American biology student is given an injection of chloroquine to counteract a supposed bout of malaria, lacks the minimum hygienic measures. The symptoms described also coincide with those of the real disease but, instead of the alarming tone of Preston, Cook advocates a more unemotional style. The victim is said to suffer from a “rapid succession of chills, fever, nausea and diarrhoea,” nothing far from the typical ailments the reader may have suffered on many occasions (*Outbreak*⁴⁸: 3). When the time comes to describe other uncommon evidence of a rare malady, this is done laconically, by simply stating the vomiting of blood, rashes on the skin and ocular haemorrhage (*Ob*: 3-4). In other words, no internal liquefaction of the organs, swelling of the genitalia, spontaneous abortions or defecation of the victim's intestines. These are simply not mentioned.

⁴⁸ Hereafter cited parenthetically in the text as *Ob*.

As for statistics, the issue is resolved quickly with casualties of “apparently eleven of the medical staff of seventeen, [...] along with one hundred and fourteen villagers” (*Ob*: 5). The writer later rearranges the figures by stating a total of two hundred and ninety-four known cases in the Bumba region (*Ob*: 7). But by and large, this is a slightly incorrect compilation since both the WHO (2008b) and the CDC (2008d) record a total of 280 casualties out of 318 positives, with a death rate of 88 %. It seems that Cook was either ignorant of the real figures, or he simply decided that the number of dead was more than enough to make his point. Actually, quarantine is vaguely mentioned and the hospital is never described in depth. It appears that the only thing that matters is to classify the newly discovered agent as “the most deadly microorganism seen since the bubonic plague” (*Ob*: 7) and that virologists were completely ignorant of its natural reservoir (*Ob*: 8).

This is the basic information pack; the compulsory material an average reader needs to know to follow the plot. Throughout the rest of the narrative, other scattered references are made comparing the agent to other known ones, like the viruses causing rabies (*Ob*: 90) or AIDS (*Ob*: 127). A few hints are also given about the history of the CDC and the EIS (*Ob*: 17-8), the maximum containment lab (mcl) protocol (*Ob*: 84) and the biowarfare program in Fort Detrick (*Ob*: 126). But that is all. Distributing the word Ebola throughout the plot seems to do the job.

This may account for the success of *The Hot Zone*. It is an unquestionable fact that both Preston and Cook want to transmit concern over biohazard matters around Ebola. But the difference in style is striking. Where one is passionate and hence definitely subjective, the other is much more unbiased yet lacking precision of detail and, of course, emotion. One writer considers subjectiveness an intrinsic and compulsory element of his narrative; the other clearly does not. As usual, it is just a question of tastes but it certainly appears that the histrionic style gained many more adepts. So to speak, Preston's is a “better” bestseller than Cook's if sales figures are the sole judge⁴⁹.

⁴⁹ While there is no available data for *Outbreak*, according to the reputed best-selling books database of *Usa Today*, none of Robin Cook's best-sellers spent more than 20 weeks in the list. By comparison, Richard Preston's *The Hot Zone* remained outstandingly for 81 weeks, from 29 September 1994 to 2 May 1996, with a peak position of #3. This data can be checked in the appendix section or on the following webpage: <<http://content.usatoday.com/life/books/booksdatabase/default.aspx>>. Retrieved 14 January 2009.

3.1.2 Plague

The *Yersinia Pestis*, the agent causing the plague –not to be mistaken with the term plague by defect– is the plot-builder for both Connie Willis and Ann Benson. Beginning with the former, the purpose of the main character’s journey is to prove that the Black Death pandemic devastated one third to one half of Europe’s population in the mid fourteenth century. The initial figures provided by Kivrin’s teachers vary from fifty to sixty-five million casualties, a deliberate mistake on the part of the writer to show up their ignorance (*DB*: 23, 29)⁵⁰. This number is in turn indirectly compared to the Spanish Flu pandemic, which is said to have killed twenty million people worldwide (*DB*: 75)⁵¹. Other maladies like smallpox, with a seventy-five percent mortality rate in the 1300s and pneumonia with seventy-two percent, are also mentioned (*DB*: 153, 184)⁵². It appears, then, that the writer is clearly trying to impress her readership, as if demanding attention for certain diseases which are nowadays underestimated.

The symptoms of the plague are spread through the narration but naturally gather importance by the end of the plot, once the bishop’s clerk introduces the epidemic into the village. Thus, Kivrin recollects that “plague victims had huge lumps under their arms and on the insides of their thighs [...] they vomited blood, and the blood vessels under their skin ruptured and turned black” (*DB*: 136). Further on, the disease is said to have been spread by fleas on rats (*DB*: 266) and that the pandemic began in China in 1333, travelled to Italy via trade ships and from there to the rest of Europe (*DB*: 281). Here and there, these common concepts of the disease are repeated. Indeed, they fully coincide with the official records of the Black Death but, on the other hand, provide nothing new. In short, Willis’ illustration is done

⁵⁰ It really is difficult to state how many people died of the disease since the approximate figures available refer to Europe only. As previously stated in the first chapter, the approximate toll given to Pope Clement VI showed 23,840,000 dead (Tuchman 1978: 93). This would roughly coincide with the twenty to thirty million deaths mentioned by other historians (Garrett 1995: 238, Piccolo 2004). However, a corporate article by *United Press International* ventures to raise the global deaths to seventy-five million, which could be acceptable taking into account that the pandemic originated in China, swept through Asia and reached Europe and probably Africa. The poor hygienic conditions of the time must also be considered (United Press International 2007). In any case, when such immense proportions are reached, it does not seem to matter much whether the statistics match perfectly.

⁵¹ The writer could have taken the figure provided in Alfred W. Crosby’s “Epidemic and Peace, 1918” as a valid reference (Westport: Greenwood Press, 1976). However, as seen in the first chapter, the figure is proved to be low by C.W. Potter, who raises it to between forty and fifty million world-wide (2001: 576).

⁵² Such data could not be checked against reputed sources.

through a series of clichés of the plague which, in one way or another, any half-educated reader should know. Certainly, the ambience is very well achieved for a historical novel but, for biohazard matters, Willis' writing definitely lacks punch.

It takes well over four hundred pages of Kivrin's loitering in the fourteenth century for the real action to appear. The arrival of the disease triggers the bioheroine's survival instinct, with her recalling what she learnt at university. Kivrin finds herself impotent before widespread ignorance. Even Father Roche shares the generalised belief that epidemics are divine scourges spread by poisonous mists, by a dead person's glance or by magic. All that seems to come to the bioheroine's mind are the lectures on the "Fourteenth Century" subject, which are summarised in the following paragraph:

There were two distinct types, no three – one went directly into the bloodstream and killed the victim within hours. Bubonic plague was spread by rat fleas. The other kind was pneumonic and it didn't have buboes. The victim coughed and vomited up blood, and that was spread by droplet infection and was horribly contagious. But the clerk had the bubonic, and that wasn't as contagious. Simply being near the patient wouldn't do it – the flea had to jump from one person to another. (*DB*: 419)

Even though the familiar *fleas-and-rats* tune is present anew, at least the three types of plague have been explained. Yet, this entry is also repeated in the transcripts in her diary (*DB*: 434), and Willis does not seem to go farther than that. In the student's practical case, it is obvious that what afflicts the whole village of Skendgate sticks to the bubonic pattern but it appears that the writer needed a couple of samples of the other instances. Thus, Lady Imeyne turns pneumonic and Father Roche septicemic, with no other apparent reason than to cover the range of plague. This is what Kivrin infers from the woman's coughing and vomiting mucus with blood (*DB*: 465) and the priest's derangement in his agony – but then again, this might as well be attributed to the high fevers (*DB*: 506). Be that as it may, with these representations, just a little touch is given of what the disease could really be.

It definitely cannot be said that, considering the length of the book –almost six hundred pages in the paperback edition, the information on the disease is very profuse. On the contrary, it seems to revolve around certain topics that have already been covered by historians and filtered to the population through education. The book may therefore be a great pseudo-historical science fiction novel, but the epidemic touch seems more like something exotic to accompany the time-travel

theme. Indeed, whatever Willis has to offer about the plague in her hefty tale can easily be found in the encyclopaedias or through a Google search. On the other hand, taking into account that no such quick access to information existed in 1992, the effort on the part of the writer to take this minority subject into the science-fiction genre must certainly be praised.

A similar reading can be made of Ann Benson's *The Plague Tales*, although the book was published five years later when access to Internet was becoming more generalised. In the historical chapters, the action is more dedicated to explaining Alejandro's adventures in his exile rather than providing a first-hand account of the arrival of the Black Death in Europe. Only by the end of the novel does the plague strike and victims suffer from the usual inflammations, fever and vomiting, which does not provide anything new so far. Moreover, we are given a sort of medieval perspective over the matter, with traditional methods for healing an illness which is taken as a divine curse.

As for the twenty-first century chapters, the information about the agent is sparse, even if more present. In fact, the *Yersinia Pestis* goes unnoticed for most of the plot and it is in the Institute's Library that the mostly encyclopaedic instruction takes place. It sounds somehow false that a trained physician like Ted can be so surprised by what he reads, even considering that he is living in a fully sterilised world. In any case, it serves well the writer to introduce several aspects of the disease. Thus, it is said that the malady is common in third-world countries, transmitted by fleas on rodents and the details may even become a little disgusting:

If the bacterium is transferred to the flea when it bites the carrier, it multiplies in the flea's digestive tract until the insect's stomach becomes engorged with bacteria. Upon biting another animal, the flea regurgitates the microbe into the bloodstream of the bite victim, who is then infected. (The Plague Tales⁵³: 282)

It is also stated that it can be acquired by direct contact with body fluids or contaminated clothing and the three types of plague are readily presented:

In the bubonic form, early symptoms include fever, headaches, minimal swelling of the lymph glands, especially in the neck and groin areas. If untreated the disease progresses rapidly to more pronounced symptoms, including massive swelling of the lymph nodes, with bleeding into the surrounding tissues. Pustules (buboes) form within the nodes themselves and often appear as raised boils on the surface of the node area. There may be marked pain, especially in the joints and extremities. Patients may experience

⁵³ Hereafter cited parenthetically in the text as *TPT*.

memory deterioration and exhibit antisocial or uncharacteristic behaviour [...].

If left untreated bubonic plague frequently develops into pneumonic plague, in which bacteria overwhelm the respiratory system by coating the inside surface of the lungs. In this form, the disease is most contagious, for the aspirated sputum and fluid droplets exhaled during normal respiration often carry viable bacteria [...].

Septicemic plague occurs when the bacteria spread to the bloodstream and vital organs. As the bacteria complete their normal life cycle and die off, large quantities of toxic effluent are released directly into the bloodstream; the kidneys and liver may become necrotic in their attempt to purge the system of toxins. The victim eventually succumbs to toxic shock. The course of this form of plague is usually very rapid, and it is almost invariably fatal. (TPT: 284-5)⁵⁴

Furthermore, the only cure for the disease is said to be antibiotic treatment through streptomycin, chloramphenicol and tetracycline. One other curious remedy is the ancient procedure of lancing the buboes, which certainly seems more apt for the fourteenth than the twenty-first century. Nevertheless, it is mentioned that secondary infections may appear as a result and that the measure must be taken with care. Obviously, immediate isolation and reporting to the World Health Organization is mandatory (TPT: 285).

Undoubtedly, Benson handles the informative matter quite effectively through these three pages. Now the reader has a referential pivot, and the writer is entitled to play with the scare of a plague release, which eventually never happens. Whatever had been said before and will be said afterwards about the disease, both in the historical and futuristic plots, can now be related to this functional entry. It is certainly the neuralgic informative centre of the novel. In this respect, Benson is much more practical than Willis: both give a nice perspective of life during the Black Death years but the former is more illustrative than the latter.

There are not many other references to the plague hereafter. In fact, there is mention of the filoviruses but, like in former cases, they simply happen to be a sort of indispensable citation. A very brief paragraph reminds the reader of the Ebola Zaire 1976 epidemic, when Janie happens to be before the very vial containing sister M.E.'s blood sample⁵⁵. The scene gives the writer the excuse to introduce this agent in the plot, which is said to cause “the victim to die horribly by bleeding from every organ and blood vessel in the body” (TPT: 524). Similarly, another canister with the name 'Marburg' on it causes the bioheroine to think of the 1967 German incident,

⁵⁴ All in all, the information supplied matches the data given by the World Health Organization about plague (2008d). The text has been left italicised to preserve the original style.

⁵⁵ Also cited in *The Hot Zone*: 114.

which “had turned the internal organs of several lab workers into cream-of-human soup in a matter of days” (*TPT*: 526). Other than Bruce's remembering that, if left untreated, plague's mortality rate reaches an awesome ninety percent (*TPT*: 562), there are no other relevant entries in the novel. Actually, these last touches, albeit adjusted to reality, seem definitely more dedicated to scaring the reader than to supplying valuable learning.

3.1.3 *Psittacosis*

The formerly *Chlamydia Psittaci*, nowadays known as *Chlamydophila Psittaci*, is not introduced in Ouellette's plot until the end of chapter seven, well over seventy pages after the prologue. Previously, several 'tribes' of *Salmonella* and *Streptobacilli* had been mentioned which, in a weird conjunction with the *Treponema Pallidum* –the syphilis virus– bring about *The Third Pandemic*. Since the combinations of events will be further explained, it is now worth mentioning that the microbe is described as “the tiniest of the tiniest bacteria” (*TTP*: 76), almost resembling a virus in its procedure of breaking the cell's walls and multiplying rapidly until the cell is destroyed. Having gained resistance to the tetracycline family of antibiotics by merging with the other bacteria, the resulting mutation mimics Elaine's *Agent 57a* perfectly. This is the doomsday microbe, which is to cause chaos all over the world as predicted in the EpiSim, the powerful software for simulating epidemics. The writer positions himself unequivocally on the question stating that the sick parrot is “a biological bomb with a power greater than the world's combined nuclear arsenal” (*TTP*: 146). This fact could probably have been presented less pompously; yet the comparison is brought quite close to reality in due time.

Whereas the author presents antibiotic treatment of *Chlamydia pneumoniae*, a close cousin, as quite effective, the mutation in the main agent proves fatal. The symptoms, though, mostly coincide if only complications lead to death in the case of the resistant *Chlamydia*. These include, fever, cough, myalgias, sore throat and sinusitis (*TTP*: 207), which do not develop further provided there is tolerance to antibiotic⁵⁶. The realisation that it could be psittacosis comes with the first patients

⁵⁶ These symptoms are effectively contrasted with the ones described by the CDC (2008e), by Mike Owen in his article “Psittacosis” (1997) available at *Birdsnways.com*, a site for the study of psittacosis, and by Jim K in *The Chlamydia Pneumoniae Handbook* (2006), published online at

presenting high fevers and chest colds that could resemble atypical pneumonia and yet do not seem to stabilise after a course of common drugs. The main difference with pneumonia is that, while the effects pile up progressively along the weeks in the former, the cases in São Tomé seem to have developed the symptoms rapidly and the patients are facing certain death. This ultimate point eventually confirms the disease. The epidemic on the small island is devastating, as Dr. Da Costa, the physician who sounds the alarm bell, writes in his report to the WHO:

As best he can tell, there are about 20,000 cases on an island of around 140,000 people. The number is a crude estimate because every clinic is understaffed and overrun. Not a single sheet of X-ray film is left anywhere, and of the hundred or so doctors on the island, only a handful are still on the job. Some have fled, some are sick, a few have died, and the rest are simply unaccounted for.

More important, the number of cases is still accelerating. The lines on his hand-drawn graph of susceptible, infected, recovered and deceased gives a stark depiction of what is happening. The infected line ascends at a steep angle, and so does the deceased line. The susceptible line is plummeting, and the recovering line remains pitifully small. This graphic picture is now clear enough to profile what will eventually happen to the island's population as a whole, and it is a nightmare of the worst sort. A very high percentage of the population will contract the disease, maybe even 80 percent. Of those who get it, perhaps 75 percent will die of it. Less than one in four will recover. Up to 60 percent of São Tomé will be dead, and dead within a few months. (*TTP*: 253)

For obvious reasons, this becomes a clear token of what the disease is about to accomplish in other parts of the planet. It is a simple matter of making the point without going into much detail: one is good for all. It is difficult to know if the extremes explained by Ouellette will ever become true since there are no records of such a brutal epidemic, but certainly there is the possibility that such a chimeric agent becomes a reality. In this respect, it must be said that the writer's presentation of how such chimera will gather form is done in a very practical way. Through Ouellette's fable-like style, with tribes of bacteria fighting for their own survival and eventually joining forces against their antibiotic enemies, a really straight picture is depicted of the *Chlamydophila* and psittacosis. What is more, following the aforementioned technique, it is not difficult to figure out how easily a similar 'alliance' of microbes could create a global pandemic to threaten humankind's self-appointed privileged position. Here is another clear instance of how to deconstruct the false myth of man as the apogee of creation.

Cpnhelp.org, a site dedicated to the sharing of information about the pneumonic courses caused by the *Chlamydia pneumoniae*.

Indirect comparisons with other epidemics in history also help to reinforce the idea that humans are unprotected before certain microbes. In fact, the EpiSim software was born to face the threat of newly emerging diseases with no predictability because they have no definite record. For such matter, the writer cites the recent advent of AIDS, Ebola and Hanta viruses, which have puzzled epidemiologists for the last three decades and still present an insurmountable challenge for current medical knowledge (*TTP*: 90). Although significant progress has been made lately as regards epidemic control, certain microbes still defy human authority and it seems that total command over them is far from close. In order to clarify this point, a comparison with the bubonic plague is in order. While this disease was transmitted mainly through fleas on rats in the last great epidemics – including the 1994 outbreak in India, not to recall exclusively the distant Black Death– psittacosis can be spread by migrating birds, thus capable of taking the disease far from its onset (*TTP*: 105). This new item of information leaves it clear that by the time a valid vaccine is made to treat an agent in a particular part of the world, this may already be in transit to another location. Hence, the old effective means of quarantining the disease, is rendered worthless; not to mention the additional difficulties if the pathogen is highly mutable, like the influenza virus. The inevitable comparison with other epidemics is here simply to shatter the myth of the hygienic bubble. Thus, it is not strange that NIH Dr. John Smali is impressed by the figures of the São Tomé outbreak:

He concentrated on the D (Deceased) line. Over sixty percent dead. Utterly fantastic. Even the Black Plague hadn't killed that many people. Still there had been even nastier killers roaming the planet in even more recent times. The famous Ebola virus delivered a brand of haemorrhagic fever with a fatality rate that exceeded 70 percent: And there was AIDS, the final nightmare, with a death close to 100 percent. But Ebola had been contained and AIDS was a slow-motion catastrophe that consumed its victims over several years. This Agent 57a was a biological blowup, a wildfire that would explode across the landscape faster that you could run to escape from it. (*TTP*: 205)

The fact that such a devilish agent has still not materialised should not make us dismiss the possibility. Furthermore, as the writer generously exemplifies by comparisons with other major biological calamities, it is quite feasible. Even the recent Mad Cow disease and its human variant, the Creutzfeldt-Jakob disease, are used to state that strange maladies may appear out of nowhere to question the alleged sanitary safety of the western world (*TTP*: 231). Psittacosis is just one of the many

emerging and re-emerging diseases that come to visit humans every now and then. Past and close epidemic history shows that the supposed hygienic bubble is a fallacy. Humankind has clearly disregarded the predatory reality reigning in the ecosystem and the anthropocentric conception of life is eventually revealed as misleading:

Humankind had given up on the earth as the center of the solar system some time ago, but it still saw itself at the center of nature, with the biosphere rotating around it in some kind of perpetual servitude. At best, it was seen as some kind of perpetual arrangement. 'Be nice to Mother Nature, and she'll be nice to you,' as if *Homo Sapiens* had some kind of partial control, and nature would be 'reasonable'. But then along came something like Agent 57a, and suddenly there was no control at all. (*TTP*: 325-6)

In the end, the world's population in the novel is reduced to what it was in the 1950s. This means that such a doomsday microbe could appear, not to extinguish the human race from the earth, but to thin it drastically. All the way, it definitely seems as a natural means of control which has been repeated over history with other species. The line of writers like Ouellette point at this direction. If a number of biohazard writers, historians and epidemiologists coincide, there must be something of truth behind these fictional arguments. The comparison of a creation of the author's mind and historical events clearly exemplify the feasibility.

3.1.4 Assorted

Finally, the most eclectic approach is given when the writer uses not one single pathogen but a number of them to build his/her plot. One first novel to consider is *The Eleventh Plague* which, for obvious reasons, deals with a variety of biological agents when trying to reenact the biblical plagues. Beginning by anthrax, the information supplied is a bit out of date since it is mentioned to be one of the favourites in Biowarfare, when there is sufficient proof that there are many other diseases with better conditions for such uses⁵⁷. It is well stated that the agent, although transmissible by air, does not usually propagate to others until its final stage when it breaks into the lungs. If the infection becomes pulmonary, treatment with antibiotics becomes ineffective and there is a mortality of 100% (Garza 2008, CDC 2008a). In the novel, it is soon noticed that the propagation has been intentional. The

⁵⁷ Although Preston and Alibek cite more convenient bioweapons, a truly enlightening list is shown in a curious webpage dedicated to the selling of bomb shelters (Bomb Shelter 2008).

rabbits in the petting zoo that supposedly infected the two index kids had been raised there and had had no contact with other animals except their own species. Moreover, the water pistol found in the zoo has the international code for anthrax written on it –022.9. This is an invaluable piece of information that leaves no doubt while illuminating the reader at the same time. It is clearly stated that there are virtually no anthrax cases in the “New World” which places the original source in a Third-World country or a laboratory (*TEP*: 104).

One curious issue is the concoction of anthrax to prepare the agent for a bioterrorist act. The writers mention that in *The Anarchist Cookbook*⁵⁸ it is recommended to inoculate anthrax into the eye of a sheep, which can be easily obtained in any Greek market. The following excerpt from the novel may even seem an apology of bioterrorism, with the pretext of enunciating how simple it is to become a mass-killer:

One anthrax concoction called for Jell-O (any flavor), a few tablespoons of sugar, and two cups of water. Three blood sausages and two whole eggs were mixed in, then set aside. Next the preparer was to sprinkle bone meal on top of the broth and gently heat it, using a coffee warmer set on low. When it was warmed, a test of pus containing anthrax was added.

After two hours, the mixture was poured into a petri dish, an Erlenmeyer flask, Tupperware, even a plastic garbage container –anything would work. (*TEP*: 106)

It is an interesting point to begin with, which is dutifully followed by a presentation at New York City's Department of Health by Bryne's wife, the renowned epidemiologist Dr. Mia Hart. The event is well attended by a number of doctors, interns and nurses and becomes a milestone present all through the narrative. Mia provides a list of the most important emerging pathogens in history. Under her –or the writers', for that matter– point of view, and in strict chronological order from the eleventh until the twentieth century, the following appear: ergotism, smallpox, leprosy, plague, syphilis, dysentery, tuberculosis, typhus, cholera, and AIDS (*TEP*: 184). Leaving aside possible discrepancies, it can be admitted as a valid reference for the unacquainted reader. Furthermore, it is also acknowledged that the chart may be Eurocentric since there are no other historical accounts, but the presenter humbly suggests that other continents may have been affected in the same way.

⁵⁸ The book can be downloaded from <<http://www.anarchistcookbookz.com/download.html>>, retrieved on 5 September 2008.

The fact that AIDS is posed to be the twentieth century pandemic takes Jack Bryne to wonder why the emergence of new diseases like Ebola or the reemergence of plague in India in 1993 –clearly a mistake for 1994– are not mentioned. This is a moot point because it really questions the dogmatism in Mia's exposition. With an almost sure certitude, there were a myriad other diseases that do not appear in historical documents and which may have had the same obnoxious effects all around the world. It would be an exercise of absolute negligence not to consider so. On the other hand, it must be accepted that this brief historical report of the natural pandemics in history is of great value; an original feature of this novel which cannot be found in the other texts studied so far. Yet, the end of the presentation is really disquieting, with Kameron questioning whether past pandemics can help predict newer ones and Bryne demanding what will be the new “Armageddon” of the twenty-first century. The expert epidemiologist can only state that her primary concern is the emergence of a resistant organism that might speed what she calls the 'Post-Antibiotic Era,' a fact which Bryne suggests is already happening with the mutation of influenza each year: “You say 'might' happen. We *know* it's going to happen,” Jack says (*TEP*: 191). In the end, it all appears like quoting Lederberg's remark⁵⁹.

Another valid point of information about agents and their use in biowarfare can be found at the beginning of chapter eleven, where a complete account of the actions taken by the infamous Unit 731 is given. The source of this excerpt is overtly declared to be *Unit 731: Japan's Secret Biological Warfare in World War II*, a cult book of the early nineties published by Peter Williams and David Wallace (1989)⁶⁰. In effect, a summary of four pages is provided which enlightens the reader over this hidden chapter of history. It is stated that CIA's Hubbard, when trying to trace Bryne's past, stumbles upon this book in the New York Public Library:

Hubbard learned that under the direction of General Shiro Ishii, the Japanese had conducted industrial-scale germ warfare against the Chinese –some of the most inhuman biological experiments ever conceived. The real mystery was why the scandal wasn't more widely known [...].

In November 1941, a single unidentified plane was seen making low passes over the streets of a Chinese city named Changteh [...]. A week later, the city's children began to develop symptoms of plague [...].

How terrifyingly close the Japanese had been to perfecting the tools for

⁵⁹ See note 8.

⁶⁰ More relevant information on Unit 731 is also given by Kristof (1997) and *Ww2pacific* (2001).

biological warfare. Hubbard read about the viruses, smallpox, cholera, typhus, glanders, salmonella [...].

The Japanese had tried to order a lethal strain of yellow fever directly from the Rockefeller labs in New York city in the late thirties. When that plan failed, they tried Brazil, with the same result [...].

By 1945, over eighty pounds of anthrax bacilli alone had been produced and meticulously stored –more than enough to kill every person on earth. (*TEP*: 220-2)

While not as extensive and thorough as Mia's lecture on the history of emerging pathogens, the account certainly holds a good illustrative value. Undoubtedly, the reader is given a detailed picture of a modern biowarfare incident without having to search much. This is obviously advantageous, even though the point of view may be qualified as biased by showing only one side of the matter. Later on, however, it seems that the writers choose to clear their conscience by mentioning, amongst other incidents in biowarfare, the use by the US army of feathers tainted with plague in the Korean War⁶¹. It is even also hinted that the US may have purposely spread dengue throughout Central and South America (*TEP*: 235)⁶². In fact, it is quite difficult if not impossible, as noted by the studies so far, to find implicit criticism of American use of biowarfare. Thus, the writers' contribution is doubly relevant.

In addition to these points, the writers also show themselves quite concerned with explaining the difference between biowarfare and bioterrorism, which is often misleading. Particular examples are provided to clarify these terms. Thus Bryne, inquired by Hubbard in a *Plato-Republic* style, states that both perpetrators may use biological agents but with a difference in purpose and targets. Biological warfare intends to incapacitate the enemy, which is better than killing for such a matter, and the example of the *Staphylococcus* bacterium that causes about a week of vomiting and diarrhoea is supplied. However, the bioterrorist wants to make a stronger statement of a political or religious kind, for instance, and the Sarin attacks on the subway of Tokyo in 1995 are provided as a clear token. Although the example is incorrect because the agent is chemical, the point could have never been explained so concisely and exactly. As Hubbard puts it, “one is for victory, the other just to make a

⁶¹ In fact, it appears that the feathers may have been tainted with other biological agents such as the anthrax bacillus and those causing encephalitis and myocarditis (Endicott and Hagerman 1999: 20).

⁶² All such items of information are contrasted by Blum (2000: 144), Cockburn and St. Clair (1998), and The Federation of American Scientists (2000).

statement” (TEP: 228). But the discussion continues and Jack points out the difference in treatment between such diseases as Ebola and influenza. In general terms, although the latter may be much more dangerous due to its mutational ability, Ebola is feared a lot more because of its exotic origin and its spectacular symptomatology. In view of the expert:

No one is going to panic much if they hear that a new strain of flu has been discovered —after all, they get exposed to influenza every winter. But let the government try and tell the population that something exotically evil, like Ebola, is spreading, and it's a whole new ball game. Given the disease's unfamiliarity, what it can do and the knowledge that it cannot be controlled or treated, people react as if they were living in the Middle Ages. It's more like a scene from *Mad Max* or *Escape from L.A.*⁶³ (TEP: 230-1)

And indeed, very clear examples of Jack's theory can be perceived in the other novels. It may well be said that this is a general belief shared by the biohazard writers: the more unfamiliar the disease, the scarier. This might be the reason why *The Hot Zone* quickly became established as a best-seller, while other interesting novels of the same kind have gone virtually unnoticed.

Once such relevant points of information have been established, it is simply a question of letting the agents themselves show what they can do. Thus, the full list of plagues, which is primarily made up of non-contagious diseases, is as follows:

#	Bible	Event/Poison	Date
I	Water to Blood	Phytotoxin Poisoning	January
II	Frogs	Centrolenella death	February
III	Lice	Ergot toxins	March
IV	Swarm	Bee venom	April
V	Murrain	Mycotoxins	May
VI	Boils/blains	Anthrax	June
VII	Hail	Botulism	July
VIII	Locusts	Neurocystercicosis	August
IX	Darkness	Rift Valley Fever	September

⁶³ Obviously this statement has been recently questioned by the scare about the Novel H1N1 Flu (formerly Swine Flu) in 2009. However, it should be understood that seasonal influenza causes around 1 million deaths worldwide (WHO 2009a), whereas Novel H1N1 Flu has caused “only” over 5700 deaths as of 25 October 2009 (WHO 2009b and CDC 2009e). Therefore, it can generally be assumed that ignorance causes unjustified fear of both exotic pathogens and new strains of familiar ones. The educational role of the biohazard discourse in popular narrative is thus validated as an efficient means to combat such incomprehension.

X	Death of the Eldest	Unknown (<i>Aflatoxin?</i>)	October?
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(*TEP*: 392)

Of all these, only anthrax and Rift Valley Fever have a microbe as a generator, with bot toxin being caused by a bacterium. The rest are either phytotoxins –poisons produced by plants, or zootoxins –poisons produced by animals– and hence of no interest for the purpose of this thesis. But whereas the information about anthrax, especially as a bioweapon, is copious, the way in which the writers deal with the other two microbes is quite straightforward. Actually, the data on botulism is reduced to mentioning that the majority of cases in adults are food-borne (*TEP*: 318), which is only partially true since there are also cases of wound botulism, infant botulism (more than 60 percent of the total) and rare intestinal botulism (Shapiro 1998). In addition to this, a table is provided with seventeen US states with cases of botulism where the victims recovered and ten where they did not (*TEP*: 321). That is all. The symptomatology is simply visible in the victims. As for Rift Valley Fever, it is through Kameron's recollections that the readership learns it is the chosen virus for the Darkness plague due to the retinal haemorrhage it causes. The small arterial vessels in the retina are ruptured and the patient experiences a growing red vision until darkness is eventually reached. The readership is also briefed that the pathogen belongs to the arenavirus family and that it gets its name from a Valley in Kenya where it was first reported among livestock in 1918 (*TEP*: 340-1)⁶⁴.

In general, then, the treatment of the different pathogenic agents in *The Eleventh Plague* reveals it as a very pedagogical book. It is clear that it has been written with the different diseases as a strong plot-builder, rather than being the by-product of the adventures of the main characters. In other words, this book is disease-centred in contrast to those which are clearly character-centred.

However, in *Time of the Fourth Horseman*, it is noticeable that diseases are secondary to actions and, therefore, information about them is almost null. Actually, they are barely mentioned and never described in depth. Not even a paragraph is dedicated to the purpose. It is assumed by the writer that the reader is experienced in all the maladies she cites; either this, or she simply does not want to waste time in explanations. The outcome, of course, is a page-turner but not precisely because of

⁶⁴ In fact, it appears that it was first discovered by modern medicine in 1915, although it may have remained endemic in the reservoir mosquitoes of the area for centuries (CDC 2006b, WHO 2008f).

the writer's fast-reading prose. If there are any particularities of a certain agent to be described, that is directly done through the victims. In fact, the symptomatology is quite universal regardless of the disease: muscle-aching, fevers, overall malaise, etc. The initial depiction of Alan Mathew Reimer, the first victim, says it all: "General muscle-aches, the all-over kind" (*Time of the Fourth Horseman*⁶⁵: 2). Perhaps, Peter Justin's report on the progress of the new polio in himself is the most dedicated account for a particular disease. But since the few droplets of information are shown through the victims, it seems more appropriate to postpone the study until chapter four, where this group is studied in detail.

3.1.5 Partial Findings: On the Existing Unmodified Pathogens

Consequently, from what has been studied of the existing unmodified agents so far, it seems appropriate to state that an already known evil pathogen seems best suited to star in natural scenarios. The pathogen is often depicted as an ancient form of life which has adapted successfully through centuries. It is a monster with a life of its own and is treated as a character in itself. It even appears intelligent enough to cause involuntary seizures in the dying victim so as to facilitate its propagation. This so-called emerging *Andromeda* appears to question the myth of man as the apogee of creation and often acts as a leveller to redress the problem of overpopulation. The Earth seems to be reacting against the presence of the human parasite and the response is a series of diseases that are meant to keep the growing population of this unwelcome lodger under control. Such a doomsday microbe could appear, not to extinguish the human race, but to thin it drastically, thus restoring the natural balance in the biosphere. As a last consideration, it seems as though the more exotic the microbial evil is, the more dangerously it is perceived (i.e. Ebola versus influenza).

3.2 Existing Modified Pathogens

Another clear group of microbial agents is made up by those which have been genetically altered to make them more harmful. This makes them suitable for a bioterrorist scenario, where they can best display their destructive potential as a

⁶⁵ Hereafter cited parenthetically in the text as *ToFH*.

bioweapon. In the case of *Mount Dragon*, though, the likelihood of a biological accident does not conceal the reality that the Pentagon is quickly attracted by the promising capabilities of X-FLU as a strategic weapon, which would also make it suitable for any bioterrorist act. In short, even if initially there may be good principles behind the manipulation of the smallpox and influenza viruses, these are soon perverted by the human factor, which invites manipulators to make big money out of research by turning the microbe into a powerful mass-killer.

3.2.1 Smallpox

Two of the writers studied in this thesis use smallpox as their plot-builder: Patricia Cornwell and again Richard Preston. Beginning with the latter, he shows his worries about the possibility of a bioterrorist act with an engineered version of the virus making it strike harder at the brain; a chimera which he baptises as brainpox. In fact, Cobra is one part nuclear polyhedrosis virus, one other of rhinovirus (common cold) and one of variola major (smallpox)⁶⁶. But, since the author himself leaves the “-pox” suffix in the nomenclature, it appears that the agent, albeit a combination, seems to be more smallpox than anything else. The common pustules are absent, though. Instead, the smallpox gene, as explained later, will grant a higher lethality. Like in his previous bestseller, there is extensive information, not only on this particular bioweapon but also about the hidden development of biowarfare at large, although this is not always objective. Nevertheless, there are many things to be learnt from his novel.

After the opening chapter, which presents Kate Moran's agony, the readership is quickly presented with a similar short second part significantly entitled *1969*. This is the year when the United States supposedly put an end to a series of biological experiments with a so-called *Utah* agent in the Johnston Atoll⁶⁷. The infectivity of this generic agent in primates reached a notorious 50%, with an awesome lethality of 100%. This seemed to prove it to be a very effective bioweapon, since the ultimate

⁶⁶ Further information on the nuclear polyhedrosis virus and the rhinovirus is given by Weeden (2008), and Schoenstadt (2008), respectively. As for smallpox, there is a factsheet included in the second appendix, which is a summary of the data given by the CDC (2007a).

⁶⁷ For years, these experiments have been concealed from public knowledge on account of security. The real time of the trials extends over the five-year period 1964-69, as Preston himself elicits in “The Bioweaponers” (1998: 61-2) and in the glossary of *The Cobra Event* (1997: 445-52). Likewise, a report by the Canadian Broadcasting Corporation confirms the fact (2004).

purpose of a strategic weapon is never to wholly exterminate the population but to decimate it drastically. In the subsequent brief chapter, Preston initiates a series entitled *Invisible History*, with an apparently instructional purpose. The first token is dedicated to the Nixon administration. As of 25 November 1969, President Nixon declared that the United States renounced the use of chemical and, especially, biological weapons. In the case of the latter, the reason was the unpredictability and lack of control over the ensuing epidemics, which might “profoundly affect the health of future generations” (*TCE*: 26). An immediate disposal of existing stocks of bioweapons was officially enforced (Time 1969, Miller et al. 2001). However, the writer considers that the reports given to the press were wrong, and that the Nixon administration only disposed of those weapons that were more expensive and less reliable to use. The induced misconception has prevailed until today and most people remain ignorant of the Johnston Atoll trials. Actually, not many know about the wide history of biowarfare. Even though the famous *Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction* –best known as the *Biological Weapons Convention*– was signed in 1972 by 158 states (with 16 yet to ratify and another 21 not signing⁶⁸), Preston claims that the US continued with the program covertly, as did the Soviet Union and other signatories. In the writer's mind, this part of history has largely been forgotten and remained invisible, which he definitely attempts to redress.

Thus, this second installment of *Invisible History* goes back to the Iraq of the Gulf War. Rather than enlightening his readership with the marvels of smallpox, Preston still delays the moment and talks of weaponised anthrax. It looks as if he wanted to keep his audience alert and stuck to the plot. When the source of the biological nightmares in *The Cobra Event*'s opening chapters seems bound to be revealed, the writer deliberately diverts the issue. Yet, he does not abandon the informative leitmotif but rather he uses the events to illustrate. And the word “anthrax” is definitely the first to come to mind when biological weapons are debated. Preston could not miss the opportunity and recalls the Sverdlovsk (now Yekaterinburg) leakage where 66 people died of the disease⁶⁹. Resuming his own

⁶⁸ A copy of the text can be downloaded from *The Biological and Toxin Weapons Convention Website*: <<http://www.opbw.org/convention/documents/btwctext.pdf>>. Retrieved 15 November 2008.

⁶⁹ According to Meselson and his team of investigators, it seems that there were 64 eventual victims

particular style, the writer accuses the Soviets of making weaponised anthrax “by the ton” in 1979, a clearly obsolete strategic device by the standards of only twenty years later:

Anthrax is not very efficient as a bioweapon, since it took a relatively large amount of dry spores to kill a relatively small number of people. A kilogram of a more advanced biological weapon released into the air should be able to make a plume as long as fifty miles. If the plume cuts through a city, the deaths should number in the thousands or millions. A far larger number of deaths will occur if the weapon is transmissible (*like Cobra, e.g. Brainpox*) –that is, if it is contagious and able to jump from one person to another in a chain of infection. Anthrax is not a transmissible weapon. You are not likely to catch anthrax by being in contact with an anthrax victim. Anthrax does not spread from person to person by a chain of infection. Other weapons – contagious weapons – are therefore more powerful, though they can go out of control. In the age of molecular biology, anthrax looks like a black powder cannon. (*TCE*: 123)

This really should be called biohazard pedagogy, a line which he completed with the publication of “The Bioweaponers” (1998) and “The Demon in the Freezer” (1999), where he proved his statements. The story goes back to Iraq's bioweapon's program, mainly developed in the Al Hakam –also known as Al Hakum– production plant. When Iraqi defector Babrak Kamal talked, the western countries finally found confirmation that the program was far from over after the defeat in the Gulf War, but rather had evolved into the development of more efficient agents through genetic engineering. Certain European biotechnological companies from France, Spain, Germany and Switzerland –like Cobra's BioArk– are accused of helping the Iraqis restart their program in the Al Manal facility after Al Hakam was shut down by the United Nations. Furthermore, the American Type Culture Collection sold the Iraqis a strain of Botulism for thirty-five dollars. It is estimated that a large amount of botulinum toxin, a nerve agent one hundred thousand times more toxic than Sarin, was made in this site. Other external sources confirm the work on a wide range of biological agents in these two plants including, of course, smallpox (“Wisconsin” 2006, Global Security 2007a and 2007b). Not a single drop of the anthrax from Al Hakam, or the bot toxin from Al Manal, or any other biological agent has ever been found. At least, this is what we have been told, according to Preston. Yet, it is hard to trust authorities any longer after the proven lies of the Nixon administration.

out of 96 confirmed cases, with an estimated 67% fatality rate (1994: 1203). However, according to Wamper and Blanton (2001), who cite unclassified reports from the CIA, the final victims rose to 68. Furthermore, the CIA initially cited “more than two hundred casualties” (1980).

Eventually, all this volume of information becomes the necessary introductory path to reach smallpox and the creation of the brainpox; designed by the Soviets according to the writer. Before we witness the horrific death of Peter Talides, which is dealt with in the fourth chapter, Preston reminds the readership that a brain virus can act so fast, one can go to bed healthy and never wake up (*TCE*: 152). Such is the nature of this engineered agent: rather than covering the body with itching pustules, it swiftly destroys the nervous system. The process is described some seventy pages ahead, where the readership is shown how the insect strain literally melts a caterpillar and turns it into forty percent virus crystals. To the writer, this is much the same way as the human strain liquefies the brain. In the same manner that the agent stops the molting process for the insect never to reach adulthood, so does the human strain, allowing the host to live while the pathogen amplifies inside. There comes a time when the amplification goes too far and the host, who has been living like a zombie during this period, eventually collapses (*TCE*: 219). Thus, the human strain of the brainpox is, for Cope, the perfect weapon to keep the population of the human parasite in check. It does not affect other species but mainly reduces the one selected by a definite percentage, just as a strategic weapon does with the enemy. A comparison with AIDS and Black Death, as known instances of corrective diseases, cannot be avoided. At this time, it appears that the bioterrorist is materialising the writer's thoughts when he states that “smallpox is a beautiful white tiger, and it has a place in nature. Who are we to presume to destroy a white tiger? The Sierra Club and Friends of the Earth should defend smallpox!” (*TCE*: 221)

The recombination process, the way the smallpox virus is manipulated until Cobra emerges is explained immediately afterwards. Not to enter into much detail, Preston describes the genetic code of Cobra in quite a straightforward manner:

Molecules of DNA resemble a spiral ladder. The rungs of the ladder are known as the nucleotide bases. There are four types of bases, and they are denoted by the letters A, T, C, and G. (The letters stand for adenine, thymine, cyostine, and guanine – nucleic acids.) The length of the DNA in the living creatures varies greatly. Human DNA consists of about three billion bases. That's about enough information to fill three *Encyclopaedia Britannica*. All of this information is crammed into every cell in the human body. A small virus, such as the virus of the common cold, has only about 7,000 bases of DNA. Hopkins had made a guess that the Cobra was complicated and would probably contain around 50,000 to 200,000 bases of DNA. (*TCE*: 236)

The comparison with the common cold virus really makes it plain. But

especially notable is the turn with Will Hopkins: since Cobra is the writer's invention, he leaves it to one of his characters to describe the DNA of his own creation. It can almost be taken for granted; a rather cunning manner of merging real and fictional information. Some twenty pages later, it is revealed that Cobra has also got a bit of the common cold in it, which turns it into a massive infector. Primarily entering the body through the eyelids or the nose, it quickly reaches the brain through the nerves while the host develops the customary symptoms of the common cold. In short, Preston's chimera combines maximum lethality and infectivity as well as being restricted to the human species: a paramount bioweapon. Through brief and direct sentences, he describes his invention as “a biological missile designed to take out the brain. There's no cure for the common cold. The common cold is very contagious. Cobra is the ultimate head cold.” (*TCE*: 252)

Meanwhile, it should not be forgotten that this is simply his particular vision of how genetic engineering may build cleaner strategic weapons. The pathogen does not exist, but it may easily come true. There is probably a real-life version involving other agents. And there is little doubt that his opinion is solidly based. Yet, Cobra becomes an excuse to uncover the history of biowarfare, a task which he takes up again after he has disclosed the origins and procedure of his creation. Hence, he denounces that any other bioterrorist like Cope could use 'A Study of the Vulnerability of Subway Passengers in New York City to Covert Action with Biological Agents,' a real experiment that the US Army carried on New York's population in the mid-sixties and published in 1968⁷⁰. It is by reading this study that the evil-doer conceives his strategy. All in all, the concise description of Cope's deployment plan almost seems like an apology for bioterrorism. Thus in Phase I, he

⁷⁰ As declared to the *British Broadcasting Corporation* by one of the scientists who took part in the experiment, the exact year appears to be 1966:

The programme hears from a retired scientist whose job in 1966 was to drop light bulbs carrying BG (*Bacillus globigii*) on the New York subway. He would then measure how the simulant might spread in the event of a real attack, using a motorised vacuum device concealed inside a suitcase.

Wally Pannier, 82, recalls: "We'd just drop light bulbs with the powdered stimulant inside. I think it spread pretty good because you had a natural aerosol developed every few minutes from every train that went past." (BBC 2006)

The experiment is also quoted in a report about biological weapons by the *Public Broadcasting Service* (PBS 2006). It is also worth noting that, although the BBC considers that the agent only “did pose a risk to people who were ill or whose immune system was failing,” *Global Security* deems: “if it were one of the predictable, dangerous organisms, could have killed thousands of persons. No one was injured or became ill as a result of the test.” (Global Security 2008)

tests the agent upon some particular victims, the number of whom increase in Phase II along with the dosage. Eventually Phase III is reached, when the human species is massively dosed with brainpox (*TCE*: 273). Definitely, Preston wants to disclose the mysteries of a biological attack to the public, but in effect he is also providing the means for anyone to mimic the movements of his fanatic character. So, by trying to be as informative as possible, his book might well be taken as a handy bioterrorist guide.

The major bulk of enlightenment comes, though, in the third part of *Invisible History*. It is here that the action of the smallpox gene in Cobra is explained. In the words of Will Hopkins, as recalled by Mark Littleberry, it is a “rocketing gene” that “destroys brain cells while it shoots the virus everywhere” (*TCE*: 292), which accounts for the high lethality of the agent. The chronicle of the eradication of smallpox is narrated by Littleberry, who remembers how he was put out of work by the supposed end of Nixon's biological program, joined the CDC and eagerly took part in the expedition to eradicate smallpox. After having killed thousands of monkeys in search of the ultimate bioweapon, the latter campaign became “the work that made me whole” (*TCE*: 295). Without delay, the world of genetic engineering is described as the art of swapping genes between organisms. It is a lecture covering the first successful experiment with *E. coli* in 1973, the Asilomar Conference to debate the hazards of recombinant organisms⁷¹, and the subsequent development of genetic-weapons programs. Being close to fact, it is mainly the Soviet Biopreparat program that is studied. And not lightly: the rest of the chapter is dedicated to it –well over twenty pages. That certainly is very informative, but also definitely biased. One cannot avoid thinking that the US have not remained with their arms crossed knowing the Soviet program so well, much in the same way as other countries like Iraq, Syria, Israel, Iran, and China, which are also quoted⁷² (*TCE*: 311).

Thus, the Biopreparat is said to have been envisioned and initially funded in 1973, under the leadership of Leonid Brezhnev. The headquarters was the Institute of Molecular Biology in Koltsovo, a settlement some thirty kilometres east of

⁷¹ The Summary Statement of the Asilomar Conference can be downloaded from the *US National Academy of Sciences*: <http://profiles.nlm.nih.gov/qq/B/C/G/D/_/qqbcgd.pdf>. Retrieved 27 November 2007.

⁷² Other than the resources already mentioned, a full list of the countries allegedly developing a bioweapons program is given in a report by the *Public Broadcasting Service* (2001). Also, *In These Times* published an interesting article on the US secret bioweapons program (Berrigan 2003).

Novosibirsk, which was supposedly dedicated to the production of medicines. Although Preston states that the West was “suspicious” of its activities, it is not until the defection of Vladimir Pasechnik, former director of the Biopreparat, that the real scope of the program was revealed:

Pasechnik spoke of massive biowarfare facilities hidden all over the Soviet Union. The Soviet Union, he said, had deployed a variety of operational strategic biowarheads on intercontinental missiles that were targeted all over the place and could be loaded with hot agents and launched quickly. Large stockpiles of hot agents were kept in bunkers near the launch sites, including massive amounts of smallpox. Dr. Pasechnik spoke very knowledgeably of genetic engineering – he knew exactly how it was done. He said that genetic engineering of weapons was a recent focus of work in his own laboratory. He said it had been done in a variety of places in the Soviet Union with a variety of hot biological agents. (TCE: 299-300)⁷³

This range of agents included numerous strains of *Yersinia Pestis*, one of which could live and multiply in a nuclear battle zone. Again, there is no proof of this extreme, although the activities at Obolensk, a research centre for applied microbiology, are well documented. Preston seems to be mixing reality and fiction quite subtly, so that we take for granted facts that could be doubted. Yet, there certainly was unknown work with those agents which may have mimicked the writer's proposition. According to his character Littleberry, the agents included Ebola, Marburg, VEE (Venezuelan Equine Encephalitis, Congo-Crimean Haemorrhagic Fever, tick-borne encephalitis, Machupo (Bolivian haemorrhagic Fever) and, of course, smallpox (TCE: 306)⁷⁴.

The author then focuses on the strategic value of an eradicated virus which is highly infective and lethal. Through the voice of Littleberry, he estimates that every infected person can infect twenty other humans. Moreover, it is stated that most of the people have lost their immunity to smallpox. Although some of us were vaccinated as kids, the effect disappears after ten to twenty years. As for the year of publication –1997, Preston claims that there were only enough shots for half a million people, mainly soldiers. Should a pandemic occur, the antidote would be “more valuable than diamonds,” provided of course that the agent had not been

⁷³ These statements are confirmed by Ken Alibek in the *HSI Journal of Homeland Security* (2000) and *The Daily Telegraph* (2001).

⁷⁴ Evidence of such extremes is given by *Global Security* (2007c) and *The Wall Street Journal* (2002). Furthermore, Ken Alibek's confessions to Richard Preston (1998) also corroborate the work with, at least, some of these agents.

engineered to elude the vaccine (*TCE*: 307)⁷⁵.

At this time, it can only be expected that the writer blames the Russians for the creation of brainpox, as he eventually does. Strangely enough, the former Soviet Union is left out of the question. In a new exercise of cunning artifice, he hints that “one participant in the confrontation between the team of inspectors and the Russian military biologists believed that they had mixed pieces of brain viruses into smallpox, thus making a brainpox –a smallpox that attacks the human brain” (*TCE*: 308). And thus, the climax is reached. It appears that all this instructive effort is not only aimed at illuminating the public on smallpox and contemporary biowarfare, but mainly at disclosing the Soviet/Russian danger to humankind. This is very valuable information indeed, yet definitely tendentious.

Other countries are subsequently accused of doing similar research, especially with collaboration of former Soviet scientists:

The staff at the Koltsovo Institute of Molecular Biology numbered four thousand at the time of the first biological-weapons inspection, in 1991. By 1997, after economic troubles had hit Russia, the staff at Koltsovo had shrunk to about two thousand. Two thousand scientists and staff members from Koltsovo no longer worked there. Some of them had gone missing, and the Russian government itself does not seem to know where to find them. Some of them had left Russia. Some of them are working for bioweapons programs in other countries, probably in Iran and Syria, possibly in Iraq, and perhaps in Asian countries. What strains they took with them, and where they are now, it is a question that bedevils intelligence agencies. (*TCE*: 316-7)

Indeed, the participation of such countries has previously been confirmed. What is new is the implication of the Russian authorities, either by ignorance or sheer incompetence. In the writer’s view, the Russians are clearly making a profit from their know-how in genetic engineering. He believes Biopreparat still goes on, probably in a smaller scope in tiny, portable production facilities. The documents considered so far prove his theories, although the US does not appear to be idle. The bioterrorist event seems to be the perfect excuse for Preston to blame the Russians for the contemporary instability in biowarfare. In time, Cobra is found to be the offspring of a Russian-funded company in New Jersey. It is described as a new character, with a definite personality, made up by the evil-doers for a gruesome task.

⁷⁵ On 20 May 2005, the World Health Organization admitted having “2.5 million doses in Geneva, and an additional 31 million doses donated by countries, including 20 million doses from the United States and five million from France” (WHO 2005b). Conversely, the CDC states that “smallpox vaccination provides high level immunity for 3 to 5 years and decreasing immunity thereafter” (2007b).

It is said to have intelligence, although it lacks mind or consciousness because, as an opportunistic being, it hides in rats waiting for better times. Since it appears that the human species will never exterminate rodents, there seems to be no better species where to hide. Like its counterpart Ebola, it finds a natural reservoir to wait patiently for its next move (*TCE*: 439-40). Eventually, Preston justifies himself with the same old message: “the public simply must be told” (*TCE*: 443). Yet, it is only at the very end of the narrative that the writer welcomes the peaceful potential of the virus on account of its versatility, i.e. moldability. In any case, the value of his work as regards the disclosure of smallpox and biowarfare is undeniable; although too subjective.

On the contrary, *Unnatural Exposure* deals with smallpox from a very vague perspective. The information on the agent is meagre and the writer clearly takes for granted that her readership is acquainted with its historical occurrences. Other than the adventures of her protagonist, when it comes to the disease, it looks as if Cornwell is only interested in pustules and the physical consumption it involves. Moreover, she somehow misleads her readership through initial inferences at other related diseases and it all appears too stereotyped: “children get chicken pox [...] adults get shingles” (*UE*: 56). It is only in the second part of the book that the smallpox theory gains weight, which means the first half is practically lost for the purpose of this thesis. After considering all the poxvirus possibilities, Kay finally identifies smallpox when studying the corpse of Crowder's mother. It is all meant to figure out the implicit suffering:

She was covered in pustules, gray and hard like pearls, her toothless mouth caved in, and dyed red hair wild. I pulled the covers down more, unbuttoning her gown, noting the density of eruptions was greater on her extremities and face than on her trunk, just as Hoyt had said. Itching had driven her to claw her arms and legs, where she had bled and gotten secondary infections that were crusty and swollen [...].

I imagined her itching, aching, burning up with fever, and afraid of her own nightmarish image in the mirror [...].

Lancing a pustule, I smeared a slide, then went down to the kitchen and set my microscope on the table [...]. All indicators pointed to the devastating, disfiguring disease variola major, more commonly known as smallpox. (*UE*: 193-4)

By now, it is clear that smallpox is not just another character for the writer, who is merely interested in the agony cliché. Although she coincides with Preston in the latter, she certainly disregards the former. They do agree in deconstructing the

ladder metaphor, but Cornwell simply mentions the war against microbes and lets it linger. Making use of the thoughts of her protagonist, she states that new diseases appear every day and she wonders if microbes will eventually win the war (*UE*: 197). Yet, this is as far as she goes; Kay quickly goes back to her daily chores. Certainly, this is just another proof that the emotional life of the protagonist is what really matters, and not her achievements as a bioheroine.

Other similar tokens confirm this theory. The autopsy of Lila Pruitt is all set to produce disgust in the reader, barely mentioning the focal necrosis along with the swollen viscera and lymph nodes accordant with smallpox (*UE*: 214). Later on, the disease is said to be airborne, a fact which does not demand a medical degree to master (*UE*: 243). Perhaps, she mentions the length of its incubation period, ranging from two to three weeks, which is less known. Yet that is all, no musing over how it may affect the development of the epidemic or how many possible victims it may cause (*UE*: 245). And to top it all, Kay states his fears that a kind of animal pox may jump species into humans without ever providing a single scientific document to prove such feasibility (*UE*: 257). Eventually, after some genomic tests, a Dr. Martin from the CDC shows that the disease is a kind of mutant pox although, in functional terms, it is simply called smallpox (*UE*: 268). The customary quarantine of the hot zone –Tangier island– and the ensuing media scare close the circle. No more information on the agent and its past record is given: the necessary amount for the ventures of the protagonist has already been deployed.

3.2.2 Influenza

The agent in *Mount Dragon* is the familiar flu, genetically modified to produce a wild beast that kills by brain pressure. Clearly, the will of the writers in the use of the so-called X-FLU is to warn about the inherent dangers of genetic engineering. This is pretty obvious in Dr. Charles Levine's lecture at Harvard. Nonetheless, he is the head of the Foundation for Genetic Policy (*Mount Dragon*⁷⁶: 41-8). In his successful presentation, he narrates a breach in a Soviet biological facility in the western Siberian town of Novo-Druzhina. Not surprisingly, the incident clearly mimics the real anthrax leak in Sverdlovsk, already covered by

⁷⁶ Hereafter cited parenthetically in the text as *MD*.

Richard Preston. In essence, he proposes a virus engineered to be fully contagious and lethal which devastates the whole population of the town, with the Soviets carpet-bombing the place to obliterate any traces. Although it may sound a little far-fetched, there certainly is the possibility of a similar incident happening –indeed, Sverdlovsk is not fiction. The pathogen may not necessarily void out the intestines of the victim –again a coincidence with Ebola– but it will definitely have a high cost in human victims. Speaking through Levine, the writers warn that viruses are opportunistic creatures that retreat to secret reservoirs waiting patiently for new chances to return. They posit the example of a farmer killing a rabbit coming in and out of the hot zone and taking it to the market from where a global pandemic might break out. Disregarding any positive aspect, the promise of genetic engineering is an utter biological holocaust:

We have reached a critical turning point in our stewardship of this planet, and were so blind we can't even see it. We've walked the earth for five thousand centuries. But in the last fifty years, we've learned enough to really hurt ourselves. First, with nuclear weapons, and now – infinitely more dangerously – with the reengineering of nature [...].

Today – barely a stone's throw from this hall – much more complicated experiments are being done with infinitely more exotic, infinitely more dangerous viruses [...].

And today transmission routes are so widespread, so quickly achieved by international travellers, it only takes a few carriers for a virus to go global [...].

Should we allow unregulated and uncontrolled experiments in genetic engineering to continue in laboratories around the world? (*MD*: 47-8)

It appears, then, that the end of a world dominated by the human race is at hand. It is only a matter of time before a similar incident causes a major biological catastrophe. At least, this is the idea we are given on the opening pages. And in order to make such a principle more prevalent, a brief look back to the history of influenza pandemics is mandatory. Actually, readers are reminded of the mortality of the *Swine Flu* pandemic of 1918, also known as the *Spanish Lady* or the *Spanish Flu*, which, according to Preston and Child, killed one out of fifty people worldwide⁷⁷ (*MD*: 70). However, the important fact is that, according to Singer –director of security at Mount Dragon– “we're ripe” for another such pandemic (*MD*: 71). This again coincides with Lederberg's point of view that the question is not whether a new pandemic is going to happen, but when it is going to happen. In a way, the purpose is

⁷⁷ It seems that the writers' estimates are correct, according to the figures provided by Taubenberger and Morens (2006).

manifestly to scare the readership. Whether this is for commitment to the biohazard cause or for mere profit-taking reasons it is difficult to say. Yet, it seems undeniable that both writers rediscover the lethal potential of old influenza as a way of enhancing the best-selling possibilities of their work.

Once the agent has been introduced, it is time to justify its alteration because of the economic benefits it may generate. The statistics that Singer supplies talk of one trillion dollars a year in lost productivity and two hundred thousand birth defects in the same period all over the world⁷⁸ (*MD*: 70). Since the bonobo chimpanzee has a gene that makes it immune to influenza –only for literary purposes, of course– it seems fair to risk merging the Human DNA and the X-FLU gene for the sake of progress.

Eugenics is, in fact, the idea Levine clearly tries to convey to the journalists when dealing with the GeneDyne issue. In the expert's view, altering the DNA of somatic cells poses no danger as the change dies with the subject. Yet, the mutation persists if germ cells are altered and it is like “you've altered the DNA of the human race forever” (*MD*: 100) because the change is inherited by future descendants. This leads Levine to claim that “it's Hitler's eugenics all over again!” (*MD*: 101). Actually, this is not a new controversy in the United States and certain questionable steps in that direction are well known (Allen 2004, American Philosophical Society 2007). What GeneDyne does, which may be said to ape what a number of real biotech companies do, questions not only obvious ethical principles, but also presupposes a factual danger for humankind. According to Levine, the biological hazard notably exceeds the nuclear one and is largely ignored. He sticks to the public-must-be-told principle and the narrative clearly confirms this.

Hence, the description of the microbial monster being cooked at Mount Dragon is brief but precise. As Carson reports to Levine, epidemiology in humans is restricted to the Mount Dragon victims, which will be dealt with in a subsequent chapter. But the effects of the X-FLU agent in chimpanzees reveal that it is 100% lethal, airborne, with an incubation period ranging from one day to two weeks,

⁷⁸ In a study published in the *Emerging Infectious Diseases* journal, Meltzer, Cox and Fukuda state that “the estimated economic impact [in the economy of the United States] would be US\$71.3 to \$166.5 billion, excluding disruptions to commerce and society.” Although no birth defects are mentioned, overall statistics would suggest “89,000 to 207,000 deaths; 314,000 to 734,000 hospitalizations; 18 to 42 million outpatient visits; and 20 to 47 million additional illnesses,” only in the United States (1999: 659).

killing in several minutes to several hours from the appearance of the first symptoms by causing oedema and haemorrhaging of the brain tissue. All in all, a *doomsday virus* (MD: 192), as Levine likes to put it. The confidential report is later on leaked to the media in a TV presentation by the scholar himself during an interview. However, there are certain items that have been altered on purpose. In Levine's concise report, it is stated that the agent is lethal in all cases, but he fails to mention that the subjects tested so far have been chimpanzees. It is subsequently stated that an identified scientist (Burt) and a technician (Brandon-Smith) came down with the disease but only the latter is said to have died of X-FLU. Moreover, the incubation period is reduced to one week, death occurring in between 5 minutes and two hours of the first symptoms appearing. The pathogen "could destroy the human race" and it is reminded that "we might all be dead" had the above victims not been quickly isolated (MD: 203-4). Needless to say, the report has been intentionally distorted so as to suit Levine's scheme in the TV debate. It cannot be said that the information is unreal, but it certainly is inflammatory.

The matter of discussion swiftly turns again to genetic engineering and, through the dialogues, newer issues are introduced. The X-FLU virus is justified for the experiments since it is capable of infecting human germ cells, a fact which allows Carson to teach inspector Teece the difference between these and somatic cells. In order to achieve a permanent cure for the disease, such an intricate process becomes vitally necessary, which accounts for the use of the aggressive agent. But then again, Teece replies that it took but a single mutation in a patient to spread the haemophilia gene into the human race, which could well be the case with the wrong X-FLU variant (MD: 209-10). It seems as if Carson is desperately trying to convince himself of the benefits of microbe engineering, while he encounters more and more people in his way asking him to abandon the project.

Eventually, it is his lab assistant, Susanna, who convinces Carson of the dubious ethical reasons for altering the human gene. Additionally, she becomes a valuable source of information as she suggests very clear examples:

The difference in DNA between human and chimps is less than two percent, and look at the vast difference. It won't take big changes in the genome to remake the human race into something that we'd never even *recognize*. (MD: 234-5)

This is another instance of the authors using the biohero's aide for didactic purposes. For Susanna it is quite plain that GeneDyne is in this project merely for

profit. The company is simply marketing the modified agent as the new panacea against seasonal influenza, thus leaving the door open to similar research with other infectious diseases. As proved so far, for Child and Preston the process is totally wrong and can only allow multinationals like the one in question to make massive sums of money out of it. Indeed, the price is set at around five billion dollars, when it is eventually uncovered that Scopes' ultimate purpose is to sell X-FLU as a strategic weapon to the United States military (*MD*: 418). Despite the efforts of the writers to assure the readers that the US is the only country in the world observing the rules of the Biological Weapons Convention (*MD*: 419), they have woven the plot in such a way that only the worst side of genetic engineering has surfaced. Thus, the information provided is definitely true but tendentious once again.

Eventually, in an act of contrition, Scopes admits what readers already know: there is an incubation period of twenty-four to sixty hours, followed by immediate death from cerebral enema. The only new item of information is that the disease resembles the common cold in infectivity, which is extremely high, and that there is no vaccine; quite obvious since the project has gone down in ashes. In order to supply a sentential end, the writers put in the mouth of Susana their own thinking: the problem with genetic engineering has just begun and terrible things are about to happen (*MD*: 475). There could possibly be no other ending for *Mount Dragon* than such a demagogical omen.

The information about the flu in *Plague of Angels* is mainly concentrated in Professor Haraldsen's lecture on the Spanish Lady pandemic of 1918. The agent has been introduced in the prologue episode via the seven miners in Longyearbyen, who involuntarily provide the source of evil. However, the action focuses on Conor's movements to disengage himself from the burden upon him until it is time to travel back to Norway. The process, though, takes about four hundred pages after which the opening chapter loses all meaning. It is only through Haraldsen's words that the bioterrorist threat takes shape. Thus, an enlightening discourse by an expert on the matter seems imperative. That is exactly why the professor has been given a role in the novel and the first half of chapter twenty-eight is entirely devoted to such purpose.

What the readership is told of the agent is that it killed over fifty million people around the world, which perfectly matches the information available from most consulted sources. Although the exact number of casualties is not known, it is

generally acknowledged that the overall number ranged from twenty-five to the above-mentioned fifty million⁷⁹ from March 1918 to June 1920. The virus is said to have acted very fast, a person waking up in the morning feeling right and being dead by lunchtime. The symptoms would include white ashen faces, darkened extremities due to a lack of blood flow, and bursting of arteries in the lungs causing bloody sputum. The incident of Longyearbyen is recalled and the bodies of the young miners are said to be buried in the permafrost, thus waiting in perfect condition for a fanatic like Branch to gather the doomsday virus. The avian flu epidemic in Hong Kong in 1996 is also covered, giving special emphasis to the millions of chickens slaughtered in order to avert a global pandemic. In Haraldsen's view, this was an extreme measure, but one which left the epidemic with only a three-year-old boy as a victim and which saved the world from another 1918. It certainly seems a little too optimistic to think that the agent could not have found any other way to reach the world. Probably a major antigenic shift accounted for such a fact rather than the chaotic and tardy measures by the Chinese government⁸⁰.

The flu virus is said to have the ability to "shuffle its genetic codes like a quick-change artist" (*Plague of Angels*⁸¹: 418-9), thus becoming highly unpredictable. With the development of air transport, a pandemic seems closer than ever. And yet again, the agent does not qualify as a strategic weapon precisely because it is still out of human control. However, Haraldsen seems to ignore that this is not a problem for the fanatic. In view of the scholar, using flu for bioterrorism is an act of utter madness. Yet, that is exactly what Branch does. Thus, the writer creates a fully functional character who is deliberately given protagonism throughout twelve pages to supply the necessary information. Only at the very end of the novel is it revealed that the bioterrorist's alter ego, her deformed twin sister, has crossed the flu and pneumonia genes to make the resulting chimera more virulent (*PA*: 523). Yet, no other hints at genetic modification are given. It rather sounds like an attempt to give a biotechnological touch to the novel and little else.

In like manner, in *The First Horseman*, the CIA's Karalekis simply speculates

⁷⁹ While Stanford University cites twenty to forty million casualties (Billings 2005), the *Institut Pasteur* lowers the figure to twenty-one million (Garenne and Noymer 2007).

⁸⁰ Actually, it appears that 1.5 million chickens were killed in Hong Kong in 1997, with six people dying out of eighteen officially recognised cases (CDC 2008b).

⁸¹ Hereafter cited parenthetically in the text as *PA*.

with the possibility that the Tasi-ko agent has been manipulated by the North-Koreans (*TFH*: 46). However, the author concentrates more on fanaticism than on giving a wide perspective of bioterrorism. Consequently, the data about the disease is quite localised and does not provide many new facts for the average reader. Other than portraying a hyperbolic symptomatology, which includes rocket-high fevers, Ebola-like vomiting, and plague-recalling bluish extremities, the opinion of an expert like Dr. Epstein seems to be the most important source of information in the novel. Yet, some of the facts given do not appear to coincide with real documents. Hence, it is strange that the name “Spanish Lady” is attributed with a high toll in this country, when others, like the United States or France, suffered this strain of flu with notably more virulence (*TFH*: 38). Conversely, it seems that the disease got its name from the absence of censorship in the Spanish press during the First World War, which led to influenza being mentioned in this country sooner than in the rest of Europe⁸².

Once again, it looks like the author's documentation before writing the novel has been poor. In short, he calls the flu a “class of diseases,” due to the ability of this virus to mutate each year (*TFH*: 39). Furthermore, the number of strains is said to be infinite. Hence, the vaccines are difficult to implement since each strain varies in infectivity and virulence. Certainly, all this is true but it does not seem to add any valuable details to what we already know. The unacquainted will probably be delighted to learn that a pandemic is global and an epidemic is local, as Epstein is glad to instruct the apparently unknowing *Blindside* group (*TFH*: 39). Yet, the didactic possibilities seem to be spoilt because of the writer's exaggeration.

The scholar's hints allow CIA's Karalekis to aim straight at North Korea's biowarfare programme, the low cost of which is readily highlighted in contrast with an expensive nuclear counterpart (*TFH*: 43). Conversely, another *Blindside* member by the name of Voorhis needs to play the sceptical part and downsize a disease that is so common. An immediate response by the biowarfare expert is supplied, for whom there certainly are other microbial monsters that kill in a ghastly manner, “but if your intention was to debilitate the enemy – to attack the civilian population in a systemic way – the Spanish Lady would be a very effective instrument” (*TFH*: 45). Moreover,

⁸² In an online article by Larry Baum (2004), it can be read that:

Spain was affected early, and because Spain was not fighting in the World War, there was no wartime censorship, and news of the outbreak became widely known, leading to the flu being called the Spanish Flu in many countries. In Spain, however, it was called French Flu or the Naples Soldier.

to the specialist's mind, the virus is clean in the sense that it only kills people and leaves infrastructure intact. Also, like other writers dealing with the flu, Case doubts as to the eventual casualties; a range that he establishes at between twenty to thirty million around the world. A new item introduced by the author states that the 1918 pandemic killed half a million Americans in just four months. Given its name, the disease should have killed many more in Spain but it appears that it did not⁸³. Similarly, in comparison with the other great pandemic, the Black Death, Karalekis says that it took twenty years for the plague to perform its gruesome task – chiefly, to kill seventy-five million⁸⁴. However, the Spanish Flu did its job in barely twelve months. Such a striking comparison inevitably demands attention for what is assumed to be an endemic disease. To top the cake the expert simply lets fall that the agent is terribly infective and that, of course, it can be tweaked into an engineered chimera. Also an interesting point is that the pharmaceutical *Genentech* sells the virus for about forty dollars, an extreme which could not be proved⁸⁵. Even though the gullible may be scared with such alarming statements, the historical data provided by the author certainly reveal influenza's killing potential.

After the Blindside meeting, however, the information clips about the influenza virus diminish gradually in favour of the Frank-Solange contest and the biohero-aide affair, which will be conveniently dealt with in the chapter on the characters. Perhaps the only source of valuable data is Frank's own article in progress, which we glimpse during his forced stay at the Chernomorskaya. After an interview with Lu Shin-li, an alleged number one epidemiologist in China, the country where flu pandemics begin, Frank decides to write an article that can make his name as a freelance writer. He mentions that the disease did not originate in Spain despite its name, but in China, and that it killed more Americans than the two World Wars. That is nothing new so far, really. Yet, the way in which he describes the deaths of the victims is certainly peculiar:

The speed with which the illness killed was as startling as the virus was deadly. In Westport, Connecticut, a woman playing bridge bid three hearts – and

⁸³ Only the Spanish newspaper *El Mundo* ventures to raise the amount of casualties in Spain to around three-hundred thousand; in any case, much lower than in the United States, where the virus could have mutated to its deadly form (*El Mundo* 2004).

⁸⁴ See note 51.

⁸⁵ Nowhere in the webpage of the biotechnological company is it explicitly stated: <<http://www.gene.com>>. Retrieved 14 July 2009.

fell over dead. In Chicago, a man held a taxi – and died before he could open the door. In London, a soccer goalie leaped to make a save – and was dead when he hit the ground.

By all accounts, each of these people appeared to be in good health – until they died. But millions of others were less fortunate, suffering an array of symptoms so various that it seemed as if a dozen diseases were at work. (*TFH*: 88-9)

Again, the comparison with a 'disease of diseases' does not seem quite appropriate. Indeed, the variant of the H1N1 that turned into the Spanish Lady had a bit of the worse agents ever known in history: it devastated whole countries, was almost impossible to control by quarantine and appeared and disappeared at will. But it was also unique in its ways: it killed fast and had a special liking for young adults. It looks as if the writer is now making a move to render “his” agent the worst possible. This is confirmed soon as what initially was the flu, somehow gathers reminiscences of Ebola and the plague:

A physician in New York City reported that his patients were 'blue as huckleberries and spitting blood.' Fevers of 106 were commonplace, as were projectile nosebleeds and endless hours of vomiting and diarrhoea. Genital gangrene was widely reported, as were instances of leucopenia (a sort of leukemia in reverse), sudden blindness, and complete loss of hearing [...].

In the end, most of the dead were found to have coughed their lives away, drowning in a slurry of blood and mucus, even as their lungs dissolved to the texture of 'red currant jelly.' (*TFH*: 89)

None of the described symptoms can be found in the manuals that cover the pandemic. There certainly is the possibility that, by extreme complications in particular patients, the disease turned into the above but the records clearly state that it killed by filling the lungs with body fluids. That is obviously a terrible death, but not the one presented. There is, therefore, an evident colouring on the part of the writer, which puts him closer to Preston in style. The information provided is clearly overstated at some points, thus not giving a real portrait of the tragedy. On the other hand, such hyperbolic statements are combined with other accurate accounts, even if fictionalised. Hence, Case explains why the annual influenza pandemics always begin in China and why there are no vaccines available through the words of the specialist:

According to Dr. Shin-Li, 'Wild ducks are the main reservoir of the virus, and we have more of them than any other country in the world. Not only that – because we raise chickens, ducks and pigs together, the virus is able to move back and forth among them, from one species to another, changing as it goes.'

Because influenza is a shapeshifter, and animals are constantly swapping

viruses, mutations are frequent. While microbes like smallpox and polio are extremely stable, influenza is an RNA virus with a segmented chemical structure that is held together by only the weakest bonds. Lacking the DNA function that guards against mutation, the virus is constantly 'reassorting' itself in its animal hosts. This means that segments break off only to recombine with other segments, generating new strains of the flu.

It is this characteristic that forces scientists to develop a new vaccine each year. (*TFH*: 89-90)

Now, it can truly be said that the writer is much closer to fact. Through a manifest creation of his own, he is portraying a more realistic account of what the disease actually is⁸⁶. In this respect, there is by now clear proof that Case has opted for a twofold interpretation of his role as a writer. First, he intends to raise awareness over the calamity by concentrating on the worst aspects of the disease, even if inflaming them so as to cause commotion. Second, and only when he is sure that everyone is well shocked, he sticks to the truth in such a way that real and unreal merge into a new disease of his own creation. Arguably, it is not the most faithful representation of the Spanish Lady, but the technique has also been observed in other writers of the genre. Having reached this point, Case focuses more on action than on pedagogical concerns. It appears now that this mortal strain of the flu is about to cause real havoc, but the moment is progressively delayed until it eventually vanishes and becomes a mere scare. It is all a bit disappointing so to speak since, with the exception of the Tasi-Ko incident, the rest are only possibilities that never come to happen.

3.2.3 Partial Findings: On the Existing Modified Pathogens

In short, the data gathered so far reveal that a genetically-altered pathogen is best suited for bioterrorist scenarios. This chimera seems to be the perfect weapon for a fanatical ecologist to keep the population of the human parasite in check. In principle, it does not affect other species but mainly reduces the selected one by a definite percentage, just as a strategic weapon does with the enemy. However, the manipulation of the biological agent causes unpredictable mutations, which usually turn it into a microbial beast out of the researcher's control. The resulting monster is

⁸⁶ This instability of the influenza virus as described by Case, seems to abide by the description of the Orthomyxoviridae, the family of viruses which influenza belongs to, as described by Robert A. Lamb and Robert M. Krug in the reputed *Fields Virology* (2001: 1216-1253).

often described as having intelligence, although lacking mind or consciousness. It is an opportunistic being, which may eventually hide in its host waiting for better times. Because of the reckless research by pharmaceutical multinationals, the creation of such a doomsday virus seems to be at hand. Therefore, the end of a world dominated by the human race seems to be close as it is only a matter of time before a major biological catastrophe is brought about. In addition, the symptoms caused by the genetically-modified agent are spectacular, always surpassing those of its unmodified counterparts.

3.3 Non-Existent Pathogens

The next three agents also have a genetic origin although not from the modification of an existing agent. Instead they seem to be created in the laboratory, out of unspecified practices which end up in the evil bug.

3.3.1 Andromeda

Crichton provides a pioneering approach to this genre. In effect, the bug is artificially created like the pathogens resulting from genetic engineering, but this one, having extraterrestrial origins, seems to convey a different kind of feeling. It looks as if, other than the inherent disgust of bodily invasion, the fact that the pathogen is of an alien source conveys a plus of rejection. So to speak, we would rather be violated by a 'native' microbe than by one from outer-space. Moreover, the creativity of the writer in providing all sorts of theories corroborating the feasibility of such a destructive alien organism is far superior to that of the writers who clearly choose the microbe as an excuse for other purposes. So believable is his account that he even provides over sixty studies and reports of his own invention justifying the alien bug theory⁸⁷. The result is that *The Andromeda Strain* has become a classic, with thousands of copies sold all over the world in the last four decades. It can very well be said that the realism in the description of the disease has contributed considerably to the phenomenal success of the novel.

⁸⁷ No trail of such documents, either in written or online sources, could be found. On the contrary, it appears that Crichton developed these studies through artistic license from his own imagination.

To begin with, the 'acknowledgements' section penned by the writer recalls the *Andromeda* crisis as a very real event and at no moment in the story is it stated that the incident never took place. It is taken as a declassified report which intends to reveal the existence of a hazardous microbial being entering the Earth after a military experiment in outer space. The probability of such an event happening was first heralded –according to the author, of course– by an English biophysicist by the name of J.J. Merrick. In a paper entitled “Frequencies of Biologic Contact According to Speciation Probabilities” he concludes that, because there are many more simple than complex creatures, “the first human interaction with extraterrestrial life will consist of contact with organisms similar to, if not identical to, earth bacteria or viruses” (*TAS*: 37). And indeed, it takes but a few years to prove his theory right.

Andromeda lands on the Earth in a satellite returning from the upper atmosphere, from where the US military intends to recover any existing organism for study –and subsequent use in biowarfare. Its effects on any higher living entity are rampant: a fulminant death is assured for humans as well as for buzzards who come to scavenge. No other animals are mentioned, but it seems that the big birds are the token with which any other higher living creature should compare. That is, *Andromeda* is lethal for mostly everyone and everything. While birds have a higher metabolic rate, this only ensures a few more milliseconds of life before they are consumed by the raging infection. But soon all the blood turns into a kind of red dust and the body collapses. Only a diabetic, a drunk man in acidosis and an ever-crying baby survive, sharing the key to immunisation against *Andromeda*. Its effects on the victims will be conveniently dealt with in the following chapter.

What is of interest now, is to notice the particularities of this genuine bug. The experiments with rats in the autopsy room let Burton determine that the agent is airborne and larger than a common virus. The actual diameter appears to be around two microns, more or less the size of a small cell, since this is the size of the filter that had allowed *Andromeda* to pass and infect the test animal. Another valid conclusion is that, although the agent is transmissible through the air, it is not so by contact with the victims because some buzzards feasted on the corpses without dying. The cause of death is blood clotting, which turns *Andromeda* into an ineffective parasite. In fact, Crichton is probably the first of these writers to consider the necessary harmony between man and bacteria that will in time be so exploited by gurus of the genre such as Preston or Garrett. The symbiotic principle is the one that

clearly shatters the myth of man as the apogee of creation, since it proves that we do need the essential participation of microbes for our own existence:

In fact man lived in a sea of bacteria. They were everywhere –on his skin, in his ears and mouth, down his lungs in his stomach. Everything he owned, anything he touched, every breath he breathed, was drenched in bacteria. Bacteria were ubiquitous. Most of the time you weren't aware of it.

And there was a reason. Both man and bacteria had gotten used to each other, had developed a kind of mutual immunity. Each adapted to each other.

And this, in turn, for a very good reason. It was a principle of biology that evolution was directed toward increased reproductive potential. A man easily killed by bacteria was poorly adapted; he didn't live long enough to reproduce.

A bacteria that killed its host was also poorly adapted. Because any parasite that kills its host is a failure. It must die when the host dies. The successful parasites were the ones that could live off the host without killing him.

And the most successful hosts were those that could tolerate the parasite, or even turn it to advantage, to make it work for the host. (*TAS*: 161-2)

Were it not because of his detailed study of fossils, it may well be argued that Gould sought inspiration in *The Andromeda Strain*. Moreover, Crichton wrote about the ubiquitousness of bacteria twenty-five years before Gould came to say that we are living in their age. Besides, it really seems that the most effective parasite is the one which leaves its host alive. In general, bacteria –and the rest of microbes by extension– seem to do that very well. From a strictly objective point of view, the fact is that the defective elements of any community do not survive. Either *Andromeda* or the human being –or even both– is defective because they cannot adapt to each other. The latter dies easily from the former which, in turn, can exterminate itself by getting rid of its host so swiftly. Thus, the human race is put to the test with this little Tasmanian Devil which does not even care about its own perpetuation. Furthermore, the data provided by Crichton to shake humankind's arrogant principles cannot be more convincing.

On the other hand, the language used is rather technical and the reader may get bored with certain biochemistry concepts. There are also many military transcripts and computer results of studies presented in the fashionable *GUI*⁸⁸ of the moment, with odd figures and square shapes. Although the machinery used certainly must have been the latest technology, it appears rather strange to the twenty-first century reader; yet, the purpose is achieved. Thus, we are given quite a straight picture of the agent and the disease it causes, deprived of absolutely any artifice.

⁸⁸ Graphical User Interface.

Personal accounts are left out of the plot and vaguely mentioned at the beginning of the story if only to provide some background to the bioheroes. Perhaps the fit of epilepsy is the only remarkable incident that does not strictly concern the mission, but it is added in the end to provide the necessary action. The rest is pure and simply the *Andromeda* crisis, the Wildfire Team and the ultra-technological facility. This certainly highlights the educative value of the novel, as the deeds of the characters seem secondary to those of the pathogen.

It is also worth noticing how the writer tries to convey the underlying perception of the scientific community of the late sixties as regards biochemistry. In a way, as Crichton does with his artificially created supporting literature, it is a matter of detaching himself from the theories presented by putting the words in the mouths of others. But, in the end, it is all a product of his own imagination and, of course, exhaustive documentation work which certainly exists, even if the writer prefers not to mention the original studies and camouflages them under fake ones. Leavitt's conference on this Hungarian-born biochemist by the name of Rudolph Karp earns the highest honours because it is directly aimed at the scientific community. In short, it is stated that this scientist was determined once and for all to end the controversy of the origin of the bacteria found in the meteorites coming to earth. While a few claimed that they had an extraterrestrial origin, the authorities in general refused to accept this and certified that they had become contaminated while entering the atmosphere. Thus, Karp took extreme precautions with meteorites by washing them in a dozen solutions and exposing them to two days of ultraviolet light. He still found bacteria that could live and reproduce but was laughed down upon presenting his information at the Seventh Conference of Astrophysics and Geophysics held in London in 1961. The surviving organisms were accidentally destroyed two years later (*TAS*: 124-5). The *Andromeda* crisis obviously proves how wrong the international scientific community was. By now it is pretty clear that, with the inclusion of his fake support stories, Crichton wants to denounce the bigotry of these authorities. He does not hesitate to put it quite plainly: "Scientists in the 1960s were not willing to entertain notions of life existing in meteorites; all evidence presented was discounted, dismissed, and ignored." (*TAS*: 125)

A complementary theory is Leavitt's "Rule of 48." Such theory states simply that "All Scientists Are Blind," because not until the 1950s was it accepted that man had forty-six instead of the forty-eight chromosomes of the great apes. Thus, the

writer summarises this ignominious episode in scientific history like this:

For years it was stated that man had forty-eight chromosomes in their cells; there were pictures to prove it, and a number of careful studies. In 1953, a group of American researchers announced to the world that the human chromosome number was forty-six. Once more, there were pictures to prove it, and studies to confirm it. But these researchers also went back to reexamine the old pictures, and the old studies –and found only forty-six chromosomes, not forty-eight⁸⁹. (TAS: 125)

This enables Leavitt to believe that Karp's experiments were correct and that any reputed scientist should abide by strict objectivity. It is precisely the bigotry of the scientific community that has allowed the *Andromeda* crisis to happen and that should allow others to come. It is quite obvious that Crichton is clearly advocating a more open mentality which can save humankind from a great deal of trouble on future occasions. Microbes and those who study them are clearly underestimated by those others who believe their research to be on a higher rung on the scientific ladder. This is how the allegory in this novel is best explained: even though the incident never took place, we must learn from the artificial world around it, which carefully mimics the real one.

In like manner, the agent tries to mirror any other bug with a deadly potential. After hours of study, this universal malignant microbe is taxonomised to be the size of a cell or even smaller, airborne, inhaled by the victim before crossing from the lungs into the bloodstream, and said to cause death through coagulation within seconds of infection. There are either no known vaccines to counteract its effects or these prove to be ineffective. No other secondary effects are observed (TAS: 168-9). It is undeniable that most of the features coincide with those described by other biohazard writers. Thus, Crichton sets the path for others to come and stands as an original pioneer in the genre.

In other respects, however, the writer goes much too far in his explanations and the novel enters the realm of fantasy. It happens so with the so-called "The Messenger Theory" allegedly postulated by John R. Samuels, a communications engineer (TAS: 222). In short, it states that an advanced alien culture could develop a sort of scout bug to proclaim its existence around the universe. Instead of using

⁸⁹ Although Crichton never mentions the source, this controversy seems to refer to an article by Joe Hin Tjio and Albert Levan entitled "The Chromosome Number of Man" (1956), where it was demonstrated that the human being has forty-six instead of the previously acknowledged forty-eight chromosomes.

physics for this, they would use biology. Indeed, the concept is innovative but rather radical all the same. It is a possibility, however, that only a groundbreaking writer like Crichton seems to consider; a fact which honours him if it is taken into account that he devised it in the late sixties.

As for the *modus operandi* of *Andromeda*, it is eventually discovered that it produces no waste at all, which means that it consumes absolutely everything. This is perfect for the barren existence in outer space where every organism must make the best out of anything. On the one hand, this would again validate Gould's "age of bacteria" since the smallest entity seems better prepared for such extreme conditions. On the other, the realisation is accompanied by a final study on a substance by the name of Kalocin, which would become the universal antibiotic: it would kill anything. However, all the trial subjects die from the most horrible amplification of infections. This can only mean that the symbiotic relationship between man and microbes is unavoidable (*TAS*: 260). Therefore, the final aim in Crichton's depiction of *Andromeda* is clear: Humankind has largely underestimated microbes, which are better suited for survival than the human being and, whether we like it or not, we are forced to live with them because they are necessary for our own existence.

3.3.2 *Anonymous*

On the contrary, *Burning Road* by Ann Benson is fairly confusing about the infective agent. To begin with, it is supposed to deal with a kind of strange bone-shattering disease, but the data on it is virtually non-existent, other than boys breaking their bones. Furthermore, the cases are already past, with the exception of the token Abraham Prives. Plus, there are also a lot of misleading references to *Osteogenesis imperfecta*, Giardia or Lou Gehrig's disease (Amyotrophic Lateral Sclerosis) which, in the end, prove to be nothing but smoke⁹⁰. It all appears to be a genetic accident made by the father of the bioheroine's boss and a subsequent gene wash by Chet Malin to cover his father's mistake. The Giardia scare eventually turns into a trick to make people cooperate. Thus, the protagonist has been investigating an alleged epidemic which happens to be neither contagious nor the cause of a

⁹⁰ More information about these diseases can be found at the webpages of the *Osteogenesis Imperfecta Foundation*: <<http://www.oif.org/site/PageServer?pagename=FastFacts>>; *Washington State Department of Health*: <<http://www.doh.wa.gov/ehsphl/factsheet/giardia.htm>>; and *The ALS Association*: <<http://www.alsa.org/als/what.cfm>>. Retrieved 27 November 2007.

particular biological agent. It seems that such a rare disease is simply the excuse for Benson to further explain more sentimental adventures of her alter ego. There is no real explanation of the rare trauma, other than the strange symptoms that basically afflict poor Abraham. All in all, such misleading depiction of the pathogen does not seem to make this novel at all educative.

3.3.3 *Nanomachines*

Another similar case is the pathogen described in *The X-Files: Antibodies*, which causes a fulminant eruption of tumours instantly ending the life of the victim. It is unknown that such an agent exists, but the writer likes to poke at the idea of some engineered nanomachines originally developed to save us from cancer eventually going wrong. The result is a deadly infection of its own, contagious by simple contact with the host and which kills in a matter of seconds. Certainly too far-fetched, but again the idea of nanomachines patrolling the human body in search of poisonous cells is quite utopian as well. Since there is no real counterpart, the information on the pathogen is scarce and mainly derived from the symptoms developed by the victims, which can be summarised with the opening death of Vernon Ruckman:

A burning, tingling sensation started at Vernon's hand, as if miniature bubbles were racing up his wrists, tiny bullets firing through his nerves, into his arms, his shoulders, his chest [...].

Vernon Ruckman felt all of his muscles lock up. Seizures wracked his body, a thousand tiny fireworks exploded in his head. He couldn't see any more, other than bright psychedelic flashes, static in front of his vision. His arms and legs jittered, his muscles spasmed and convulsed [...].

From inside his head, he heard bones shattering. His own bones. (*The X-Files: Antibodies*⁹¹: 6-7)

Shortly afterwards, the sick Jeremy Dorman notices Ruckman's skin ripping and bubbling turning his body into a swollen mass of pustules and lumps. It appears that the prototype nanomachines, who have been successfully tested on lab animals, provoke conflicts inside the human body, since they are forced to adapt to a different biological system (*XFA*: 206-7). The result is the viral-like infection described above. There really is not much said about the disease, nor do we find any more information

⁹¹ Hereafter cited parenthetically in the text as *XFA*.

throughout the plot. The other victims suffer from the same symptoms. Whatever must be known is witnessed within the two hundred pages ranging from the initial death of Ruckman to Dorman's last confessions to Mulder.

3.3.4 PZ9 Plasmid

Similarly, the strange case of the PZ9 plasmid in McClure's *The Scorpion's Advance* also seems to fit in this group. The agent is a complete invention –at least no other real counterpart could be found, although the use of different kinds of plasmids in the field of genetic engineering is recurrent. It is defined as a cloning vector designed to transfer genes (*The Scorpion's Advance*⁹²: 35) and it is its combination with the Galomycin antibiotic that proves lethal. The symptoms of the disease are witnessed in the opening victim, as seems usual in the genre. These include the likewise typical headaches and sky-high fevers, swiftly turning into spasms, seizures, back arching and tongue biting which herald an almost immediate death from heart failure (*TSA*: 15). After that, there are the ups and downs with confusing data until it is eventually disclosed that the agent was originally developed as a vaccine against leprosy. The last confession of the bioterrorist reveals the interest of both the American and Israeli governments and the extradition of the white-collar criminal from the former to the latter country for research (*TSA*: 244).

Indeed, it is shown that creating the writer's own mortal engineered agent clearly hinders his/her margin for improvisation. On the other hand, comparison with other real agents should allow more creative accounts, which none of the three novels discussed above show. In general then, the information about the diseases treated by these last three authors is either irrelevant or simply non-existent.

3.3.5 Partial Findings: On the Non-Existent Pathogens

A quick overview of the characteristics of the non-existent agents reveals that normally the chimera is designed for, or comes from, a project to help the human race. However, the plan goes wrong and the resulting monster endangers the species. The pathogen is used to advocate a necessary harmony between man and microbes as

⁹² Hereafter cited parenthetically in the text as *TSA*.

well as a higher control over current experimentation with biological agents. The scientific community does not seem to consider the advent of such a chimera and proves to be impotent to stop it. Thus, the resulting microbial fiend, which causes hitherto unheard of symptoms, leads to a fast, spectacular death of the victim because there is no effective medical response. Additionally, the very fact that the pathogen does not exist seems eventually to hinder the imagination of the writer as it should produce a symptomatology which is not akin to those agents causing already-known diseases. As a result, with the clear exception of *Andromeda*, the description of the pathogen and its effects is vague and hardly reasoned, since there are no scientific data upon which the writer may base his/her creation.

3.4 Pathogens: Conclusions

As a general principle, it seems clear by now that the biohazard writer wants to share his knowledge with the readership. At least, most of the writers studied so far provide a good amount of information about a particular agent and its implications in biowarfare, bioterrorism or past natural outbreaks. Certainly, this seems to justify the pedagogical value of the biohazard discourse. On the other hand, however, the manner in which the author contributes with his/her expertise varies greatly. Thus, there are writers like Ouellette, Child or Case who take a very enthusiastic approach and provide all sorts of data, whereas others like Yarbrow, Cornwell or Benson are much more functional and give just the necessary to hold the plot together. Reaching this point, a very clear dichotomy can be established between those novels which are disease-orientated and those which are character-orientated. The attention given to the pathogen and the degree of enlightenment shifts accordingly. It is easy to find writers who devote entire pages to describe a particular historical incident involving a certain disease, while others hardly waste a couple of paragraphs on such a matter, lest the protagonist should be deprived of status. However, as will be discussed in chapter four, this does not necessarily mean that the characterisation in these novels is shallow. There are disease-orientated novels with a large number of pages dedicated to different characters, but the opposite is also true. Of course, such concepts inevitably affect the quality of the final product.

But then again, the manner in which this information is transmitted can also

change dramatically. Hence, there are writers who stick to fact and just establish a clear background of the disease, whereas those who choose to be informative can, and often do, colour the data supplied. Of the former group, Cook is probably the most dispassionate, with his initial presentation of past Ebola outbreaks to show what the beast can do to then proceed with his thriller. Also, a very interesting approach is the inclusion of a scholar like Professor Haraldsen, who gives the reader a functional lecture on the epidemiology of the agent in question. In the latter group, Richard Preston is arguably the most vehement in blaming the great powers, especially the extinct Soviet Union and today's Russia, for the growing danger of the development of bioweapons. In the same manner, a scholar like Charles Levine mingles truth with artificial fact in such a way that it can be taken for granted. Thus, it appears that the data provided is often manipulated to favour the writer's point of view. This is quite noticeable with the death tolls given for past outbreaks of a particular disease. While they roughly coincide with the official records, these are usually rounded up so as to make the danger more present. This would be relatively acceptable if that was the case for some individual victims, but it happens that epidemics kill by hundreds and pandemics by thousands or even millions, and that makes a considerable difference. On the other hand, it is much easier to overstate the victims of the Black Death pandemic than those of the Yambuku outbreak, even if the official accounts probably fall short for both.

It appears that the enormous success of a writer like Richard Preston is directly proportional to his unequivocal grim style. Whether we like it or not, the more gruesome, the better. In a way, the western citizen has become numb to those diseases which are familiar as they do provide nothing new. However, any exotic bug coming out of the rainforest soon demands attention. Whereas influenza has been a mass-killer for centuries and things do not seem to improve much due to the ability of the virus to constantly mutate, it is no surprise that it naturally thins the weakest elements of the species each year. Hard as it may sound, this appears to be a shared truth. But those agents that call attention are the ones which kill fast and spectacularly. In comparison, the recurrent nuisance of the yearly flu bout seems to lose prominence. Unless it is genetically modified to fulminate people in a matter of hours and cause horrible pains, of course; or it is reminded that, less than a hundred years ago, a hitherto unknown strain not only killed millions of the young and the elderly, but was particularly fond of young adults as well. Then, it definitely becomes

a best-seller.

In any case, it seems imperative that the materialisation of *Andromeda* is seriously considered: a microbial slaughterer which naturally controls the unstable growth of the human race. As some of these writers suggest, and being an idea also shared amongst leading epidemiologists, it is not whether it will happen, but when. After studying the information provided so far, such an agent would come to question the false assumption that man is made in God's image and likeness. Humans do not rule over the rest of the living entities and, thus, both the myth of man as the apogee of creation and the ladder metaphor are deconstructed at once. Therefore, the biohazard writer demystifies the unswerving belief of the western individual in the hygienic bubble. The agents above are used to shatter such faith and make humans more realistic. Life itself is based on harmony between species, including the microbial ones. A necessary symbiotic relationship with microbes is advocated, mostly because it is essential for humankind's survival. Crichton's Kalocin soon comes to mind: a universal antibiotic would cause unspeakable deaths through the weirdest infections because it would not differentiate between "good" and "evil" bacteria. No such simplicity exists in the real world. Perhaps it is easier to have basic ideas in mind to understand certain complicated axioms but the truth is that the human being needs microbes to survive. They may cause humans harm at a particular time for a particular reason, but a general extermination is not the solution. Nor can it be achieved. The biohazard writer opens our eyes and demands a better communion with the environment. Moreover, humans had better be prepared for the new messiah that is about to come, not to save us, but to save the Earth from the human parasite.

It is also worth noticing that, whenever a microbial saviour is postulated, this invariably goes wrong and turns against humankind. The powerful nanomachines, which are originally designed to patrol the human body in search of malfunctions, cause a terrible death by the most grotesque deformations. The PZ-9 plasmid to cure lepers also leads to a most painful death in combination with antibiotics. Malin's genetic treatment for his father's mistake causes a sudden bone-shattering disease. Even the X-FLU gene, which is to save humankind from the yearly casualties and economic losses of influenza, eventually fails and endangers the species. The upcoming creations of biotechnological companies are not going to be the panacea. Furthermore, there will always be the heartless ready to profit from the huge

possibilities posed by microbial engineering. It seems as if we are risking the continuity of the species as we know it if we persist in tweaking the human genome. As Charles Levine states, altering somatic cells is reversible but the changes made on germ cells, like those supposedly made to render the flu virus harmless, cannot be undone. It appears sensible that genetic research continues as long as there is a stricter regulation, which seems to be nonexistent nowadays.

Even when there is a good principle behind the modification of a virus, the evil side of the human being inevitably appears. At this point, the author wonders sincerely whether the scientific community is simply too blind to notice the danger. Before the menace posed by any biological agent with the potential to kill by thousands, no such incongruities should be allowed. As a general rule, the biohazard writer uses a real or fictional bug to show the reigning lack of union amongst those who are supposed to protect the human race. Either through ignorance or the incompetence of the authorities, humankind's future may be questioned and that is an extreme that should never be reached.

All things considered, it can finally be established that the biohazard writer wants to share his knowledge with the readership. The manner of illustrating oscillates mainly between those writers who stick to fact and those that colour the data provided. Moreover, emerging pathogens seem to be more appealing because they shock the mass, thus becoming the favourites over other more common agents. There is also a coincidence amongst biohazard writers and epidemiologists that an upcoming *Andromeda* is ready to shatter humankind's false principles of supremacy. In general, the genetic alteration of some pathogens is viewed as a source of further evil rather than as a real benefit for mankind. Finally, both the arrival of *Andromeda* and the lack of regulation in the field of genetic engineering appear to be the reason why a necessary communion between scientific and political authorities is demanded.

CHAPTER 4: A CHARACTER TYPOLOGY

The biohazard writer is keen to work with a series of characters that, inasmuch as they are commonly used, become archetypes for this kind of narrative. Although the number and kind of people in each novel is certainly changeable depending on the writers and the nature of their narration, there seem to be certain figures that invariably appear in most novels, thus giving rise to some categories that are classified and discussed in the following pages. In this respect, easily-discernible stock characters like the classic hero and villain materialise respectively into the biohero/-ine and the bioterrorist; the former being a personal nomenclature to define the opponent of the latter. Whereas all the novels have a biohero/-ine, not all of them have a bioterrorist, precisely because the biological threat may have a natural cause. In the case where there is a confrontation between good and evil, both sides normally have the stereotypical sidekicks and henchmen, which have been conveniently named for this purpose as aides and crooks. Finally, no biohazard novel would be such without dealing with the inevitable victims of the disease⁹³.

4.1 The Biohero/-ine

The concept of biohero/-ine was coined as a complementary alternative to the traditional hero/-ine. It grants the common features of this literary character but applied to the biohazard discourse. In the words of Northrop Frye as he revised Aristotle's *Poetics*, the biohero/-ine seems to be "superior neither to other men nor to his [her] environment, the hero[/-ine] is one of us" (1973: 34). He/she is mainly the protagonist of the biothriller, that is, with permission of the infectious agent itself, with which he/she shares the lead on some occasions. His/her mission is basically restricted to disclosing and fighting against a momentous biological threat which is

⁹³ On the whole, such classification largely coincides with John G. Cawelty's four main character roles for the hard-boiled formula:

- (a) The victim or victims; (b) the criminal; (c) the detective; and (d) those involved in the crime but incapable of resolving the problems it poses, a group involving police, suspects, and so on—in effect, the set of characters who represent society in the story. To this set of relationships, the hard-boiled formula very often adds one central role, that of the female betrayer. (1977: 147)

This last role could very well be represented by the hypnotist Magda Slanic in Alan Blackwood's *Plague of Angels*.

to jeopardise the lives of many, if not the whole of the human race. As for their profession, there is a wide variety of occupations, but mainly oscillating between the Medical Doctor and the law enforcer. The first label would include scientific researchers in microbiology, virology, bacteriology and epidemiology, public health physicians and forensic doctors, plus a couple of army veterinarians. The second would include either federal agents from the FBI and the CDC, or police officers whether active or retired. The only notable exceptions are a journalist and a history student. By way of working, most of them strive individually, although there is also a foursome of researchers and three notorious couples featuring the famous Mulder and Scully. But even if the biohero/-ine is an individual, he/she does not usually work alone. Most often he/she is well surrounded by a good number of collaborators who are dealt with below.

4.1.1. The EIS Officer

The perfect embodiment of the biohero/-ine is the Epidemic Intelligence Service (EIS) officer, a singular investigator from the Centers for Disease Control (CDC) having both the roles of researcher and federal agent⁹⁴. There are two characters of this kind in the novels studied, both of whom are young women. Probably, the first writer to grant the leading role in a biohazard novel to a disease detective, as they are popularly known, was Robin Cook in his novel *Outbreak*. As opposed to the standard hard-boiled detective, Marissa Blumenthal is introduced as a fragile thirty-one-year-old woman, only five feet tall and one hundred pounds in weight (*Ob*: 18). However, Marissa shows a notable deductive ability which, on the other hand, happens to be one of the main characteristics of the epidemic investigator. Since her task consists of gathering and analysing the different clues showing the origin of an epidemic, she does not need to be physically strong. Although the writer likes to play with his protagonist's frailness in a couple of mugging episodes, she surprisingly manages to overcome them quite gracefully. In both cases, it seems very improbable that the delicate Marissa may so easily dodge the fierce ruffians. These had previously effortlessly mugged other stronger doctors and, just some minutes before the last attack, smoothly strangled a cleaning maid in a

⁹⁴ Further information about the EIS officer can be found at the *Epidemic Intelligence Service Homepage*: <<http://www.cdc.gov/eis>>. Retrieved 18 February 2009.

neat execution outlined in seven lines (*Ob*: 300). However, Marissa shows an amazing dexterity with handy objects as weapons, the vaccination gun in the first instance (*Ob*: 245-7) and a paring knife in the second (*Ob*: 304-5). Eventually, it is this quickness of thought that saves her life.

This is in turn supported by her outstanding manipulative abilities, which allow her to obtain whatever she wants without much trouble. She takes advantage of Tad's fondness for her to obtain a list of the people getting in and out of the CDC's maximum containment lab (mcl). This is a place which supposedly holds the single acknowledged American source of the Ebola virus and thus is highly relevant for Marissa. Her female condition is therefore an ace she plays quite advantageously (*Ob*: 158). Being such a pretty woman without a steady partner is indeed a feature to be conveniently exploited by the writer. It is an inviting status to attract other men around Marissa, who has the skill to speculate with her sexual appeal. Not only Tad, but also her boss Dubcheck wants something more than a mere professional liaison. Yet, their relationship changes dramatically once he is rejected. Dubcheck seeks refuge in his authority and relegates Marissa to minor tasks, an attitude which obviously does not please the protagonist. Instead, the young woman focuses on Ralph Hempston, the prosperous ophthalmologist who eventually proves to be the source of her nightmares. Ralph appears to Marissa to be the only man capable of substituting Roger, the neurosurgeon who left her for a fellowship at UCLA when they were about to marry (*Ob*: 21). This caused her a depression that only the assignment to the EIS helps her overcome. To our protagonist, Ralph is romantic and sophisticated, the exact opposite of the compulsively shy Tad. But just as Tad is infatuated with her, Marissa is so captivated with Ralph's kindness that she jeopardises herself once and again until she discovers his connection with the conspirators. Feeling betrayed, she does not hesitate to tantalise and pay him back in his own terms. Certainly, the bioheroine's distinctive shrewdness accounts for her eventually uncovering the conspiracy, even if fate also appears to favour her.

Astuteness is likewise a defining characteristic of Dr. Alice Austen, another EIS officer in Richard Preston's *The Cobra Event*. Practically a clone of her predecessor, she is two years even younger but also frail in constitution since, like Marissa, her strength is intellectual. Her hands are indeed strong, definitely not very feminine for a beautiful woman of her age but an asset for a pathologist, who needs them to tear apart organs in body autopsies. As far as her emotional life is concerned,

she is said to have many friends and lovers, yet she is “a loner by temperament, independent minded, curious about how things worked” (*TCE*: 35). Such outline certainly seems universally applicable to a vast majority of researchers. It is a common feature that can be explained because the nature of an investigator leads him/her to spend many hours alone concentrating on work, leaving aside meddlesome feelings. As a result, the biohero/-ine becomes an outsider, intentionally or not, who sacrifices his/her personal well-being for the sake of humankind.

The daughter of a retired chief of police in a New Hampshire town, Alice also demonstrates good deductive abilities. Because an EIS officer is both a public health officer and a lieutenant commander, Alice’s familiarity with police procedures is an advantage for her. Thus, she proves very efficient in trailing the source of the infection, either by making inquiries to relatives of the sick or dead or directly by performing autopsies on the corpses and analysing tissues. Methodical by nature, she sticks to a very systematic process so as to determine the root of the disease. Soon after the first two cases appear –a homeless man and a young girl, she begins a series of interviews to collect evidence of the infecting vector. At the same time, she eagerly takes part in the examination of the corpses of Harmonica Man and Kate, so as to determine the nature of the biological agent. Especially in the autopsy of the girl, she shows a notorious control of the procedures, coldly removing intestines, inner genitalia and other viscera to finally empty the body cavity to find the internal symptoms of the disease (*TCE*: 75-6). Shortly afterwards, she equally endures the always difficult situation of sawing off a corpse’s head to obtain relevant tissues for microscopic analysis (*TCE*: 225-33).

With the valuable results and after a few inquiries, she discovers that the infectious agent is a brain virus made by a fake pharmaceutical company (*Bio-Vek*) acting as a bioweapons facility. When one of its managers confesses to having hired a researcher by the name of Tom Cope to help them replicate the virus in human tissue, it is merely an FBI job to find the bioterrorist. However, Alice’s strength of character makes her join the search team and risk her own life, when her job could well have finished here. Thus, she enters the subway tunnel where Cope is readying his final blow and, despite her physical inferiority, arrests the criminal (*TCE*: 427). Even though she has to undergo the compulsory quarantine, the bioheroine is gratified to have avoided a major catastrophe and cracked a dangerous pharmaceutical business. She even has the courage to reject a formal offer to join the

FBI and prefers to stay at the CDC, which again demonstrates her strong disposition (TCE: 436).

4.1.2 *The Researcher*

A transitional character is Richmond's Chief Medical Examiner in Cornwell's book *Unnatural Exposure*. Although she does not have the federal agent status, the medical researcher nonetheless works closely with the police. Being much more mature than Marissa and Alice, she shares with the former an unstable emotional life since her divorce and the subsequent death of her husband in a bomb blast in London. This produces a kind of alienation in Kay, who practically dismisses social life and devotes herself to her job. Thus, the protagonist spends most of her time either dissecting bodies, visiting crime scenes or making enquiries and it is only when the case is solved that she decides to spend some time with her lover, Benton Wesley (UE: 362-70). Sometimes, she even uses disease to keep him far from her, like when she is not sure whether she has got the flu or smallpox and does not allow him to touch her. This is a case that Benton himself lucidly labels as a "functional illness" (UE: 266). In fact, after some months together which prove their incompatibility, she acknowledges that he is nothing more than a pastime for her (UE: 46). For the rest, Kay simply uses Benton, a FBI special agent, to help her find a solution to the murders.

On the other hand, all the inability to get on with him turns into a great facility for socialisation with other experts in image enhancement (UE: 89) or microscopic analysis (UE: 94), with whom she spends many hours investigating. Kay appears to the reader as a workaholic, capable of getting the most from her colleagues. Also, she can be quite authoritative should the situation demand strength of character, either to stop the ambitions of a researcher with strong connections (UE: 99-103), or to calm down a suspect who is about to lose control (UE: 104-6). This ability to administer people and situations, although not far from the manipulative gift Marissa displays, certainly indicates a more diplomatic shift that honours Cornwell's bioheroine. A mature person in a position of responsibility, Kay has a less dramatic way of leading the investigation than Cook's counterpart.

The enquiries with Dr. Phyllis Crowder, a microbiologist she turns to for help, who is eventually exposed as the murderer, provide a good instance of Kay's savoir-

faire. Although revering her research deeds, she nonetheless arranges a rhetorical trap that is to expose her as the bioterrorist. Hence, she begins by undermining her authority and goes straight to a former accident in Birmingham (UK), which is to prove her guilt. Once Crowder crumbles, she puts all the weight of responsibility on her shoulders by remembering the torments of the victims, including her own mother. In the end, the sick scientist acknowledges her resentment of Kay's reputation, who pronounces her own verdict in advance: "Your punishment will be to die the way they did" (*UE*: 352-61).

Although sharing the same academic field, Janie Crowe, the researcher in forensic archaeology in *The Plague Tales*, is a different sort of traumatised bioheroine. At the age of forty-five, Janie comes to Britain with a post-Outbreak travel permit in a time of generalised health restrictions due to a pandemic of resistant bacteria. This is the reason why she has been sterilised and properly immunised against all major infectious diseases. Other than that, not much information is given concerning her appearance or past background. However, by the time she meets a former acquaintance, it is said that she had been happily married and had a daughter but lost her family in one of the first outbreaks back in the nineties. Such a circumstance makes her sink into a deep depression, which she tries to overcome through her doctoral groundwork. Apparently quite disorganised, Janie is nevertheless obsessively dogged in her investigations. In spite of her untidy hotel room in London, where she is supposed to manage her research, the protagonist has come to Britain with a careful scheme in her mind: digging at the site of the Great Fire of 1666 and performing lab analysis of the soil in the burnt and unburnt sections for subsequent comparison. She has even employed an assistant, Caroline Porter, who prepares the maps and helps with the lab work. No matter whether the caretaker complies or not, she has made up her mind to dig the site and stealthily accomplishes her mission, thus freeing the dormant monster (*TPT*: 50). Hence, Janie manifestly portrays one of the biohero/-ine's most significant features: perseverance. This stubbornness in completing the work come what may is not only the reason for the onset of the troubles, but also the reader's assurance that it will properly be undone.

As the different setbacks appear, she seems to have twinkling responses to each. She even has the spirit to name the bacteria *Gertrude* after her grandmother, "the original source of my funding" (*TPT*: 91). Once there is confirmation that the agent in the fabric is *Yersinia Pestis*, she convinces Bruce to neglect his duty as

public health official to inform the biopol (*TPT*: 475); a decision which eventually endangers society. After Bruce gets hurt, an unavoidable obstacle to access the lab, Janie promptly severs Ted's hand (*TPT*: 478-9), which is successfully placed in the palm-print reader and allows them to ratify the morbid cause of his death. In order to complete her manipulative plan, she encourages Bruce to burn Ted's corpse so as to avoid the biocops sure investigation (*TPT*: 568) and makes him drive to Sarin's house, where Caroline miraculously recovers and the *Yersinia Pestis* is effectively neutralised. It is therefore evident that her love affair with Bruce, apart from its gratifying emotional purpose, is also functional. She simply uses him to untangle the mess she has caused.

This idea is verified in *Burning Road*, where she callously substitutes Bruce's love for Tom's, her lawyer. By the end of this novel, Janie is expecting a son by the latter and has already forgotten the man who proved crucial as her troubleshooter. Thus, although traumatised by the loss of her first husband and daughter, Janie is closer in her love affairs to Bryne's startling licentiousness than to Nat's heartily kindness, as will be discussed below.

For the rest, Janie keeps the same *modus operandi* in this second novel, which emphasises her insurgent character. Because of her determination, the bioheroine cannot accept the foundation's policy and starts investigating by herself; an action which again causes trouble. Without leaving aside her inclination to play with those who surround her – basically characters from *The Plague Tales*, like Michael and Caroline, but also new ones like Tom – she goes on with her unauthorised diggings; of a digital kind, though. Using Michael's access code, which has been previously purloined by Caroline, she enters Big Dattie – Biopol's database – and discovers the fact that all the sick boys are Jewish (*Burning Road*⁹⁵: 151-2). This new discovery encourages her investigations as she begins questioning Chester Malin's authority. Indeed, the relationship with her boss is definitely not fluent. To her mind, Chet is nothing more than an incompetent “asshole” who “must have done something for someone to get this job” (*BR*: 110) and whom she invites to join her “personal Last Man on Earth Club” (*BR*: 36). Certainly, she does not seem to be the only one thinking this way since her colleagues know him as “Monkey Man,” due to his hairy appearance and his recurrent habit of “scratching his dry scalp with one hand when

⁹⁵ Hereafter cited parenthetically in the text as *BR*.

[...] thinking about something” (*BR*: 36). Consequently, it is not strange that Janie does not take his admonishments into consideration. Much the contrary: after Chet's sarcastic request to investigate the life of the Catholic popes, she takes it even more personally and becomes truly determined to beat him.

As it seems, the eventual result of this personal confrontation is Chet's factual implication in the case. Such a discovery is the consequence of a comprehensive investigation, which puts Janie on the same level as the EIS officers. Like her colleagues, she proves to be quite efficient in logic and brings light to the clues she obtains through her manipulative methods. Finally, by means of interviews with the owners, and the precious help of Kristina Warger, she can identify Chet's father as the origin of the infection and thus unmask her boss' intention of profiting from the vaccine patent. Nonetheless, the bioheroine is fair enough to grant him a last redemptive task: he is to replace the defective gene with the new one she and Kristina have discovered in all the sick boys (*BR*: 625-6). Hence, her mission impossible is properly done and her sweet repayment dutifully achieved.

Accordingly, in a certain moment of his professional career, the scientific researcher may find himself entangled in the strange deaths of some people by a particular disease which falls within his/her field of study. Thus, he/she becomes a kind of improvised epidemic investigator who has to discover the reasons why these characters are losing their lives to these lethal bugs. This is the case of Marr and Baldwin's noted virologist in *The Eleventh Plague*. Jack Bryne is suddenly requested by the medical authorities of the St. Roch hospital in San Diego to shed some light on the uncommon ailments of a couple of kids recently admitted. Although living in New York, the protagonist's strong English accent denotes a strict paternal influence; his father being an Anglican minister married to an American woman serving as missionaries in China during the Second World War. The death of his parents to the dreadful Unit 731 caused a terrible trauma which marked him for the rest of his life. As a result of this experience, he turns to virology and devotes himself to helping the sick, founding ProMED⁹⁶ –a worldwide medical computer network– and becomes “a scholar of unusual communicable diseases” (*TEP*: 23). A proficiency in foreign languages, of which he can speak nine, proves quite helpful for his profession since he has to travel a lot to exotic countries.

⁹⁶ *Promed-mail* is a real organisation depending on the *International Society for Infectious Diseases*: <<http://www.promedmail.org/pls/otn/f?p=2400:1000>>. Accessed 30 July 2008.

Married to a beautiful New York public health official, Mia Hart, he is nonetheless quite independent-minded and authoritarian, a fact which anticipates future problems with those who have required his expertise. However, he shows a notable attachment to his lab assistant, Drew Lawrence who, apart from doing the necessary analysis, acts as his own personal secretary, keeping his busy agenda updated. Moreover, he cooperates with a pushy TV reporter, Vicky Wade, and a Hebrew scholar, Shmuel Berger. These people complete his limited research team. There comes a time in the story, though, when he cannot even trust them because it is made evident that a close colleague is setting a trap for him (*TEP*: 247). His complicated relationship with Mia, to whom he has never been faithful, seems to be the result of his solitary attitude and concentration on his work. In fact it is the reappearance of Vicky, a former lover, that gives him the lead towards the criminal as she asks him for help to trace a recent epidemic of Eastern Equine Encephalitis, which is eventually linked to his own case.

Thus, the former virologist has to act as his own private detective as well, both trailing the different agents and the bioterrorist behind them. In this matter, Bryne demonstrates a remarkable use of logic, which helps him bring together the different clues. Paradoxically enough, the nightmares caused by his traumatic experience at Pingfang⁹⁷, makes him realise there is a connection between the anthrax case in San Diego, the horses dying in Kentucky and the honey bee swarms in San Antonio:

Suddenly, in his dream, the prisoners in their death throes became the dying horses at Churchill downs, became Joey St. John and Jody Davis in their last ghastly moments, became a multitude of maddened bees, became the overwhelming horror of Turner's *The Fifth Plague* [...]. (*TEP*: 154)

Eagerly, he reveals the relationship between Turner's painting, previously seen in a former research trip to Indianapolis, and the biblical plagues to Mia. His wife does not seem to pay much attention but he concentrates deeply on the ten biblical plagues, drawing up several disease charts which link them to the different biological agents, as well as the victims and the place and date of occurrences (*TEP*: 302, 362-3, 382, 394). In this way, he can formulate his own proposal and avoid the FBI pressure. However, the obsession with plagues along with the impossibility of trusting others but himself turn him into a haunted man, verging on paranoia.

⁹⁷ Unit 731 experimental camp.

Although he is aware of this situation (*TEP*: 195-6, 334), Bryne has to fight Kameron if only to save his own reputation and not to be unjustly charged with the crimes. The subsequent deaths of Drew and Mia, victims of respective bioterrorist attacks, make him feel strongly guilty and claim a vengeance that he is to carry out himself (*TEP*: 491-503).

Yet another scientist becoming a biohero is microbiologist Guy Carson, Lincoln and Preston's protagonist in their joint novel *Mount Dragon*. Not much is said about Carson's physical appearance or age, although his eighteen months' experience in GeneDyne since his PhD at the MIT, suggests a man in his early thirties. About his attitude, Carson seems a bit irresponsible, especially for a man who holds a post in such a weighty biotechnology company but arrives compulsively late to his job. Nevertheless, he is proud of what he is doing, even more so when he is reassigned to Mount Dragon, expressly chosen by GeneDyne's founder Brent Scopes from five thousand other PhDs working in the company. The opportunity to work in a state-of-the-art remote facility with an exclusive team of eminent microbiologists is certainly thrilling for Carson, who is eager to fulfil the essential mission for the company where his predecessor, Franklyn Burt, failed. But, above all, the biohero is looking forward to the boost that such a task means to his career; plus a reasonable increase in salary, of course. Such an enthusiasm characterises the pushy researcher during the first part of the novel, until more obscure aspects of his job begin to bother him.

Indeed, the controversy originated in Carson's mind concerning the use of genetic engineering to improve the human race constitutes the basic core of the novel. On the one hand, the scientist is fascinated by the possibility of becoming humankind's saviour, the discoverer of a new gene therapy against flu; which virtually opens the door to a universal cure for every single disease. He generously gets to work on the X-FLU supergene but soon realises that his deeply philanthropic purpose clashes with the marketable ambitions of his firm. As he corrects the mistakes of his predecessor and develops X-FLU II, he starts questioning the ethical principles of his research. The whole matter emerges from an apparently insignificant argument with his lab assistant about the necessity of sacrificing so many animals for the sake of humankind. Whereas Carson is deeply convinced that research with live animals is "a necessary evil," Susana brings money into the context to state that Scopes is into "*mucho dinero* [sic]" (*MD*: 108). Such distrust is

certainly well based since Scopes intention is to sell the agent to the US army for five million dollars, as revealed later on.

Carson's candid excitement eventually vanishes when Dr. Charles Levine, a former professor and confessed enemy of Scopes, accesses the GeneDyne net and warns the researcher about the danger of his investigations (*MD*: 175-6). Even if Carson tries to resist the eloquence of Levine's words, the latter bombards him with painful questions: "Why mess around with a deadly virus like this?, [...] do you think you have the moral right to alter the human genome?" (*MD*: 190-1). Carson faces a controversy that had never occurred to him before, and which could be common amongst genetic engineers. It is best materialised in his assistant's reflection:

What gives us the right to alter the human genome? [...]. What the hell is a defect exactly, Carson? Is having the gene for male pattern baldness a defect? Is being short a defect? Being the wrong skin color? Having kinky hair? What about being a little too shy? After we eradicate the flu, what comes next? Do you really think science is going to refrain from making people smarter, longer-lived, taller, handsomer, *nicer*? Particularly when there's billions of dollars to be made? (*MD*: 234)

Eventually, Carson accepts his responsibility and decides to provide Levine with all the necessary information, so he will be able to stop Scopes' dreadful machinations in time. The scientist's repentance comes in the epilogue where, despite Susana's comforting words, he acknowledges that he is ultimately as guilty as the rest of the researchers involved in the project (*MD*: 474).

Another scientist in search of answers to strange deaths is Neil Anderson, the bacteriologist in McClure's *The Scorpion's Advance*. There is no physical description of the character but he seems to be a sturdy middle-aged man of Scottish origin. Of his past background, he is said to have been brought up in a family of farmers; having one older brother and a younger sister. Whereas the former takes over the farm, he studies medicine in Glasgow University and his sister chooses veterinary in the Royal Dick Veterinary School in Edinburgh. Although he has a happy childhood and holds his family in very high esteem, he does not seem to miss them much and leads a merry life in Surrey. In fact, the seizure of the first victim (Klein) interrupts his affair with a pretty blonde colleague, Angela Donnington, who he immediately goes back to once the patient dies (*TSA*: 16-8). Moreover, the reader quickly becomes aware of Anderson's promiscuity either through his thoughts about other work colleagues, like the "wasted" pharmacist of the Galomycin group, Mary

Ryle (*TSA*: 18) or through his actual deeds, like his lustful scan of the graceful Myra Freedman (*TSA*: 61) and his eventual romance with Mirit Zimmerman.

Nevertheless, Anderson readily puts aside his love life as soon as duty calls. Hence, he decides to study medical journals in search of answers to Klein's death instead of another night of sex with Angela (*TSA*: 25), thus discovering the PZ9 plasmid's significance in the case. When the lab technician also dies, Anderson confirms his theory that the combination of PZ9 and Galomycin is lethal and informs the hospital authorities, who send him to Tel Aviv. Once in Israel, Anderson continues his investigations and shows, as a common ability of the biohero, a notable gift for logic and determination. With the dexterity of the police detective, he soon traces Klein's parents to Caesarea and visits them in search of the student's personal notebook. Without finding it, Anderson goes back to Hadera and puts some time into cogitation. Despite his agitated life, Anderson always finds the odd moment for meandering and his conclusions are definitely accurate. Thus, between his demanding lab work and his equally exhausting love affairs, he likes to lose himself in a library, Tel Aviv streets or the beach in Hadera to gather his thoughts. This brings into context a distinguishing characteristic of the biohero/-ine since, as an epidemic investigator, he/she has to work out the relationship between the different biological clues he/she finds. Whether a bacteriologist, virologist or microbiologist, the biohero/-ine has to find the logical relationship in his/her progressive discoveries.

On the other hand, even if Anderson has the deductive power of the private investigator, he proves quite clumsy when it is time for action. For such matters, there is the inestimable collaboration of the beautiful female captain. Furthermore, it is the well-timed appearance of the CIA agents and not Anderson's performance that defeats the villain (*TSA*: 252). The biohero is definitely bold enough to undertake brave actions but, without having the fighting skills of the law enforcers, he has to rely on others. Far from the stereotyped portrait of the infallible hero, Anderson is markedly vulnerable in a field for which he has not been prepared. While he demonstrates a remarkable competence not only in bacteriology but also in reasoning, both endowments that put him above common mortals, he is much closer to the reader precisely through this lack of warrior powers.

In addition, he experiences a variety of paradoxical feelings, which also make him more human. For instance, Anderson is quite intrepid and ready to follow suspects around the city (Shula Ron, *TSA*: 124-29), dodge secret agents in the

unknown streets of Tel Aviv (CIA's Dexter and Hiram, *TSA*: 166-70) or break into private buildings (Jan Kouros hospice, *TSA*: 181-92; and Kalman Institute, *TSA*: 225-55). Yet, he is uncomprehendingly paralysed on Hadera beach, waiting for the sniper's lethal bullet (*TSA*: 97), frightened to death after the unpleasant encounter with a leper (*TSA*: 190), and once again frozen in the face of a painful death in the incinerator just a moment before Hiram liberates him (*TSA*: 252). Moreover, he is definitely uncoordinated as well as unlucky in the worst possible occasion. This is the only possible explanation for the Arab escaping from him merely by throwing rocks at him, one of which happens to land exactly on the wound he got in the sniper incident (*TSA*: 128). Even when he takes his revenge on the crook, he has to be admonished by Hiram to release the safety catch before shooting him (*TSA*: 252). There is no need to say that any of these situations is totally unthinkable and positively humiliating in the curriculum of the standard hero.

However, he does not lack the Bond sex appeal, a feature that ensures a good deal of romance and, therefore, the reader's immediate affection. His relationship with Mirit, undoubtedly his better half, is nevertheless much more than a commercial trick to gain the reader's sympathy. The attractive military officer, other than saving his life on more than one occasion, makes Anderson express feelings that would otherwise remain hidden. Strangely, he falls deeply in love with her, something inconceivable at the beginning of the novel when his liaisons with women sought only pleasure. Indeed, his first intentions with Mirit are not far away since his sexual attitude to her mate is completely primal.

In short, as a perfect prototype of the biohero, Anderson is capable of the best and the worst: discovering the elusive source of a terrible death and missing a suspect by the mere throw of a stone, tracing the villain's lair and being defeated by his own clumsiness. All in all, he happens to solve the case with lots of luck, in the same way that he could have been eliminated and a terrible weapon left for the terrorist market.

Other bioheroes/-ines decide to work together against the epidemic crisis, disregarding any other allies than themselves. Indeed, they are specialists in the fields necessary to tackle the matter so, in principle, they should not need much help outside their endogamic group. Eventually though, like the individual biohero/-ine, some couples will ask for support in certain specific areas. Needless to say, the larger the group, the less the need for additional assistance, which is precisely the case of

the Wildfire Team in Michael Crichton's *The Andromeda Strain*. This special scientific squad designed to deal with a biological threat is made up of five – eventually four– authorities, who work together in a secret facility in the middle of the Nevada desert. Jeremy Stone, a Nobel Prize winner worried by the idea of an alien microorganism entering the earth, suggests the whole idea of the project to the President of the United States. The rest of the team is made up of a microbiologist, a pathologist, a public health doctor and an anthropologist. Supposedly these eminent authorities, who have been carefully selected for the post, should deal effectively with any major biological threat. In effect, the *Andromeda* crisis is to test the validity of the project.

The visible head of the group, Jeremy Stone, is the chairman of the Bacteriology Department in Stanford University. He is described as a thin balding man of thirty-six “with a prodigious memory that catalogued scientific facts and blue jokes with equal facility” (*TAS*: 38). Certainly his genius is only parallel to his agitated social life, since he has been married four times, with special predilection for colleagues' wives; a background which already anticipates trouble. Moreover, his current wife is the daughter of a US Senator, which somehow grants him the necessary power to command the Wildfire team. Because the facility is his own idea, he quickly introduces the other scientists to the different sections as the protocol requires. Stone's explanations are especially directed at the surgeon Mark Hall, who has systematically belittled the project since its creation. However, the Wildfire leader has entitled him the Odd Man job in the team: due to his single condition, he is the holder of the key to set off a nuclear device to eliminate the whole facility in case of a biological leak; a circumstance which indeed takes place. Matter-of-factly, Stone hands him the file containing the study proving his suitability for such responsibility along with the key (*TAS*: 102-6).

The second officer aboard is microbiologist Peter Leavitt. An authority in infectious diseases with an irritable yet imaginative character, he used to travel around the world doing parasitic research, but fell deeply sick and quit. Thoroughly acquainted with the base, he acts as Hall's mentor –being a retired internist himself, whom he introduces to the wonders of Wildfire as soon as they reach it. Despite his acute pessimism, Leavitt knows that he is “the idea man, [...] who would always provide the most improbable, mind-stretching theories” (*TAS*: 200). Certainly, he does not fail the team because, through his long hours in search of the agent's amino-

acids, he throws light onto its existence in such a barren context as outer space. However, this excess of work is bound to cause him a couple of epileptic fits which, fortunately, do not bring about a catastrophe (*TAS*: 200, 255). It seems understandable that his need for action makes him hide such flaw so as not to be rejected from the mission. Nevertheless, he endangers the team in the worst possible moment and it only seems proper for a reasonable man of science like him to make his defect known to Stone, who would surely substitute him for a more reliable colleague. The eventual resolution of the crisis, though, renders his fits irrelevant.

The pathologist is Charles Burton, described as the exact opposite of Stone:

Where Stone was organised, Burton was sloppy; where Stone was controlled, Burton was impulsive; where Stone was confident, Burton was nervous, jumpy, petulant. Colleagues referred to Burton as “the Stumbler,” partly because of his tendency to trip over his untied shoelaces and baggy trousers cuffs and partly because of his talent for tumbling by error into one important discovery after another. (*TAS*: 48)

A man of fifty-four, he is a widely respected authority in the effects of bacteria on human tissues, and is both a professor at Baylor University and a consultant to the NASA. He participates with Stone in the actual reconnaissance of Piedmont after the tragedy and seems to notice facts which escape the leader’s notice. By living up to his reputation as a stumbler, he enlightens Stone on the generalised clotting of the victims (*TAS*: 66, 69, 70) and the possibility that some people may be partially immune to the agent though facing insanity (*TAS*: 74). Above all, Burton is a very committed man and spends the first night asleep recalling striking images of death from Piedmont (*TAS*: 113). Further on, this stress will induce significant mistakes in the autopsies of the dead animals and the agent’s vector of transmission. Ultimately, Burton discovers his mistake in the autopsies in time. Thus, he realises that insanity comes precisely when there is an absence of coagulation as a result of a series of body malfunctions; all of them likely to happen to an old drunk and a distressed baby (*TAS*: 236). When the alarm goes off, he unfortunately gets trapped in an isolation unit but, paradoxically enough, panic saves him. By breathing quickly, hyperventilation produces respiratory alkalosis which prevents the *Andromeda* organism from growing, thus avoiding death. In the end, therefore, Burton demonstrates being a real stumbler.

There is also a public health doctor, Mark Hall, a skilled surgeon who can operate faster than anybody and is described as quick-tempered and unpredictable

though methodical and a lover of routine. Despite the apparent detachment of his speciality to a biological crisis, Hall is especially recommended for the team by Leavitt, who appreciates his expertise on blood chemistry and his single status. In due time, both aspects will prove essential. Entering the team as the unaware apprentice, he eventually becomes Wildfire's and, largely, humankind's saviour. The Odd Man has a distinctive curious disposition, which enables him to learn quickly from his unexpected instructors. Moreover, he shares with Frank Daly, mentioned below, the rare ability of listening to his patients and this is how, by talking with Peter Jackson, he gathers enough data to solve the *Andromeda* enigma. First, he discovers that the old man is addicted to a wild combination of aspirin and sterno –a blend of alcohol and methanol, which causes him acidosis (*TAS*: 176-7). Then, he learns of the existence of a previously unheard-of subject, highway patrolman Willis, who happens to be a diabetic in acidosis through not taking his insulin (*TAS*: 230). Once the critical discovery is made, Hall becomes a two-fold hero. On the one hand, he saves Burton's life by making him continue breathing fast in the isolation unit (*TAS*: 268). On the other, he materially climbs up through the central core of the facility, dodging all the traps to prevent test animals from escaping, and inserts his key at the right time to avoid a nuclear blast, which would have caused thousands of new mutations of *Andromeda* (*TAS*: 278). Whereas Stone, the irrefutable leader would have preferred a physical chemist to Hall (*TAS*: 247), the rookie wins his leading role with these two actions.

Finally, the last member of the team is anthropologist Christian Kirke, “an ill-informed and rather foppish man who possessed, as if by accident, a superbly logical brain” (*TAS*: 49). Nevertheless, due to an inconvenient case of appendicitis, this member cannot join the others in Flatrock.

Even though their specialties are quite diverse, it is precisely in the variety of the member's abilities where this team's strength lies. Actually, all of them are taken to perform in areas which they do not master and the key to success appears to be precisely in this profitable combination of knowledge and willingness. Thus Stone, although a bacteriologist by training, acts as a morphologist, locating the agent in the satellite and analysing it through the electronic microscope. Leavitt, the microbiologist, handles the biochemical analysis so as to discover how the agent turns matter into energy. Burton, the pathologist, does the autopsies on the test animals; thus discovering that the agent basically kills by blood clotting. Finally

Hall, the surgeon with knowledge of electrolysis, is left with the least rewarding task: taking samples from the survivors. However, through regular interviews with Peter Jackson, he grasps very valuable details of the incident, which enable his final understanding of *Andromeda's* restricted pH margins.

Other than individual work, there is quite a significant collective effort, a fact that can also account for the team's success. Hence, Stone and Burton engage in a first reconnaissance of Piedmont, where the satellite is recovered, the victims perceived to have died by instant blood clotting and the two survivors located. Once in Wildfire, Leavitt often helps Stone in the morphology room and Burton additionally brings some light to Leavitt's amino-acid analysis, which evidences a good collaboration between these members. Yet, whereas all the other scientists work in pairs at one time or another during the investigation, Hall is left alone with his lab nurse and is in contact with the others primarily through the compulsory meetings. Nevertheless he proves to be quite efficient in the personal treatment of his patients and this eventually happens to be decisive for the mission. It is therefore a mistake by Stone to ostracise the youngest member and not to allow him more direct cooperation with the others, a decision which would undoubtedly have avoided much trouble.

Another team of scientists working together against a microbial menace is the Jaax couple in Richard Preston's *The Hot Zone*. Both veterinarians, they met at Kansas State University, graduated, got married and decided to join the army so as to ensure an income for their recently formed family. Neither of them has a military background although they often enjoy taking army courses on personal defence. Nancy has a slim, athletic constitution and she is deep into martial arts training to win respect in a male-oriented context. Jerry, on the other hand, is depicted as a tall, good-looking man with prematurely grey hair. He has a tendency to buy things compulsively, this being one of the few marital disputes described between the Jaaxes. Another one is Jerry's detachment from his domestic chores. Having both grown up on farms in Kansas, they had a very traditional upbringing, a fact demonstrated by Jerry's total inability to do the housework, which is disinterestedly done by the generous Nancy.

They have two children, a son and a daughter who, at the time of description –25 September 1983, are seven and five years old respectively. The boy, Jason, is thin and quiet and is expected to grow as tall as his father. On the contrary, Jamie, is

shorter than she should be for her age and shares the greenish eyes of her mother. Their Victorian house is also inhabited by a variety of animals, including an Irish setter, an Airedale terrier, a parrot and a python. Despite the already mentioned conjugal discrepancies, the Jaaxes are portrayed as quite a united family.

In order to gain recognition in the army, Nancy applies to work with the pathology group at the USAMRIID in Fort Detrick, making use of her training in veterinary pathology. At first, the officer in charge does not want to accept her on account of her married female status but her strong will makes the army change its mind. The reason for such a shift must ironically be found in Nancy's intolerance to vaccinations. Since there are no vaccines for Level 4 agents, she makes her flaw a virtue and applies to work with the most lethal microbes, quickly convincing the military authorities through her courage. She bravely volunteers to work on the Ebola project, a job that hardly anyone at the Institute (USAMRIID) wants to do. In spite of some initial reticence, including her husband's, she is accepted (*THZ*: 67-9).

Constancy is a defining feature that allows her make herself a place in the army and gradually reach a higher rank. Moreover, a nearly fatal accident involving Ebola which she avoids by the timely protection of a fine glove, acts like a kind of war wound and gives her a name amongst the army's bioheroes/-ines (*THZ*: 87-92). By the time of the Reston incident –late 1989, she has advanced from her 1983 rank of major to the lieutenant colonel, an honour which has also been granted to her husband. She is already the chief of pathology at the USAMRIID whereas Jerry has become the head of the veterinary division. It can therefore be said that Jerry has substantially benefited from Nancy's resolve: not only does she take care of the household duties, but she equally achieves a more respectable professional position for her and her husband. Once there is confirmation of the outbreak, Nancy directs the investigations on the dead animals to find a way to stop the monster. Meanwhile, Jerry leads the team of soldiers who eventually nuke the monkey house.

However, Nancy is also a vacillating bioheroine. As a veterinarian, she has her doubts about the need to kill lab animals in order to find a cure for fatal diseases. The inherent core of her profession is to save animals, but there is a much more important commitment, which is to save human lives. It is understandable, therefore, that a person whose own family includes a number of wild animals does not feel at ease with the suffering of the test monkeys. Yet, a hypothetical cure for Ebola stands above any other feeling and Nancy sticks to this humanitarian principle whenever

she has to overcome the dilemma (*THZ*: 79-80). Such painful decisions, which are, on the other hand, intrinsic to the military post she holds, certainly bring the bioheroine closer to the reader; she is more human, so to speak⁹⁸.

Initially, Jerry Jaax acknowledges his being totally unprepared to lead a biohazard team into the monkey house: there is a large number of animals to neutralise and neither his troops nor himself have been in such a situation before (*THZ*: 313). What is more, he is also a veterinarian by instruction and, although having received the basics of military training, he has never commanded a nuking squad. Until now, as a member of the Army Veterinary Corps, his job has been basically reduced to taking care of a variety of animals: dogs, horses, mules, cows and sheep. All of a sudden, he has to handle a military operation to deal with four hundred and fifty monkeys infected with Ebola.

Likewise, his difficulties in leading the operation can also be found in the violent assassination of his brother, which sinks him into a deep depression. As the commanding officer of the 91-Tangos (the nuking squad) he has to take difficult decisions which involve many soldiers, some of whom are barely eighteen. On some occasions, he has to leave people, like a pregnant sergeant, out for security reasons. Of course, the decision has nothing to do with male chauvinism, but with the possibility of the soldier acquiring the virus and the subsequent dreadful consequences for the foetus (*THZ*: 314). On other occasions, he has to dodge the television crews sent to the area, wisely instructing his soldiers to put on their space suits inside the building so as not to provide the media with prime material (*THZ*: 290).

In spite of such strict orders, Jerry shows concern for his subordinates. In general, the operation is a success and there are no casualties due to his careful planning. While the 91-T and himself render the monkeys unconscious, there is a

⁹⁸ It should come as no surprise that the contemporary hero/-ine is close to the readership in his/her feelings and actions. He or she is one of us, a vacillating human being who has to take hard decisions for the benefit of humankind. According to Ray B. Browne, the biohero/ine does not need superpowers:

In an advanced civilization there is less room for and patience with the misty, part fake-phony hero, the anthropological culture hero of the past, because there is less dependence placed on him. People have less need for demigods. The kind of hero that is still needed –the down-to-earth, realistic role model– still serves contemporary society. (2005: 20)

It is a very effective manner to empathise with a character that does not have a mythological origin. In the case of a biohazard event, what is needed is somebody with specific knowledge and willing to face an invisible enemy.

group of veterinarians working on the numb animals. Then, he sets up three subteams: the bleed team, who wash down anything tainted with Ebola; the euthanasia team, who kill the sick monkeys; and the necropsy team, who take samples of infected tissues. Thus, an assembly line deals effectively with the animals which he brings in himself in such a way that, in a matter of minutes, a monkey is captured, blood samples are taken, it is put to death, necropsied and finally secured in a biohazard bag. Whether the army gets to know Jerry's mind is left unknown but certainly he manages to eradicate the Ebola menace with no casualties.

With his family, Jerry is shown as a loving husband for his wife and a dedicated father to his children. Despite his zealous protectionism, Jerry comforts Nancy in times of trouble and there are moments of good communication when they share impressions about their job; especially at night, after work. In Nancy's eyes, no one understands her better than Jerry (*THZ*: 53). This may explain why she altruistically accepts taking care of the household activities: Nancy is deeply in love with him. On the other hand, Jerry admires his wife's determination; perhaps because he lacks it. Even though he is excessively solicitous, especially with her involvement in the Ebola project, he understands that she is truly concerned about what she is doing. Obviously, he does not like his wife wearing a space suit, arguing that she is "the only wife I've got" (*THZ*: 68). Still, such an intransigent disposition must be analysed through his traditional upbringing. In the same way that the husband does not do many –not to say none– of the domestic activities, he cannot cope with the idea of her wife risking her life in a job outside the house. Certainly, Jerry's everyday life without Nancy would be an absolute martyrdom and that appears to be the reason of his worries. But, precisely because of the mutual care and respect, the Jaaxes become such a valid response to the Reston incident.

Similarly, Chelsea Quinn Yarbro envisions a group of righteous doctors taking up arms against the corrupt medical management in *Time of the Fourth Horseman*. Their leadership is naturally assumed by a paediatrician by the name of Natalie Lebreau and the intern who treats her son, Emile Harrison (Harry) Smith. Initially, the writer focuses on the female party, although not much information is provided about her physical appearance or past background. As regards her life outside the hospital, she is simply depicted as a middle-aged woman who is deeply devoted to her good-looking husband –Chief Pathologist Dr. Mark Howland– and her four-year-old son Philip.

Even though she is a dedicated physician, two incidents make her fight hard against the government conspiracy. First, she painfully witnesses her beloved husband's shameful affair with a colleague in the hospital lab (*ToFH*: 22). The ensuing separation is not only physical since, in due time, Mark is also revealed to have played a major part in the conspiracy. On a couple of occasions she tries to make him change his mind, but to no avail. Second, by the time she starts considering eradicated diseases coming back, it is too late to prevent her own son from dying from diphtheria (*ToFH*: 55). As seen in other bioheroes, this traumatic experience produces introspection into her work, which leads her to reject the proposal to join the "Project" and fight it resolutely.

Thus, she brings other concerned doctors together and creates an alternative public health net to help sick patients. The whole issue ends up in a massive dismissal (*ToFH*: 89). Nevertheless, Natalie appears to have quite a charismatic attitude and soon organises her dissident army in an uninhabited house, which becomes a backup hospital. The leader inside the bioheroine suddenly appears on scene. It seems that only Nat has the common sense to think about facts other than medicine, for instance, supplies. Thus, she risks her own life in a chaotic world to obtain dried food (*ToFH*: 125), becoming an example for others to follow. She will also sacrifice herself at the end of the story. By choosing to help the lawless boys and going deep into the heart of a sick city, she will surely die for the cause (*ToFH*: 245). Yet, such a philanthropic disposition does not seem surprising in a dedicated doctor.

Another feature that makes her different from the other alternative doctors is her follow-up of the crisis through the media. Nat likes to share her distrust of the official reports of victims with other members of the House, so as not to let the collective confidence crumble (*ToFH*: 174). The early moderate paediatrician is gradually becoming a passionate revolutionary, ready to confront the system. Her personal instability may explain such change. In fact, since the painful loss of her family, Nat has been unable to mend her emotional life: the blow has been hard and, on the other hand, she has been really busy. Perhaps Harry is the only man Nat feels at ease to hug and sometimes cry with, although this is a very chaste love; a bit more than a professional relationship but nothing else.

As for the male counterpart, he enters the scene to take care of Nat's son, and they first get acquainted when Harry has to give Nat the bad news (*ToFH*: 56). Even though it seems quite odd that they are strangers working at the same hospital, the

author justifies it by the enormous size of the Westbank hospital, which does not avoid, however, an immediate empathy between the leaders. Thus, the fruitful collaboration begins at once, Harry providing all the characteristics that Nat lacks: where she is cold and calculating, he provides the necessary temperamental stamina; when Nat needs time to understand the problem and take measures, Harry reaches his own conclusions quickly and gets down to the matter. Whereas Nat is still startled by the situation, Harry confronts the hospital management and demands reasonable explanations.

For good or the bad, Harry is a person who leaves nobody indifferent. Moreover, his quick temper makes things even easier: either you are with him or against him. In the case of Nat, who was anyway bound to lose her job, Harry happens to speak his own voice in front of the administration and musters the words she cannot find to admonish Justin and Braemore. Yet, for the others, Harry takes them down the road to ruin. Whether they like it or not, they will have to fight by his side. The dissidents soon begin brainstorming ideas, a working technique which the biohero seems to master. In the face of their scepticism, Harry plans to contact the medical authorities and challenges the defeatist attitude of his colleagues.

Over the next pages, we also discover an extremely prolific organiser, capable of foreseeing the necessities their alternative campaign is about to face. Harry appears to suffer from an incontrollable emanation of ideas which he immediately puts into practice; some of them with far more effective results than others. Instead of crossing his arms and letting the epidemic ravage the population, Harry keeps looking for a light in such a desperate state of affairs: “There’s got to be a way. I can’t simply sit here while the whole city dies” (*ToFH*: 98).

Driven by this motto, the biohero shows an admirable dedication to his work; even stronger now that it is completely philanthropic than when it was merely professional. Amidst the growing casualty list (Alexes, Stan, Amanda, Dave, Eric, ...) a magnetic Harry still manages to hold the group together and make them fight like a squad of life-savers. Yet, there is very little he can do for the Westbank, which falls pray to the flames, charring the magnificent Mark Howland in the blaze. When everything seems lost, however, Harry eventually finds an ultimate means to fall with dignity. Once he is conscious of the emergent polio mutation taking hold of his aching body, there is nothing better than to fight fire with fire. Thus, grasping the possibility of a hearing with the Cabinet in Washington, he is quite determined to

make them realise what a terrible mixture of contagious diseases they have been responsible for unleashing. The best way to do so is to tell them about the new disease and give them the incubation period, about five weeks, to take a quick resolution. Now that his life is fading and her love is gone, this is the last chance he has to match Nat's altruistic act.

4.1.3 *The Law Enforcer*

Similarly, there are also certain law enforcers who become involved in bioterrorist events precisely because of their profession. A character that fits this role perfectly is the Seattle police Lieutenant who decides to help the beautiful Dr. Elaine Wilkes in Pierre Ouellette's *The Third Pandemic*. Far from the lanky boffin image, Philip Paris is the typical tough cop, a sturdy forty-seven-year old and well above six feet in height. Once a candidate for Homicide Division captain, he falls into a depression after the death of his wife to *E.coli*⁹⁹ food poisoning. This spoils his prominent career. Refusing to accept an accidental death, Paris takes too much time off his job unsuccessfully trying to find the serial poisoner who has apparently killed his wife and other innocent people. Eventually, his division boss transfers him from Homicide to Burglary and Theft, a decision he demurs in since he knows he might as well have been sent to patrol the streets.

Primarily then, the biohero is depicted as quite an understanding man, a feature which will define him in many other circumstances in the novel. This is certainly why he is often chosen to undertake arduous negotiations in his department. One such instance appears very early in the story line, when he has to attend the demands of an evil genius named Barney Cox, who eventually becomes Paris' main target. The capo asks for full immunity in return for ignoring the negligence of the health authorities in some TB records concerning other prisoners. Simple as the proposition may be, Paris knows that the scandal that may follow could ruin the reputation of the public health system and decides to accept. In the process, he gains the favours of a health officer who, in the end, will lead him back to Barney (*TTP*:

⁹⁹ The *Escherichia coli* is a common pathogen which has not been included in the appendix section as it does not play a leading role in any of the novels studied in this thesis. Further information about the agent can be found in a dedicated webpage entitled "Disease Listing: Escherichia Coli General Information," by the *Centers for Disease Control and Prevention*: <http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html>. Retrieved 30 July 2008.

53-63). The second negotiation he has to undertake is the quarantine of the passengers on a 737 jet who face sure death unless they are allowed to abandon the plane. Paris knows very well that he has been chosen for a symbolic act, so:

He realizes that his role here as a negotiator has descended into a tragic farce. He was skeptical from the outset, when the police commissioner and the state public health director had explained the nature of his mission. Even then, it was fairly clear that this was a political gesture, a way to legitimize what was clearly illegitimate. In this case, the government was the terrorist, and he the representative of some undesignated moral force. (*TTP*: 303)

Paris proves his empathetic nature. What he demands, the possibility of the passengers staying quarantined in an airport lounge, meets the laws of logic since they are not to enter into contact with other people. Just some shade and water do not seem such a big deal. Still, what he gets in response is sheer intransigence. The realisation is bitter. After a few words with the captain, he understands that “there was no use arguing anymore. Reasonable individuals no longer ran the government. Fear ran the government” (*TTP*: 304). Such is the power of a pandemic.

Common sense is also present in the arrest of Elaine Wilkes. Even though the case is properly run, Paris appears suspicious of Robert Fancher, later exposed as Barney’s attorney. Certainly, his instinct does not fail him. Taking time to listen to Elaine, who briefs him on her investigations, he learns of the corporation’s true aim to silence her (*TTP*: 158-65). However, it is not until Elaine is attacked in jail that he decides to take action (*TTP*: 173-5). And, although Paris is rather proud of his tolerant disposition, he appears to be swift when his mind is made up. Both physically and intellectually strong, he becomes a rather fearsome enemy. But it is curious that his transfer to the Burglary and Theft division eventually supplies him with an extra dose of adrenaline. In the past, he never had to use his gun. Yet, by accepting the case, he has to kill twice to protect his own life. Recollecting his thoughts when writing the duty report, he notices the blatant contradiction to his moderate character. Paris suddenly found himself with his 9mm in his hands in a decision that puzzles himself: “It was a primal, hardwired decision, not a soft reasonable one” (*TTP*: 120). Later on, however, such determination proves vital when killing one of Elaine assailants at the *Cedar Queen*. Paris responds quickly, which once again honours his acute sense of logic (*TTP*: 228-9).

It is undoubtedly weird, however, that, even if using a gun in a real situation is a whole new world to him, he proves to be terribly efficient with the weapon: three

chest hits in both cases. And still, when he most needs such outstanding aim, he unexpectedly fails to hit Barney. A lucky turn of events, nevertheless, soon settles things through the criminal's unsuspected heart attack (*TTP*: 365-70). Thus, even if indirectly, the biohero achieves his purpose.

Another clone biohero is ex-cop Conor O'Neil in Alan Blackwood's novel, *Plague of Angels*. At the age of thirty-seven, he is depicted as tall, broad-shouldered, handsome, confident and charismatic. The most gifted descendant of a well-known Irish family of police officers, Conor becomes the youngest captain in the city's history by the age of thirty. However, an excessive love for his job costs him his prominent career and a broken marriage. Three years before the time of the narration, he uncovers a secret death squad of New York policemen, who are sent down for many years. Even though he resigns from his post immediately after the case is sentenced, coercion by his convicted colleagues causes his wife and three-year-old daughter to move away from him. Yet, Conor has soon rebuilt his life and become the Chief Security Officer of a large Fifth Avenue store, which is proud to advertise him in police uniform as its safe-keeper in the local media (*PA*: 32).

As far as his emotional life is concerned, Conor does not miss his former wife and now has a new girlfriend, Lacey, a beautiful TV reporter twelve years younger than him. Although he does not have many friends, his outstanding appeal finds helpers everywhere. For example, in return for the dismantling of the Forty-Ninth Street Golf Club –the death squad, the *capo di capi* Luigi “The Artist” Guttuso declares him his honorary brother (30). Other characters are also easily convinced to join his cause, like Magda Slanic, the woman who hypnotises him to rob the safe-deposit boxes; Eleanor Bronsky, the artist manager; Sidney Randall, master hypnotist; or Davina Gambitt, a rich woman who loses property in the robbery. Along with Sebastian and Ric, a couple of Lacey's friends, they make up the team that chases the two bioterrorists.

Paradoxically then, the “mistake” he made by applying the law with all its consequences, has gained him the powerful friendship of former enemies. Conor shows an ability to make the best of the circumstances. Yet, instead of the tolerant mood of his twin Paris, this new biohero proves to be far more violent in discourse and action. As a negotiator, he is keen on verbal intimidation to handle difficult situations like the robbery at his store. Most ironically, he foresees consequences –quite accurately indeed– which, on the other hand, can really dissuade the robbers:

If you steal any of those safety-deposit boxes, you're going to have people after you who can afford five million dollars just to have you tracked down, and their property returned, and your body minced up and fed to every pig in Iowa. [...]. I don't think the wife of the owner of the third largest petroleum refiner in the United States needs an appointment, do you? (*PA*: 37-8)

This is not a single instance of his eloquent ability to gain the confidence of his enemies. It is precisely through this same argument that he persuades Magda Slanic to join his team:

I have to tell you, Ms Slanic, you don't know what you've gotten yourself into. The sooner you give me that stolen property back, the easier it's going to be. We're not dealing with idiots here. We're dealing with people who own half of Manhattan. [...]. They'll have you tortured until you tell them where it is, and then they'll kill you. And the cops won't help you either. (*PA*: 213)

To what extent his procedures are ethical or not does not matter much, as long as he reaches his objectives. Ultimately, he shows a great ability to dominate people and make them walk his way. But, just in case rhetoric fails, there is always room for some physical action, where he appears to be far more powerful than his colleague Paris. This is made patent at the store robbery, when he pretends to accept the attacker's conditions only to evade the police siege and avoid more victims. Such a farce leads to a Hollywood-like car chase through the New York streets eventually ending with the arrest of the criminal (*PA*: 46-68). There is no need to say that the show gains him a few more enemies amongst his former police comrades, but the property he guards is recovered. Likewise, and despite the fact that he does not shoot any enemies, he appears to be pretty ingenious at using other people as shields. This is the case of Ramon Pérez, Magda Slanic's associate, who receives the fatal impact of a bullet aimed at Conor (*PA*: 287). In the long run, therefore, the end-justifies-means policy seems to be what matters for this biohero.

One other couple working together against a biological threat is the illustrious *X-files* duo made up of Fox Mulder and Dana Scully. Certainly, the mutual understanding between the agents make them a very efficient team at solving the DyMar mystery. On the one hand, Mulder is the sceptical half, always willing to find apparently non-existing machinations where nobody else would imagine them. He is the one to notice the strangeness of the lab's sabotage, distrusting the official explanation that blames a group of animal rights activists, and the one to discover the nature of the nanomachines: a highly coveted breakthrough as much as an intrinsic danger to well-established people in power. On the other, Scully is the mastermind,

constantly studying and analysing evidence to establish the proper logical connections that help disentangle the enigma. As a doctor herself, she performs autopsies, interviews people who have been close to the disease and follows the biological trail left by the sick Jeremy Dorman.

Mulder's distrustful nature does not escape Scully's mind: "Mulder, you see conspiracies everywhere" (*XFA*: 59). Yet, this is precisely what lets the team progress towards Dorman. Despite Scully's extraordinary analytical abilities, she devotes so much time to thinking that it takes her ages to set herself in motion. On the contrary, her male counterpart is definitely readier for action. It seems as if Mulder is quite proud of his job, often showing his FBI credential to anyone who questions his authority (*XFA*: 108, 142). Yet, although he proves to be quite an efficient leader, Mulder is aware that such a bold attitude sometimes jeopardises the whole operation. The biohero is then assaulted by feelings of guilt, when he realises he has left Scully alone (*XFA*: 167). His acute sense of responsibility makes him blame himself for not anticipating the men in black as the Syndicate's squad and naively believe they were reinforcements (*XFA*: 261). Even though the case is solved properly, he somehow feels he has been fooled again:

Mulder, meanwhile, would simply write up the case, keep all of his records and his unexplained speculations, add them to his folders full of anecdotal evidence. Once again, he had nothing hard and fast to prove anything to anyone. Just another X-file. (*XFA*: 269)

But this is precisely the nature of his job: a clear case would have been no X-file at all. On the contrary, Scully seems to accept stoically that this mystery will be left unexplained. However, she feels satisfied enough at having saved the young Jody from certain death and the world from a new danger. Her main worry is to save the boy, even if she has to give her own life for him. Having suffered the cruelty of cancer herself, she immediately empathises with a kid too young to endure such a disease. The determination is simple: make his last days as happy as possible. Since they suffer from the same disease, she confronts Jody's enemies as her own ones. As the child miraculously recovers from leukaemia, Scully understands the complete disappearance of the nanomachines. Once their mission is accomplished, they have no purpose in Jody's blood. A still convalescing boy at the hospital later confirms the bioheroine's suspicion (*XFA*: 268). Yet, other people might be interested in the boy for further analysis and this leads Scully to devise a plan for his personal safety.

Thus, the case is not closed for her: from now on, she has a young protégé to take care of.

4.1.4 Other Bioheroes/-ines

One character that stands aside from the typical boffins and cops appears in John Case's *The First Horseman*. Although he resembles Conor and Paris in his sturdy constitution, the tenacious journalist Frank Daly initially had a successful sports career eventually ruined by a difficult family relationship. His love for sport is inherited from his father, an equally frustrated football player, who quit at the age of twenty because of persistent knee injuries and married early to father Frank. Tall (six-one) and 160 pounds, he inherited such a Herculean build and his dark brown hair from his father. As an adolescent, he soon catches the eye of the Kerwick High School football team, becoming the starting quarterback and already a leader at such a young age. On the other hand, his mother has given him green eyes, a handsome face and a captivating smile, as well as the love of reading, a remarkable photographic memory and his ability for understanding. Not only is he an outstanding athlete but also a bright student, and is soon admitted to Berkley University. Although he is interested in biology, economic problems lead him to a liberal arts degree and is soon taken on by *The Washington Post*, where he chases promotion (*TFH*: 87).

Unquestionably, this family trauma can be explained as the source of his dual personality: an accomplished-worker through his mother who cannot escape from the temperamental and shameless nature of his father. Frank leads a merry love life with a temporary girlfriend infatuated with his sports car. Still, he focuses his attention on the intellectually-appealing Annie Adair, the pretty virologist on the Kopervik expedition. To seduce her, he uses yet another hereditary gift from his father, "the flexibility of character that enabled him to become the perfect foil for anyone he was with" (*TFH*: 155). Without much reserve, Annie feels comfortable and falls to Frank's irresistible charm. It does not take long for the scientist to brief the inquiring journalist on every single detail of the expedition. Indeed, his ability to socialise with everyone is certainly one, if not the leading, key to his successful professional life. Along with seducing Annie, Frank also obtains information on the expedition by drinking beers with other scientists taking part in it. Here, the reporter shows his

fondness for the “art of listening” –a “genius” in the words of the writer, which makes unknown people trust him with valuable data for his articles (*TFH*: 119).

And yet another essential ability for Frank’s success is persistence. The journalist is constantly demanding information to the point of pestering his collaborators with questions. Whenever the conversation gets too tough, he also seems to control it with a bit of his humour. Some examples can be found of his making fun of Gleason (the FBI agent on the expedition) with the scientists (*TFH*: 118), swearing on *Gray’s Anatomy* to prompt Annie’s giggling (*TFH*: 150), or boasting of chiromantic powers to make the virologist laugh again (*TFH*: 155-6).

As far as work is concerned, Frank shows himself to be quite accomplished once his emotional life is set aside. Above all, he has an ambitious character, which explains his constant moving from Los Angeles to New York, Boston and finally Washington. At *The Washington Post*, his hard work brings him regular promotion from the Metro desk, to the National Security beat, to the National desk, where he covers political reporting, despite his distaste for such matters. However, his insatiable hunger for new experiences leads him to the Johnson foundation, where he applies for a grant to inquire into emerging viruses. This lets him take a year off from the unwanted White House news, and work on a subject he could not study at university due to a lack of money. It is precisely his research into the mutability of flu that guides him to the Kopervik expedition where the novel starts and, eventually, to the bioterrorist lead. To uncover the joint *Temple of Light*-North Korean conspiracy, he has to make use of his logical thinking, thus putting himself at the same level as the other epidemic investigators. He personally interviews the people involved in the expedition (*TFH*: 119), analyses satellite pictures (*TFH*: 177-180), meets the sect leader face to face (*TFH*: 360-363), is captured and tortured (*TFH*: 365-367), and ultimately frustrates the bioterrorist attack himself (*TFH*: 392-410). All in all, although lacking the predisposition to action of his former colleagues, Frank not only shows discipline in the thoughtful follow-up of the case, but also courage in its eventual resolution.

Another awkward bioheroine is Kivrin, the history student who travels back to the fourteenth century in Connie Willis’ *Doomsday Book*. What is supposed to be a simple research project to study the social customs of the time becomes a struggle for survival during the Black Death period. Sent by mistake to Christmas, 1348 instead of 1320, Kivrin has to make use of all her knowledge of such a dangerous

age to stay alive. Furthermore, she strives to help her host family survive, which converts her into a messiah amongst the powerless. As regards her physical features, Kivrin is described as a fragile fair-haired woman, “not even a meter and a half tall” (*DB*: 7), who is in her third year of her history studies at Brasenose college in Oxford in 2054. Kivrin is mostly regarded by her professors as a dedicated student; her eagerness to learn allowing her to become quickly proficient in Middle English, Church Latin, Anglo-Saxon, herbalism and medieval medicine. During the two years prior to the beginning of the novel, she has also learnt how to ride a horse, milk a cow, gather eggs and spin with a spindle –since the spinning wheel had not been invented in the 1300s; plus the common basics of vegetable gardening (*DB*: 9). Moreover, during the previous month, she has undergone an exhausting process of immunisation through enhanced T-cells, given all kinds of antivirals, had her appendix removed, been implanted with a 2.5 gigabyte chip-recorder and taken cortixidils to make her hair grow longer (*DB*: 10-12). There is absolutely no doubt about Kivrin’s strength of will.

On the other hand, such painstaking arrangements are soon proved invaluable. To begin with, she has to establish communication first in Latin with Father Roche (*DB*: 107), and later on in Norman French with Lord Guillaume’s family (*DB*: 153). Despite the precious help of a chemical translator –another gizmo inserted into her brain to support her connection with the fourteenth century world, Kivrin has to make great efforts to decipher the messages of its inhabitants. Actually, she is mistaken for a foreign lady for a good part of the story because she sounds French to her hosts.

As for her instruction on medieval medicine, this becomes very practical once the plague epidemic breaks out. Taking into account that such an extreme was not supposed to happen during Kivrin’s call on the past, she shows a notable proficiency in administering medicinal herbs –comfrey, lungwort, tansy and foxglove, minerals –powdered sulphur and mercury, as well as in lancing buboes (*DB*: 445-9). Moreover, Kivrin has the ability to make good use of whatever elements she has at hand, like wine to disinfect the incisions, as well as the common sense to wash clothes to use as clean bandages; an obvious procedure for a twenty-first century dweller, yet most unusual in the Middle Ages. Even though her patients die, she is without doubt the best physician they can possibly have.

Such efficiency in all the tasks she performs can be explained by her innate

gift to observe. This simple skill, which may indeed seem quite ordinary, allows the bioheroine to study her hosts carefully prior to establishing oral contact, notice the social customs of the time –especially those related to Christmas– and, of course, take care of the family members once they begin falling ill. Like all the bioheroes/-ines, Kivrin is sharp-eyed by nature and that is why she has the singular ability to perceive apparently irrelevant aspects, which eventually become valuable data for her research. The confirmation of this statement is precisely the *Domesday Book*, the chip recorder which becomes a complete journal of her stay in the Middle Ages. In this diary she carefully registers every single detail of her experiences with the fourteenth-century dwellers for subsequent analysis back in the future. Yet, it is just through the accurate transcripts she introduces into this serviceable tool that she understands something is wrong. It does not take long for Kivrin to realise the time slippage and the terrible era she has been sent to. The clues are all so evident: a family of women voluntarily ostracised from the everyday world, the urgency of the departure of the bishop's envoy and his party purposefully leaving the sick clerk in the house and, obviously, the latter's development of buboes, a swollen tongue and the haemorrhaging under the skin along with the apparently mild fever (*DB*: 385). All these strange facts seem to have a very straightforward and dramatic explanation.

Were it not for the timely appearance of Dunworthy, the bioheroine would have followed the fate of the other victims; certainly not by dying of the plague because of the effective immunisation, but she would have probably starved to death. What is more, by the end of the novel, her will to live is manifestly non-existent. Kivrin has painfully endured the passing of those who have become her adoptive family and she is in no position to continue her struggle (*DB*: 544). All in all, her first research project as a history student has turned into an unrepeatable experience.

4.1.5 Partial Findings: On the Biohero/-ine

One of the main characteristics of the biohero/-ine, especially notable in the individual but also present in some team members, seems to be a past trauma causing introspection into work. The stereotypical biohero/-ine undergoes an emotional or physical experience inevitably leading him/her to confront a biological crisis and come to terms with his/her past. In turn, it is through this flaw that a perfect catharsis is communicated to the reader, who endures the struggles of the biohero/-ine from a

distance and eventually understands the biological threat. One other distinguishing feature of the biohero/-ine is his/her method. By nature, this person is an accomplished hard-worker, a systematic character following a strict *modus operandi* which has been either learnt by training or acquired through experience. Curiosity and an insatiable will to learn are defining characteristics. It is all thanks to an open personality that these bioheroes/-ines effectively tackle their mission. On the other hand, the bioheroes/-ines also appear to have a sharp eye, a singular ability to perceive valuable data in seemingly irrelevant objects and situations and this becomes essential for solving the crisis. In other words, they see what the general public does not; hence earning the admiration of those lacking their powers. In this manner, they become visionaries whom the baffled do not doubt to follow.

Likewise, such an observant disposition inevitably leads to meaningful conclusions, thus revealing a good logical ability that genuinely distinguishes them. Indeed, deductive reasoning is a generic skill which all the bioheroes/-ines seem to boast, whether researchers or law enforcers. It is worth mentioning that, even though some of them may possess a good deal of physical strength, their real potential is intellectual. The bioheroes/-ines certainly tend more to think than to act. Of course they do act, but mostly such a meaningful event is delayed until the very end of the plot, only when they have gathered all the necessary data to indict the bioterrorist. And when the time comes, the action is performed unhesitatingly, which again earns them admiration. Indeed, it appears as if the bioheroes/-ines have certain special abilities that allow them to overcome obstacles which are absolutely unassailable for the rest of mortals. Plus, they are regularly favoured by fate in the crucial part of the plot. At the same time, they are mostly brave in the face of an invisible enemy, which somehow demands a special predisposition. There are certainly very few people capable of such an undertaking. Thus, they inevitably gain the respect of those who lack these abilities or simply do not want to risk their lives for an altruistic purpose.

In conclusion, the biohero/-ine is a singular figure with a number of features that shape his/her personality. After the above-mentioned, it can be asserted that he/she is mostly a highly deductive person traumatised by a past experience, often leading him/her to solve a biohazard crisis. He/she is also charismatic and accomplished in his/her work, curious and resourceful and, above all, a courageous individual clearly out of the ordinary, who is widely respected precisely because of his/her uniqueness. Similarly, such admiration covers a sometimes disreputable

behaviour, which certainly would not be acceptable in other characters. Amongst the generally acknowledged stock heroes/-ines, this character would stand between the competent researcher, the champion-like contender, and the naive and sometimes even clumsy post-graduate student who faces his/her first biological threat.

4.2 The Aides

This is by far the largest group of characters. Whether he/she wants it or not, the biohero/-ine is invariably forced to cooperate with other people in order to decipher the mystery¹⁰⁰. Thus, some of these task-forces of collaborators are personally chosen for the mission by the leader, like the dedicated assistants and scholars, whereas the FBI agents are compulsory when dealing with bioterrorism and, even if initially unwelcome, always provide the necessary expertise to solve the case. Other relatives simply happen to be next to the biohero in the worst possible moment, helping him/her the best they can but quite often also becoming propitiatory victims. What is true, however, is that some bioheroes/-ines decide to work with as limited a number of aides as possible, mainly a sidekick and a law enforcer, while others just incorporate any necessary new member to the team to cover any particular field. It is obvious that the former take much more prominence, only second to the biohero/-ine, and the latter become quite ephemeral, selectively appearing in limited parts of the plot. This explains that the number of characters to be studied under this heading is very numerous. In order to study them efficiently, it is best to group them according to the function they play in the plot. Thus, there are mainly aides for research purposes and for enforcing the law, while there are also others with a variable function. Accordingly, there are bioheroes/-ines who rely on one team or another, sometimes on both, and there are still a couple of exceptions that count on characters who are not related to the aforementioned professions.

4.2.1 *The Pathology and BT Teams*

Alice Austen is not alone in her quest to uncover the bioterrorist who is

¹⁰⁰ According to Arthur Asa Berger, this is not strange in popular narratives since “the hero generally needs others and though he fights for freedom and justice, and individual rights, these terms are shown to be connected to some kind of good society” (1992: 21).

holding New York to ransom. She is flanked by two teams of aides without whom, due to her conspicuous inexperience, the resolution of the case would have been impossible. Initially, she commits herself to the pathology team, made up of Dr. Lex Nathanson, Chief Medical Examiner of New York, his deputy Glenn Dudley, and the morgue attendant Ben Kly. In this early stage, the investigative core of the case rests on Dudley and Kly who perform the corresponding autopsies of the victims. Although Alice shows a creditable interest in the matter, she is a medical pathologist and her training in forensics is quite basic. Undoubtedly, she is quite good at tracing Cope's trail –not in vain is she a cop's daughter herself, but definitely not experienced in studying corpses. It can therefore be said that, without the examiner's help, the analysis of the symptoms leading to the discovery of the agent could have been unattainable for the epidemic investigator.

Even though Nathanson commands this team, the real practitioner is Dudley, the man who materially carries out the autopsies. Nevertheless, Kate Moran's is left to Alice on a straight order from Nathanson, who seems to measure the CDC investigator's abilities with this action (*TCE*: 68). Dudley is supposed to assist her during the autopsy, but his sarcastic comments are actually misgiving rather than real help (*TCE*: 64, 69). On the contrary, the morgue attendant Ben Kly is much more useful to Alice. He offers her his past expertise as a mortuary van driver, which confers him a thorough knowledge of the city and its hiding places. Especially, he personally leads the bioheroine to Lem's lair, deep inside the subway tunnels, carefully advising her on the dangers of an inhospitable hidden world (*TCE*: 136-141). It is only a pity for Alice that he has to die so soon, if only to save her from Dudley's madness (*TCE*: 164).

Once the biological threat to the population is made evident, it is time for the BT (Bioterrorism) team to come on scene. This group comprises Frank Masaccio, assistant director of the FBI and head of the New York field office, who leads the operation to seize the bioterrorist; Will Hopkins, head of the *Reachdeep* team, a special operations unit in the Bureau to deal with bioterrorist events; and Mark Littleberry, a retired doctor in the United States Navy with experience in biowarfare. In essence, they will provide the necessary knowledge, deduction and command eventually leading Alice to arrest Cope.

The most helpful of these characters is undoubtedly Hopkins. Even though he is not the protagonist, he takes the lead on several occasions acting like another

biohero. As he tells Alice when they are introduced, he is the man in the *Bureau* to deal with a bioterror event (*TCE*: 182) and is proud of his unit, a covert team of agents with a range of scientific degrees. Moreover, he is a man of command and likes to exercise it. This feature is markedly visible from the very first *SIOC*¹⁰¹ meeting, when he eagerly talks of his group and demands recognition for their work, overtly understated by the representative of the White House (*TCE*: 190-5). After the meeting, he personally organises the work and assigns different subteams to study Cobra. During the bioterrorist's chase, and despite being under Masaccio's command, he persists in giving orders to Alice (*TCE*: 376 and 406) and Littleberry (*TCE*: 386), with negative results. In the end, his being shot in the dark tunnel allows Alice to fall on Cope and arrest him, a merit which could have been his (*TCE*: 426-7).

Another essential member of the BT team is Mark Littleberry. Despite the fact that he is not an actual member of the Reachdeep team, his experience in biowarfare and the United Nations makes him a valuable consultant to the operation. So much so that, as soon as Hopkins is informed of the Cobra event, it takes but a short phone call on a secure government band for him to be assigned immediately to the meeting (*TCE*: 182). A man in his sixties, Littleberry still portrays a youthful, somewhat rebellious demeanour, which is often revealed in his questioning direct orders. Especially notable is his ability to go AWOL¹⁰² breaking out of the UN inspection convoy in Iraq (*TCE*: 43), rambling around Bio-Vek on his own (*TCE*: 345), and searching for biological items in the NY subway tunnels. It is precisely this last escapade that leads him to a heroic death, finding a hitherto unseen biological bomb left by Cope (*TCE*: 428).

According to Littleberry, the pathogen's advanced design suggests an American make, while smallpox indicates a Russian connection. Since a virus of this kind cannot be engineered in many places, he proposes an American company near New York City (*TCE*: 318). Only Bio-Vek is doing research into the Lesch-Nyhan syndrome and close enough to New York. Later on, as he goes AWOL in the facility, he finds Dr. Mariana Vestof, a Russian agent whom he is acquainted with after the Iraq incident, thus proving his theory: Littleberry has found Cobra's origin (*TCE*:

¹⁰¹ Strategic Information Operations Center.

¹⁰² (*Mil.*) Absent WithOut Leave.

341-8).

Eventually, he becomes the most grieved casualty of the team, as demonstrated by Alice and Hopkin's weeping together (*TCE*: 429). Despite his philanthropic work for the safety of humankind, it is not mentioned that he is given any medal or official recognition by his government. Nevertheless, Hopkins tries to comfort his widow by stressing his momentous discoveries both in Iraq and New Jersey: evidence of a biological-weapons program in the former country and liability of some Swiss and Russian biotechnological companies to face American justice in the ensuing investigation (*TCE*: 434). Even if personal, it seems to be a posthumous acknowledgement of his valuable work.

Finally, Alice's difficulties are settled by the man in charge of the whole project, Frank Masaccio. A man in his forties, it is quite evident by his "ample gut" that he is not much used to physical exercise. Yet, his perspicacity and the fact that she does "not have to explain anything twice to him" (*TCE*: 172) suggest there is a very bright man behind his apparently careless physical appearance. Actually, simply with Alice's presentation of the events he understands she is a cop's daughter, which says a lot about his deductive abilities. In the course of action, he will show that he does not need to be physically fit: once again his work is mainly intellectual. To Alice's mind, Masaccio is more like a chess player arranging the moves of his –New York– defence (*TCE*: 175).

During the *SIOC* meeting, Masaccio does not appear to have very good relations with the White House. He publicly acknowledges Alice's value in front of the leading personalities attending the videoconference and demands for her to be sworn in as a deputy US Marshall (*TCE*: 195). In due time, this move allows the bioheroine to materially arrest Cope. In fact, when he is informed of the good news on the headset Masaccio appears to be glad it was the young woman who seized Cope. Nonetheless, a lot of credit is his (*TCE*: 430). It seems too reasonable for him to promote Alice as an FBI agent, but it is just a shame that she decides to stay at the CDC.

Likewise, Frank Daly has the inestimable help of microbiologist Annie Adair, FBI agent Neal Gleason and graduate student Ben Stern in his personal crusade against Luc Solange. Of the three, Annie is clearly the most useful. A pretty young woman, her actual age is not mentioned, although her recent PhD and the fact that she has no steady job and still shares an apartment suggests late twenties or early

thirties. Despite her recurrent habit of giggling, especially with Frank, the protagonist knows very well that she does not have the “pretty woman’s psyche” (*TFH*: 154). She is not prone to flirtation and declines physical contact with Frank; at least during the first dates, until they eventually become lovers. More than his better half, she is the specialist he needs to comprehend certain scientific aspects that are far from his natural journalist capability. Additionally, she also seems to be the right person to fill an emotional vacuum in the reporter’s heart.

Yet, Annie is, above all, a sagacious woman. Leaving aside her knowledge of microbiology, Annie pays attention to details which, initially, do not seem to be important. For instance, she notices an American flag on the helicopter on Koperovik’s satellite photograph, thus showing the nationality of the perpetrators (*TFH*: 192). Moreover, before Frank or Gleason perceive it, she is the first to observe the suspicious ferry that Solange intended to use to spray New York with the lethal agent, thus facilitating the action against the Temple of Light squad (*TFH*: 392). Also, she recognises the van the Operations Team uses to kidnap her with its strange southern motif, which leads Frank to the final pursuit, that eventually results in Solange’s capture (*TFH*: 399). In a general sense, Annie has an eye for detail, being someone who, as she acknowledges herself, spends most of her time analysing the blurry components of invisible bugs. In the end, such a peculiar ability becomes essential to save many from undergoing a frightening experience.

So distinctive is this beautiful and enlightened woman that she obviously seizes Frank’s heart. In spite of her acute shyness, Annie also seems to find Frank quite attractive, not only because of his physical handsomeness but also because of his outstanding tenacity. Ultimately, then, Annie happens to fulfil all of Frank’s needs: she provides him with relevant scientific data, gathers those important aspects of the investigation which Frank fails to grasp, looks after him, goes on with the research while he is recovering and, incidentally, satisfies his emotional demands. There really is nothing else that the biohero could ask for.

On the other hand, Neal Gleason plays the role of the mandatory FBI liaison. During the first part of the novel he simply detaches himself from the action and behaves like a common auditor to *Blindside* (the code name for the Tasi-ko working group). However, he is the man to deal with the Agency on chemical and biological matters, and yet he seems to despise the obligatory meetings, leaving at will and bidding the other members to keep him informed (*TFH*: 41). Even when Annie and

Frank visit him to tell him about The Temple of Light's implication in the stolen corpses, he plainly ignores the matter to Annie's great surprise. What's more, he threatens Annie with violation of the national security oath she signed in joining the expedition and even Frank, who is not subject to any such oath, with treason (*TFH*: 281). Nevertheless, the events take a sudden turn when the FBI's blow to the Temple's headquarters' is frustrated. Although he does not even seem pleased to have saved both researchers from certain death (*TFH*: 374), he is more concerned about the escape of his prey. At this time, he understands that, if they are to catch Solange and the rest of his followers, they must work in group: Annie and Frank have the knowledge to predict Solange's next move but they do not have the means to stop him, which a baffled Gleason does. Eventually, it takes but a short interchange of information between the three of them to know the dispersal will probably take place from the river in New York (*TFH*: 386, 392).

Finally, Ben Stern, who is writing a thesis on new religions at that time, is in charge of the consultation on matters of The Temple of Light. A rather shabby man in his late twenties, he produces an elaborate discourse on proactive millenarianism before enlightening the investigators on Solange and his sect. He reveals the vastness of the organisation, with several branches covering finance, recruitment and intelligence (*TFH*: 296). He also shows the sect's relationship with the North Koreans, who are basically funding the organisation (*TFH*: 300). It is only too prophetic the way he describes the special teams of the Temple's in-house intelligence agency: "if you piss them, they'll come after you. One day you'll wake up and – boom! You'll be gone." (*TFH*: 299). Precisely, he will pay the price of knowing so much by tasting 'Bertha,' in Solange's own words: "a microwave chamber, [...] basically it boils away the liquid, and then it's a from of rapid desiccation. You end up like a pile of soot" (*TFH*: 371). And indeed, that is what Ben Stern eventually becomes.

A similar reading can be made of the estimable group of collaborators around Jack Bryne. Despite his acknowledged expertise on virology, there are many complicated aspects of the enigma posed by the Biblical plagues which escape his expertise. Thus, in order to prove his innocence, he needs the help of those who directly or indirectly get involved in the case. First of all, there is his faithful lab assistant, Drew Lawrence, who takes good care of Jack's office in his absence: running tests, performing autopsies on bats or simply answering the telephone. Of

the four blessings Jack recognises to have occurred in his life, Drew happens to be second only to the actual offer to lead the New York State Zoonosis Laboratory (*TEP*: 53). A highly-experienced lab tech after his work at the New York Medical College, Drew arrived at the facility many years prior to Jack. Rather than merely being his assistant, the writers would rather state that “the two men had worked beside each other as equals, sharing their knowledge” (*TEP*: 53). So positive and fruitful has been their collaboration that “Lawrence was now as skilled in epidemiology and virology as he had been in parasitology” (*TEP*: 53). In return, Jack has earned a devoted partner who is capable of ‘running the show’ while he is investigating the most bizarre outbreaks all over the world¹⁰³.

As a pious Baptist, Drew’s knowledge of the Book of Books greatly exceeds that of his boss, which makes him an authority on the subject. Besides, Jack has no problem at all in recognising his assistant’s command of the Scriptures. Much the contrary, he often asks for advice. In fact, when Hubbard comes to interview Jack on his work at the WHO and his expertise on bioterrorism, he finds that it is Drew who traces the first incident back to the Word of God. It really seems to be him and not his boss who is the specialist in bioterrorism and religion (*TEP*: 227-238).

In Kameron’s plan, eliminating Drew Lawrence means not only a significant restriction of Jack’s movements but also a considerable discouragement to him. Yet, the biohero has other equally helpful friends. This is the case of the ambitious journalist Vicky Wade. A former lover of the protagonist, Vicky is a middle-aged woman who likes to take care of her physical appearance. Leaving aside her notorious charms, the reporter has her own personal trainer and runs fourteen miles a week to keep in shape. Being fully aware of her popularity as a *Hot Line* star, Vicky also spends time and money on her “rich, thick, flaxen gold” hair, dresses elegantly and drives a spectacular silver Lexus (*TEP*: 114-7). All these elements certainly help to shape the external image of a confident TV reporter touched by grace and fame.

Above all, Victoria Wade is a source of information for Jack; and yet, so is Jack for Vicky (*TEP*: 119-120). The reporter suggests an immediate exchange of information, a game the doctor is not willing to enter into. Basically, he is afraid that

¹⁰³ Actually, Elizabeth Lyon considers that “the partner or sidekick role is indispensable to characterization –especially for contrast and chemistry– and for advancement of the plot, and frequently, he or she operates like a co-protagonist, although most often, without a point of view” (2004: 114).

whatever he may mention about the San Diego incident –the two children dying from anthrax contracted at the city zoo– might be on the air that same evening. In order to prove her loyalty, Vicky takes the initiative and suggests the disease was not a natural occurrence. In a sense, she opens the eyes of the doctor who guesses that money might be behind the outbreak. Very sensibly, she claims that perhaps one single horse would be killed for the insurance, but not twenty-seven from five different stables. In a way, she becomes a question raiser for Jack; more than a nuisance, a debating instrument to validate his still incoherent thoughts (*TEP*: 122-137). Eventually, all this information and the reporter’s inquiries will allow Jack to assemble his own scheme in order to envisage the recreation of the biblical plagues. Once the San Diego and the Churchill Downs incidents come together under the same macabre plan, the biohero will soon formulate his biblical thesis.

Vicky’s interested help is replaced by the sincere assistance of the forthright Shmuel Berger. A seventeen-year-old youngster in Manhattan’s foremost high school for gifted students, Shmuel is also a bookworm of the Torah, which he learns following a family tradition. Furthermore, through the past two years at Stuyvesant High School, he has developed a growing appetite for science in general and biology in particular. The reason seems to be in a book he has accessed called *Microbes Hunters*¹⁰⁴, where he had seen his destiny to become a virologist (*TEP*: 259). It is also thanks to the fine technology at Stuyvesant that he discovers ProMed mail, whose webmaster is precisely Jack Bryne. By reading Jack’s request about the plagues on ProMed, Shmuel finds the way to amalgamate his two passions and decides to contact Jack personally and offer his help. Indeed, his knowledge of Hebrew happens to be conclusive in clarifying the cause of the third plague. Whereas Jack had been revolving around *lice* as living entities, Shmuel takes the term as if characterising a disease:

The Hebraic term for lice is *chinnim*, often translated as generic ‘vermin,’ but the Greek *sciniphes* means mosquito or gnat. I personally believe it was anything that causes intense itching. It doesn’t *have* to be lice as we know them. (*TEP*: 217)

Obviously, this crucial revelation enlightens Jack, who quickly shows ergotism to be the real agent behind the third plague. In this respect, Shmuel’s voice

¹⁰⁴ Any of the writers or both of them could have been inspired by *Microbe Hunters-Then and Now*, a book edited by Koprowski and Oldstone and published by Bloomington in 1996.

becomes the perfect counterpart for the scientist: whereas the vast majority of his colleagues at ProMed are doctors like him, the young boy is just a responsive student with a curious disposition. So to speak, his mind is still untouched by the tedious scientific method. And what is more, he has a priceless approach to the Holy Scriptures. Therefore, he is “a breath of fresh air” (*TEP*: 217) for Jack, who is in deep need of trusty collaborators believing in his eccentric plague theory.

Thus, he becomes Jack’s personal assistant on Biblical matters and, according to his new distinction, attends the emergency meeting arranged by Mia at the New York Academy of Medicine. To the surprise of the eminent audience, the young boy uses a comprehensive OHP display to show Jack’s assignment. For each of the plagues the biohero writes on the blackboard, there is a corresponding transparency, with its Hebrew translation and a correlation recording back to the time of the Pharaohs (*TEP*: 380). Certainly, a masterpiece which quiets the voices critical of the boy’s presence in the meeting.

Of the group of professionals around him, it is Shmuel who, without studies or experience, contributes the most crucial discoveries to solving the case. Therefore, the junior advisor can only receive words of praise from Jack. Not only is he encouraged to work in the mystery, when perhaps others would have ignored the boy, but his meaningful cooperation is also acknowledged in front of the other notables. Thus, he is introduced at the emergency meeting, as “a researcher who has provided critical data to this project,” (*TEP*: 381) after elucidating the tenth plague¹⁰⁵, Jack admits he has done him “an enormous favour by solving a big problem,” (*TEP*: 409) and at the final meeting in Hubbard’s office, he is presented to the FBI agent as “the guy that actually cracked the case” (*TEP*: 509). Likewise, he also receives Hubbard’s compliments when he clearly asserts that “it is you, Shmuel, and not Dr. Bryne who deserves the Bureau’s thanks” (*TEP*: 509). Hence Shmuel becomes Jack’s best ally to defeat Kameron. In doctrinal terms, he represents the side of religion which favours the biohero, as opposed to the one confronting him, embodied in the bioterrorist. The access to biblical knowledge through his rabbi as well as the

¹⁰⁵ In the following days, Shmuel also cracks the puzzle posed by the tenth plague, ‘The Death of the Eldest.’ To his mind, it all has to do with the famine reigning in Egypt after the preceding nine plagues, which forced the starving Egyptians into the granaries. Since the grain had been stored improperly, it was contaminated with mycotoxins. The *eldest*, who were the ones in power, entered the grain houses first and died either by inhaling the pathogen, eating the spoiled grain or eating the livestock fed with it. On the contrary, the lower classes coming afterwards ate from a safer grain, which had remained below the surface (*TEP*: 408).

enthusiasm of adolescence are certainly his best assets. And, of course, he remains unknown to Kameron, which spares him from certain death. On the other hand, nobody but the straightforward boy can herald the upcoming eleventh plague; yet one which is not dealt with in this novel.

Another character of scanty help compared to her potential is Jack's wife, the renowned epidemiologist Dr. Mia Hart. Had she dismissed from her mind her palpable resentment of Vicky's helpful disposition, her contribution to the case would undoubtedly have been much more relevant. Not in vain does Jack consider their first meeting at a WHO conference in Paris as one of the four blessings following the death of his first wife (*TEP*: 54). Obviously, such a fact does not escape Teddy Kameron, who aims at her immediately after having eliminated Drew.

Despite being assured that Vicky's intentions are merely professional and knowing that theirs was an incidental affair fifteen years ago, the weight of the past is too hefty a burden for Mia to bear (*TEP*: 367-368). Although she wants to be considerate, the many hours she spends alone longing to be with Jack make her tolerance vanish when another woman –Vicky, for instance– is mentioned. Without being intentional, Mia's agitated state worsens their already fragile marriage. It certainly is a shame that the alleged professional comprehension goes out the window because of jealousy. Mia fails to notice Jack's intrinsic need; at least until Drew's death. This event undoubtedly means a turning point in Mia's attitude towards her husband, whom she realises is in real danger and she has neglected all this time (*TEP*: 367-368). She seriously envisages the possibility of losing him, since the package that killed Drew was addressed to Jack's laboratory. Unfortunately, though, just after a reconciliation dinner she opens a FedEx package similar to the one that kills Drew. Being addressed to Jack in neat handwriting makes suspicion reappear and turns its content into an unbearable secret. The inviting note accompanying the cologne bottle inside the package makes it impossible for her not to try its deadly scent (*TEP*: 372). It can well be said that jealousy signs her death sentence.

Yet, even in agony, there is still time for contrition and a last useful remark. Strange as it may be, it seems that only Mia amongst the gathering of notables attending the crisis meeting notices that the Memphis explosion is mistimed. According to Jack's monthly schedule, whereas the plague of Darkness –brought about by the Rift Valley Fever virus and intended to kill Mia– happens in September,

The Death of the Eldest plague –believed to be the explosion of the Memphis silo which abruptly ended the meeting– should take place the next month. In a last heroic stream of logic, Mia suggests a trial test, bidding her husband to discover where the final event is going to happen (*TEP*: 400). From now onwards, Jack will depend on the collaboration of another former sceptic of his theory: FBI agent Scott Hubbard.

This is a character who emanates authority and respect. Already by his first appearance, at the emergency meeting after the San Diego incident, a powerful halo around Hubbard seems to encourage deference by everyone nearby (*TEP*: 88-98). The fact that the reader can notice this character’s stealthy personality helps to enlarge, if possible, his enigmatic aura. Hubbard becomes the necessary Big Brother representative looking to preserve the status quo at any cost. This means that he, empowered by his obscure organisation, does not hesitate to take any protective measure, whether this is legal or not. Actually, the only difference between him and the Syndicate’s Lentz is the side they are on, which they conveniently change whenever it is believed necessary. For this occasion, since he eventually collaborates with Bryne, he is treated as an aide.

Once at Twenty-six Federal Plaza, Hubbard invites his suspect to relive his childhood at Pingfang, and explain the connection between the San Diego and Kentucky incidents (*TEP*: 355-6). A patient listener by nature, the FBI man slowly gains Jack’s confidence until the latter begins to unfold his theory. The virologist understands he needs a law enforcer more than ever, and after the coherent presentation of the interconnected events, Hubbard understands he has to concede his suspect, at least, the benefit of the doubt.

Thus, he agrees to attend the emergency meeting Mia is preparing for Jack at the New York Academy of Medicine, where the biohero intends to explain his theory in detail to the competent authorities. It is a time of confusion for the agent, who is not sure whether to consider the doctor “a savior or a Satan” (*TEP*: 364). As usual, throughout the event, the FBI agent shows himself quiet and prudent but, deep in his mind, Jack’s incontrovertible presentation of the events has the effect of taking him off the suspect list. What is more, through his fine use of logic, Hubbard quickly profiles a criminal who significantly differs from the doctor. But it has to be through stool samples, confirming the absence of the tapeworm the bioterrorist must hold in his guts, that the unbiased agent is eventually convinced (*TEP*: 425). The process Hubbard has followed has been implacable, growing from almost conviction of

Jack's guilt to an eventual discard. Inversely proportional has been his help to the case: from impartial interviews, to a germane contribution in profiling the criminal. And now that he is sure Jack is innocent, he gives him his most unconditional support. Especially, because his prime subject has been wrongly targeted and there is unquestionably someone meaning to strike his final blow. By now, Hubbard needs the doctor's help to arrest the criminal as much as Jack needs the FBI man to prove his theory. And both have a reputation to be cleaned.

Acknowledging his mistake, Hubbard promptly suggests a pact: "Now we give you all the help we can and you help us find the guy" (*TEP*: 426). For the first time since the onset of the biological crisis, he talks in first person plural not meaning the Agency, but the newly formed team: "So what's *our* next step?" (*TEP*: 426). Together, they make an almost perfect biohazard couple: whereas the doctor is intuitive, the agent is analytical; where the former is impulsive, the latter is temperate; when one is spontaneous, the other is judicious. The distressed virologist understands the agent's personality at once, thus comparing him to a police Labrador, brought to sniff dangerous stuff: "*He's like that dog*, Bryne thought; *he's not going to leave here until he does exactly what he's been told*" (*TEP*: 443).

Like an omnipotent genie, Hubbard grants Bryne whatever he asks for: turning off the lights at the Met to discover the mycotoxins on the bread (*TEP*: 455), tons of ammonia to neutralise the aflatoxin at the fountain in the East River (*TEP*: 466) and, most important, a Defcon One (*TEP*: 467). As perspicacious as ever, he gets to notice a breathing device which has been ignored by the agents about to inspect Kameron's bathroom. Through his inseparable UV penlight, he gains everyone's admiration by turning off the light and revealing a deadly vapour emanating from the keyhole. Once again, his expertise and discernment saves the lives of many, if not all, of his team (*TEP*: 465).

Nevertheless, his precious donation to the case ends here. After providing Bryne with the necessary atmosphere and means to catch Kameron, it is now time for the biohero to complete his mission. Much to his regret, Hubbard breaks his ankle at a most inopportune time (*TEP*: 493). From now on, all the weight of capturing the bioterrorist lies on Bryne's back. The agent's last role is reduced to hosting an eventual reunion of those who remain alive –Bryne, Vicky, Berger and Hubbard himself– to celebrate the successful resolution of the crisis. Still, they are about to presence the onset of the eleventh plague.

4.2.2 *The Researching Team*

On some other occasions, the biohero/-ine only needs a researching team basically because he/she handles the bioterrorist task. This is the case of Lieutenant Philip Paris who begins a more than professional relationship with the charming discoverer of agent 57a –the virtual counterpart of the *Chlamydia Psittaci*– Dr. Elaine Wilkes. An attractive blonde in her mid-thirties, Elaine likes to take care of her physical appearance, as endorsed by her “expensively shaped” hair (*TTP*: 158). She is also quite fond of flashy cars, driving a Saab with a sunroof. In other words, she is an accommodated young woman living a comfortable life. But being a hard worker makes it very difficult for her to find the right man. Moreover, she would not take anyone who does not meet her exigent requirements. Obviously, she thinks of the mighty Bennet Rifkin, but he is too arrogant to meet her compulsive altruism. There is also David Muldane, whom she loves working with; yet he is a loser, a doctor who would not overcome the challenge proposed by the Virtual Surgery Center. Already reaching a critical age, Elaine has an emotional vacuum inside, inappropriate for a successful professional (*TTP*: 44).

Thus, it is not strange that she immediately grows fond of the good-looking cop. Paris is for Elaine precisely the kind of gentleman she has been looking for: tough yet not menacing (*TTP*: 162), warm (*TTP*: 165), trustful (*TTP*: 295), a powerful man who nonetheless does not crave more power (*TTP*: 326). Furthermore, in the dire situation she is now in, Paris means understanding and protection, two valuable features which immediately infatuate the young doctor. Yet, certain events arise in their joint crusade against Cox which reveal some unwanted aspects of her mate. On the one hand, Paris is a man of action, someone who is used to taking quick decisions of his own; Elaine being likewise quite an independent researcher. This inevitably brings about her resentment when he swiftly chooses the safest movements for her, even if she knows it is for her own good. She likes being protected, yet she would like to share decisions (*TTP*: 295). On the other, Paris has not completely overcome the loss of his wife and Elaine does not like to share her man even with this ethereal presence. However, she knows quite well there is another more important matter to attend to and decides to postpone the solution of this problem for a better time (*TTP*: 343). A future time which will not take place in this novel.

Therefore, the new conditions have led Elaine to depend on somebody for the first time in her adult life, as she admits to herself (*TTP*: 189). But, what is more important, she has learnt to accept her partner both with his virtues and defects. A fact which, at first sight, should not be a problem for someone who is willing to face imprisonment due to her self-assumed altruism. Because, to Elaine's mind, it is solely her deep philanthropic concern that has led her to the complicated struggle she is now implicated in. Of course, Elaine's leitmotif when she decides to abandon the project and fly to Seattle with the stolen data is the altruistic principle of the "right to know" (*TTP*: 112). Whereas Bennet and his Uni associates can only think of the immense profit they can make from the upcoming vaccine for agent 57-a, Elaine decides to inform the CDC and the WHO as soon as possible. But there is also another driving force behind her movements, especially after the torture episode at the King County Jail in Seattle: revenge (*TTP*: 181). While she accepts prison as long as the outcome of her investigations is handled to the competent authorities, she is certainly not prone to becoming a martyr for the sake of humanity. Once Bennet's villainous procedures are exposed, she commits herself not only to revealing his ominous plan, but also to hindering his until-now successful career. This is also another reason for her timely association with Paris since, as a lieutenant, he has the power to unmask Bennet's criminal organisation.

Consequently, she also helps Paris fight their new enemy. In order to do so, Elaine shows a strong determination which becomes essential for the eventual resolution. Even though she is quite slender, she also manages to save Paris from death by timely kicking her assailant when he was about to shoot her protector. This, at the same time, could have led to her own death, since one of Paris' shots hits her between the ribs (*TTP*: 229). Her recovery seems miraculous, especially at a time when the epidemic has already reached the hospital and left it in utter chaos. Likewise, she shows an innate ability to skilfully manage the *Cedar Queen* –Paris' boat, which appears to be really uncommon for a young woman with no previous background in sailing. Still, she performs complicated manoeuvres and even becomes Paris' pilot in his final foray against Cox. Not only this, but she also takes the liberty of fixing the electrical equipment of the vessel, something which in fact is not so strange for a person who is keen on computers (*TTP*: 357). Once Cox is eliminated, all Elaine needs is a deserted Uni office to send the data to the authorities. Perhaps this final scene in the epilogue is the best to summarise why they

unite forces: “Paris used some of his street-learned skills to let them in, and Elaine promptly activated the computer and telecommunications equipment” (*TTP*: 373). Thus, rather than Elaine becoming Paris’ assistant, it can somehow be said that they help each other mutually.

Another couple of good aides for Guy Carson are Susana Cabeza de Vaca, Guy’s lab assistant in Mount Dragon, and Dr. Charles Levine, a former university professor. In fact, the latter’s relationship with Guy is merely one of convenience, since Levine obstinately opposes Brent Scopes and his GeneDyne corporation on behalf of humankind. A wholehearted enemy of unregulated genetic experimentation, Levine accuses GeneDyne and ultimately Scopes of pursuing the perfection of the human race, with all the dangerous implications it supposes. What he seeks in Carson is a spy inside Mount Dragon who can provide him with all the necessary information to defeat his enemy. It cannot be said that Levine simply helps him at first. Other than that, he seems to provoke all the ethical doubts in Carson which are inherent to his research. He does not bid him to leave the project at once and yet he demands collaboration. Certainly, somebody else would take his place should he decide to abandon, just as he had with his predecessor Frank Burt but, at this point, it is fairly evident that Levine does not only pursue philanthropic aims in his conflict with GeneDyne. What he really wants is the capital data, a true act of industrial espionage.

Nevertheless, by touching those moral principles that every scientist should follow, somehow he helps him open his eyes to the productive bribery Scopes is inducing him into. In this sense, Levine’s recommendations to remain sceptical and to question whether his work is worth it after all (*MD*: 175) tumble around inside Guy’s head until Susana finally opens his eyes. Without Levine’s boost, Carson would have credulously followed Scopes instructions until the end. He could have either finished his job and become the wicked creator of an infamous biological weapon or end up like his late predecessor, Franklin Burt. In both cases he would have ended up badly. He has to thank the professor's advice for that not having happened.

Likewise, he has to show his gratitude to the resolute Susana, an attractive divorcee of Spanish origin. Like Annie or Elaine, she seems to be the perfect counterpart to the biohero. Whenever the compulsory space suit is removed, there appears a beautiful brunette with purple eyes who has become the sexual token in a

remote facility with very strict working rules. The only problem is her bad temper. As soon as she is challenged, a Spanish curse follows, often accompanied by a slap on the cheek (*MD*: 120). Quite a character which surely prevents her from being distracted from her duties. But spending most of the time working with Guy makes her develop an affinity for him. In fact, he is not precisely bad-looking and also a New Mexican like her; the only two natives in the facility.

But there is one thing Guy appreciates in her: determination. Precisely because of her strong character, Susana can reach wherever the biohero cannot. Her knowledge of Mount Dragon and the people working in the facility grants her access to valuable information. In other words, she acts as an info provider for him. Thus, she is the one to discover the fail-safe mechanism in the facility which, eventually, will support her and Guy's headlong getaway (*MD*: 162). Also, the microbiologist seems too credulous to really notice the GeneDyne corporation's massive profits from his research. It has to be Susana who opens Guy's eyes. While he still believes that the entire monkey slaughter is a "necessary evil" on account of the millions of lives which will be saved, his pragmatic assistant is more focused on a fruitful business generating big profits:

Do you really think science is going to refrain from making people smarter, longer-lived, taller, handsomer, nicer? Particularly when there's billions of dollars to be made? [...].

And who is going to decide what's better? You? Me? The government? Brent Scopes? No big deal, let's just get rid of the unattractive genes, the ones nobody wants. Genes for fatness and ugliness and obnoxiousness. Genes that code for unpleasant personality traits. Take off your blinders for a moment, and tell me what this means for the integrity of the human race. (*MD*: 234)

Unlike her boss, Susana seems to embrace Dr. Levine's eugenics theory. Somehow, she decides and makes Guy decide to abandon the precious project before it is too late. In a way, she manages to impregnate Guy with her ethical doubts and successfully convinces him to withdraw with her arguments. From this time onwards, the consolidation of their relationship into something other than the simply professional is obvious. Their joint adventure through the *Jornada del Muerto* desert, where they can finally give free rein to their passions, is nothing but a commercial trick to catch the reader's attention (*MD*: 429). Once the biological menace is aborted, the materialisation of their love as they dodge Nye in the desert is only an addition, while the dispute between Levine and Scopes is resolved.

On the other hand, Dr. Marissa Blumenthal is not surrounded by many

people. Mainly, there are only three characters with whom she is constantly in touch: Her immediate superior in the CDC, Dr. Cyrill Dubcheck, the lab technician and friend Tad Schockley, and her bad fiancé, Dr. Ralph Hempston, eventually her fiercest enemy. However, as far as work is concerned, Marissa basically deals with the former two. Contrary to what is common in most of the other novels, she forms part of a team which she does not run. Whereas she materially performs the research in the different hospitals where the disease appears, Tad takes care of all the laboratory analysis, under the strict supervision of Dubcheck. Therefore, the decisions taken by these two characters and the degree to which they collaborate with Marissa certainly have a direct influence on the resolution of the plot.

Hence, even though it is the bioheroine who takes the lead, the real boss behind the operation is Cyrill Dubcheck. This widower, who is quickly introduced in Ralph's party at the very beginning of the novel, noticeably gathers strength during the commotion caused by the initial outbreaks. Briefly described as "a striking man with coal black, intelligent eyes and an olive complexion," (*Ob*: 26) his sole presence emanates power wherever he turns up. After Marissa's rejection, Dubcheck involuntarily downplays his subordinate's achievements and what had been a good mood turns into coldness and increasing recriminations (*Ob*: 76). All the help he has provided by carefully introducing Marissa into the business suddenly disappears, thus leaving the EIS officer on her own.

Despite his boss' denial of access to the maximum containment lab (*Ob*: 92-93), Marissa still finds positive features in her boss. Thus, one of the characteristics she most admires is his apparent ability to work long hours without tiring. This is a man who does not mind rolling up his sleeves and labouring with his technicians, regardless of his hierarchical superiority (*Ob*: 108). Neither does he seem to get any sleep at all because, having left for the hotel at 5.00 a.m., he reappears clean-shaven and well-dressed again merely a couple of hours later (*Ob*: 111).

Dubcheck's position is certainly not very comfortable: Marissa is inexperienced and he has to correct the girl's behaviour for the sake of the operation. Especially notable is the bioheroine's particular obsession with this kind of microbiological sanctuary to which only a few privileged scientists are allowed. It is certainly the eagerness of this novel investigator to enter such a select group that makes her profane the sacred temple. Faced with this last act of indiscipline, Dubcheck has no choice but to separate her from the case. Much to his concern, the

girl has become a real danger more than a help given the dire situation of the Ebola epidemic and this is not a risk he can afford to run (*Ob*: 195-6).

With the relationship between the characters deteriorating almost to the point of non-existence, it is not strange that Dubcheck materially disappears from the plot during most of the last third of the novel. However, he miraculously reemerges at the very end to save the life of his protégée (*Ob*: 334-335). Thus, this character experiences different stages along the plot. First, he appears to be an understanding boss but only because he falls in love with his subordinate. Then, he changes to a progressively angry mood, eventually leading to isolating Marissa to protect the CDC. Such a movement seems to confirm his participation in the conspiracy but an eventual return proves his innocence and his love for the bioheroine. Dubcheck is ambiguous, indeed. Yet, his participation becomes essential for the ultimate success of the protagonist.

Much the same can be said of the lab technician, Tad Schockley. A young PhD –probably in microbiology, although not mentioned (*Ob*: 27)– his jolly behaviour does not grant him the necessary seriousness for a character in his position. Moreover, dressed in baggy jeans and torn jackets, he likewise gives the impression of a slaphappy researcher. Indeed, he is gleeful but certainly not careless, as he often demonstrates over the course of events. His value is already stated at Ralph’s party, where all the guests are well-established practitioners except for himself and Dubcheck; Marissa attending the dinner party as Ralph’s fiancée like the rest of the physicians’ partners. No sooner does the conversation turn to epidemic matters than his contribution is requested (*Ob*: 30). No doubt, it is assumed that his participation in the subsequent chapters is going to have a significant weight.

Actually, he seems to be quite excited with the possibility of working with Ebola. Thus, Tad demonstrates his courage by facing the invisible enemy and probably seeking his place in the Hall of Fame of renowned microbiologists as well. That he wants recognition is ascertained the very first moment he allows Marissa into the sacrosanct mcl. It is a common habit in Tad to turn to the subject of his research to impress the young lady. This is especially notorious during their first joint visit to the lab, when Tad proudly takes the role of Marissa’s host to show her around (*Ob*: 79-88). To be true, the technician realises that the way to succeed in this case must be found together. He concurs that, by finding the way the virus is transmitted they will discover the source of the Ebola strain and will both earn praise. Thus,

although he is perfectly aware that he is being used, he accepts the situation in his personal quest for success (*Ob*: 158). The need is, therefore, mutual and so is the manipulation.

Nevertheless, when word spreads around the CDC of Marissa's undisciplined behaviour Tad's position is questioned. He cannot make any more favours and shuts the door to the mcl (*Ob*: 234). Other than a concerned friend, he is the virologist who leads Marissa to determine the origin of the Ebola outbreaks. Likewise, he is also a sporadic source of well-being for the bioheroine at a time when nobody seems to believe her. However, it seems quite strange that he vanishes when his dear friend most needs him. It looks like Cook had to quicken the pace of the book and Tad, much like Dubcheck, became redundant.

Similarly, a secondary character with a most relevant participation in *Time of the Fourth Horseman* is the epidemiologist Peter Justin. Initially unwilling to collaborate, he switches his attitude after contracting the new polio mutation resulting from the general vaccine cleanup. Although his opening parts in the plot show an extremely uncommitted doctor, he knows he is doing wrong. Only this way can his palpable nervousness be explained. For all his diplomacy and logical explanations, there is an obvious moral principle he is breaking by allowing all those anonymous victims to die. There are exceptions to the greater good; especially when it is achieved at such a high human cost. Thus, he cannot avoid showing signs of inner conflict, which do not escape Harry, like nail-biting or wiping inexistent dust off the table (*ToFH*: 77).

Hence, Justin's sudden materialisation at the Van Dreyter house is not unexpected. However, he has visibly deteriorated; in a physical way, because of the disease, and also psychologically, due to the unbearable weight of guilt. But, as a good epidemiologist, Justin has kept track of the malady taking hold of him, carefully recording in his diary the incubation period, symptoms, and other significant characteristics of the polio variant. Obviously, such information becomes extremely valuable for those treating the disease at the Van Dreyter house. Knowing also of his reduced chances of survival, he decides to stay with the dissidents and help as the most honourable manner of "paying his debt" (*ToFH*: 226).

At the same time, Justin is the one to select those to enter the five vans heading to salvation and those to stay awaiting death (*ToFH*: 242). Making use of his authority, he writes the letter which will eventually reach Washington; certainly not

to put an end to the biological nightmare but, at least, to uncover the conspiracy behind it (*ToFH*: 227). Thus, Justin's participation in the plot is fundamental for these final deeds. Whether Nat and Harry would have managed to solve the crisis by different means is uncertain, but it is true that, under the circumstances, Justin's participation provides the best possible way to solve the emergency fast and neatly.

Additionally, some dissident doctors appear who acquire name and surnames for a particular part in the plot. This is the case of the think-tankers Stan Kooznetz, Eric Patman and Lisa Skye, the multifunctional chiropractor Ernest Dagstern, or the handy van-driver Ted Lincoln. Other than that, they are simply named in the dismissal list (*ToFH*: 88-89) or collectively referred to as *the others* or *doctors*. There are occasional examples of their courage, like the brave deaths of Radick Lescu (*ToFH*: 235) or Dave Lillijanthal (*ToFH*: 237). In the same way, it is also suggested that many other anonymous dissidents will die in the Van Dreyter house helping the many nameless victims. Without their valuable collaboration, Harry and Nat's enterprise would equally have been impossible.

Yet, another couple who share their expertise with other specialists are the Jaaxes. Although these aides play a minor role, they certainly deserve mentioning. In not many books –if any at all– can we find such eminent researchers as Eugene “Gene” Johnson, Joseph B. McCormick or Peter Jahrling¹⁰⁶ taking part in the action. The former is a civilian virus hunter specialised in Ebola who is experienced in seeking exotic microbes in the rainforests. Although he is widely reputed amongst his own colleagues, his personal appearance does not generate much confidence. Moreover, an obsession with finding Ebola's reservoir makes his project at the USAMRIID a kind of horror that everybody but the resolute Nancy tries to avoid. During the Reston incident, he becomes Jerry Jaax's right-hand man and his advice is always listened to. It looks pretty thoughtful to name him an “Ajax of this biological war” (*THZ*: 285). Not only does he keep control of the situation by himself, but he helps those in command to keep it as well.

By the time of the Reston event, Joseph B. McCormick is the Chief of the Special Pathogens Branch of the CDC. Like the former, he is widely respected and

¹⁰⁶ The profiles of these researchers are given by *The University of Texas* at <<http://www.uth.tmc.edu/gsbs/tutorial/mccormick.html>>, *National Institutes of Health* at <<http://www1.od.nih.gov/oir/demystifyingMed/DM07/Speakers/Jahrling.htm>>, and *New York Academy of Sciences* at <<http://www.nyas.org/biodef/speakers.asp>>, respectively. Retrieved 4 August 2008.

has also taken part in important missions in Africa in search of Ebola. Yet, he criticises that the army (Johnson) spent taxpayer's money investigating Ebola in Kitum Cave on Mount Elgon, on the border between Kenya and Uganda, without publishing any results (*THZ*: 260). In his view, this is not the right way to perform public research, since the findings are hidden from those who have financed the investigation. Thus, when the USAMRIID (Johnson) and the CDC (McCormick) have to join forces in a crisis cabinet, trouble is served. Nevertheless, it is quickly settled by Major General Philip K. Russell, MD, who states that the army will manage the monkeys and the monkey house, whereas the CDC will take care of any human victims or casualties (*THZ*: 265). However, collaboration, is not precisely easy to achieve; especially when the Chief of the disease-assessment division at the USAMRIID, colonel Clarence James Peters MD, has mocked McCormick about his quick test for Ebola in front of the other members of the cabinet (*THZ*: 264). It is therefore fair to say that, more than consensus, what is reached is an enforced agreement: the army (Russell) imposes the aspects to be dealt with by the civilians and the military.

Meanwhile, other characters like Peter Jahrling and Tom Geisbert play a double role. One is a civilian army virologist, whereas the other is an intern at the USAMRIID running the electron microscope. Both are codiscoverers of the Ebola Reston strain and both are afraid that they may have contracted the disease. In consequence, they give the crisis cabinet the minimum collaboration the situation requires. Actually, they decide to run blood tests on themselves and report to the Slammer (the fearful Biosafety Level 4 containment hospital at the USAMRIID) only if they come out positive (*THZ*: 209). Certainly, this proves to be a major dereliction, since they may communicate the disease to many other people in the meantime and cause an irreversible chain reaction. The two sides of the biological researcher appear once again. Eventually, no humans come down with Ebola.

Thus, the mission is seriously endangered through unacceptable jealousy and negligence. There is no doubt that communal work becomes essential for a felicitous resolution. However, one may wonder what would have happened if General Russell had not settled the disharmony between Peters and McCormick; or if Jahrling and Geisbert, internationally acclaimed as discoverers of the Reston strain of the Ebola virus, had actually come down with an airborne disease. Certainly, their behaviour shows how thin the line between success and failure is.

Finally, the audacious Kivrin is certainly lucky to count on the valuable aid of the reflective Dunworthy. A rather nonconformist person, he shows himself quite critical with the time travel system and especially with Gilchrist, the academic in charge of the project. Their contention and mutual accusations of incompetence throughout the crisis become a constant (*DB*: 5, 8, 23, 29, 50, and 95, for example). This is about to leave the protagonist stranded in the fourteenth century and facing a sure death. It is only thanks to the scholar's patience and savoir-faire that the situation is redirected and a major catastrophe avoided. Even if he initially refuses to tutor her unofficially, it is quite clear by his concern that Dunworthy regrets his subsequent acceptance; especially because she is now in the hands of negligent professionals (*DB*: 11). Thus, he has to accept the task, confront those who should take care of the project and gradually take an unwanted command.

Through his words and reflections, the author poses a series of doubts as to whether humankind is safe in a allegedly hygienic affluent world (*DB*: 5), whether diseases from past or future times along with immigration and its epidemic threats can be controlled (*DB*: 64), or the usefulness of learning from past pandemics (*DB*: 93). In Dunworthy's world, significant technological advances have been made towards humankind's most wanted dreams. However, infectious diseases are not under control. It seems as if the scholar is the only one to notice such a threat, until the flu violently strikes the bubble. By this time, however, excessively restrictive measures have been taken to prevent the pandemic from spreading. What is worse: certain incompetent subjects like Gilchrist have gained absolute power in the absence of the academic authorities. It is Dunworthy's obligation to disclose negligence and miraculously arrange a rescue trip with the help of the technician who has wisely kept a back-up with the right coordinates.

4.2.3 The Law-Enforcing Team

Conversely, those bioheroes/-ines who already possess medical knowledge and do not trust the crisis to other colleagues only need the help of certain law enforcers. Thus, the beautiful Mirit Zimmerman provides fundamental support to Dr. Neil Anderson. Because he is not familiar with a foreign environment such as 1980s Israel, the need for a native to guide his steps around the unknown country becomes imperative. Many would be capable of performing such a task, but a young captain

of the opposite sex adds the necessary live bait to activate the plot. From the moment she is assigned to follow the bacteriologist's moves, their professional relationship acquires an everyday status; thus sharing protagonism for most of the second part of the novel.

In a way, her commitment to her country also has personal roots. Coming from a family of German Jews, Mirit has inherited a strong nationalism from her father, subsequently cultivated in the unstable years following the Six-Day War. Such a background helps to explain the present situation and how she has acquired such a high rank in the army in a short period of time. The powerful image of her father crying after the Arab occupation of the wall of the temple in Jerusalem impressed her so deeply that, in her own words, that was "the day when I discovered what being an Israeli meant" (*TSA*: 120). To Mirit, the protection of her country is a major driving force and she likes to be in the army where she can dedicate her own life to the cause. She even seems to accept the Arab threat as the main reason keeping Israelis united, also stating that the will to survive has become the inner engine of the country (*TSA*: 120).

Becoming her host's guardian angel, time together inevitably brings about affection and love. This brings trouble since she is also sincerely committed to her country. The young woman is carrying an unbearable burden and she has to choose a side because the prospect of continual deceit and evasion is "eating her alive" (*TSA*: 195). So, she decides that:

She wouldn't betray Neil Anderson; she would give him up! She would tell him that it was all over between them and that she didn't want to see him again. But could she do it? She did love him. Yes, she decided, for after that he would go home and he would be safe. He would be back in his leafy Surrey lanes where he really belonged and he would get over it in time and so would she, however badly she felt. What's more she would be able to live with herself. With Neil gone, Mossad would have no further interest in her. The Klein gene would be someone else's problem. (*TSA*: 196-7)

Undoubtedly, this would be the most reasonable solution. But she is too deep in now to let him go and, although she makes a hesitant attempt at breaking up, her arguments turn out to be completely unconvincing. It is clear that she does not have the strength to betray her own feelings and, in the end, emotion prevails over reason: the unbendable couple is now ready to tackle the decisive scene.

Thus, Mirit takes initiative and command of the stealth operation at the Jan Kouros hospice; Anderson lacking the necessary training. Nonetheless, it is

improbable that a captain in her early twenties would have enough expertise to carry on the approach and, as a matter of fact, it cannot be said that it is a real success. Indeed, they are soon discovered and it is the CIA that eventually frees them. Perhaps rage is what makes her eventually accuse the Americans of exporting bioterrorists to Israel (*TSA*: 247). Although she has been ordered to seize the outcome of Freedman's research, it appears that she cannot deceive an alert Anderson. Thus, she helps him fling the remaining Klein cultures into the furnace in the incinerator-room at the hospice (*TSA*: 254).

In the end, Mirit Zimmerman seems perfectly compatible with the biohero. Whenever he lacks confidence, she manages to push Anderson forward. More than a faithful guide, she becomes the ideal complement for his many flaws: she takes the initiative of the operation to discover his would-be killer, she tackles his opponents for him as soon as action appears, she makes the logical deductions which Anderson does not seem capable to reach and, above all, she fills a gap in his heart which gives him the necessary stamina to go on. Ultimately, she even changes her deep commitment to her country for a new one with the biohero. There is no better aide for Anderson, who undoubtedly achieves his objectives thanks to the faithful assistance of the beautiful young officer.

On the contrary, Dr. Kay Scarpetta is not inclined to trust her job to any secondary character. As a loner, she prefers to perform the investigation all by herself. Occasionally, she may ask those around her to carry out lowly tasks, basically aimed at quickly solving certain obstacles she finds in her investigations. In this respect, she seems to be quite well accompanied. On the one hand, she counts on Pete Marino, commander of Richmond's city police homicide squad, to provide her with manpower and resources. He is obviously chasing her, yet she does not pay much attention to his affectionate overtones (*UE*: 45). This is more or less the case of Benton Wesley, who incidentally happens to be the FBI agent leading the investigation of the event. Of course, he is also in love with Kay, with whom he has already had an affair and even spent some holidays together. However, they did not get along during that time and it is pretty obvious that she simply maintains the relationship out of self-interest (*UE*: 46). Likewise, her own niece Lucy Farinelly also happens to be an FBI agent enrolled in the Hostage Rescue Team and taking care of the Criminal Artificial Intelligent Network. That is to say, she provides access to all sorts of files. Mostly, she acts as a brainstorming booster and contributes with

some clues that seem to escape the bioheroine (*UE*: 154, 163). Additionally, a series of minor characters –private investigators, USAMRIID officers, fingerprint chiefs and even family practitioners– also appear for certain situations. Their involvement in the plot is nonessential, only to relieve Dr. Scarpetta of excessive prominence.

4.2.4 *The Heterogeneous Team*

Finally, there are also certain biohazard writers who endow their bioheroes/-ines with as many aides as they need for any particular event. Another lonesome biohero who is well-surrounded by such a group of loyal collaborators is former cop Conor O’Neil. Whether it is his girlfriend or a scared customer, a stage hypnotist or a mafia capo, Conor always seems to make the best out of his acquaintances whenever he is in trouble. Thus, he partially or completely delegates his tasks to these characters on a number of occasions, even though he likes to be in control of the situation from the background. His friends help him escape from the unexpected extreme position he finds himself in. What is more, the key to the eventual successful outcome lies precisely in the variety of characters around this charismatic biohero; each of them supplying a particular ability which Conor lacks.

To begin with, he is blessed with the beautiful and resolute girlfriend by his side. Twelve years younger than him, Lacey is a wilful journalist aged twenty-five, who has entered Conor’s life to fill the sentimental vacuum left by his traumatic divorce. Despite keeping a brave man like him shamefully on a diet (*PA*: 27), she initially gives him physical and emotional protection once the crisis breaks out. It is obvious, however, that she is precisely the biohero’s Achilles’ heel and it does not take long before Branch kidnaps her (*PA*: 240). After the painful experience, she realises that she has to leave from Conor to live her own life without fear. It is a sad decision, though, which Lacey reaches only when she has seen death up close. In the end, she reappears after everything has returned to normality to provide a happy ending to the novel (*PA*: 535).

However, while Conor does not have Lacey by his side, the unfathomable Magda Slanic fills the gap. Typically characterised in the *femme fatale* look, Magda is described as very tall, nearly six feet, always dressed in black to match her dark eyes and hair. In contrast, her skin is deathly pale and she wears a singular perfume of decaying roses and over-ripe fruit (*PA*: 16). Conor’s first contact with her is at the

store, when he is hypnotised by Ramon, Magda's stage counterpart, prior to the robbery which is to put his reputation at stake. Then, she materially disappears from the scene until Ramon's death, which propitiates Magda's collaboration with Conor. Supposedly, she fears for her own life since, once her job is done, Magda is redundant to Branch. Somehow, she manages to convince Conor to join forces with her; not only through words, but also using hypnotic induction (*PA*: 346). It is not clear whether Conor's need for Magda is by his own will or through the spell she has put on him but, from then on, the biohero relies on the hypnotist woman to chase Branch.

Actually, she is powerfully attracted by the charisma of the champion and, now that Lacey has forsaken him, she sees the opportunity to conquer his heart. Although she may be helping Conor for vengeful purposes, Magda's physical attraction to the biohero is out of the question. It can be said that this is a second reason to justify her helping role. In the same way as Conor has been left without Lacey, she has been deprived of Ramon and both have sexual needs to fulfil. Yet, Magda's powerful technique does not seem to have much effect on Conor, who has been well trained by Sydney Randall to avoid being hypnotised (*PA*: 498-99). For a woman like her, this is an insult she cannot cope with. She abandons the biohero and reappears only when Dennis Evelyn Branch is dead.

In the end, she gives Conor the affidavit that proves his innocence, but she also utters an enigmatic final question indicating that she has also achieved control of the biohero's mind: "Now, of course, you can have anything your heart desires, can't you?", said Magda. '*Anything*'" (*PA*: 541). Considering that she proudly acknowledged her ability for post-hypnotic suggestion –"I could hypnotise a man, and then three weeks later, at precisely four o'clock, I could make him prick his finger with a pin" (*PA*: 384), it is certain that she has hypnotised Conor for a new deed. This also explains why the biohero does not find words to tell Lacey what he is about to do in the paragraph that ends the book. Eventually, therefore, it looks as if she has been in control of the whole situation from the very beginning: Conor, Branch, and the rest of the characters have been simply manipulated by the hypnotist witch, who prepares a new blow with the biohero in the leading role.

On the other hand, Conor is also well advised by the theatrical agent Eleanor Bronsky. A former manager of Ric –Sebastian's partner, Eleanor has the prudence that age endows, an experienced woman in her sixties who is acquainted with

Broadway and the diverse populace around it. Although the inevitable passing of the years has left a visible mark on her looks, she is still beautiful to Conor, who depicts her as “etiolated by smoking and decades of late nights, with well-cut white hair and a face that, once, must have been striking” (*PA*: 111). Also a former manager of Hypnos and Hetti –Ramon and Magda, she decides to help the biohero because she does not approve of the unethical manners in their practice of hypnotism. In her view, there is an implicit code of honour on stage that they do not respect, as she mentions the instance when they hypnotised a man into eating a whisky glass and he was never able to speak well again (*PA*: 114).

Thus, she manages to convince Sydney Randall, a great hypnotist of the fifties. Whereas she does not take part in the physical action, Eleanor proves to be of vital importance doing the background work and makes the best of her contacts to lend a hand. Unexpectedly, though, she starts meddling in Conor’s affairs and, not less surprisingly, the protagonist seems to accept such interference. In fact, Eleanor visibly inspires his confidence both because of her experience and helpful contacts. Hence, Eleanor becomes Conor’s private advisor and appears to provide the compulsory down-to-earth point of view.

It is because of her words that Conor, reluctant as he had been, finally requests the help of the mafia capo Luigi Gutusso, who contributes his men and an apartment (*PA*: 292-293). Likewise, he also accepts Davina Gambit’s money to finance his expedition to Norway (*PA*: 340). In this manner, the mature agent makes Conor leave behind all the religious and moral obstacles that prevented him from facing his enemies on equal terms. What is more, she has even secretly settled with Gambit to supervise the operation from Norway, where she flies with Conor and Magda (*PA*: 428). Actually, the truth behind the woman’s selfless assistance appears to be the painful loss of her son James, of whom Conor reminds her so movingly (*PA*: 427). But her last gift to the party is a chicken casserole surrounded by candles, reducing her participation to the motherly figure she is likely to become for Conor in the future (*PA*: 495).

Yet another obliging character is Sydney Randall, the retired hypnotist who initiates Conor into this intriguing art. As introduced by Eleanor, Sydney is already seventy-eight and not really up to much activity. He is described as a tall bony old man with an angular face, a prominent nose and a straggly grey beard (*PA*: 134). As if to make a point, he censures the frivolous use of such a powerful ability by

unscrupulous amateurs, thus warning Conor of the dark side of the ability he is about to acquire. As he begins hypnotising the biohero, he is also keen on deconstructing some false concepts, like the image of the hypnotist swinging a pendant in front of his/her patient's eyes (*PA*: 145). He has the chance to prove his powers with a couple of Labrea's felons coming to get Conor. Both are induced to shoot each other when the situation is most desperate (*PA*: 156). However, his most significant contribution is his advice to the biohero in his confrontation with Magda at the Rialto theatre (*PA*: 209-222). Once located, Conor must face Hypnos and Hetti so as to find out who has put him in such a miserable position. Needless to say, without Sydney's preparation and his personal assistance at the theatre, such a step would have been an utter failure. Unfortunately, this is his last useful participation in the plot because he is shot twice in the chest (*PA*: 286).

There are also some minor characters who give their support to the biohero. First of all, we find Lacey's personal friend Sebastian and his partner Ric. The former is described as a tall black man, with a shaven head and extravagant clothes and jewels (*PA*: 96). In spite of his marked effeminate movements, he happens to be quite proficient in karate, an ability which he does not hesitate to use against Ramon's bodyguards at the Rialto theatre (*PA*: 218-20). His collaboration, though, goes no further since he is also shot at the Waldorf-Astoria (*PA*: 284). As for the latter, he is a young blond boy, barely eighteen, who has already taken part in some Broadway plays as a dancer (*PA*: 97). He is also acquainted with Ramon and Magda, with whom he used to perform (*PA*: 101), and is the one to give Conor Eleanor's phone number to keep track of the two evil-doers (*PA*: 106). Although he is not as skilled in martial arts as Sebastian, he also escorts Conor around the city and performs some uncommon activities for the typical masculine character, like washing and ironing the team's clothes (*PA*: 201).

After the critical episode at the Waldorf, Conor is left without manpower, which he promptly obtains from the Mafia capo Luigi Guttuso. More than that, he also supplies him with two other gifts: a safe house where he can hide from both Branch and the police and a light Browning to defend himself. He states that "if crime wasn't against the law, you and me, we would have been pretty good friends" (*PA*: 298). Furthermore, he reminds him of the Mafia's conventional devotion to the family and uses this to justify his support for rescuing Lacey at any cost.

As for legal advice, Conor has the backing of his lawyer Michael Baer, who

only appears in the plot on a couple of occasions. In the first instance, he is briefly cited by Lacey, who reports his appearance on TV saying that he should give himself up and let him defend the case (*PA*: 120-121). His girlfriend also brings Baer's message that he has received large amounts of money from customers who want their properties back, an idea which obviously pleases Lacey who dreams of a big house in Florida. A subsequent meeting with the lawyer reveals that over sixty-five million dollars have already been sent to him but, of course, the biohero cannot return the property simply because he does not have it (*PA*: 185-186).

Finally, when the epidemic menace is uncovered, the biohero seeks knowledge from Professor Jorn Haraldsen, who produces a minor lecture on the Spanish Flu pandemic (*PA*: 214-222)¹⁰⁷. Surely, such information is vital to understanding the new turn of the plot which, by now, should have the reader who is not familiar with the history of epidemics quite confused. Yet, at the same time, Conor eventually uncovers Branch's malevolent plan through Haraldsen's illustration, thus making up his mind to stop him not only for personal but for philanthropic reasons as well.

Indeed, after so much help, Conor cannot take the whole credit for his successful mission. While he has a reputation to regain, each of these many aides also deserves recognition. Even though partially, they are all bioheroes/-ines of their own kind.

Another large group of collaborators is the one around Janie Crowe, both in *The Plague Tales* and *The Burning Road*. Amongst them, however, Caroline's contribution is outstanding, though not precisely because of constant support. As a matter of fact, she spends the second half of *The Plague Tales* in a fitful coma, and enjoying her newly acquired married status in the succeeding story. However, she holds a steady part in both novels: she is patient zero¹⁰⁸ of the ancient Black Death in the first book, and the bearer of the saving genes in the sequel. Therefore, she becomes a crucial axis around which the plots revolve.

More than just a stunning lulu, Caroline is also organised, determined,

¹⁰⁷ Such characters as Professors Levine, Dunworthy or Haraldsen seem to play the Jungian archetype of the "Wise Old Man" (1968: 208). While their contribution to the plot is variable, they appear to provide some necessary knowledge about biohazard matters which seems to be ignored (i.e. the risk of permanent damage by altering germ cells, time travel slippage to biologically dangerous ages, or a revision of the Spanish Flu pandemic, respectively).

¹⁰⁸ A synonym for the index case.

intelligent, independent and has lots of initiative, not to mention her ability to listen and provide good advice to her boss and friend (*TPT*: 99). Furthermore, she proves to be an incredibly sturdy woman, with an immunological system capable of resisting both bubonic plague and DR.SAM's consecutive infections a year later, thus providing resistant genes for a universal cure. The only problems for Janie come precisely from her independence and her naiveness; if this, of course, can be considered a defect.

Yet another interesting character, more present in *The Plague Tales* than in *The Burning Road*, is the good-looking doctor Bruce Ransom. A former fellow student in the medical school with Janie back in the States, he moved to England after being recruited right out of residency by Ted. Bruce does not practice medicine at all, but spends his time in the magnificent laboratory inside the Microbiology Institute. Far from regretting such a lack of practice, he is quite content with his life since he acknowledges that he is doing exactly what he loves (*TPT*: 193). This is obviously not surprising when he is co-leading the institution, one of the most powerful and best equipped in the world after the Outbreaks, with his recruiter. Indeed, it can be said that he is holding a rather authoritative position in the twenty-first century England under the dictatorship of the Biological Police. In fact, he is quite proud of having personally developed the compudoc system and the bodyprinting technique, the favourite control instruments of the biocops. What is more, he admits that he was one of the first volunteers for bodyprinting, which he has undergone ten times, a disgusting experience which Janie can only attribute to simple masochism (*TPT*: 418).

Basically, he is the one who provides her with the necessary emotional stability to go on with her personal quest. More than a mere affair, he gives her love and attention when she most needs them, she keeps her head cool with his sound advice in the most distressing situations, and supplies her with the necessary means whenever these are needed. Thanks to his powerful contacts and substantive expertise, he can take Janie and Caroline out of impossible situations and acts as a guide for them in an alien world. And why not, he also becomes a sexual aperitif who enables the protagonist to put aside all the troubles she encounters, if only for a few moments (*TPT*: 434-5). Sure enough, it seems too great a price to pay to be left without the woman he loves in return for his constant and trustful care.

Things change a lot in *Burning Road*. While the presence of Bruce in

conversation is quite recurrent, he is still in England when the action has now moved to the United States one year later. This added trouble relegates Janie's main advisor to a second level. Thus, his participation is reduced to a couple of phone conversations to send the bioheroine sensible pieces of advice (*BR*: 210-211, 249-251) and a torrid encounter with her love in Iceland (*BR*: 456-458 and 462-463). Nevertheless, his wise counsel is relevant to Janie who, despite shifting her attention to Tom, still values the sound words of her remote lover. Somehow, Janie knows that he is partly right when he tells her to quit her new objective and preserve her job and personal integrity, but she is too stubborn to let the case go now.

What he does not know, obviously, is that Janie's attention has turned to her lawyer; somebody who has progressively taken his place as counsellor and who is much more tolerant with her movements. All the features that made Janie focus her attention on Bruce in *The Plague Tales*, are now shared by Tom: he takes care of her through sound advice (*BR*: 27), comforts her in absence of her partner (*BR*: 205-208) and, eventually, happens to hold a much more powerful position than expected at the beginning of the novel (*BR*: 590). Indeed, he becomes a new champion in line with the new circumstances.

Actually, their lives have always been in tune to a certain extent. Despite the fact that they have never got married or established their relationship, they have grown up together and shared intimate experiences. Through Janie's words, it is discovered that their relationship as youngsters included joints, beers and sexual intercourse (*BR*: 157). Moreover, they have never lost contact, either through Janie's marriage or in her widowhood. However, Tom is quite determined to put an end to this sporadic relationship, and the fact that Janie is left without a home to sleep in facilitates the completion of the "circuit between them" (*BR*: 559). After all, this could be nothing more than a new liaison, just like the ones they used to have in the past. Yet, it is taken for granted that this is the one. The disengagement from Bruce comes almost immediately afterwards (*BR*: 583). And the final surprise also comes hastily: Tom reveals his ownership of *Camp Meir* (*BR*: 591). Thus, all the help she has received from the secret organisation, Kristina Warger, and the Virtual Memorial is revealed to be attributable to him. Eventually, he reveals his unconditional financial support to her investigation hence highlighting his father-like figure.

Also in this novel, Janie receives the invaluable help of the likewise enigmatic Kristina Warger who eventually turns out to be Tom's daughter. Actually, her

introduction into the novel via an e-mail bidding Janie not to be afraid and signed with the pseudonym *Wargirl*, wraps her in a mysterious aura (*BR*: 170). In turn, this is later enhanced by her brusque materialisation in Janie's house immediately after it had been broken into, which does not precisely help her gain the protagonist's initial trust (*BR*: 240). It is at this time that she is physically described to the reader as an athletic young woman in her early twenties, nonetheless looking quite benign despite her flagrant intrusion. A swift explanation of the e-mail considerably softens the tension for a prompt collaboration. Furthermore, the protagonist's empathy with her has a lot to do with Kristina's extraordinary resemblance to Janie's daughter Betsy, lost in the Outbreaks. Not only does she match her physically, but she also appears to be the same age Betsy would have been at that time (*BR*: 298). Undoubtedly, these weird coincidences make the cooperation quite fruitful right from the start.

In the beginning, Kristina shows herself to be rather bossy, with a strange sense of command provided by a secretive organisation oddly interested in Janie's work. Somehow, she appears to wander between her ostensible independent character and a submission to an unknown higher authority in the agency, eventually unveiled as her own father. The agency itself is commonly substituted in conversation by *we*, which also accounts for a new turn of secrecy, as Kristina seems to have an equally important position in it (*BR*: 244). The bioheroine is only allowed to know that they are an independent private agency, made up of volunteers, investigating possible cases of illegal genetic manipulation.

The joint productive task is finished in the agency's wonderful lab in *Camp Meir*. Once the patient zero is found, it only takes Kristina a trace of DNA from a European Jew to perform remedial genetic manipulation. Miraculously again, Janie remembers the hair in Alejandro's journal. As she puts it:

In an entire nation of DNA she couldn't find the little segment she needed. But in one ancient Jew she would. It was absurd. But it was undeniably possible. He fit the profile perfectly. (*BR*: 533)

Still, Kristina finds time for a momentous discovery no one had noticed: a healthy gene to cure Gehrig's disease¹⁰⁹, is equally valid for DR.SAM, the natural pandemic evolving in the twenty-first century (*BR*: 683-686). Hence, the praise for the gene wash procedure should be given to the assistant rather than to the

¹⁰⁹ Also known as *Amyotrophic Lateral Sclerosis (ALS)*.

bioheroine. Undoubtedly, without Janie's research both in England and the States, the critical moment would not have been reached; yet it is Kristina's brilliant mind that brings about the future eradication of this modern plague. Thus, the aide has also unexpectedly become a bioheroine.

Another collaborator is Ted Cummings, the Institute Director in *The Plague Tales*. First mentioned through Bruce's voice as "a shrewd maker of political deals," Ted does not have the experience of the former in the lab, his job concentrating solely on administrative matters (*TPT*: 104). In fact, he personally recruited Bruce right out of college for the tough job, so his apparent isolation should not surprise the reader. However, there is an unexpected turn of events forcing his inexcusable participation in the plot: the *P.Coli*'s explosion in the lab threatening to sully his immaculate reputation (*TPT*: 140). A boss greatly respected by his subordinates, Ted cannot afford to lose his well-gained authority through an incident which is blamed on the deceased Frank. Yet, such an obsession with keeping his social status is about to cause his immediate downfall.

Certainly, it is unusual for a man described as "annoyingly Spartan" in every detail (*TPT*: 216) to touch the fabric without protection. The reasons for his negligence must be found, first of all, in his inexperience at the lab, which he has rarely entered ever since Bruce's recruitment to the Institute. Likewise, the ensuing panic after the accident and the subsequent fear of the blame, make him disregard the necessary precautions and inspect the strange piece of cloth without gloves. As a result, instead of helping redress the already complicated situation, he is bound to make matters worse. Not only poor Caroline, but also the unknowing Bruce and Janie are dragged headlong with him.

For him, it is not simply a question that Caroline may wander freely around London propagating the plague but, somehow, he also feels responsible for unleashing the evil bug and tries to avoid any possible implication in the matter. Even though Bruce has been doing the groundwork, still the credit has been for both and he has a social status to maintain. The weight of guilt for such an accomplished man becomes absolutely unbearable:

He had screwed up; he was entirely responsible for this mess, and there was a very tangible paper trail to prove it, some of which was not within his immediate control. As a result of his own incompetence he was suffering from a potentially fatal and highly infectious disease, and if he sought treatment through normal channels, the whole scientific community would discover what

had happened. He would never be able to reconstruct his orderly, precise, life.
(*TPT*: 286)

Yet, on account of the rapid degradation of his nervous system, he not only panics but also behaves clumsily, which makes Caroline suspicious of his intentions. Nevertheless, he manages to give her a dose of a sedative along with a healing antibiotic so that he can search for the fabric undisturbed (*TPT*: 340). By this time, however, the symptoms of the disease are too strong for him to control. Doubling the recommended amount, he mistakes tetracycline for the sedative, thus giving himself a fatal injection. The realisation comes too late, with only enough time to baptise himself as the *Anti-Faust*, “bargaining with God so I can keep my soul” (*TPT*: 343). But, unlike the former, he is not given the chance and falls dead over Caroline; the innocent Margaret of this modern tragedy.

As for his last words, there seem to be, at least, a couple of ways of interpreting them. On the one hand, he seems to accept his punishment and makes a final call for help, thus allowing the ensuing shame to fall over him. In his own terms, "I'd rather be alive and ruined than a well-respected dead man" (*TPT*: 343). In this sense, his proclamation as the *Anti-Faust* is quite clear since, unlike the classical myth, he does not even mind degrading his own existence as long as he remains alive. On the other hand, despite having the chance of obtaining his own particular Margaret, he still has the strength to refuse the temptation. In this second case, he becomes the opposite of the classical Faust because he does not submit to Mephistopheles' lure. Whatever the case, neither does he ever get to make the final call for help or is he rewarded with keeping his miserable life by declining to abuse Caroline.

Another twofold character is Lieutenant Michael Rosow, Caroline's relentless pursuer in the first novel and surprisingly faithful husband in the second. It is uncertain which features of the character cause Janie's assistant to fall so suddenly in love and marry him. However, from his very late introduction in *The Plague Tales*, one understands he is clearly modelled as her perfect partner. Holding a high rank in the London branch of the International Biological Police, he is likewise a rather cultivated man, as demonstrated through his love for classical music, with a special predilection for Brahms (*TPT*: 530).

We also know from the end of the first book that he is quite an accomplished leader, guiding his group of biocops behind the redhead with an unflinching persistence

(*TPT*: 588-591, 621-622, 640, 642, and 660-661). Instead of feeling frustrated by the striking elusiveness of the unknown female, Lt. Rosow shows a characteristic tenacity which is surely bound to make him reappear in the second novel. Hence, the apparently strange marriage in *Burning Road* must be relativised. To a certain extent, it is suggested from the end of the previous work that Rosow would come back; his perseverance leading him straight to Caroline. The meeting between the two heartbreakers could only end, either in a fatal clash or, as in the case, in unavoidable mutual attraction. The rest is simply left to the reader's imagination. Rosow (Michael)'s position is much too important for the plot of the sequel to let him disappear so easily. Indeed, Michael has now been reassigned to the western Massachusetts division of Biopol; thus with access to essential information for the bioheroine (*BR*: 40). As mentioned before, perhaps the token synthesising Michael's power is his palmtop; i.e. the key to virtually any kind of information. It seems natural that once informed of Janie making use of this personal device without his consent he would get terribly crossed. Yet, the character has changed a lot, at least in his collaboration with his former target, now being amazingly lenient with Janie (*BR*: 204).

Other minor characters also back up Janie in both plots. In the former, it is necessary to mention Robert Sarin, the retarded caretaker of the manor where the ill-omened digging takes place. Firstly reluctant to collaborate with the project, it is his unavoidable destiny to apply the traditional cure for the bubonic plague as recorded in Alejandro's journal to Caroline (*TPT*: 614). What is more, Janie and Bruce equally benefit from the knowledge held in the ancient book: both of them also take their dose of the nauseating potion, thus certainly saving their own lives (*TPT*: 625-626). Eventually, Sarin's last gift to Janie is indeed the journal itself, the link between the historic and futuristic plots and, probably, the key for the continuation of the series¹¹⁰.

In the second book, Myra Ross, the empathetic curator of the National Hebrew Book Depository, likewise happens to guide Janie when she is most disoriented¹¹¹. Actually, her position should be one of detachment since she is simply

¹¹⁰ Indeed, in September 2007 Ann Benson published *The Physician's Tale* to complete the trilogy.

¹¹¹ Both Benson's Myra Ross and Blackwood's Eleanor Bronsky seem to provide the feminine counterpart of the aforementioned professors, or what Jung describes as the "Wise Old Woman" (1968: 209).

charged with the task of taking good care of the physician's journal. However, she is prone to express her opinions and Janie seems to trust her from the very beginning. Her own physical description, a petite woman in her sixties full of wit and charm, already announces what is going to be her role during the course of the events (*BR*: 72). It is Myra who discloses the contents of the journal and provides Janie with information about its author (*TPT*: 339-346). It is also the elderly woman who reveals its high value, estimated at about a million dollars (*BR*: 525). However, her greatest contribution comes at the end of the novel when, amidst the anarchy reigning during the DR.SAM's pandemic, Janie needs someone to whom she can explain her problems and get some comfort. After having her house burnt down and still stuck in the web between Tom and Bruce, she does not seem to have the necessary cool mind. At this unsteady time, Myra's care is a welcome gift. As a matter of fact, Janie acknowledges that Myra reminds her of her missing mother, thus trusting in the aged lady what she cannot with her female parent (*BR*: 518). What she really wants of her, however, is a fundamental move to solve her risky adventure. In essence, the curator is to simulate a security breach in the library involving the journal, so that Michael can gather evidence about it. The results are later scanned by Kristina who finds the necessary material for the gene washing operation in one of Alejandro's hair, an European Jew like the boys at Camp Meir. An Auschwitz survivor herself, Myra has no objection to the plan whatsoever (*TPT*: 519-526). Nevertheless, she does resist slightly returning the valuable journal to Janie when she is leaving the city for the safety of Camp Meir (*TPT*: 647-650). Having learnt to treat the bioheroine like her own daughter, her final gift is to offer Janie a secure place to stay during the pandemic: the library itself, designed to resist assaults with heavy weapons (*BR*: 649). Yet, Janie has better plans for Tom and herself and leaves the stoic woman behind in her fortress of ancient Jewish treasures.

4.2.5 Partial Findings: On the Aides

To conclude, if there is one notable function of the aide, that is admittedly to provide those abilities the biohero/-ine lacks. This is why, in the majority of the cases studied so far, the protagonist is surrounded by an assorted group of these people. In some other cases, the protagonist may indeed possess the abovementioned abilities, yet delegates the completion of certain tasks to a particular companion while he/she

is taking care of others. Thus, the sidekick often takes care of the paperwork, keeps the agenda up to date, does the phone calls, and other routine activities which may distract the champion from accomplishing his/her main target. More than anything, they can be regarded as personal secretaries. Also, by exchanging ideas in the loneliness of a highly sterilised room the aware technician quite often helps the biohero to make up his/her mind.

Another significant function of some of the aides is that of filling an emotional vacuum in the biohero/-ine's heart. In one way or another, most of the protagonists either need a love affair, a spouse or sometimes both to break from his/her strenuous obligations. It must be noticed as well that the emotional support does not necessarily include sex appeal. In this respect, the advisor-aide gains prominence. In the end, it is the leader who usually takes the credit for aborting the biological threat whereas his/her collaborators, sometimes bioheroes/-ines of their own kind, rarely take more than a communal recognition for the mission.

As for the female stock characters easily discernible amongst the aides' groups, there should be special mention of *femme fatales* like Magda or Vicky Wade who, in turn, shares the sagacious journalist character with Lacey. There is also room for beautiful scientists like Annie, Elaine and Susanna, or a Tomboy like Mirit, eventually leading to love affairs; not forgetting faithful wives like Mia and mature moms like Eleanor or Myra. On the male side, there is a wide variety of law enforcers from the police and the FBI, biowarfare veterans and CIA agents, another assorted group of MDs, made of microbiologists, virologists, epidemiologists and Health Doctors, as well as professors and learned students. Even apparently unconnected stock characters like a mafia capo or a Machiavellic lawyer may appear to provide some help. In conclusion, anyone who can support the biohero/-ine in one way or another is always welcome in this large group of characters.

4.3 The Bioterrorist

The evil counterpart of the biohero/-ine is not a compulsory character in the biohazard novel since he/she appears only when the plot is explicitly dealing with a possible case of bioterrorism. Accordingly this reduces the number of characters to be dealt with in this section. These are mainly fanatics of either religious or ecologist

causes, who seek revenge for a past abuse by certain individuals or humanity at large. Needless to say, they basically work alone, even if some of them are leaders of sects who have crooks to perform particular tasks, in the same way that the bioheroes/-ines have their aides. There are also a couple of groups of conspirators who want to deal with their medical competitors and overpopulation respectively using biological agents. Although they are a group of villains, there appears to be a character epitomising them, who is mainly treated as the bioterrorist and becomes prominent. Apart from these main groups, there are also some unwilling bioterrorists who happen to make a mistake and try to cover it up until the biohero/-ine eventually exposes them. An evil genius also claims his part as a villain. It is worth noting that most of these characters are also researchers who take to the dark side of science to take revenge or simply to become more powerful.

4.3.1 The Revengeful Researcher

Described as a simple middle-aged man of average height prematurely balding, Tom Cope wears expensive metal-framed glasses and is keen on natural clothing, which gives him a discreet casual appearance. At first sight, then, nobody would take him for a potential mass-killer. Yet, he has been trained to handle biological agents which can devastate the human race in a matter of days. This becomes his strongest asset: an ordinary individual with the power to destroy the (human) world. In fact, Cope is a convinced ecologist who considers man the earth's parasite; a drone whose population has grown too large for a natural balance of the ecosystem. Thus, the human species has to be thinned out and he has the perfect biological agent to do it: the brainpox virus. It is fast, clean and ecological but, most of all, it is completely innocuous to other species:

Of course, brainpox caused human suffering, but it was over soon. None of this lingering, as with AIDS, no time for public health doctors to find a cure. Brainpox wouldn't harm any other life forms on the planet, because brainpox infects only the human species. It wouldn't affect the ecosystems and habitats of the rainforests. (*TCE: 222*)

In his insanity, Cope thinks of himself as Mother Nature's champion, and holds the virus as the true equaliser. Moreover his hatred is especially directed at public health doctors, whom he considers as "environmental criminals of the highest

degree” (*TCE*: 220). To his mind, they are not only personally responsible for the existing overpopulation but also the poachers who have brought the smallpox virus – a natural species– to the edge of extinction. Despite his affable appearance –he even has some friendly feelings towards the people he encounters in the subway (*TCE*: 177), Cope is a real psychopath who is determined to immolate some individuals for the sake of humankind. Far from the total extinction of his race, he seeks a behavioural change in his fellow brothers and sisters in order to achieve a better communion with Mother Nature.

Those who do not adhere by his strict ecological standards are executed: he kills Penny Zecker because she cheats on him in the market (*TCE*: 131-132, 150-151), the homeless men are witnesses to his escape route (*TCE*: 141-142, 397), the kids who mistreat street cats have to be punished (*TCE*: 265-266, 326-331); and if there are other subsequent victims –like Kate Moran (*TCE*: 3-10), or Peter Talides (*TCE*: 152-155)– it is for a good cause. No individual life is important enough to jeopardise the completion of his master plan; hard as it may be, they have to be sacrificed. Such a scheme also includes many other anonymous inhabitants of a city which is to become the epicentre of a redeeming pandemic. Provided everything goes as scheduled, soon the infection will spread to the most important cities of the world and, from there, to every single corner of the human civilisation. This is the way it has to be, so as to restore the balance to the ecosystem.

It is quite clear that Cope suffers from an acute lack of emotional intelligence. Yet, he is far from the common fanatic: he is intelligent and scrupulously methodical in performance. Of course, he has been trained to be so. He has a Ph.D. in molecular biology from San Francisco State University and has worked in Los Alamos National Laboratory and Bio-Vek, a division of the biotechnology multinational BioArk (*TCE*: 357). That is where Cope has his first contact with the virus having been hired to complete its development into a bioweapon. The agent is not able to replicate in human tissue and the future bioterrorist helps to solve the problem. Later on, he is fired on account of his troublesome personality although he takes with him the lethal result of his research (*TCE*: 358). This explains Cope’s remorseless behaviour as well as his vengeful attitude towards humankind. Surely, he must feel used by a company which only seems to seek profit. This clashes with his particular ecological viewpoint and results in rage against his misguided fellows who do not share his outlook.

Hence, three major conclusions may be drawn: Cope is demented with an absolute disdain for human life; he is very accomplished, does not act randomly but according to a careful plan; and he is a convinced ecologist, to the point of eliminating those who do not share his rigorous principles. The critical blend of lack of empathy, social revenge and the eventual effects of the disease turn him into a profound absolutist who intends to subject the human race to his own beliefs. Even when he is about to be caught, he is assaulted by megalomaniac derangement, perceiving himself as an invincible hero with supernatural powers (*TCE*: 399-400). While he means to be remembered for ages as the planet's saviour, he ultimately becomes a major threat to humankind who is providentially deactivated.

The characteristics of Dr. Phyllis Crowder, the microbiologist in the Medical College of Virginia (MCV), make her another potential mass-killer. In fact, it is only her own failure in the genetic modification of the smallpox virus that prevents it from spreading. Crowder has spliced the DNA of monkey pox into the smallpox genome with the aim of making it invulnerable to the available vaccines (*UE*: 357). Yet, there must have been a mistake in the process because only the initial patient seems to develop the disease. Had the virus been able to replicate in the primary victim and cause subsequent infections, there would certainly have been many more casualties than the eventual three.

Since she does not appear much on scene –she is briefly introduced when Kay first visits her (*UE*: 179-181) and finally interviewed for an incriminating confession (*UE*: 350-361)– the information about her life is quite vague. It is evident, however, that Kay holds her in very high esteem, because she often demands her expertise on the electronic microscope. Although her parents were American, she was born and educated in England, a past which has left her with an unmistakable British accent. She is forty-four years old, single and has dark hair and eyes (*UE*: 179). Like in many of the previous novels, there is a simple motivation for the bioterrorist to act as she does: revenge. Mostly, she resents Kay's success and devises a thorough stratagem to show her up in public (*UE*: 360).

Yet, the incident in Birmingham in 1978 moulds Crowder's conduct as well¹¹². Two deaths are attributed to her, thus the university readily cleansing its

¹¹² The writer characterises Phyllis Crowder as the virologist who caused the leakage that eventually killed Janet Parker, the medical photographer who was exposed to the smallpox virus in the Medical School of the University of Birmingham in 1978. As the Head of the Department of Medical

name by dismissing her (*UE*: 355-356). It has not been difficult for her to keep a frozen source of the virus adequately stored in nitrogen through the different labs she has worked in since. Nevertheless, it is difficult to understand how such an accomplished worker, who detests meetings where there are “people sitting instead of doing” (*UE*: 179), can unleash the beast without having a vaccine. Indeed the feelings of revenge must be strong enough to skip such a vital step. It is not only Kay that she hates profoundly, but also her own stagnation at the MCV, which is summed to the incident of bigotry in Birmingham. In this institution, she undergoes another humiliation by being rejected as department chairman in favour of a Harvard-trained pathologist (*UE*: 355). For a woman who has been collecting the wildest microbes for study in search of the Nobel Prize, this lack of recognition as opposed to Kay’s pre-eminence is the spark inducing biological retaliation.

However, neither will she get the distinction she desires nor her vengeance on Kay. In a most divine punishment, quite recursive when dealing with bioterrorists, she falls victim to the same disease she intends to propagate. This time, it cannot be said that the evil-doer has underestimated her counterpart; much the contrary. Plus, it definitely seems that Crowder has achieved a fairly respected position. If she is in charge of the electronic microscope at the MCV, she must be quite an authority in the field. Precisely because of this, these mistakes can only be ascribed to jealousy. Otherwise, it is quite difficult to explain how such a revered and dedicated microbiologist can expose her hidden *deadcoc* identity and herself to the disease so plainly.

The biological menace posed by Theodore Kameron, on the other hand, is one of another visionary with a divine mission to fulfil. A good-looking man, he catches the attention of many girls in university, although his burnt hands and strange behaviour prevent him from having a steady relationship. When he becomes a CDC scientist, his life conditions improve substantially but a lab explosion attributed to his own negligence ruins his auspicious professional career (*TEP*: 148-149). Hence, two major happenings lay behind the bioterrorist’s performance: the influence of his mother when he was a child and the bigotry of the scientific and religious communities.

As for his childhood, the torture on account of the Bible and the sexual

Microbiology in the university committed suicide soon afterwards, a young Crowder was conveniently blamed for the incident and had to emigrate to the United States.

repression become a constant. While nothing is mentioned about his father, his mother hates his handsomeness, which she considers diabolical, and forces him to learn psalms by heart, sinking his head underwater to prevent him from forgetting. By the time he begins experiencing the first sexual changes in his body, she burns his hands to prevent him from touching himself. On other occasions she makes him stand naked and ridicule his sexual attributes. When the blisters in his hands get infected and she has to take the boy to the doctor, she burns them all into one by pressing his hands onto the burning tray in the oven. As a consequence, he is never able to reach an orgasm unless he torments and kills small animals (*TEP*: 472-473). In due time, this degenerates into more complicated plans of torture, which eventually lead to the events described in the novel¹¹³.

In similar manner, the betrayal of his fellow colleagues at the CDC as well as the lies by his sponsors at the Christian Council shape Kameron's demeanour critically. On the one hand, his successful experimentation with mycotoxins at the CDC together with Kameron's unsociable behaviour raise a great deal of jealousy in his fellows. When a centrifuge containing risk material not assigned to his grant program fails, nobody covers him and he is dismissed (*TEP*: 149). On the other hand, Kameron trusts the Christian Council to finance his toxin test but, after his loss of reputation, they cannot risk their money any longer. Once they are provided with the subculture from his investigations they shut his lab (*TEP*: 479). Thus, all the promises of fame he has guaranteed his wife as well as his own Nobel dreams are shattered at one go.

The combination of both traumas results in a sociopathic behaviour bearing an uncontrollable feeling of revenge. This is implemented through a careful plan, for which he uses his mother as a test subject. In fact, Kameron's decision to become a doctor is already a revenge on her, who has never believed in the blasphemies of science. As an adolescent, he deceives his mother by showing interest in healing, which she approves, thus beginning to study toxins and poisons. After his graduation, he goes back home and frenziedly kills all her fish –the one thing except horses and the Bible she loves– by adding some ciguatera toxin to the fish tank. Such is the pleasure he takes in his mother's suffering that he ejaculates without touching

¹¹³ The bioterrorist's alienation seems to be another cliché of the formula. In Berger's view, villains "tend to be alienated and unloved and they sublimate their sexual longings and aberrations into a quest of power and domination" (1992: 21).

himself. Two months later she dies of a heart attack after a long time in distress: the first stage of his plan is attained (*TEP*: 474-6). As time goes by, Kameron's progressive derangement materialises in 'The Voice,' which guides him in the recreation of the Biblical plagues. Following the shocks of losing his reputation and status, he believes he has God's approval to take revenge on his wrongdoers, thus finding a convenient use for the large collection of organic toxins he has assembled since adolescence (*TEP*: 483, 485, 489). The Ten Plagues of Egypt are to be unleashed monthly, each employing different biological agents. These include animal and plant toxins as well as microbial infections. As far as microorganisms are concerned, the Boil Plague is devised through the anthrax bacteria, the Hail Plague is brought about by Botulism, and the Darkness Plague is recreated through the Rift Valley Fever.

Despite his severe madness, Kameron happens to be quite lucid to get his victims infected via crafty methods of contagion. Joey St. John and Jody Davis, the former the son of an earlier Kameron supporter, acquire anthrax from a water pistol deliberately loaded with the pathogen. Kameron, who knows that the boy is never allowed to have toy guns under parental restriction, manages to deliver the gun to Joey while at the San Diego Zoo. It is only too bad that others may get the disease through a squirt –fortunately, only Jody and a rabbit from the petting zoo– as this is all for the good of a grand mission. If an innocent child happens to catch the pathogen, that is simply a collateral casualty (*TEP*: 10-11). The same could be said of those who live by the lies of the ministers meeting at the New Christian Response Caucus. They all deserve to die. That is why the small soda bottle containing the Rift Valley Fever virus left beside a radiator explodes after reaching the right temperature. An inspiring move to bring about generalised blindness since a significant symptom of the disease is retinal haemorrhage (*TEP*: 341-349).

Yet, that is not enough. The madman wants it to be known that these events are not just misfortune, but the deeds of an unknown powerful bioterrorist. Thus, he leaves the characters 'LMPG' (Moses' famous "Let My People Go")¹¹⁴ along with the international code for the disease as a personal sign in each of the objects devised to transmit it: around the handle of the toy gun (*TEP*: 97), on the bottom of the

¹¹⁴ Exodus 5:1: 'And afterward Moses and Aaron came, and said unto Pharaoh: "Thus saith the Lord, the God of Israel: Let My people go, that they may hold a feast unto Me in the wilderness.'" (Holy Bible 1978: 66)

gloves (*TEP*: 320) and carved into the plastic bottom of the soda bottle (*TEP*: 364-365). This is such a brilliant conception for a sick mind. Moreover, the sociopath takes enormous delight in assessing the press reverberation of his performance, particularly, the San Diego Zoo operation (*TEP*: 240-1).

At the same time, Kameron provides the FBI with information that turns Bryne into the main suspect behind the biological incidents. It really looks like very good fortune to the evil-doer when the federals harbour suspicions about the man who actually wants to disentangle the mystery. After such a lucky turn of the events, Kameron can only “collaborate” with the justice. When interviewed by agent Scott Hubbard, the bioterrorist describes Bryne as a man “very much his own [...], passionate” and “quick to anger” (*TEP*: 181).

There is an obvious case of professional jealousy here. Since Bryne is a respected figure who shadows Kameron’s mastery of biological toxins, the bioterrorist chooses him to avenge his downfall. In the same way as he takes pleasure in reading about his blows in the media, he relishes sending him details of the upcoming agonies of his victims. The sociopath can only feel sexual arousal through other people’s pain and he makes his own fantasies out of the terrible suffering of his former supporters. To make his reverie complete he enjoys baffling Bryne, envisaging the mutilation of Thomas Matthew Ogilvie (*TEP*: 206-8), reviewing the mocking abortion of an elderly Mother Superior (*TEP*: 209-11), or imagining the weird death of one of Reverend Cato Phipps’ –a forecoming victim– parishioners in the operating theatre (*TEP*: 211-13).

A great deal of irony is employed in the depiction of Kameron’s anticipation, something which is not common in the demented. Otherwise, it seems like his rationale has found new behavioural standards, which obviously do not concord with the common good. For any reasonable human being these are certainly the deeds of a madman, but he simply abides by patterns that the majority cannot understand. Nevertheless, playing with Bryne, a powerful mind like his own, is a high risk which eventually does away with Kameron’s plan. The bioterrorist’s final blow in New York is frustrated, although he does achieve the martyr-like ending any visionary seeks. This is just another of the many sociopaths who are prepared to deal with biological weapons and do terrible harm. Luckily, this is only fiction.

Similarly, inside the tortured mind of David Vincent Muldane, the opportunistic bioterrorist in Pierre Ouellette's novel, there is a weird personality split

giving birth to a couple of different characters. On the one hand, David is a dedicated aide to Paris who, after his failure to become a doctor, has found a job in the Seattle King County Department of Public Health and is assigned with the cop to negotiate Barney Cox's surrender. On the other Vincent, a schizophrenic who has already committed several acts of food poisoning with *E-Coli* at the onset of the plot, takes advantage of his acquaintance with the new bug to deal a final blow to the city of Seattle. To Paris' experienced mind, this double personality is set to reconcile the good and bad behaviour, a way to represent the angel and the demon inside everyone. Vincent is rooted in the basic stem of his brain, never free of a dysfunctional early childhood prior to his adoption, whereas David is closely dependent on the rational brain, a more educated character who has nonetheless failed to reach his main goal (*TTP*: 353).

It is precisely this basic urge to become a doctor that eventually brings the two characters together in a most surrealistic manner. David's stepfather, the only father he remembers, had died of a massive heart attack and since then he had studied all the necessary literature and kept in touch with the latest advances to become a cardiovascular surgeon. Yet, the uncontrollable Vincent made him leave the medical school by the third year and David had to rely on the Virtual Reality Surgery Center to obtain his degree. There, at the beginning of the story, he fails and turns to public health to make a living. It is not strange that he crumbles in the most important moment of his life. As suggested in different flashbacks, the relationship with his stepfather had not really been fluent; nor his marriage, which broke up soon after his university fiasco, although life with his wife had not been easy (*TTP*: 12-23). This is too much stress for a man who has never come to terms with his adoption.

Indeed, David wants to vindicate himself but the Mr. Hyde inside him is much too powerful for the would-be surgeon to show his real abilities. It is only a question of time before Paris makes the right connections and reveals Muldane as the mysterious chaplain visiting his victims in hospital. But that, of course has to be at the end of the story. Also, his fraud is discovered when Elaine tells the cop to hand the disk to a Doctor Muldane in the Department of Public Health (*TTP*: 185). In his misery, he has to confess his secret to Paris who surprisingly proves quite lenient. Certainly, the participation of this loser is much needed.

As it seems, Muldane is an utter failure: his childhood, medical studies,

marriage and professional career are deceptive. Even his attempt to conceal the food-poisoner inside him proves ineffective in the end. There is, however, one last chance for him to redress his bad omen. One act of contrition which he does for personal success and not precisely for philanthropic purposes: handing the disk with the simulation to the WHO authorities (*TTP*: 237). Thus, the desecrated Muldane gets the credit he has been searching for since the death of his stepfather. At last, he has been granted the chance to do something grand in medicine with which to vindicate himself and his past. From this time on, he could be remembered as a hero in the annals of epidemic history.

Yet, Vincent cannot miss the possibility to round out his masterpiece. He had already been poisoning restaurants with *E-Coli* long before David's failure. In his deranged mind, Vincent prepared his first theatrical production, where he was actor, playwright, director and producer. It mimicked the only three memories he recalled from his early childhood: a snake biting a dog that crushes its head, Vincent as a boy jumping off an attic, and an old cartoon caption of some demons chasing a rabbit-child (*TTP*: 79-80). The corresponding three acts included growing the germ culture from a specimen from his own gut, deploying them in selected restaurants, and visiting the victims disguised as a clergyman. Of course, the second and third acts are so addictive to him that new poisonings are to be expected.

It is difficult to imagine the reasons behind this bioterrorist act. Somehow, Paris suggests that the criminal always comes back to the crime scene. Trying to empathise with the evil-doer, he reckons that the bioterrorist has to experience the suffering of his victims because that heightens his ego (*TTP*: 182-3). It seems, therefore, that the tormented Vincent needs to seek refuge in the chaplain character so as to justify his evil acts. Behind his costume, it looks as if the responsibility for such crimes befell somebody else; someone who is still not reconciled with his past, and probably never will be.

The last scene in his cyclical play is all a product of circumstances. Vincent cannot just let go the possibility of a grand firework show to complete his masterpiece. Thus, again disguising himself as a hospital chaplain to get Henry's deadly microbes (*TTP*: 291) or as a major to drive through the road block between Portland and Seattle (*TTP*: 302) is only part of a new improvised script. The ultimate mall event, with two-hundred and thirty-three pigeons flying free and scattering fecal dust anointed with Henry's culture, is his personal accomplishment to find his place

on earth: "Then the world would be his, and he would be the world" (*TTP*: 302). Obviously, the realisation comes too late. The depression comes back, enhanced by the initial headaches of his home-brewed plague, and suddenly Vincent notices he also needs David in his life. This is why he takes on a new personality and becomes the doctor that his alter ego cannot be. All he has to do is offer his fraudulent character to a hospital and he is so welcome: there is also need of heart surgeons in a decimated world. And it is only through sheer luck that the hapless Barney eventually lands on his feet (*TTP*: 370).

4.3.2 *The Fanatic*

Far from Cope's simple physical appearance, John Case's Luc Solange is otherwise pretentious and glamorous. Initially concealed during the first half of the novel, Solange enters the scene full of power and leads the story until the end of the book. Thus, the first illustration of the villain is through a picture on a wall in the sect's headquarters. The photograph shows a laughing middle-aged man standing on a mountaintop with the world behind and below him. As Frank proceeds into the compound, he can see other similar pictures where Solange appears with a halo, inviting the beholder to follow him into the light. As a matter of fact, light is the common denominator in all the pictures, which likewise endows the guru with a divine image. Some of the photographs cover entire walls in different rooms while others even have an audio feature with a powerful voice quoting the Bible on an inspirational track with the sound of the wind (*TFH*: 266-270). As described by Susannah, a member of the sect, the guru is the most attractive man she has ever seen (*TFH*: 312). The Temple of Light is a deeply hierarchical structure and no questioning of the guru's command is ever admitted. Solange is the perfect leader – mighty, attractive and charismatic – and his subordinates seem to be enraptured by his overwhelming personality.

Yet, although their personalities are completely different, both Cope and Solange do share a common concern: the human parasite. To the mind of this new kind of bioterrorist, overpopulation is about to bring civilisation to a hasty end. Solange considers himself the first horseman of the apocalypse and believes that God has sent him to earth to conquer "a species gone amok" (*TFH*: 372). Such a profound belief is already made evident to Frank in his first visit to the compound when, along

with the pictures, he notices a population clock shaped like a bomb whose digital numbers run crazily away (*TFH*: 270). And they also share a similar solution to the problem. Just like Cope, Solange thinks he has the perfect biological weapon to save humanity from its misery: the Spanish Lady.

Of Swiss origins, a traumatic inability to enter politics because of the bigotry of some influential personalities is the onset for a deep hatred towards industrial civilisation. Thus, he opens a clinic in Los Angeles and sets up his ecological movement. By the time of Frank's investigation, the organisation is supposedly dedicated to making homeopathic remedies and aromatherapy products (*TFH*: 295-299). However, Solange's plans reach further away from mere alternative medicine. According to Ben Stern, the graduate student writing his thesis on new religions, the guru is "a secular apocalyptic," who is not satisfied with the modern world and demands a strong behavioural change (*TFH*: 291). He believes himself to be the last world historical figure, like Jesus or Buddha, aiming to restore Eden through the destruction of life as we know it. And it is here where biology rises to the fore as Solange wants to reshape the world through disease. Not only does he point at the Spanish Lady to drastically reduce the global population, but his staff of scientists has also developed various crop plagues which are intended to decimate the remaining population by means of starvation (*TFH*: 314-315, 368-369).

It is glaringly obvious that the guy is a convinced megalomaniac. The enormous pictures in the compound, apart from the intrinsic commercial purpose, already denote a narcissistic personality disorder¹¹⁵. Everything surrounding Solange

¹¹⁵ The portrayal of this character undoubtedly falls into the diagnostic criteria for a narcissistic personality disorder, where at least five of the following are necessary:

- has a grandiose sense of self-importance (e.g., exaggerates achievements and talents, expects to be recognised as superior without commensurate achievements)
- is preoccupied with fantasies of unlimited success, power, brilliance, beauty, or ideal love
- believes that he or she is "special" and unique and can only be understood by other special or high-status people (or institutions, e.g.: Harvard and other Ivy League institutions)
- requires excessive admiration
- has a strong sense of entitlement, i.e., unreasonable expectations of especially favourable treatment or automatic compliance with his or her expectations
- takes advantage of others to achieve his or her own ends
- lacks empathy: is unwilling to recognise or identify with the feelings and needs of others
- is often envious or believes others are envious of him or her

is large; the Temple's headquarters themselves are massive. The complex, a former private school, occupies a huge valley enclosing several cottages, dormitories and labs along with a Tudor mansion, reconverted into Solange's residence. On the other hand, the organisation is also mammoth-like, including offices of special affairs, research, operations, security, recruitment, banking and communications, administration, technical services and litigation. It can well be stated that his business is the perfect realisation of Solange's motto: the bigger the better.

A person of this kind could not have lesser ambitions in his life. Thus, his divine appointment is explained. Answering Annie's question on his plans to bring plague and famine to the human race, Solange blames the creation of disease-resistant corn and rice, which support the multiplication of the human parasite. Instead, he aims to redress Mother Nature's balance and assure respect for the ecosystem, even if this means suffering. To validate his ideas, he shrewdly sticks to genetic engineering, stating that it is as much valid to create a vaccine against influenza as to create a superflu. Certainly a true analogy, were it not for the common welfare of humankind, which is clearly endangered (*TFH*: 369-70).

Still, it matters none to a deranged person who has planned his performance in full detail. With the financial support of the North Koreans and his own technical facilities, it is not difficult for him to obtain the 'Spanish Lady' and multiply its already awesome lethality by five. Of course, all the members of the sect are to be vaccinated, including recruiters abroad, who will be sent the vaccine via courier in insulin ampoules to treat their feigned diabetes, not forgetting his North-Korean allies, who will also get their due doses (*TFH*: 314-316). In his careful plan, Solange has even arranged some dispersal tests. The most spectacular of these is the opening one performed in Tasi-ko, a small village in the demilitarised zone between the two Koreas which is ravaged by the disease and then razed to the ground by the army. Over one hundred and twenty inhabitants die in the test, the entire population of the village, except for a medical assistant who reports to the American Embassy (*TFH*: 12-23). His revelation later proves crucial for disentangling the connection between the sect and North Korea. However, Solange has also performed several dispersal tests in different American cities to discover which is the best method to bring about

• has arrogant affect, haughty behaviours or attitudes.

Indeed #1, 3, 4, 5, 6, and 7 are clearly discernible. ("Narcissistic" 2007)

his biological holocaust. The strain used in the sample scenarios is primarily inoffensive and the thousands of victims recover quickly after a mild case of flu. Yet, this does not remain unnoticed at the CDC, which publishes the outbreaks in the *Morbidity and Mortality Weekly Report* (TFH: 334). This, in turn, becomes Solange's perfect tool for assessing which city has the greatest rate of infection, which eventually happens to be Washington. Indeed the bioterrorist may be mad, but he is absolutely ingenious and methodical in action. It is only Frank's decisive spirit that discloses a painstaking plan that has even eluded the CIA.

And it is precisely when his scheme is ruined and Solange needs to make the best of his cunning abilities, that he appears to be so clumsy. All of a sudden, a man who boasts a complete control over his body, an expert in martial arts who should easily get rid of Frank in a face-to-face confrontation, cannot shoot his opponent dead and is, against all odds, knocked down (TFH: 408-410). Had he ever foreseen his own end, certainly it would have been much more glorious. Yet, in the writer's mind it seems that a villain should never have such a pleasure. On the other hand, the formula demands a convenient punishment for the evil-doer, "preferably by death though for reasons of decorum a conventionalized right to the jaw often has to suffice" (Browne 1980: 207).

Alan Blackwood also dreams up twins, brother and sister, religious bigots who plan to revive the 1918 'Spanish Lady' pandemic. Actually, the sister remains out of sight until a brief part in Norway, on account of a grave deformity. Because of the rubella virus, she is born inhumanely deformed and is kept hidden from the rest of the world. From then onwards, her brother, Dennis, takes both names so as not to forget his sister and lives both their lives. He studies microbiology in the university for her and records all the lectures while Evelyn writes the papers and instructs him in lab work. Although they both coincide in their urge to cleanse the world of the atheist scourge, the idea of planting bombs is chiefly Evelyn's and Dennis is simply the executioner (PA: 473-474). Thus, it can be said that the real brain behind the operation is actually Evelyn while her brother puts the plan into action.

As for the visible head of the twins, Dennis Evelyn Branch is introduced quite late in the plot and, like Solange, moves to the fore once he comes to light. Regarding his physical appearance, he looks awkwardly handsome to Conor since, although he holds an intrinsic elegance, his head is disproportionately large for his body. Moreover, his skin is completely white, thus adding a ghostly aspect to his

figure, and his face displays a virtuous yet insane impression to the beholder (*PA*: 224). The seventh son of an early TV evangelist, Branch believes himself to have the power to heal and exorcise demons; at least, that is what his father used to assure his screen-followers. He soon gives signs of an outstanding intellect at school and takes a doctorate in microbiology while studying at Dallas Bible College. As a researcher, he works for Texas Bio-Systems trying to find a method of dealing with potential outbreaks of smallpox, but he is fired after his involvement in the bombing of an US army facility. During his three years at the company, he makes no friends and seems to have difficulties with his relationships with women, mainly because of his albinism and manifest eczema. This in turn, produces an obsessive introspection at work, which does not help much to solve his social dysfunction. Not in vain, the company personnel records show a sociopathic, devious and fundamentalist attitude, complemented by his firm conviction to white supremacy. Sentenced to ten years imprisonment, he is unexpectedly released after eleven months to work for the US Army, allegedly to counteract the Soviet's Biopreparat program. However, he disappears in 1989 to make a striking return in 1995, when he formally announces to the world the creation of his 'Global Message Movement,' a sect aspiring to agglutinate all non-believers in search of the only true God. His last known action before the start of the novel is the bombing of a municipal centre in Omaha, Nebraska in 1996, killing one and injuring three other office workers. Yet, given the sum of money he has robbed in the opening scene, it seems obvious that he is planning a grand blow (*PA*: 246-251).

Like the previous bioterrorists, Branch shows a great accomplishment in his deeds, which becomes patent as his –or rather Evelyn's– master plan unfolds. Actually, Conor's involvement in the evil project, in which he becomes a fundamental piece whether he likes it or not, is a confirmation of the villains' craft. First of all, the biohero appears as suspect number one for the crime in the eyes of his former colleagues, who want to retaliate against Conor for the Forty-Ninth Street Golf Club affair. Apart from himself, nobody except the twins and Darrell Bussman, who is in a coma and unlikely to recover, knows about the conspiracy. Obviously, the evil-doers are not going to testify on his behalf, and nobody will believe that he was hypnotised to open the safety boxes. If that is not enough, the bioterrorists kidnap Lacey, his beautiful girlfriend, to ensure the ex-cop's collaboration. In the meantime, Conor has to obtain an extra twenty million dollars from his former clients, in return

for some valuable documents that are robbed along with more money from the safety boxes. An absolutely brilliant scheme, were it not for the biohero's counterplan.

However, the key to Dennis' success is clearly his sister. In fact, when she is granted some lines in Norway, she speaks about the plan as her own. Once used, Conor has become a nuisance for Evelyn and, since he patently refuses to join the new crusade, she is determined to eliminate him, "I like things to go to plan, sir. I like things to go orderly. And you –you were definitely not part of my plan, and you were not orderly, no sir" (*PA*: 470). However, she is not allowed to stay on scene much because Magda conveniently hypnotises the twin sister into dosing herself with the fatal virus (*PA*: 481). In the writer's mind it looks as if Dennis should have more prominence as the marked bioterrorist, so she is made redundant. In any case, his sister's death acts as a boost to Dennis, who is now more than ever decided to take action and use his newly-acquired bioweapon.

Yet, without the sister's cold mind, arrogance is sure to bring about his downfall. Like other bioterrorists, Branch is an intolerant narrow-minded absolutist, a proscriptive flaw for someone who craves for nothing less than world leadership. And, while it seems obvious that he will never achieve such a grandiloquent aim, there is always the probability that, through his fanaticism, he may cause terrible harm. In fact, Conor seems to understand his adversary's madness very well; much more than the rest of his team, to whom he has to explain the difference between normal people and people like Branch:

You and me, we'd think that the whole idea of trying to convert everybody to the same fundamentalist religion was absurd. Impossible.

But Dennis Evelyn Branch doesn't see it that way. As far as he is concerned, he's always right and anybody who disagrees with him is in the wrong. If he kills a few hundred people, then that will be *our* fault, for not recognizing his religion, for not giving him air time, for defying a direct instruction from God. You can't win people like him. You can't reason with them. The only thing you can do is stop them. Dead. (*PA*: 371-2)

There is, therefore, a patent antagonism between the hero and the villain, implying that there is not enough room for both in the world. This obviously announces the defeat of the villain since he represents an unsustainable threat to humankind. With respect to this, another trait appears in Conor's words which brings Branch closer to the rest of the bioterrorists: the justification of innocent casualties. It all again becomes a matter of being with or against the terrorist; an extremist positioning which supports the villain's deeds no matter how pernicious these may

be. Thus, Branch refuses any responsibility deriving from the pandemic that may result from giving the disease to the United Nations delegates. It is simply the Lord's will.

But, oddly enough, the visionary is persuaded to fly off the roof of the UN building; egocentrism propitiating the villain's debacle (*PA*: 528)¹¹⁶. Yet, in contrast with the previous cases, the grand bioterrorist attack is performed without major problems. Whereas Cope's blow is minimised by Austen's determined action and Solange's is simply aborted, Dennis Branch enters the UN building and smoothly deploys the pathogen. It can therefore be said that, even if the holy mission is not accomplished, the fanatic achieves revenge through a bioterrorist act which, after all, is what had to be avoided at all cost. Even though his plan is not fully accomplished, the biohero's job is not attained either. While Branch's threat is gone forever, there may be others to come.

4.3.3 *The Conspirator*

As regards Mark Howland, Nat's unfaithful husband in *Time of the Fourth Horseman*, he is more a conspirator than a real madman. Unlike Ralph Hempston in Robin Cook's *Outbreak*, he is depicted quite superficially and nothing is known of his past. Physically, Mark has the complexion of the Greek hero: beautiful face, strong muscles and a graceful air to his movements. Nat is deeply in love with her husband. Most of all, she admires his wild, almost feral demeanour, which contributes to Mark's acknowledged authority (*ToFH*: 12-13). Yet, in Mark's mind, Nat is simply a child-raiser who spends her free time doing charity work in the hospital (*ToFH*: 22). Thus, he does not seem to take her words very seriously when she tells him about her acquaintance with the *Project* and his personal involvement in

¹¹⁶ Actually, the fact that the bioterrorist is far more literate than the biohero seems to contribute extensively to Branch's underestimation of Conor. This is not a novelty in the confrontation between the two characters in popular fiction. As Williams and Zenger point out:

While the villain may be literate, he can never have skills superior to the action hero's. And while literacy may allow the villain to gain what power he has, it can ultimately contribute to his downfall. (2007: 103)

If there is one biohero that has more of the popular action hero rather than the detective one, that is clearly Conor O'Neil. Therefore, it is not strange that the bioterrorists suffer the classic death penalty applied to the villains of the action story. Additionally, it may well be argued that those bioterrorists with a PhD in Microbiology often get infected with the pathogen they use, in the case that they do not die like the Branch twins.

it. What is more, feeling safe through his administrative endorsement, he warns Nat to remain quiet if she wants to keep the job. He even invites her to participate in the conspiracy, promising an official ban if she persists with her posture (*ToFH*: 39-45). Still, it only appears to precipitate the dissolution of an already broken marriage.

In fact, Mark does not care much since his own wife and son seem to be an unbearable burden for his dedication to the beloved ‘Project.’ It can be said that the pathologist’s initial convictions are not at all wrong because overpopulation is indeed a serious problem for the human race. What is not only immoral but also undeniably ominous is the deliberate spoiling of effective vaccines to allow a horde of pathogens to do the thinning process. However, Mark is an extremely figure-oriented person, a doctor who is not in daily contact with the sufferers of such terrible diseases, unlike his wife. What he does share with the other madmen is the same intellectual capacity together with an acute lack of empathy. Such an obstinate man in his privileged position is a patent threat to humanity.

Moreover, Mark takes great pleasure in applying his power to those who surround him, especially Nat and Harry, who eventually become the leaders of the dissident doctors. He likes to undermine Nat’s philanthropic convictions, remind her of her feminine nature which invariably ties her to home and the family, and obviously coerce her into concealing the conspiracy. As for the latter, he simply denies his lab requests to test for already eradicated diseases in the young casualties. Most contemptuously he justifies his rejection stating that “our lab has better things to do than test sore throats and running noses,” and endorses his standpoint stressing that “this statement reflects official hospital policy” (*ToFH*: 61). Even when the ‘Project’ has evidently run out of control, Mark does not accept Nat’s suggestion to stop it, although, once again, he relishes the scene of his wife imploring him for something he will not concede. Instead, he insists it is “on schedule” despite his wife continuous allegations to the contrary (*ToFH*: 182).

He only seems to pay attention to her when she mentions typhus, but only to declare his surprise at such an early manifestation of the disease, which was not foreseen so early in his plan (*ToFH*: 183). Stubborn as he is, Mark can only stick to the overpopulation problem as a reason for continuing the programme. Even so, he still tries to justify the ideals of the people who help him by ironically assuring Nat that “we know where the outbreaks are the worst, and we’re being careful” (*ToFH*: 185). Yet, he cannot accept his wife blaming him for the death of their son.

As expected, Mark falls victim to his own ego. Following the generalised chaos brought about by the diseases, the Westbank hospital catches fire and the evil-doer is fatally burnt. The aura of charm and power suddenly disappears, as if something ephemeral, which gives way to a critical ending:

His beauty was gone, like a clay figure which had not satisfied the artist and been pinched and smeared in the sculptor's frustration. His disfigurement would have been hideous if there had been the slightest chance he would live. (*ToFH*: 239)

Still persisting in his arrogance, he can only accuse his wife of his own downfall. Yet, that does not matter much to Nat, who has already decided to stay amidst anarchy to continue her philanthropic task.

Another conspirator of similar characteristics is Ralph Hempston, the flourishing ophthalmologist in Robin Cook's *Outbreak*. As a member of the Physicians Action Congress (PAC), who has decided to undermine hospitals run by foreign sources in the US, he can equally be treated as a bioterrorist since the bioweapon used for this purpose is Ebola. Like Mark, he is very vaguely outlined and nothing is known of his past other than a successful professional career (*OB*: 22). He is quite refined, with a manifest tendency towards luxury possessions, which nonetheless does not reach the previously analysed megalomaniac standards. Without reservation he likes to boast of his brand new 300 SDL Mercedes along with a 450 SL in the garage, an act of ostentation which does not impress an average miss like Marissa (*ToFH*: 120, 327). On the contrary, the coy epidemiologist is certainly more keen on his elegant three-story Victorian mansion, which she often visits. Ralph's love of cultivated activities, like theatre, music and sophisticated restaurants, is also appealing to the candid investigator, who does not figure the man she admires is the source of all her troubles.

Meanwhile, Ralph plays his part for the PAC, keeping Marissa under control and using her for the benefit of the obscure organisation. Despite Ralph's attempts to retain Marissa in Atlanta, she is sent to investigate the mysterious outbreaks around the US and the situation overwhelms him. Nevertheless, since Marissa still trusts him he receives phone calls every now and then. Even when she discovers Ralph's "donation" to the reactionary congressman Calvin Markham, he still seems to fool her with straightforwardness, confessing his sympathy for the politician (*Ob*: 198). Ralph is quite a good liar and Marissa seems to feel comfortable talking everything

out with him. As her investigations progress, however, he begins to lose patience and what used to be kind advice become resolute orders to come back to Atlanta and forget the case (*Ob*: 272). By this time the other members of the PAC have already lost their confidence in Ralph and send thugs to neutralise her.

But it is too late. Ralph has underestimated the bioheroine and this proves to be a major mistake. In her last visit to his house, Marissa happens to overhear a telephone conversation with Jackson –the apparent head of the PAC– who prompts him to retain the troublesome gal (*Ob*: 316-7). However, a combination of luck and the determination of Marissa’s boss will put an end to the conspiracy. Eventually, Ralph becomes easy prey to Marissa’s feminine enchantment. Even though he has not pushed the bioheroine in sexual terms before, the temptation is too strong to resist. Ultimately, the backstabber is left as an idiot in front of his comrades. What is more, by sinning through lust –not strange for an atypical man in his fifties with no steady couple– he will have to face two accusations: his implication in the Ebola conspiracy and the attempts to kill Marissa. That is a lot of a punishment for an allegedly righteous man.

4.3.4 *The Materialistic Villain*

In *Mount Dragon*, the maniac is Brentwood Scopes, a mastermind in genetic engineering who has fallen into dark research. Once a promising student, he leaves college after isolating a particular gene that prevents corn rust and splices it into a hybrid labelled X-RUST. With the enormous income from this patent, he founds his pharmaceutical empire ‘GeneDyne’¹¹⁷, which owns Mount Dragon, the lab where research for the creation of the hazardous X-FLU is being done (*MD*: 102-103). Scopes has always favoured intellectual matters in his life: he has a taste for classical music, especially Beethoven and Mozart, and literature, beginning with the Bible itself. He boasts a magnificent six-octave quadruple-string pianoforte designed for Beethoven himself in the early nineteenth century. Not only does he enjoy having the valuable piece of art, but he is also quite proficient in playing the difficult melodies composed by its original owner (*MD*: 87-88).

However, his favourite game, the very one which he used to enjoy with

¹¹⁷ Note the similarity with *Genentech*.

Levine during his college years is to quote the classics by subject word. It is by beating Levine at this game that he obtains his colleague's signature on the X-RUST patent. A man of his word, Levine has to give in and allow Scope to create his empire and grow awfully rich, when he only intended to make their discovery openly accessible for the benefit of humankind. After eighteen years, the patent has to be renewed and they play again on the same terms. This time, Scopes loses despite cheating but, being a compulsive liar, he does not mean to let his patent out of his hands so easily (*MD*: 453).

Indeed, Scopes makes use of his inherent ability to deceive whenever he has the occasion. Since Levine refuses to sign the patent, the villain develops a stratagem aimed at cutting his rival's source of income: GeneDyne is to sue Scopes and Harvard for two hundred million dollars. By bribing a German associate with access to Nazi documents, he manages to portray his enemy as the son of an SS officer and a Polish woman. While Levine is well known for his personal crusade against the Nazi holocaust, from which he maintains his mother herself had escaped, such documents certainly means a tremendous loss of credibility. So much so that Harvard University eventually revokes Levine's foundation's charter on account of "moral turpitude" (*MD*: 272).

This slandering operation is harmonised with another one aiming at cleansing GeneDyne's image. Levine has exposed the dangerous experiments with a doomsday virus that are being done in Mount Dragon through Carson. So Scopes needs to counterattack with neutralising data choosing his unscrupulous media contact to state that they are "only" working with influenza. It is easy to mislead the covetous editor about Scopes' plot by pointing to their economic losses. Furthermore, there is an implicit call to his American patriotism:

There is a Japanese corporation working on a very similar line of research. On this particular type of germ line research, they're actually ahead of us. If they realize its ramifications before we do, then we're dead. Winner take all, Edwin. We're talking about a fifteen-*billion*-dollar annual market here. I'd hate to see the Japanese increase their trade deficit with us, and have to close down GeneDyne Boston, all because Edwin Bannister at the *Globe* revealed what virus we were working with. (*MD*: 270)

There is no need to say that misleading illustrations of this kind are designed to keep the population ignorant of a very real threat only for profit reasons. At the same time, by minimising the devastating potential of a disease, the ladder metaphor

prevails and, with this, the erroneous idea that humans rule the earth. Suffice to say that the 1918 flu pandemic killed millions all over the world. What Scopes deliberately forgets to declare is that the lethality of the flu they are working on has been enhanced via genetic engineering, it is even more contagious and there is no available vaccine. Thus, he evidently becomes the stereotypical Big Pharma businessman fooling the populace to maintain his hyperbolic gains.

Another defining aspect of this character is his aggressive management, archetypal of the successful neo-capitalist. As seen above, Scopes is a convinced follower of the ‘winner-takes-all’ philosophy. Hence his authoritarian tendency, completely oriented to the achievement of results, and his extremist inclination to reward results just as he cruelly punishes failure. This is a trait that becomes fairly evident to the reader with the very first video-conference between Scopes and Carson. The investigator is offered a highly-coveted research post at Mount Dragon, a state-of-the-art facility boasting the latest advances in microbiology. Likewise, he is given a year’s salary for six month’s work plus fifty thousand dollars, his current salary, if he manages to splice the X-FLU gene. But, on the other hand, he will be dismissed if he fails (*MD*: 32-33). For Scopes it is just this simple; research is reduced merely to success or failure.

When the time comes to negotiate the price of the bioweapon with General Harrington, Scopes proves to be equally aggressive. Knowing that he has the power, he asks for a billion dollars more than the three offered by the Pentagon, and he even dares to add one more on account of the general’s reluctance. Once more, Scopes makes the most of his guile and mocks the military by stating that it is not even their own money they are paying while he is risking “his” virus (*MD*: 409).

The tyrant likes to feel mighty and intimidating. In fact, his “cypherspace,” which lets him control every single detail of the organisation, confers him with a Big Brother status. This is a circumstance which Mime –the hacker– has to remind Levine before entering GeneDyne’s net (*MD*: 123). It is only at the very end of the novel, when Levine has to physically go to the Institute and break into the cypherspace, that he notices Scopes’ staggering creation. This does not simply create command programs, but whole worlds with real people and experiences Scopes remembers from his childhood. It’s a God-like creation for the entertainment of a God-like personality. Such a realisation leads Levine to another one:

It was a perfect illustration of the contradictions in Scope's character. Only a genius of immense creativity could have written a program this beautiful and subtle. And yet the same person was planning to sell X-FLU II. (*MD*: 422)

The genius is truly a man of contradictions, like a good deal of other brilliant minds, capable of the best and the worst. However, his detailed plan devised to make big money is ruined by the combined action of Carson and Levine. Egocentrism, as usual, precipitates his abrupt comeuppance. Although he likes to dress casually, the evil genius is as megalomaniac as Solange or Branch can be, so who belittles his adversary. When he has Levine on the lift with his security guards ready to shoot him dead, he nonetheless decides to save his life for only one reason: the final game (*MD*: 438, 440). But again the villain underestimates his opponent's power. The evil genius will never accept his defeat and hand over the virus. Hence the eventual quarrel for the ampoule ending up with the infection of both contenders (*MD*: 453).

4.3.5 *The Unwilling Villain*

Rather than an evil-doer, Chet Malin, Janie's supervisor at the New Alchemy Foundation in Ann Benson's *Burning Road*, is more of a wrong-doer. In his quest to undo his father's mistake, an orthopaedist who illegally inserted a defective gene into young boys, Chet makes the damage worse by performing an erroneous gene washing (*BR*: 624). Suddenly, the boys start suffering weird bone injuries and, in Chet's mind, Janie is the right person to cover the case. After all, as an associate researcher she is not likely to cause much trouble and is prone to accept her boss' requirements without question. Of course, Janie gets too interested in the case and he has to devise a plan to stop her. Throughout the process, he shows a manifest incompetence.

Actually, his physical appearance already invites the reader to doubt his proficiency. It is not exactly his fat and hairy nature that suggests such an idea but rather the sloppiness of his work, which adds to his shabby dressing habits. Moreover, the nasty custom of scratching his head when musing over a matter leads to him being nicknamed "Monkey Man" by his fellow workers, which stresses his careless image (*BR*: 36). By the end of the novel, he is still unaware of such a nickname, unlike Janie, who would rather change it for "Chicken Man" given his eventual faintheartedness. Such a lack of personality can only make the sturdy

bioheroine declare him “dumber than I thought” (*BR*: 625).

Unquestionably, his plan is well structured. The only problem is that, as usual, the bioheroine’s determination is not taken into account and the villain has to constantly rearrange matters until he is finally discovered. In this respect, Chet Malin is not different from the previous bioterrorists. First of all, he blames economic restrictions for cutting Janie’s unforeseen investigations, but this does not do much to prevent the stubborn researcher from continuing digging (*BR*: 37). After Janie is granted a system-wide search, he sticks to a lower success rate and the subsequent loss of the foundation’s reputation to hamper the investigator. Sarcastic as he can be, Chet bids Janie to “find out how many angels can dance on the head of a pin” (*BR*: 109), to later better it with “how many of the popes have been catholic” (*BR*: 110). Yet, Chet’s patronising mood with the questioning researcher produces exactly the opposite effect. He decides to take more drastic action to stop his undermining subordinate, including hiring thugs to rummage through her house and eventually burn it down. At the same time, Chet demonstrates he is a hypocritical scoundrel by offering her the help of his brother-in-law to rebuild the house (*BR*: 487).

When Janie charges against him in the final move, he states that “no one will give a shit about a little genetic accident that happened years ago” (*BR*: 624). Even though he hides behind his father and blames him for the “accident,” Janie holds him responsible for the subsequent cure that has eventually created the bone-shattering malady. In the face of the evidence, Chet cannot fight any more and crumbles under the power of good. Despite initial resistance, he accepts Janie’s proposition to treat all the boys involved with her new miraculous gene. In case he fails to comply, he faces being charged with murdering the librarian who helped Janie enter Big Dattie. Like other villains, Chet overtly underestimates the heroine’s abilities and this eventually leads to his downfall. He also shares an inherent good intention to help the Jewish boys, but again the profits from the patent darken his philanthropic purpose. He gradually loses power and finally ends up ridiculed by the originally powerless bioheroine.

Another controversial character is Sam Freedman, the genetic engineer in *The Scorpions’ Advance*. Quite recurrently, he also seeks recognition through the Nobel Prize. However, in the quest for a vaccine against leprosy, one of his assistants clones the wrong gene by mistake and precipitates a chain of events unmasking Freedman’s obscure procedures. Like Malin, he initially seeks a philanthropic cause, yet employs

immoral methods to achieve it.

A short man with hawk-like features, Freedman is a rather charismatic character, who does not seem to lose his apparent good mood easily. In comparison with other bioterrorists, he is distinctly extrovert, always ready to establish a conversation on a wide array of subjects, preferably science and politics (*TSA*: 73-4). While it is quite normal that he likes to exchange views on his research field with other colleagues, it may seem a bit strange that he takes such serious interest in Israel's policy towards biotechnology. However, his Jewish upbringing and the covert cooperation of the US with Israel in terms of biological warfare make his political concern less exceptional. As a matter of fact, Anderson will in time discover that the US has deported Freedman to Israel after performing illegal genetic experiments on American soil. In an ominous deal, which nonetheless exalts the bioterrorist's brilliant mind, he and his wife take advantage of his origin and Israeli's policy of accepting all Jewish immigrants. At the same time, the US government avoids a scandal and controls his work through the CIA, while Israel plays dumb and secretly joins the biowarfare race (*TSA*: 244-245). Arguably, the treaty itself already merits respect.

His restless intellect does not escape Anderson, who also notices fast talking and constant change of subject in his speech, revising and altering his own ideas as new considerations flourish in his mind (*TSA*: 75). Notwithstanding, Anderson is aware that he is addressing an acknowledged authority in biochemistry, a man whose intellectual abilities are far above the average. What he ignores is that part of Freedman's brain is dedicated to Anderson's disappearance, and anyone who may interfere in his project.

In the same way as Scopes needs his flu vaccine for economic reasons, Freedman needs his simply for the Nobel recognition. Obviously, although it is not mentioned in any of the cases, it is understood that the latter can make money out of it just as the former may also deserve international distinction. However, from the few occasions when Freedman takes the lead and especially in the final scene at the Kalman Institute, it is quite noticeable that he is obsessed with the Prize, doing anything to fulfil his ambition. Such an obsession is well exemplified in his final Machiavellian stand, "I don't concern with the details as long as the end result is achieved" (*TAS*: 250). It seems that his introspection into hard work has resulted in depersonalisation and acute meanness. When questioned about the people who have

died because of his ‘unfortunate accident,’ he simply repudiates his kinship:

How I’m sick of people whining about other people. People are the most plentiful commodity on earth! Do you honestly expect me to give up my work over a few interfering people? (*TAS*: 249)

Freedman accepts exclusively those who share his outlook. On the contrary, individuals like Anderson or Mirit are disregarded as “people with no brains” who “always seem hell bent on obstructing those of us who have” (*TAS*: 249). Even though it cannot be said that direct action by the biohero results in the bioterrorist’s downfall, arrogance and underestimation of his opponent certainly can. In the end, Freedman manages to control Anderson and Mirit, and even dispatch Shamir, an undercover agent, but not in time to dodge the CIA, who put a drastic end to his pretensions.

Finally, another scientist struggling between good and evil is Jeremy Dorman, the carrier of the unstable prototypes of nanomachines in *The X-Files: Antibodies*. He is described as a large, broad-shouldered man, probably middle-aged although his real age is not mentioned, and single although a surrogate uncle for Jody, the Kennessey’s sick son (*XFA*: 4). Formerly almost another member of his colleague’s family, he is desperately searching for them. After the death of his associate David Kennessey in the bombing of DyMar, Dorman’s salvation forces him to find Vader, the Kennessey’s dog, who carries the stable prototypes. In his pilgrimage to the Kennessey’s cabin in Oregon, Dorman has to endure the tremendous pain of the defective nanomachines rearranging his body at will. Such a dreadful existence is characterised by solitude. He is on his own: any contact with the medical authorities would certainly reveal his position to the Syndicate, who originally funded and subsequently demolished DyMar. He does not want to kill either, but whoever touches him dies.

Indeed, the former researcher is in a deep controversy. On the one hand, he holds generous feelings: the onset of the nightmare begins because he and David try to find a cure for Jody’s terminal leukaemia, which should eventually become a universal remedy (*XFA*: 206). Furthermore, with the exception of the trucker, he informs the few people he encounters and warns them not to touch him; an instruction which neither the guard (*XFA*: 6-7) nor Patrice Kennessey follow (*XFA*: 156), with pernicious results. On the other, he is outraged at the Syndicate’s betrayal: he had been promised to be allowed to go on with his research into nanomachines,

but DyMar's sabotage also meant to kill both David and himself. He goes into dark research, thus betraying David, for mere vain reasons, only to be ingenuously deceived by the conspirators. In order to escape the bombing alive, he has to inoculate himself with the unstable prototypes, thus unleashing the biological threat (*XFA*: 153-155). Therefore, he sets himself the two main aims of finding the dog with the stable prototypes and destroying those who forsake him. Moreover, the good versus evil struggle in his mind is enhanced by the action of the nanomachines, which unbalance Dorman's brain to unexpected extremes. Nonetheless, he is conscious of the situation and knows that he does not have much time before he finally loses control over his body.

However, the movements of the FBI agents attract Lentz's attention and that of his men in black, who smash Dorman's honest intentions. It is only at this time, when he sees that all his efforts have been in vain, that all the hidden anger in Dorman transforms his body into an abominable monster (*XFA*: 244). Eventually, he capitulates before the power of the nanomachines and a weird symbiosis takes place which Vader, carrier of the stable prototypes is exclusively entitled to terminate (*XFA*: 259-260). Thus, Dorman happens to fall into the Syndicate's conspiracy dreaming of his future renowned career and sets in motion an event of incalculable damage to humanity. Fortunately, it is simply a twist of fate that avoids a massive catastrophe.

4.3.6 Partial Findings: On the Bioterrorist

The villain in the biohazard novel appears to share a number of common features with the biohero/-ine. First of all, he/she is usually a traumatised character led to perform evil to seek compensation for a previous offence. In his/her carefully devised plan to achieve such recompense, he/she proves to be at least as accomplished as his/her antagonist, equally basing his/her strength on intellectual rather than physical abilities. His/her leadership comes mainly through a charismatic personality, which leads his/her subordinates to grant him/her full obedience. In case he/she does not lead an organisation, he/she either has an important post in it or decides to implement revenge on his/her own. He/she is rather dogmatic and materialistic, lacking basic empathetic skills, which often turns him/her into a psychopath capable of anything to achieve his/her main objective. The bioterrorist is,

therefore, egocentric and often a megalomaniac who needs to evade an unwanted world in a self-made/bought luxurious reality. There are also a number of characters with an initially philanthropic disposition, which soon turns into evil-doing so as to conceal the antihero/-ine's own misdeeds.

A variety of stock villains is therefore at hand. Actually, these bioterrorists can easily be associated with more than one single common stereotype. There are clear instances of the popular maniac, best embodied by such fanatics as Branch, Kameron, Cope or Solange, but also in the jealous Crowder and the bipolar Muldane. There are corrupted heroes, like Mark or Freedman, who choose the wrong side to carry on their investigations. A more stereotypical big boss is Brent Scopes, but also sharing his tyrannical demeanour with the former. Even such tokens as the evil albino and the bad fiancé are clearly represented by villains like Branch and Ralph, respectively. However, the latter is more of a clear conspirator; rather similar to Mark and Justin with the IIA project. Finally, obvious examples of the reluctant villain are found in Chet Malin and Jeremy Dorman, who eventually turns into a giant monster, yet another classic of popular fiction.

4.4 The Crooks

In the same way that the biohero/-ine counts on a well-assorted team of aides to solve the biological crisis, the villain also has a number of characters to implement his/her mischievous plan. It cannot be said that they are all really bad. Most often they are bent scientists or law enforcers who, unlike their good counterparts, have chosen the wrong side for a variety of reasons. Basically, however, they all seek recognition in one way or another, just like those on the other side, but with the difference that –ethically speaking– they are meddling where they should not. Thus, the bent scientist is doing dark research that affects the human population; the bent law enforcer “serves” but does not “protect,” the fanatic simply wants to impress the sect guru so as to climb within the hierarchy, while the gangster just depends too much on the money paid by the evil boss. Be that as it may, they willingly collaborate with the bioterrorist to threaten and kill. Even some, like Lieutenant Drew Slyman and Doctors Vestof and Heyert, do it apparently unknowingly but quite sure that their deeds are unethical. In sum, there is a new bunch of characters to

enlarge the hordes in this confrontation between good and evil.

4.4.1 The Bent Researcher

Next to Dr. Ralph Hempston, there is a group of sinister physicians with a dubious concept of what health care should be in the US. It appears that the leading voice amongst the PAC members is Dr. Joshua Jackson, a vaguely defined character who is personally against the use of Ebola. That is not precisely because of a sudden repentance but due to the fact that his own family lives in Atlanta. He seems to be quite an authoritarian individual, as is clearly patent in his interview with Dr. Herberling, the Professional Labs Corporation director and main culprit for the use of Ebola instead of influenza for the scare (*Ob*: 228-32). However, despite all the orders he issues, he has to accept his loss of power in Herberling's benefit. Once the project is set in motion, neither he nor any other member of the PAC seem to be powerful enough to stop it. The rule now belongs to somebody whom Jackson's refined judgement of character readily classifies as a psychopath (*Ob*: 230).

Dr. Arnold Herberling appears to have been contacted by the PAC to implement what seemed a simple plan to spread panic. Like Jackson, not much information is given about the character apart from his initial description as "a stocky, middle-aged man dressed in blue coveralls" (*Ob*: 218). Yet, it is evident that he wants to control the situation from his telephone demand to Jackson to handle Marissa (*Ob*: 221). The change of powers is materialised soon afterwards as mentioned above. Allegorically enough, the physical appearance of the two doctors seem to show the switch from white-collar crime to a rougher one:

The two men sat facing each other. Physically, they couldn't have been more different. Herberling was stocky with a bloated face and coarse features. Jackson was tall and thin with an almost ascetic face. Their clothes helped heighten the contrast: Herberling in coveralls; Jackson in a banker pinstripes. (*Ob*: 229)

At this moment too, a group of Mafia-like gangsters enter the scene, working under Herberling's direct orders. The first one seems to be his personal bodyguard, a big man by the name of Paul, who has a limp elbow after being shot by a policeman when he was a kid (*Ob*: 221). He is the one to go after Marissa with the vaccination gun and, to great surprise, the one to get an Ebola shot instead. The fighting at the

Palmer House in Chicago is certainly uneven, and yet the brute is overpowered by the cunning bioheroine; with considerable luck, that is to say (*Ob*: 247). In the same manner, Paul's recovery with merely “a severe case of serum sickness” after trying an effective vaccine can only be described as miraculous (*Ob*: 339). Once Paul is down, a threesome is called into action. They are led by Alphonse Hicktman “Al,” an East German immigrant with blond hair, blue eyes and a kid's face (*Ob*: 257). He is a man of action with a mighty grip over his subordinates. But for all his fearlessness, he appears to be just as clumsy as Paul with the young woman, whom he fails to shoot on different occasions in New York. Although he considers himself a professional, and very well paid indeed –a thousand dollars a day, the girl keeps evading his traps. Eventually, he is repeatedly stabbed in the stomach with a paring knife and topped with a telephone blow to his head (*Ob*: 305). All in all, extremely surprising for a man who strangles a hotel maid –certainly sturdier than Marissa– a few minutes before (*Ob*: 300)¹¹⁸. The other two crooks are George Valhala, nicknamed 'The Toad' for his extraordinary patience, and a mumbler by the name of Jake with an ability to get on Al's nerves. The former is on the verge of obesity, the latter of undernourishment. They are both dressed elegantly on account of PAC's money, with the special detail of George's Armani suit and alligator shoes, which seem to make him invisible in the eyes of the hotel's private detectives (*Ob*: 256). Nevertheless, they do not get better results with the bioheroine. One of them, probably George, is shot by the FBI when he is about to unload his Magnum at Marissa (*Ob*: 335).

Of the remaining PAC doctors, only two play minor roles in the plot. Dr. Jack Krause, living in his magnificent castle in the centre of New York, is visited and made extremely nervous by the EIS officer (*Ob*: 281-282). Dr. Sinclair Tieman is also simply terrified by the bioheroine in his limited partnership in Professional Labs Corporation, one of the few laboratories in the US equipped to handle Ebola (*Ob*: 295-297). The others are nothing more than bodiless names on a list coinciding with the list of partners for Professional Labs. Succinctly, Robin Cook eventually decides to list the following PAC board of directors:

¹¹⁸ On the other hand, it must be noted that the function of henchmen in popular fiction is basically restricted to “their inability to hit anything with their weapons and their serviceability for dying by the dozens at the excellent marksmanship of the good guys” (Miller 2006: 157). While the former defining trait is clearly applicable to the PAC's crooks, the latter is clearly visible in the relentless slaughter of the anonymous men in black.

President, Joshua Jackson, MD; vice-president, Rodd Becker, MD; treasurer, Sinclair Tieman, MD; secretary, Jack Krause, MD; directors, Gustave Swenson, MD; Duane Moody, MD; and Trent Goodridge, MD. (*Ob*: 240)

Similarly, even though detached from Tom Cope, two additional criminals play their role in the Cobra event: Bio-Ark's researcher Dr. Mariana Vestof, and the president of the American subsidiary, Orris Heyert, MD. The former is the typical spy character, a Swiss citizen born in San Petersburg as she confesses to Littleberry in Iraq. It is precisely during a snap UN inspection in April that she enters the scene running the allegedly humanitarian *Al Gar* agricultural facility. She is described as an elegant woman of no particular age with a liking for designer clothes and accessories (*TCE*: 52). Throughout the inspection, she is the one to calmly lead the conversation, while her Iraqi colleagues remain silent and conspicuously nervous. She materially vanishes once the mobile lab departs for the desert to surprisingly re-encounter Littleberry during the Bio-Vek raid. This time she does not feel so at ease, although she clearly tries to keep cool and produces a hint of irony when inquiring after Littleberry's habit of inspecting toilets (*TCE*: 346). In the ensuing extraordinary board meeting Dr. Vestof uses her relatively high status in the dark biotech multinational to threaten the president of Bio-Ark's subsidiary with moving to a safer country. This is her last appearance. She is supposed to disappear from the States in search of such a location to relocate Bio-Vek to.

The president of the small company, however, is not so lucky. Dr. Orris Heyert appears to Hopkins as a handsome family man in his forties, wearing a shirt and tie but jacketless and with his sleeves rolled up during their first contact in the company's only facility (*TCE*: 336-7). At first, he seems to be insulted by Hopkin's suggestion that his research could be hazardous, which he confronts with the recursive philanthropic goal (*TCE*: 339). But soon he discloses his work both making vaccines and selling engineered pathogens to Bio-Ark (*TCE*: 356). This unethical research is what has to be concealed and by destroying evidence he gives the FBI the excuse to take over the company. His initial reluctance to collaborate disappears when facing a capital crime connected with a terrorist act, which may carry a death penalty. As he crumbles, the jinxed investigator reveals all the necessary information about Bio-Ark, the biological chimera and the bioterrorist. The Bio-Vek connection is proved and Tom Cope exposed as a by-product of the dark biotechnological market. The purpose of this character in the novel is achieved and his contribution is

no longer needed.

Conversely, in *Time of the Fourth Horseman*, while a federal agency has fathered the pandemic, Mark Howland acknowledges to his wife that only Miles Wexford, Peter Justin, somebody called Cockburn and himself are empowered to stop the nefarious project (*ToFH*: 184). Amongst these characters, the unknown Cockburn does not participate in the plot. Accordingly, Miles Wexford, the chief administrator of the Westbank only appears to sign the dismissal list of the insurgent doctors (*ToFH*: 88-9) and to leak an apparently fake suicide by the subverted Eric Patman to the media (*ToFH*: 176-7). However, Peter Justin, the Statistics administrator of the hospital really does have a relevant participation as an aide. He seems to be accessible only to Harry, safely secluded in his Statistics office high up on the sixteenth floor of the Westbank hospital. As an epidemiologist, he only has eyes for numbers and disregards any human link with the casualties. Even though Harry reports fifteen patients under the age of ten lost in a week along with a dozen of Natalie's, Justin only appears to be interested in the unauthorised statistical research that has been done without his consent. It is clear that he is deliberately delaying taking any effective measures and is simply warning his subordinate not to meddle in the matter any longer (*ToFH*: 51-3).

In his second participation, however, Harry puts much more pressure on him and he discloses certain aspects of the project which should have been kept hidden. He is definitely nervous, which can be noticed from the meticulous manner in which he trims his nails and wipes unreal dust off his desk. On the other hand, he displays a tremendous ability to retain figures in his mind, not even needing a printout to relate the more than one thousand casualties in the last two months in the Westbank, all classified according to the fatal disease and ages. Even those from the Country General or the Inner City hospitals are kept in a separate register in his superhuman brain. No doubt, he is well-chosen as head for this department. The stubborn Justin still believes they are fighting a real war against overpopulation and these are but tolerable losses, which Harry readily uses to demand him to spend less time in detached offices and more walking around the hospital corridors (*ToFH*: 77-9). Soon afterwards, the blacklist appears with the names of the seventeen renegade doctors relieved of service, signed by Peter Justin and Miles Wexford (*ToFH*: 88-89). It all seems a symptom of frustration in Justin, who has not been able to stand through any of the two rounds he has fought with Harry. Yet, as soon as he gets the mutant polio,

he joins the dissidents and contributes effusively.

Finally, another character who does not seem to be in charge of the massacre, yet appears to be quite powerful is the chief of the terminal patients plant, Jim Braemoore. In a way, he is the projection of the inaccessible Miles Wexford, and carries the chief administrator's messages of the rebellious leader. There is a line that has been crossed and there is no turning back for the dissidents. Jim appears to be quite stubborn. For him, it is all a controlled experiment to merely thin population, with enough vaccines to stop it if things get out of the established. But they already have and the reputed doctor is too blind to see it. Even if he does, he pretends not to. He has a job and a status to keep and, after the years, he cannot find the strength to join the insurgents (*ToFH*: 62-65) .

4.4.2 The Bent Law Enforcer

Although his main motivation is to clear his reputation, the advent of the vengeful policemen forces Conor to fight two battles at once: one against Branch and his fanatic servers and another against Lieutenant Drew Slyman and his annoyed cops. Being one of the three leading hit men of the 'Forty-Ninth Street Golf Club,' and due to the biohero's previous inability to gather enough evidence to indict him, Slyman becomes a secondary objective in Conor's personal quest, especially when he threatens to shoot his girlfriend. The man in question is quite ill-favoured: thin and black-haired, with a narrow head and two bulbous eyes. In addition, the strong smell of Cerruti aftershave and his shining brogues shoes make him look outdated (*PA*: 66-7). Moreover, after his miraculous survival from the biblical fire at the Madison Square Marquis hotel, he is left with an 'Invisible Man' aspect due to the multiple bandages covering the third-degree burns all over his body. Therefore, his sinister personality is highlighted by a physical appearance which does not inspire much confidence.

On the other hand, the lieutenant likewise emanates authority. This is plain from his first intervention at Spurr's, where his presence seems to bring about a necessary dose of control over the ravaging chaos. By both urging the robbers to drop the weapons and his men to hold their fire, he is certainly avoiding a bloodbath (*PA*: 56-8). It is an authority, though, he wants other people to acknowledge, whether subordinates or not, as exemplified in his boasting about sending the hapless gunmen

to the Richmond Inn restaurant (*PA*: 325).

More than anything, Slyman embodies corruption. It is not his purpose to collaborate to catch the real criminals. Actually, it is later disclosed that he has always been aware of Conor's innocence. Neither does he show any mercy when threatening to shoot Lacey in the pelvis instead of killing her straight away. His intention is to cause as much harm as possible: "Instant hysterectomy," he fumes, "just to make sure that the world isn't plagued by any more O'Neils" (*PA*: 325). The punishment for such an evil character can be no other than burning in the particular hell the hotel has become. Yet, even death seems to be too easy a way-out. Following the biblical allegory the writer implements, Slyman still has to endure the agony of his own personal purgatory, with a charred body, until Magda decides to put a compassionate end to his pain. In the end, his lifeless body lies on the floor with arms spread, as if crucified (*PA*: 540).

Analogously, the real villain behind the DyMar case is in fact no bioterrorist, but the Syndicate. The enigmatic Adam Lentz holds a high position in an unknown federal agency which has its headquarters in an obscure building in Crystal City, Virginia. Under his command, there are hordes of men-in-black ready to deploy mobile tactical units anywhere in the US. In order to reach this powerful post, Lentz has taken advantage of his "patience and cool lack of emotion as well as an absence of remorse" (*XFA*: 234). With the passing of years, it seems that he has also gained a great deal of respect amongst his subordinates, who unquestioningly obey his orders. He knows all their special qualities and it seems he has supervised the recruitment process personally. Although they are perfectly capable of handling any such operation by themselves, Lentz prefers to be on the ground so as to make sure everything goes as planned. He is, therefore, a great leader irrespectively of the questionable assignments he is asked to perform. He simply dedicates himself to his job, leaving aside any possible moral considerations.

Indeed, his coldness is most fearful. However, the motivation pushing him behind Dorman is actually his own mistake. He has failed to attain his primary task, which was to keep the nanomachines under control and, subsequently, his secondary goal, which was to erase every single biological agent so that humanity was kept ignorant. Now, he has to amend his own negligence before he has to report to a higher authority. He has an immense power to dedicate to that task and really means to use it. The one great advantage of his invisibility is that no one is going to ask

annoying questions about his deeds, and he will not have to fill in the leaden compulsory reports to justify his expenses. He is an omnipotent shadow empowered with dealing out justice as he pleases.

Ultimately, however, such an errand depends not only on him, but also the mysterious “Cigarette Smoking Man.” Despite his significance in the series, this character only makes a couple of appearances. Actually, the first one is a simple telephone conversation to inquire about the unaccomplished destruction of Kennessy's nanomachines. This is a situation which does not please Lenz at all, since he had intended to leave explanations for a later time. It is quite evident that the “Cigarette Smoking Man” imposes a great deal of respect over his subordinate, who readily follows his instructions to trail Mulder (*XFA*: 191). In his second and last appearance, he is described as the personification of conspiracy, the man behind the rise and fall of presidents, governments and even countries. He is vaguely depicted as gaunt, with haunted eyes, an unremarkable face and dark brown hair combed back (*XFA*: 271). The ghostly atmosphere, with a shadowy mist of smoke around the inscrutable body, intimidates even the cold-blooded Lenz. The sole intention of this unrecorded personal interview is to verify that the nanomachines have completely disappeared, hence out of humankind's reach. In his view, the world is not yet prepared for such a breakthrough; humanity must remain ignorant at all cost. That is why he congratulates his subordinate for a new never-rewarded secret success. In the end, he is left coughing hard, an allegoric illness of his soul. After all, the thousand conspiracies he has arranged through his life could not go unpunished.

One other intriguing character is Brent Scopes' right hand in Mount Dragon, namely the facility's security director, Nye. An odd personality with very strange habits, he is not known to have any friends amongst the staff, with the exception of his deputy Mike Marr. After a disgraced failure in a nuclear complex in his native England, Scopes transferred him from GeneDyne UK to safeguard the magnificent installation convinced that his past fiasco would make him a faithful servant. And indeed he seems to have dutifully paid the magnate's favour, for he is said never to have left Mount Dragon since his arrival in 1986. His unchanging ponytail, safari hat and long coat magnify his low popularity. None of the residents, including the security personnel, ever dare question him and Carson is well advised to do likewise if he wants to survive (*MD*: 94-5). He very soon has the opportunity to show why everybody is so afraid of him. The stage-two alert settled after the chimp incident

entitles him to assume full command of the facility temporarily, which he readily uses to reinstall saneness amongst the wild personnel. In his discharge, it has to be said that he definitely takes the right steps by securing the facility, lest the X-FLU menace be able to reach the outer world. Yet, he certainly shows the worst of his despotic personality by ignoring any other proposal but his own. Now he represents authority in the martial state developed by Scopes and nobody is ever allowed to suggest anything. His is no easy job: he is there to be feared, especially in exceptional events like the X-FLU breach (*MD*: 127-37).

On the other hand, his relationship with Carson is not particularly good; especially after being followed by the biohero on one of his frequent escapades into the desert. The bold researcher does not follow Singer's advice and crosses the security director by gumming up his three-thousand-dollar Holland & Holland rifle (*MD*: 159). Soon, PurBlood –a genetically-altered blood that ultimately rockets blood pressure– does its vile work inside Nye's head. The anger after the succession of events has done nothing but to boost its effect. It seems as if the disease is not only affecting his rational thinking, but also his trained reflexes. Carson fools him once and again. By the time of the final rendezvous the growing derangement plays a defining role. His obsession with Mondragon's gold, certainly an amplification of PurBlood over an initial curiosity, makes him vulnerable again to a last desperate cheat. Thus, he trades his horse, gun and remaining water for the non-existent treasure (*MD*: 457).

Mike Marr, Nye's deputy security officer, also takes a relative stand by being present in every turmoil on behalf of his master. He used to be a tunnel rat in Vietnam, probing secret tunnels in search of Vietcong and their weapons caches, and he got his limp when a tunnel collapsed on him (*MD*: 232). Through Susanna, we know he is the perfect unquestioning servant, an ideal dummy to obey orders. This is why, whenever there is trouble, he is the one to appear in the place while Nye controls it via the intercom and remote camera. Although it is not specifically mentioned, it seems that he cannot make it out of the Level-5 lab before the blast and dies there.

4.4.3 *The Fanatic*

The henchmen in *The First Horseman* are by no means lesser characters. In fact, the guru entrusts the so-called 'Operations Team' with different tasks in the name of The Temple of Light, including the dispersal test in Washington prior to the final blow. This group of warriors for the ecological cause consists mainly of a limited number of activists, whose thoughts are quite important for eventually understanding the plot. This way, a wider, more objective point of view is portrayed to the reader, who can not only grasp the feelings of the biohero, but also try to comprehend the reasons behind the acts of those on the other side.

The most important of these characters is definitely Susannah Demjanuk. In the opening lines of the novel, she already describes the nervousness of Tommy, another young member of the team and father to their forecoming son, when kidnapping and killing the parents of a defector from the sect. Actually, she acknowledges her anxiousness too, especially about torturing the target couple as Solange requires. In any case, that is the job for another crook who is also responsible for administering the fatal injections of morphine. Being part of the mission is, therefore, both exciting and excruciating for a non-practising Catholic, who nonetheless feels there is something wrong in it. However, Solange's words and depersonalisation techniques have not been in vain: she is a soldier fighting a secret war and, thus, is allowed to kill for the cause. Moreover, it all has been rehearsed carefully and success seems guaranteed. Her assignment is to gain the confidence of the mature couple while the others take hold of the situation. This she can do without much problem: she is pretty, young and pregnant, the ideal bait for such a task (*TFH*: 10).

It seems that she is more confident in her new undertaking in Los Angeles, where Susannah is carrying out a dispersal test of an agent mimicking the flu. She has been supplied a false identity –Mrs. Elliott Ambrose, a healthy bank account, a new car and a cool apartment. For a young woman with a newborn baby, it seems as she has been provided with more than the basic needs. She feels accepted in a place where "everything gleamed and shone, even the people" (*TFH*: 145). However, she cannot allow too much involvement with what her guru considers the belly of the beast. She has been given a precise route to disseminate the light bulbs in "the pep center of conspicuous consumption" (*TFH*: 145-6) and cannot fail her leader.

Therefore, even though she feels at ease in Rodeo Drive, detachment is compulsory for the accomplishment of her mission.

The eventual solution of the biological threat takes a brand-new perspective through the eyes of the young woman. The hijacking of the ferry looks like a day out with the family for Susannah. She even takes the baby with her and proudly shows him the Statue of Liberty while her companions shoot a brave kid along with an innocent woman (*TFH*: 391). Finally, despite all her infatuation, Susannah's mind seems to be completely cleansed in a couple of months. It is as if the charges of kidnapping and murder produce a miraculous effect. In the subsequent trial, she also claims that the cult members acted on direct orders from Luc Solange, whom she identifies in court, when kidnapping, killing and dismembering the Bergmans (*TFH*: 419-20). Whatever power the guru has on her, it appears to evaporate before the prospect of a long imprisonment sentence.

The twenty-six-year-old Thomas Reckmeyer –Tommy– is another prominent member of the team. He is in charge of the aerosoliser, the device that is to make the bioterrorist attack possible. It is his own design, which has gained him the praise of his master when it outperformed the one custom-made for the occasion (*TFH*: 202). Since then, Tommy has in a way felt as infatuated as Susannah as with the sect's guru. He feels he is an essential component of the operation –as he indeed is, yet he has certain negative sentiments concerning those around him. First and foremost, he cannot stop thinking about Susannah, who is on her own in Los Angeles. He misses her, mostly sexually. That his hormones be overpowering his neurones is an abomination he cannot abide by.

From this simple fact his anxiety rises and the anger towards other members' annoying habits. He especially dislikes Belinda and Vaughn's technical jargon, their dependence on the cell phone and laptop and their air of superiority. Not even meditation can erase these disruptive thoughts. So extreme is his negativity that their continuous dependence on the reports of the Weather Channel becomes unbearable. The dispersal test in Washington had to be aborted in three previous occasions and the responsibility is about to make him crumble. So, when the right meteorological conditions allow a successful trial on the Potomac river, all the earlier tension turns into irrepressible happiness. The idea that his own invention may make the engineered flu reach the Pentagon and even the White House and the President is such a boost (*TFH*: 201-207). Hence, Tommy focuses more on personal success,

although also for the cause, than Susannah's more corporative thinking. While both seek a triumph for the ecologist cause, it is clear that the young man is more concerned with personal promotion than the former.

In Alan Blackwood's *Plague of Angels*, Branch tells Conor to expect a call from a man by the name of Victor Labrea, who will tell him how to retrieve Lacey (*PA*: 241). An alleged forty-six-year-old international investment banker, his introduction into the plot is mostly through other people's words and this phone call. Moreover, his eventual materialisation in the Waldorf-Astoria shooting episode takes place as a complete surprise, when he comes out of the shower half-naked to meet Conor's party (*PA*: 283). On the whole, it seems as if his anonymity cannot be guaranteed any longer and he is forced to enter the scene. Branch's deputy in New York certainly appears to be discreet by the way he conducts his brief initial conversation with the biohero, although it is fairly evident that those around him do not share such a virtue.

It appears logical that Labrea is so successful as a banker: in person, he also proves to be a hard negotiator. He knows how to defend his keep and has the ace of Lacey. If anything happens to him, the beautiful young lady will pay the consequences. Feeling confident, he does not hesitate to use his silenced Beretta; first against Sebastian and Ric, to put them down (*PA*: 284), then on Sydney twice in the chest after the latter's attempts to hypnotise him (*PA*: 286). So strong is his mind that, unlike other characters and even Conor himself, he resists Sydney's spell to carry on his mission. As a man of power, he is not the kind who accepts being told what to do. Much the contrary, Labrea is a commanding character with an army of subordinates waiting around for orders. In fact, he does not consider himself Branch's aide but, in his mind, they are "soulmates" (*PA*: 303). They both have a mission to accomplish and herein lies his strong will. As he proudly tells the biohero:

What you're trying to interfere with here, it's bigger'n you, and it's bigger'n me. It's paving the way for the Second Coming, and whether you kill me or not, well, that won't make a [sic] ounce of difference. (*PA*: 288)

That is why he feels confident enough to face Conor's threat to his life since his determinism does not give him a chance. Thus, he calms his worried wife:

I don't believe this fellow is up to killing me in cold blood, and if he is, and this is the moment that I'm going to meet my Maker, well, that's the will of the Lord, and who am I to argue with that? (*PA*: 289)

This weird combination of deductive ability and fanaticism clearly puts Conor to the test. It takes the convenient but unexpected appearance of some frightened hotel guests, a blessed intervention of chaos in the words of Blackwood, to let Conor shoot his opponent. Nevertheless, his girlfriend now falls in Slyman's hands (*PA*: 324).

4.4.4 *The Capo*

One single character deserves such a classification: the opportunistic Barney Cox in *The Third Pandemic*. Rather than a bioterrorist, Barney is quite an astute mind who knows how to make the best of the current situation. Thus, when a devastating pandemic ravages the world, he has the ability to organise an army of crooks in charge of collecting and disposing of the dead. It is only the determined action of his natural counterpart Philip Paris that stops him from eventually ruling over an utterly anarchic world. From the scarce information about his background, it is clear that as a child Barney already showed a precocious tendency to take justice into his own hands, as well as a natural predisposition for leadership. The case of Jerome, an adult who used to bully him illustrates this assertion pretty well. After tricking him into a hunting party which ends with Barney as an improvised target, the young boy understands that “there was no justice, not like they said in the school. There was no safety. There were only the rules men made for themselves” (*TTP*: 56). Although Jerome never means to really hurt Barney, such a traumatic experience makes him set his own standards of equity by which he is to abide for the rest of his life. Since his obvious authority cannot be questioned, he devises a clever plan to avenge Jerome's transgression: he makes a cuckolded brute believe Jerome is laying his wife. Although Barney never gets to know that Jerome bleeds to death from castration (*TTP*: 58), it does not matter much. He knows he has had his revenge. At such an early stage in his life, Barney realises that he has a way with words. He also knows that, in the course of time, his eloquence will help him build a gruesome empire based on his particular understanding of justice.

It is not surprising, therefore, that his first entrance on scene be violent: torturing a prisoner in King County Jail (*TTP*: 48). Here, Barney has become the capo and he runs his criminal organisation both inside, controlling life in the prison, and outside, doing jobs for other people. This is the case of Robert Fancher, the

corporate attorney who asks him to find Elaine Wilkes and the data about the virtual expansion of agent 57a. But, well before Fancher comes with his assignment, Barney has already devised a shrewd plan to shake off his confinement which, on the other hand, is strongly connected to Tuberculosis. The villain has discovered that the city and county authorities are deliberately tolerating the spread of TB amongst the convict population and has accessed documents proving his thesis. In return for silence, he negotiates his release, along with the rest of his collaborators inside the prison. Moreover, he demands the evacuation of the prisoners until the jail is properly ventilated. It is in the course of this negotiation that he meets his antagonist Philip Paris, an inopportune obstacle in his particular quest for freedom.

Thus, it can be said that Barney is always arranging matters for his own personal improvement. Indeed, throughout the plot, he keeps scaling social levels until he reaches his long coveted mansion looking out over the city. Barney has no scruples about doing whatever is needed to achieve his objectives. Like his predecessors, he is completely unempathetic, torturing and killing both to retain his authority and for pure sadistic pleasure. This is well exemplified in the macabre decapitation of eleven of his men for being disloyal (*PA*: 340-341). Paradoxically, in the same world of anarchy that has propitiated the rise of his crooked kingdom, he struggles to maintain an intrinsic order his own men have never observed. It is certainly obscene to discover Barney moralising his ruffians over the social burden they bear:

I cannot overemphasize that you represent the *new leadership* of this city, [...]. And with that must come a sense of *duty* and *responsibility*.

If we do not follow policy, if we break the rules, we jeopardize not only ourselves, but this entire organization. And I'm here to tell you, friends, this organization is the only chance that any of us have of surviving. If you go against the team, you go against all of us. (*TTP*: 338-9)

Despite these cruel acts, Barney is respected by his men, who appreciate his arrangements to take them out of prison. Furthermore, he knows how to treat them well, and they all receive truckloads of liquor after a hard day collecting and cremating the victims of the pandemic (*PA*: 346). All in all, Barney has given his people the possibility not only to survive, but also to live quite splendidly amongst the generalised chaos. In return, he has become an unquestionable leader, even more powerful than the city council itself.

Obviously, it does not escape his brilliant mind that the only available source

for an effective vaccine is in Dr. Wilkes CD and he readjusts the terms of his deal with Uni Corporation. Once out of prison, he uses Fancher to contact the higher ranking post in Uni and immediately gets rid of him. After throwing him into the void from the attorney's office in a shiny skyscraper, he goes on to rape –and surely kill– Fancher's attractive wife (*TTP*: 333-4). It appears he has to regain the time lost in prison as soon as possible and begin a new life of power. Yet, to complete his plan he still needs to find Paris and Wilkes and retrieve the Episim data on agent 57a. Although he does not know the pharmaceutical market, he is perfectly aware of the value that a drug against the pandemic may have. Of course, he is not interested in the philanthropic benefits of the vaccine; he simply wants the money. Thus, he welcomes the idea and includes it into his pre-existing plan of social improvement.

However, now that he has such a powerful organisation, it looks pretty easy for him to seize the apparently vulnerable biohero and his aide and devote himself to his political ambitions. By postponing the matter he commits a mistake common to the other evil-doers: he underestimates the biohero. It is only a turn of fate that Paris misses a shot aimed at him which eventually hits a bodyguard, as is Barney's heart attack (*PA*: 366). Yet, he could have prevented the situation had he gone for the lieutenant first. Therefore, arrogance again appears as the main reason for his downfall.

4.4.5 Minor Crooks

Of all the glamorous criminals in Blackwood's novel, Magda's stage partner is certainly most preposterous. A Latin-American of unknown origin –sometimes referred to as Mexican (*PA*: 101), other times as Cuban (*PA*: 204), this is a man who takes his physical appearance to a grotesque extreme. In his first entrance, his hair is described as patterned in “luxuriant black curls” (*PA*: 16), and he nourishes “a thin black moustache that could have been drawn with an eyebrow pencil” (*PA*: 17). He is also keen on houndstooth blazers over his shoulders (*PA*: 17), silk ties and cashmere coats (*PA*: 283), while his Cuban shoes are also unmistakable (*PA*: 217). All in all, his extravagance already provides a strong signal of his weird personality. This is grim. Since he is a markedly unstable man but nonetheless gifted with a powerful skill, Hypnos is a lethal walking weapon. It is certainly alarming the way Ric remembers the couple's unscrupulous performances in “Vaudeville Days,” stating that they

materially hated their audience. To prove his assertion, he recalls the time when Ramon made a middle-aged woman dance naked on a table with a pink-feather duster up her ass (*PA*: 103). Top hypnotists like him are doubtless powerful enough to control other people's minds, even leading them to kill or commit suicide, leaving no evidence behind. Aside from all the demagogic myth around the matter, there is fact behind all this fiction. Quite understandably, the author is warning about such individuals, who can be easily hired to join his cause by a fanatic with enough money. Much worse, a hypnotist like Magda can turn the whole situation to her favour, as eventually happens. It is only a pity that a character with these possibilities ends up being accidentally shot to death (*PA*: 287). Yet, the protagonism now falls on his female counterpart.

Around these evil aides, so to speak, there are also a variety of minor characters with some particular assignments in Branch's apostolic mission. This is the case of Gary Morton, also regarded as Angel Gabriel by Conor, who materially performs the assault on Spurr's and is eventually arrested after the Brinks-Mat truck pursuit. As Branch will later reveal to the biohero, he is simply a fall Mister-no-one to lay a false trail (*PA*: 227). In turn, Conor's deputy, Salvatore Morales has been easily suborned on account of his compulsive gambling and his debt to the hospital because of his mother's cancer. But above all, Salvatore is jealous of Conor for a job he believes he is more suited to, thus betraying his boss (*PA*: 228). Mostly unknowingly and certainly unwillingly they, like many other subordinates, join the crusade because of their avarice, thus proving how fallible the human being is. Contrary to the dogmatic Labrea, the other participants in Branch's holy war have simply been bought, especially due to their low economic status. If there is one lesson to be learnt, it is that, as long as there is enough money, there will always be volunteers for any terrorist cause.

Accordingly, other lesser contributors to Solange's secret war also carry out tests to check the infective capacity of the agent. One of these is an engineering student in Madison, Wisconsin. To pay for his tuition and books, Andrew has accepted a part-time job which consists of adding chemicals to the boiler feed pump at the steam-generating plant. Obviously, the sectarian guru does not miss the possibility of using the services of this sympathiser to check a new form for spreading the lethal disease. Moreover, the kid is a university student, thus, in principle, not precisely easy to fool. Yet, the glorious image of himself and Solange

as brothers in another life keeps wandering through his head, impelling the kid to throw the test agent into the water (*TFH*: 230-235). Indeed, the charismatic aura of the sect leader reaches a wide range of people.

In the same way, Gene Oberdorfer, a retired pilot in Daytona Beach is a regular member of the 'Temple.' He wakes up early in the morning to perform his exercises and meditation, before playing golf with his friends. However, his mission requires a small plane and a private hangar like the one he owns in Pine Creek Fly-In, which allows him to be airborne in merely five minutes. Oberdorfer is definitely much more naïve than the student. He is told to send a spray of dirt and grass into the air given the right meteorological conditions. He is also given the proper device to carry out his mission and that is precisely what he does. There is no room in his square mind for anything that is not golf and executing a perfect dispersion with his Cessna (*TFH*: 260-264). Peripheral thinking, as seen in other wrong-doers, is clearly absent in this case.

Finally, there are other members of the "Operations Team" who appear briefly and with no definite description of their inner feelings. For instance Belinda Barron, deputy chief of the Special Projects unit, is said to be a control freak who triply encrypts the messages to the headquarters. She is also in charge of recruiting characters like Andrew, whom she additionally flatters by pointing at a supposed brotherhood with Solange in another life (*TFH*: 232). This is indeed contradictory since the one in charge of recruitment is a woman by the name of Veroushka. Her final function is to blame the FBI for overreacting during the ferry incident, acting as a spokesman for the imprisoned cultists (*TFH*: 418). Yet, we have no direct access to the depths of her mind and she really seems an all-purpose character for the writer. Much the same can be said of the twenty-five-year-old Vaughn Abelard, a vague individual also with an ambiguous part in the team. Initially he is described as a doctor, in charge of pulling out the Bergmans' teeth and chopping off their fingers before killing them with an overdose of morphine (*TFH*: 2). However, he is studying a project on wheat-stem rust in the safe flat in Alexandria, then immediately runs the aerosoliser in the Potomac test (*TFH*: 203-7). In the final act, he simply carries an Ingram sub-machine gun on the hijacked ferry to intimidate the passengers.

There are also some "legends," in Susannah's mind, in the 'Temple' who take part in the aborted assault. Thus Saul, the director of the Office of Special Affairs, is strangely the one in charge of fixing the aerosoliser to the deck of the ferry and is the

only casualty of the team caught by FBI fire. Antonio, a deputy in charge of research, on the contrary shoots a brave kid on the deck, while Veroushka, Solange's mistress and the woman in charge of recruitment, pushes the still standing body to the deck (*TFH*: 391). Etienne 'the Frenchman' Moussin, who helps Saul with the aerosoliser, appears to escape and seek refuge in Cuba, according to the press (*TFH*: 420). The operation involves another character named Avram and at least four or five others with automatic weapons who also carry out undefined tasks.

All in all, there is an avalanche of hitherto unknown members of the sect with ill-defined functions who perform the hijacking. This is true especially if Susannah's classification of their roles in the organisation is to be taken seriously. Nonetheless, these crooks seem to be here to fill the pages, as opposed to Susannah and, to a minor extent, Tommy, who provide their own subjective view of the whole event.

Likewise Scopes' secretary, Spencer Fairley, briefly appears at the end of *Mount Dragon* to implement his master's wish of sterilising the Octagon in the GeneDyne headquarters in Boston. His participation is centred on acquiring the VXV canisters and the cyanophosphatol beakers within two hours. After a few others "yessirs," his job is over. Very much like the executor Alan Lipscomb, who is merely instructed to set aside fifty million dollars for an Institute of Advanced Neurocybernetics. His lines do not go beyond "yes" and "very well" (*MD*: 469). Other servants, like Scopes' guards at GeneDyne Boston, are left anonymous. They are instructed to chase the intruder Levine inside the compound. One of them is even allowed the cynical move of stating that he is not going to clean up the mess after Levine's head is blown off (*MD*: 438). Nevertheless, Scopes takes good care that such an extreme is never reached. Their participation is over when they take the scholar to the Octagon.

In Ken McClure's novel, the figure of the crook is clearly personified in the evasive Arab man. Apparently Shula Ron's murderer, he manages to dodge Anderson by hitting him with stones to make the biohero fall off the wall; certainly an odd way of escaping (*TSA*: 127-8). Before fainting, however, the vertigo-stricken biohero manages to compose a fairly accurate description of the man, which he gives to the Israeli police: "Tall, over six feet, sallow skin, Mediterranean features, well-built, black moustache" (*TSA*: 132). Apparently, he is also the anonymous sniper in Hadera who also evades Mirit's soldiers (*TSA*: 95-7). His final reappearance at the Jan Kouros Hospice implies that he is Freedmans' bodyguard and thus, the man trying to

kill the biohero. He communicates either non-verbally or in unwritten Arab, which only Mirit can decipher for the reader. The guy is a complete dummy, with no personality whatsoever reflected in his acts. He is simply depicted as “a spectre of malevolence” when proceeding with the incinerator; quite logical after being left toothless (*TSA*: 251). In essence, he embodies Edward Said’s feelings of a Palestinian Arab, who is stereotypically dehumanised by Westerners. To his mind, oil economics and the power of the Jewish culture in America have substantially contributed to such demonisation (1978: 27-28).

In *The Third Pandemic*, there is also a last lackey to consider: Uni's attorney in Washington, the arrogant Robert Fancher. From a past recollection, “Bennet could see the high forehead, the aristocratic nose, the bright blue eyes, the nasty little scowl welded onto the pale, starved lips” (*TTP*: 133). The lawyer is certainly most unwelcome in the whole affair. In effect, Fancher is tangled up in a web that goes from Bennet to Barney. As he acknowledges, “his retainer with Uni” is “the foundation of his current lifestyle,” including several sumptuous houses by the lake, in the mountains and on a paradisiacal island, some luxury cars, an exclusive school for his children, and an apartment for his mistress (*TTP*: 148). Should any major disagreement bring this fruitful relationship to an end, he would be forced to rely on his other darker source of income, the one in King County Jail, and he clearly does not favour such a possibility. In order to please his major funder, he has to provide Barney with whatever means he needs to catch the fugitive researcher, in return for bail. In the end, the attorney finds his reward being sent on a seventy-three stories flight with no protective measures (*TTP*: 309).

4.4.6 Partial Findings: On the Crooks

A great variety is also noticeable amongst the characters of the crooks. A prominent characteristic is the intrinsic authority entitled to the leaders amongst the bent law enforcers who, like the main villain, also need to avenge a past offence. In order to make their corrupt personality more obvious, they are not exactly attractive physically. Likewise, it is interesting to note a conspicuous depersonalisation in the Syndicate’s men in black, the gangsters and the Temple of Light’s “Operations Team.” Contrary to the groups on the biohero/-ine's side, they are not there to think but to act. Other strong personalities are the bent scientists who, despite following

orders, also have a large degree of autonomy. In any case, participation in a biological crime quite often leads to an exemplary punishment. This can be the proper death of the crook in a dishonourable act, like Slyman, Labrea, Ramon, George or Saul, all of them men of action who die by the sword. Those who survive, like Gary “Angel Gabriel” Morton, the Temple of Light’s members, Dr. Heyert and the PAC and Westbank conspirators, do not escape without a just conviction. Yet, there still are some who somehow manage to dodge the forces of good and are believed to continue their illegal activities, like Dr. Mariana Vestof, and the omnipotent “Cigarette Smoking Man,” along with Lentz and his men. These are the ones whom the writer apparently considers most dangerous and probably that is why they escape unharmed. The reason seems to be that they usually stay within but above the action of any government and this is precisely why they can create so much havoc without assuming responsibilities.

Amongst the generally acknowledged stock characters, it is fairly easy to note the evil scientist in all the conspiracy doctors and especially in Preston’s Dr. Mariana Vestof. Correspondingly, a number of dog-heavies like Jake, Gary Morton, or Saul to name a few, also abound in the novels by Cook, Blackwood and Case respectively. Finally, to consider Adam Lentz as an upcoming Dark Lord undergoing the compulsory training period to substitute the evil “Cigarette Smoking Man” would certainly not be too far-fetched.

4.5 The Victims

The victims are the least participative characters in the plot. Yet, they are the most substantial since they manifest the dire effects of the biological threat. It can well be said that they are guinea pigs, certain fictional subjects on whom the writer is prone to experiment to make his point. As long as the epidemic is confirmed, the pattern around these characters seems to be repeated time and again: a referential victim is introduced to reveal horrible symptoms which other subsequent pigeons will suffer. Thus, an initial victim, who is often, but not always, ‘patient zero’ –the initiator of the epidemic, lives normally until he/she starts suffering strange ailments that inevitably lead him/her to a ghastly death. Sometimes his/her corpse is later analysed to reveal the mysteries of the lethal agent and locate the origin of the

infection as soon as possible. Other secondary victims also undergo the same process until either the bioterrorist or the natural source of the disease is discovered and neutralised. Those who survive an encounter with a biological agent are very rare exceptions and are conveniently crippled afterwards. In this simple but effective manner, the writer makes sure his/her readership comprehends the gravity of the message. Some are treated individually and others as a group. These usually become statistical figures to enlarge the casualty list and scare as much as possible. Some others, who can be called collateral casualties, do not die directly by means of the biological agent, but in the action to try to stop its propagation. Therefore, the potential victims are mainly those who take too many biological risks and those arbitrarily slaughtered by the bioterrorist. In order to study them carefully, they have been divided into two groups according to whether or not the biological threat materialises.

4.5.1 Victims in a Materialised Threat

The largest group, they follow the pattern of an introductory case with subsequent secondary infections. While the overall toll of infections amounts to thirty-two cases in *The Cobra Event*, only some of them seem to be relevant enough for the writer to mention. Not all of them die, of course. There is the lucky case of Suzanne Tanaka, the microbiologist who survives the disease after being bitten by a lab mouse (*TCE*: 255). Nonetheless, her example clearly reveals how easy it is to break the strict lab code and apparently jeopardise humankind. On the other hand, the morgue attendant Ben Kly, despite being killed in action, does not count as a factual victim. Much the same can be said of the FBI's Mark Littleberry.

As for those who do count, Preston devotes a great dose of his writing skills to concisely depict the cruel passing of Kate Moran, who becomes the referential victim. The general dizziness and running nose quickly give way to wild seizures and jerking as Kate completely loses control of her body (*TCE*: 8). This is when Preston rejoices in the portrayal of certain uncommon and particularly nasty symptoms. Thus, the fairly unmerited observation of Kate's involuntary evacuation during the seizure becomes the prologue for a gory episode. The accurate description of the girl's sudden fit of self-cannibalism has no paragon among the rest of biohazard writers:

Then her teeth sank into her lower lip, cutting through the lip, and a run of blood went down her chin and neck. She bit her lip again, hard, with ferocity, and she made a groaning animal sound. This time, the lip detached and hung down. She pulled her lip in, sucked her into her mouth and swallowed. Now she was chewing again. Eating the inside of her mouth, chewing her lips, the insides of her cheeks. The movement of her teeth was insectile, like the feeding movements of an insect larva chewing on its food: intense, greedy, automatic - a kind of repetitive yanking of the tissues at her mouth. Her tongue suddenly protruded. It was coated with blood and bits of bloody skin. She was eating her mouth from the inside. (*TCE*: 8-9)

The image of the innocent girl surrendering to her primeval instincts through the action of the pathogen is truly spectacular. Nonetheless, Preston's followers would not expect a less breathtaking presentation. Precisely because it is absolutely odd to witness a person involuntarily chewing herself in a frenzy state, this token victim exemplifies the nature of the writer's intentions. It is not only necessary for the reader to be aware of the lethality of the agent, but he/she also has to fear the painful death it causes. Thus, the characterisation, not of the victim, but of his/her agony plays an essential role in the articulation of Preston's discourse. The whole episode is finally topped with a dramatic curving of the spine which the author describes as basal writhing, a convulsion associated with damage to the base of the brain. The white eyes, the mixing of the running blood from her nose and the urine, as well as some weird cracking sounds from the spine ultimately complete the gory scene. Suddenly, Kate awakes and passes away in absolute peace (*TCE*: 10). All in all, the biothriller is served with a gripping histrionic opening.

However, the scary possibilities of *Cobra* do not end with the death of the victim. There is still room for some post-mortem extravaganza. The potential of a dissected cadaver is wide, especially as related to the genitalia. Organs like the vagina, the rectum, the urethra and the bladder must be mentioned. As far as possible, they must also be handled in a most nauseating yet undoubtedly professional manner:

Austen reached through the abdomen, low inside the girl's pelvis, and grasped the vagina and rectum with her left hand (her chain-mail hand¹¹⁹). With her right hand, she inserted a scalpel down into the pelvic area. Working delicately, by sense of touch, she cut through the base of the rectum, through the vagina, and she cut away the bladder at the base of the urethra. As she was cutting, she pulled steadily. Nothing happened. She pulled harder. The bundle of organs were suddenly freed, and they came out of the body in a bubbling squelch. The

¹¹⁹ In forensics, the hand that is protected by a metal glove below the regular one to avoid unwanted cuts.

sound is known as the pelvic slurp, and it is caused by suction drawing air inward as the organs are pulled out of the pelvis. (*TCE*: 76)

Correspondingly, the cranial contents could never be missed. That would mean that the exciting interlude with the Stryker saw is ruined. As the assistant matter-of-factly plugs in the saw and adjusts the safety glasses, the revulsive element reaches an insurmountable peak. The odour of the resulting bone dust smoke is readily paralleled to that of a dentist's office. The process is completed with a V notch on the forehead, so that the skull bone can be placed back properly afterwards, along with the pool of blood collected in the calvarium –a bowl of blood to the writer. Once honoured, Alice can befittingly slice open the girl's brain, which immediately turns “into a kind of glassy, red-gray mush” about to “spread out in a soupy mess on the cutting board” (*TCE*: 85). It is difficult to imagine a more repulsive way to describe the killing process of an infective agent: much to the credit of the best-selling writer, yet gratuitous, nonetheless.

Once the introductory case is explained, other victims are entitled to die in a most strange and dramatic manner. An unidentified homeless man by the name of Harmonica Man is used to consider a strange curving of the spine. Shortly afterwards, Penelope Zecker, the woman who had traded the box with Kate also appears dead in the St. George Hospital in Staten Island. Again the recursive arching and biting are present. Preston readily denounces the unprincipled practice of some for-profit hospitals of not performing autopsies or any other complementary tests on insolvent patients (*TCE*: 132). Finally, Harmonica Man's best friend, Lem is found dead during Alice and Kly's little excursion through the New York subway tunnels. The scene is not particularly appealing, with the deceased bent in the shape of a crescent moon, a swollen belly as if pregnant, with gases of decay, green and black fluids dried over his mouth and staining his pants and covered with a cloud of flies. Yet, the most disgusting feature is that he had enucleated –pulled out his eyes– himself (*TCE*: 140-1). This last fact is certainly questionable since a biological agent does not necessarily lead to such obnoxious extremes.

A similar case is the dazzling death of Peter Talides, Kate's art teacher. As the reader already knows the symptoms, Preston has to devise a truly dramatic episode to keep his insatiable devotees satisfied. In a short chapter of merely three and a half pages, we witness Talides' disorientation on account of a brain virus. The agent is powerful enough to drive a sound man insane and drop him on the tracks of the train

inbound to New York. He could have died on the streets, on the platform, in a coach or even on the tracks. However, the writer chooses to burn him with thousands of volts by grounding the live third rail through his wet head, moments before an approaching train cuts the body in two. As if to top the magnificent passing, his cranial contents also boil and make his skull burst and soak the incredulous bystanders with a shower of grey material (*TCE*: 152-5). His death is certainly anything but dull. It is again to the credit of this writer's outstretched imagination, which turns the mediocre dying of a victim into a colourful firework display.

Lastly, an innocent kid completes the range. Having no more symptoms to describe except the common spine arching and self-cannibalism prior to the seizure, the writer decides to reveal the connection between Cobra and the Lesch-Nyhan syndrome through poor Hector Ramirez. This is a very rare genetic disorder caused by a mutation in the X chromosome that the newborn acquires from the mother. The final result is the absence of an enzyme called HPRT causing a huge excess of uric acid in the bloodstream¹²⁰. Thus, Preston happily produces a chapter with the name of the disease (*TCE*: 328-31). It appears that the disease caused by Cobra looks like a variant of the Lesch-Nyhan Syndrome. But other than the already customary writhing, and the chewing of tongue and lips, the boy has little more to offer. His death is much more muted than that of his predecessors; as long as the hole drilled into his skull to control the swelling of his brain is accepted as orderly (*TCE*: 323). But then again, his purpose as a victim is solely to introduce the characteristics of this strange syndrome. Cobra only resembles Lesch-Nyhan, but it is not Lesch-Nyhan. It looks as if Preston is running out of ideas and Cope is promptly stopped soon afterwards.

The treatment of the victims in *The Hot Zone* does not differ much. The narration begins with an initial exemplary wretch who crashes in a most sensational manner. The case in question is Charles Monet, a French loner living in the shadow of Mount Elgon. Specially illustrative is the writer's initial warning:

The doctors remember the clinical signs, because no one who has seen the effects of a Biosafety Level 4 hot agent can ever forget them, but the effects pile up, one after the other, until they obliterate the person beneath them. (*THZ*: 4)

¹²⁰ Further information about this strange disorder can be found at the *Lesch-Nyhan Syndrome Information Page*, a webpage depending on the *National Institute of Neurological Disorders and Stroke*: <http://www.ninds.nih.gov/disorders/lesch_nyhan/lesch_nyhan.htm>. Retrieved 8 August 2008.

In Preston's mind, Monet's personality changes and he becomes a kind of zombie, a walking biological bomb (*THZ*: 21). After an introduction to the victim's life and surroundings, the opening symptoms are the customary fever, accompanied by headache and nausea by the seventh day after exposure to the virus. In the next three days, the transformation appears to be more noticeable, in such a way that the patient, although not delirious, seems to lose memory and grows acutely irritable (*THZ*: 15). Following his characteristic gross style, Preston also enhances the depersonalisation process by concentrating on the dissolving tissues of the victim's face, while the head turns deep purple (*THZ*: 17). To make it clear, he states that “the *who* of Charles Monet has already died while the *what* of Charles Monet continues to live” (*THZ*: 18). By this time, the patient enters the phase of extreme amplification, when the agent saturates the body of the host so copiously that he is materially possessed, as if the microbial form supplanted the self. However, in this particular process, a biological mistake happens, when the virus materially liquefies the internal organs of the host. The thrilling modus operandi of a haemorrhagic virus is fastidiously observed by a writer who seems to know very well what his readership wants. Moreover, he adds the necessary dramatic touch, emphasising the frailty of a walking corpse about to fall apart. Without delay, the answers to such a stunning transformation are provided:

He appears to be holding himself rigid, as if any movement would rupture something inside him. His blood is clotting up –his bloodstream is throwing clots and the clots are lodging everywhere. His liver, kidneys, lungs, hands, feet and head are becoming jammed with blood clots. In effect, he is having a stroke through the whole body. Clots are accumulating in his intestinal muscles, cutting off the blood supply to his intestines. The intestine muscles are beginning to die, and the intestines are beginning to go slack. He doesn't seem to be fully aware of pain because the blood clots lodged in his brain are cutting off blood flow. His personality is being wiped away by brain damage. (*THZ*: 19)

Yet, so rapidly does the agent kill that it has to find a new host. This explains the eventual crashing, with a massive vomiting of blood and the expulsion of the intestines through the anus, a grisly culmination of the agent's attack on the host. Preston materialises fear in the pool of blood expanding around the agonising Monet, trying to reach the other patients in the waiting room. By supplying an absolutely clear instance of what the beast can do, he is making sure that his audience will bear in mind Monet's collapse throughout the plot. This is the main reason for slashing his primary victim so ferociously.

The next in the chain of infection is Dr. Shem Musoke, a physician in his late twenties who treats Monet. So eager is this young man that he explores the patient with bare hands and leans forward to face with him so as to peer through the epiglottis with a scope. Suddenly, the inevitable happens: Monet jerks and throws up black vomit into the doctor's eyes and mouth (*THZ*: 26-7). Even though the patient seems to revive for a moment, Musoke's efforts to keep him alive are in vain. But the virus has found a new host. Merely nine days after the infection, the physician begins to notice the initial symptoms. The aching sensation in the back gradually spreads to all the muscles of his body, his eyes turn red, and he develops jaundice and fever. When the team of surgeons open him to check the condition of his liver, they find it swollen and reddish but, most important of all, they also find that his blood would not clot. This fact gives the writer the opportunity for a new disturbing witness report, with the impressions of one of the surgeons who states that the team had been “up to the elbows in blood” (*THZ*: 31).

Eventually, through the vials of serum from Musoke, the agent is identified as Marburg, a haemorrhagic fever virus from the family of the filoviridae and a close cousin of Ebola. After the meticulous cruciation of the victims, the beast has been given a name. Over the next ten pages (*THZ*: 35-45), Preston can now provide a thorough background to the infectious disease, not failing to mention the particular affinity of Marburg for the eyes and the testicles (*THZ*: 39). In a most miraculous manner, however, Musoke recovers and brings some hope against a seemingly apocalyptic agent. It takes him ten days of painful agony to become slightly active and several others for the fever to subside and finally regain his mind. Nevertheless, there are wide gaps of blank memory. As he acknowledges to the author, he barely remembers Monet vomiting on him, the nurses turning him in bed along with the muscle and lower-back aching (*THZ*: 47). With the inclusion of this testimony, Preston wants to prove that while Marburg is not always lethal, the virus leaves lifelong sequels. Any close encounter with the microbial beast is bound either to kill you or leave you crippled in some way. After Musoke's short participation in the plot, we are reminded that there have always been and will be future microbreaks like this. And it is not only a natural occurrence that threatens humankind nowadays: the US army, at least, has vials of the agent, supposedly merely for research purposes, with the subsequent added risk of an accidental leakage.

Once the Jaaxes have been introduced, a series of victims epitomise different

outbreaks of haemorrhagic fevers in Central Africa. The index case of the epidemic of Ebola in Sudan in July of 1976 is a man named Mr. Yu. G., a reserved storekeeper in a cotton factory (*THZ*: 95). The manner of infection remains unknown today and the writer likes to play with different possibilities: insects, bats or rats living in the factory, or any other obscure source. The open possibilities offer a valuable means to scare, which Preston does not waste. Moreover, he also highlights the fact that he did not attend any hospital, was traditionally treated, died in his cot in the tribal hut and was buried under a pile of stones, a tomb afterwards visited by a number of European and American scientists. In a way, the idea is to alarm through the accepted disregard of the minimum hygienic conditions, which is presented as customary in Africa, thus making the continent a never-ending source of biological nightmare.

A couple of months later, the Ebola Zaire strain is represented via a schoolteacher, whom Preston heralds as the first known case of the new outbreak, yet not the index one. This could have probably been any of the many people who, like the schoolteacher, visited the Yambuku hospital seeking treatment. The frightening anecdote ushered in with this victim is the evidence that the nurses in this hospital only used five syringes to inject hundreds of patients every day (*THZ*: 102). It can perfectly be said that the main purpose of this character is to attend the Yambuku hospital so that the writer can explain the abnormal violation of the most basic sanitary measures. Once entitled to do so, Preston can meticulously recount the sickening excellences of Ebola.

In turn, this is freshly exemplified by means of two young nuns working in the hospital. The first, known as sister M.E., is taken to Kinshasa after she comes down with the disease. Without mentioning exactly that the agent attacking this particular victim is, Preston immediately proceeds to describe in over four pages (*THZ*: 105-9) the inexorable advance of the disease in a human body. Besides the liquefaction of the internal organs, appropriate attention is given to the virus' effect on the genitalia, which swell, turn blue and suffer from massive bleeding. In case there is any more need for revulsion, we are reminded that pregnant women deliver stillborn fetuses significantly hot with Ebola (*THZ*: 107). Of course, sister M.E. dies in such a spectacular way that the writer ponders the inherent goodness of a Supreme Being (*THZ*: 109).

Also, Preston notices that he has to deal with the international crisis brought about by this biological event. Thus, he narrates the situation generated by Mayinga

N., a young nurse in the Ngaliema hospital in Kinshasa. Somehow, the virus affects this young woman in such a way as to cause a psychological denial of the disease, taking her on a weird tour around the capital, inevitably raising panic. Preston briefly recalls how the rumour reaches the World Health Organization and how European governments consider blocking all flights from the country (*THZ*: 113). The whole affair seems to be solved when Mobutu Sese Seko places the Ngaliema hospital under quarantine and seals off the Bumba region. Once again, the writer manages to scare a reader who wonders whether these measures would be enough should a new outbreak of Ebola reappear.

Having raised the controversy, the author now feels free to end with this character. He does not use a strict objective tone to describe the final features of her death. Instead, he hypothesises –for the worst, obviously– how the poor girl may have felt:

In the final stage, her heart developed a galloping beat. Ebola had entered her heart. Mayinga could feel her heart going blubbery inside her chest as Ebola worked its way through her heart, and it frightened her unspeakably. That night she died of a heart attack. (*THZ*: 128)

It definitely is not licit for a writer who is supposedly writing nonfiction to speculate in such a melodramatic manner. Quite certainly nurse Mayinga died of a cardiac failure, but it might as well have been a respiratory failure or an ischemic stroke: plainly, she dies of Ebola. The victim is simply an excuse to provoke.

Finally, this headlong succession of deaths is completed with an anonymous Danish boy who comes to be named Peter Cardinal. In September 1987, the boy visits his parents in Kenya and dies of Marburg. As usual, the writer recollects the memories of Dr. Silverstein, the physician who sends Musoke's samples to Sandringham and Atlanta¹²¹, to narrate the scene as if included in the plot of a biothriller. While the symptomatology is quite familiar, he administers a brand new anecdote to avoid monotony. The process is called third spacing, which is described as follows:

¹²¹ Laboratories in South Africa and the United States, respectively.

If you bleed into the first space, you bleed into your lungs. If you bleed into the second space, you bleed into your stomach and intestines. If you bleed into the third space, you bleed into the space between the skin and the flesh. The skin puffs up and separates from the flesh like a bag. Peter Cardinal had bled out under his skin. (*THZ*: 135-6)

Since the writer's ability to scare of has been widely proved, it is certainly best to keep the alleged informative purpose of such anecdotes. Other than that, the kid is used to establish a connection with Charles Monet who, like him, has also been to Kitum Cave in Mount Elgon (*THZ*: 140). Furthermore, the writer does not fail to mention how the Americans keep hold of blood samples of all these haemorrhagic viruses. Because there is no known vaccine for them, they immediately become potential biological weapons. Thus, the victims seem to be used again with the basic goal of alarming the reader.

On the contrary, the casualties in *Outbreak* are clearly more referential. Not much background is provided and their timing is relatively quick. Indeed, they do not take much of the writer's talent. This is already plainly visible from the introduction, when John Nordyke, a Yale biology student who develops the classic headache, nausea and fever, soon suffers from haemorrhages and dies. The whole process is described in no less than the initial four pages. Immediately afterwards, we are also informed of the similar deaths of other nameless villagers, without being given any other information. All that seems to matter is the spectacular progress of the disease and the number of casualties, which are promptly established at one hundred and fourteen villagers and seventeen members of the medical staff (*Ob*: 5). One of these is an anonymous Belgian nurse airlifted from Yambuku to Kinshasa. By reference, it could well be sister M.E., but Cook never states her name. He only focuses on the fact that blood and tissue samples from internal organs are sent to laboratories in Belgium, the US, and England¹²². By the end of the sketchy introduction, the many unknown victims have only been useful for a statistical purpose: they amount to two hundred and ninety-four cases as of 30 September 1976 (*Ob*: 7).

Already in the prologue, an outstanding ophthalmologist comes down with the disease. Similarly, other undepicted patients suffering from the familiar symptoms seem to pop up out of nowhere. Some happen to have a name and a surname, like Helen Townsend, Dr. Richter's secretary of medical records and

¹²² Altogether, these facts coincide with the information supplied by Preston seven years later.

mistress, or are just given a single name, like Alan, a lab technician. Yet others are not even mentioned; there is enough with some prototypical representatives. As opposed to the initial less-portrayed characters, Dr. Richter is slightly better defined: he has an ashen colour, with sunken eyes, slack skin and dried blood on his front teeth. He is granted a short interaction with Marissa where he states that he is not feeling well, that he was in Africa six weeks earlier and that he did not come into contact with any animals or attend anyone ill there (*Ob*: 41-42). The lab technician, Alan, is also interviewed by the bioheroine, only to confirm that he feels like he has “been run over by a truck” and that he got infected through a vacu-container needle (*Ob*: 46-47). Yet, there is no more significant presence of victims. Even though more anonymous cases keep coming to the clinic, they are neither given any part nor even described. The event ends with Dr. Richter and Ms. Townsend's condition deteriorating and Dubcheck's assertion that “there is little that can be done” (*Ob*: 60).

After an illustrating visit to the mcl back in Atlanta, the action returns with an outbreak in the Greater Saint Louis Community Health Plan Hospital. The index case here appears to be Carl M. Zabriski, another ophthalmologist who met Richter at a medical meeting in San Diego. Again the description of the patient is laconic, barely mentioning a rash along with apparent signs of haemorrhage (*Ob*: 100). Without much loitering, the action is focused on two new admissions: a woman about the same age as Marissa and an anaesthetist. Both had met Zabriski previously, one as a patient, the other playing tennis with him (*Ob*: 106).

Following this schematic style, Richter's autopsy is most hasty. There is barely room for a prompt view of the white corpse showing “a livid purple on the bottom” (*Ob*: 112). In addition, a wise statement by Cook reminds us that the CDC recommends not using power saws in these cases lest airborne infection take place. This indeed questions Preston's autopsy of young Kate, where the opening of the girl's skull proves essential to creating a gruesome ambience. Other than this, the autopsy is also useful for Marissa to discover a scalp laceration, which is later confirmed by the deceased secretary as a result of his being mugged, and a circular bruise on the right thigh, which is eventually associated with the vaccination gun (*Ob*: 113). Once the victims have played their concise role, there is but a brief mention of five more admissions, including Mrs. Zabriski, and the action is ready to move on to a new location.

However, the treatment given to the new cases cannot even be considered

superficial: they are nothing more than numbers. In this new outbreak in Phoenix, there is no initial case but eighty-four at the same time. In fact, all these victims seem to be here simply to offer the bioheroine an opportunity to boast about a largely statistical study:

One of the initial patients is an ophthalmologist who attended the same San Diego conference as Drs. Richter and Zabriski. Another of the initial cases, an orthopedic surgeon, went on safari to East Africa two months ago. Two of the initial cases have used monkeys in their research but have not suffered recent bites.

As a group, all eighty-four cases developed symptoms within a six-hour period, suggesting that they were all exposed at the same time. The severity of the initial symptoms suggests that they all received an overwhelming dose of the infective agent. Everyone worked at the Medica Hospital but not in the same area, which suggest the air-conditioning system was probably not the source. It seems to me we are dealing with a food- or waterborne infection, and in that regard, the only commonality that has appeared in the data is that all eighty-four people used the hospital cafeteria. In fact, as nearly as can be determined, all eighty-four people had lunch there three days ago. (*Ob*: 143-144)

This simplistic reduction of the outbreak in two paragraphs clearly accounts for what the victims are for this trained physician: a study record. As the plot develops, the idea is confirmed with almost no description of the patients. There is a visible reinforcement of casuistry when the mystery is about to be solved. The personal facts disappear and it is all reduced to a death toll of fifty-eight in Philadelphia and forty-nine in New York, with several other cases ready to increase the account, as reported by *The New York Times* (*Ob*: 314). Surprising as well, is the fact that one of Marissa's attackers, a henchman by the name of Paul whom the bioheroine shoots with the vaccination gun, may survive a disease of such daunting lethality. He is said to have tested a trial serum which proves strangely effective (*Ob*: 338). No other facts are given about him. As it seems, they are not necessary for the writer.

However, in *The Third Pandemic* Pierre Ouellette chooses a paradigmatic character for every agent. Therefore, the system technician Peter Rancovich acts as host to the *Streptobacillus moniliformis*, the prostitute Maria Santoz supplies the *Treponema pallidum* –the syphilis germ, whereas the businessman Steven Henry takes the resulting chimera to the first world. Instead of presenting the victim already in the final phase of the disease, we are given a few hints at this character's life before he or she develops the first symptoms. Thus, Peter Rancovich is introduced as enjoying his holidays in Iquitos, his well-earned "vacation on the border between

heaven and hell" (64). We are also given details of his difficult relationship with Diana, who chooses not to follow the brave steps of her partner. We even attend a session with a shaman who dies when taking Peter on an induced journey (*Ob*: 71). It is when fleeing from this misadventure that he is bitten by the rat carrying a new resistant strain of *Streptobacillus moniliformis*. By now, it is only a matter of time before he transmits his malady to another victim. Indeed, the exchange takes place in the city itself with Maria Santoz. Like Peter, we are also introduced to a scene in her life. In particular, we attend a visit to a doctor who identifies her sufferings with the previously mentioned microbe. In one way or another, the reader somehow infers that the two bacilli are predestined to meet and, when they do, the incident is narrated in a most casual style:

As Maria descended the stairs, a most unusual event was occurring inside her, an international conference of sorts. During her coupling with Peter, a small abrasion on his penis had acted as a portal for the *Streptobacillus moniliformis* and launched them into her vagina, which bore its own small abrasion at the tender site where the chancre sore had recently resided. As these two tiny wounds came into contact, the *Streptobacillus* germs had jumped ship and crossed over into Maria, where they quickly found their way to the local transportation network, the minute capillaries at the far end of the circulatory system. For the time being, they were tourists seeing the sights. But soon they would be ready to take up residence and do business. (*TTP*: 115)

The next step in this weird combination of misfortunes has been taken. The paragraph above illustrates the writer's tale-telling style, not worrying about agony, suffering, aches and arching like his colleagues, yet describing the experience as like a kid's story. However, things change with the successful businessman, Steven Henry. By the time he reaches Seattle after a never-ending tour round many US airports, Steven is fully aware that he has contracted a sort of complicated disease. What he does not comprehend, however, is that he has helped to spread the recombinant disease to a global level.

As soon as he comes back, he is identified as a likely victim of the epidemic which is already devastating Africa (*TTP*: 286). Steven is quickly isolated. The appearance of the familiar isolation suits and facemasks announce the gravity of the situation. In fact, the whole event is narrated as a blurred memory in the victim's mind, whose neurons cannot make the right connections because of the joint action of the disease and morphine. Once hospitalised, Steven is comprehensively entubed and a number of ineffective drugs are injected to his decaying body. Furthermore, he

is constantly monitored not only by doctors and nurses but even also policemen. This exposure does not seem to matter much for a patient who is numb and about to die.

The rest of the victims simply succumb to the pandemic. However, there are two exceptions. One is Oscar Silva, the owner of the Paradiso Club, which Maria used to visit. He sounds the alarm bell to western health officials when being treated for a rare malady (*TTP*: 209). The other is Martin N'Dong, who is allowed to perform minor jobs, including the unregistered burying of the first casualties until he contracts the disease and vanishes for a sure death (*TTP*: 257). As for the statistical treatment of the victims as a group, a CNN report on the São Tomé outbreak barely announces “widespread sickness and death among the island's population of one hundred and fifty thousand,” plus several thousand in Libreville (*TTP*: 269-70). When it reaches the United States, over ten thousand people are said to die every day in Washington (*TTP*: 337), whereas Barney Cox's army is reported to have dumped nearly sixteen thousand in one day (*TTP*: 344). By the end of the novel, the global population is culled to what it was in the fifties (*TTP*: 374).

In *The Andromeda Strain*, on the other hand, Michael Crichton chooses to assemble his victims into three definite groups. These coincide with an initial phase of distant monitoring of the incident, followed by groundwork in the village of Piedmont, and a last one of study of the living victims in the Wildfire base. In the initial phase, the victims are treated as a set of anonymous bodies scattered around the streets of the small village. The soldiers in charge of monitoring the landing of the satellite, a private by the name of Crane and a driver called Shawn, die at the same moment they enter into contact with a mysterious man in a white gown (*TAS*: 10). No background information is given about these characters. They are shallow on purpose: the story has to move on and there is no time to lose with unnecessary descriptions. As for the rest of the bodies, flyby pictures allow an estimate of over fifty casualties within eight hours of the landing of Scoop VII, plus the old survivor.

In order to obtain a more detailed assessment of the situation, an on-the-ground inspection is required. Arguably, this is where Burton and Stone make their most important contribution by examining the dead bodies in the hot zone. In this second stage, the treatment of the victims varies with them being given a name and surname. It is here that Crane is mentioned with the rank of private (*TAS*: 66). Hereafter, a consecutive set of identifications begins. The first in line is Dr. Alan Benedict, the general physician in Piedmont. He is the doctor who opens the satellite,

thus releasing *Andromeda*. Disregarding all other symptoms, the writer concentrates on the almost instantaneous coagulation of the blood. To begin with, Dr. Benedict shows no signs of dependent lividity –the accumulation of blood in the lowest parts of the body, especially significant for somebody who dies sitting on a chair yet shows no blood on his bottom or thighs. Subsequent incisions on the radial artery and vein at the wrist and the femoral at the thigh find a weird red-black clotted soil which the vital fluid has turned into. Not even by ripping open his chest and slicing into the left ventricle of the heart can Burton find any liquid blood, only "red, spongy material" (*TAS*: 70).

The autopsy of this index victim defines the standards for the others. His wife and son show that not everyone dies immediately but do so while doing certain other activities (*TAS*: 71). Another family dies sitting together at the table in an apparently happy, relaxed mood (*TAS*: 72). Other characters show signs of dementia, like the physician's son who empties a tube of modelling cement into his mouth, the old woman who writes a posthumous letter about the arrival of Judgement Day (*TAS*: 72), the man running the gas station who drowns himself in his bathtub (*TAS*: 73), the seamstress who sets herself on fire (*TAS*: 73), or the old man in the World War I uniform who records a deranged tape before putting a bullet into his head (*TAS*: 74). Among all these victims, there is one evident conclusion to be reached: those who do not die instantly go crazy. As in previous cases, there is no room for unnecessary prolongation of their role in the plot, nor endless characterisation of people who have a specific purpose in the novel. The most significant symptoms of the disease have been cited.

However, things are different with the next two characters, the survivors of the epidemic: an old drunken and a crying baby. They signal the entry into a third stage in the treatment of victims, basically because they are allowed a greater dose of protagonism. Indeed, they are casualties of the strange disease that have amazingly dodged the lethal effects of the alien bug. The Wildfire team is to study the causes of this biological miracle thoroughly. As for Peter Jackson, the mysterious man in a white gown, he can be materially interviewed although his state is definitely not the best for answering questions. Nevertheless, he is sober enough to inform Hall about his treatment with Aspirin and Sterno –a wild mixture of alcohol and methanol– for a stomach ulcer (*AS*: 177-178). This explains the acidosis in his body, which eventually puts him out of the pH range of action of the *Andromeda* bug. As a

survivor, he can also report on the events of that night: how they found the satellite, took it to the doctor and then all started dying grabbing their chests.

Since the infant cannot talk, he is a much more difficult victim to handle. Yet, it seems that he has survived *Andromeda* because he was scared to death and never stopped crying. That made him breathe rapidly, a basic body reaction to get rid of excessive acid that can become lethal, thus becoming alkalotic and moving out of the pH range of action of the bug (*AS*: 263). Like the previous victims, his purpose in the novel ends here. Once he has been analysed and the source of his astounding survival discovered the baby can disappear from the action. Jackson also reports a third survivor. This is the highway patrol officer, Martin Willis, who is said to have gone through the village some thirty seconds before the onset of the epidemic (*TAS*: 230). A posterior teleprinter shows evidence that he also goes crazy and kills some customers in a cafeteria in Brush Ridge, Arizona before shooting himself (*TAS*: 248). Eventually, he is also shown to be a diabetic in acidosis from failing to take insulin.

Therefore, the reason these victims are treated differently is that they have to provide decisive information to unveil the working method of *Andromeda*. For different motives, they all remain out of the alien bug's pH range and this is what has saved their lives either temporarily or permanently.

Likewise, the victims in *The X-files: Antibodies* are concentrated around two poles. On the one hand there is Jeremy Dorman, the researcher who decides to inoculate himself with the imperfect nanomachines, and pays the consequences in the plot. On the other, there are those who come into direct contact with him and die of a multiplication of tumours: the night guard Vernon Ruckman, a truck driver by the name of Wayne Hykaway, and the wife of Dorman's associate, Patrice Kennessy. The initial case develops very strange symptoms, obviously unheard of in modern medicine. These include wild spasms and convulsions of the muscles, bone breaking, skin rippling and bubbling, and a final destruction of the muscle tissue accompanied by "swollen growths, pustules, tumors, lumps" (*XFA*: 7). They all happen within seconds of coming into contact with the infectious agent –the unstable nanomachines. Needless to say, the pattern is repeated without variation in other victims.

By introducing a futuristic malady, Anderson has to conceive of an extravagant reaction of the human body to the nanomachines. The result is certainly most bizarre yet believable, especially when it is sanctioned by agent Scully, a medical examiner

herself, who performs the autopsy on Vernon. Confirmation of the contagious disease comes with the discovery of a dead truck driver five days later. Mulder's visual inspection of the corpse helps to identify the same strange disease quickly:

The pudgy man's face was contorted and swollen with lumps, his jaw slack. The white of his eyes were gray and smoky, laced with red lines of worse-than-bloodshot veins. Purplish-black blotches stood out like leopard spots all over his skin, as if a miniaturized bombing raid had taken place in his vascular system. (*XFA*: 164)

There is no more dwelling on particularities. The plot has to move on swiftly and the connection of the two deaths, which confirms contagiousness, has been made. Agent Scully discovers the next case, Patrice Kennessy. The description of her body takes but a similar paragraph:

Her skin was blotched with numerous hemorrhages from subcutaneous damage, distorted with wild growths in all shapes and sizes. Her eyes were squeezed shut, and Scully saw tiny maps of blood on the lids. Her hands were outstretched like claws, as if she had died while fighting tooth and nail against something terrible. (*XFA*: 173)

These three characters die because they come into physical contact with an index case who is still alive. The victim at the other pole, therefore, is like a ghost searching for the stable prototypes that can free him of this never-ending agony. Jeremy does not want to kill. What is more, he warns the other victims not to touch him. It is clear from his actions that his only goal is to free himself from the constant swelling and moving of his internal organs, the ceaseless transformation his body is suffering. It is precisely all these changes that keep him alive. In their particular manner, the unstable nanomachines are trying to change Dorman's body into a new being, and they do it in the wrong way since they have not been properly adjusted. As a consequence, Dorman is heading for an unsuspecting evolution, which he is trying to terminate, yet takes innocent lives in the process.

The final stage comes with his return to the ruins of the DyMar Laboratories, where the corrupt Adam Lentz and his men are waiting for him. An “unleashed biological chaos” (*XFA*: 245), based on his most primitive DNA coding, eventually turns Dorman into a nightmarish beast of undetermined proportions. The control that has kept his body from changing disappears with the ultimate betrayal by the conspirators. His muscles grow to fantastic dimensions, his bones break and rejoin in milliseconds, and even tentacles reach out of his extremities and his tongue. The

monster only has the primary purpose of fulfilling his most elementary raging necessities. In other words, the nanomachines have readjusted their host body to satisfy their needs: to kill. Only Vader, the Kennessy's dog bearing the stable prototypes, can put an end to this implausible show (*XFA*: 259-260). It can be said that the story line is built around these different stages of Jeremy Dorman's misery. In the meantime, there are brief interludes to introduce the compulsory collateral casualties. The eventual result, according to the study of the victims, is a fast-reading novel that focuses on the torment of a betrayed researcher and restricts the suffering of the indirect wretches to single paragraphs.

Also, in *Time of the Fourth Horseman*, the casualties do not last long in the plot and are used mainly to illustrate the scope of the catastrophe. The first couple of kids, a boy and a girl, basically monopolise the action in the first chapter by respectively introducing polio and diphtheria; diseases which are supposedly eradicated. On admission to hospital, Alan Mathew Reimer, as stated in the clinical history, keeps complaining of being sore all over his body, showing general muscle aches and bad chills. His face is as white as wax and he moans on the table with his hands moving fitfully on the sheet, before going deadly silent. Two nights later, a young girl with a delicate ashen face is admitted with “exhaustion and a whacking good case of pleural bronchitis” (*ToFH*: 17). The ensuing blood test gives positive for the long-gone diphtheria. Nothing else is mentioned about her. She is simply transferred to another hospital where she probably dies like Alan. With little delay, Nat's own son Philip, barely three and a half years old, also comes down with diphtheria. The protagonist somehow anticipates the dreadful end. Certainly, the white face and fitful movements denote something more than a mere bout of croup. Moreover, Nat has some privileged information about what is really going on in the city and she knows that the boy is doomed to a sure death. It all happens very quickly. The whole process is summarised in a paragraph:

During the next ninety minutes Harry watched the boy's condition deteriorate. Breathing became shallow, his pulse light and erratic. As his circulation worsened, the tiny nails took on a bluish cast, the sunken face turned gray. Harry watched the monitor display, his face impassive, as the readout went inexorably on, a Greek chorus foretelling a necessary end. (*ToFH*: 55)

In this plain style is Philip's death narrated: no gruesome detail, no terrible evidence of a painful agony, no grim autopsies. He simply contracts the disease,

develops coughing and a fever and passes away in front of an impotent physician. He is only a doctor's son who has to die of the epidemic of epidemics. In the following hundred and fifty pages, victims come and go. Beginning with Philip himself, who is treated as number sixteen in one week (*ToFH*: 53), several admissions of such varied infectious diseases as smallpox, measles, typhus or scarlet fever join the previously-seen diphtheria and polio cases in an orgy of plagues. No particular description of the instances is given: they are only mentioned as happening. Thus, all these scattered occurrences eventually appear summarised in Justin's follow-up. In a smart manner to put everything together, the writer decides to enunciate the general symptomatology and death rate amongst the anonymous victims. It is Peter Justin himself who reads the report aloud to his fellow doctors:

The incubation period, as far as I have determined, is four to five weeks. The disease generally begins with general malaise, loss of appetite, soreness and some swelling of the joints and some fever. This turns, in the space of a week or so, into a higher fever, acute body aches and muscular debilitation, loss of weight" -he motioned to his shrunken body- "occasional vertigo, and the beginning of paralysis. The last stages, which have shown a slighter greater than fifty per cent fatality rate, last for anywhere from three to ten days. At the end of that time, if death has not occurred, the temperature drops to subnormal and the patient is lethargic for several days before a realistic assessment of the degree of debilitation can be made. Partial paralysis is quite common in those who survive. (*ToFH*: 225)

Thus, it is not necessary to go character by character describing how he/she contracts the disease, develops the first symptoms, falls into the final phase and eventually dies or overcomes the malady mostly with after-effects. As noted above, Justin himself is also sick and anticipates his own death in about twenty-four hours from reading his report (*ToFH*: 241). The same can be said of Harry, who is quite aware of having contracted the malady and wants the powerful people of the Cabinet to face paralysis or death like himself (*ToFH*: 250). No more description of the victims is provided, nor does it seem to be indispensable for the swift development of the plot. According to Justin's records, whoever contracts the mutant polio faces death or partial paralysis. Arguably, this seems to correspond to what the reader must know in view of the writer being extremely pragmatic.

In addition, the leading role for the victims in *Doomsday Book* comes in the last quarter of the plot, when the plague epidemic reaches Lord Guillaume's house. The character who introduces the disease in the novel is the clerk who comes with the bishop's envoy, a hitherto minor personage who takes the lead precisely because

of his misery. The unmistakable symptoms indicate the arrival of the Black Death in England: High fever, a swollen tongue, and swellings under the arms and in the groin. Without loitering in the man's disgrace, the writer just describes the necessary. The patient writhes in agony, delirious with the high fever, while lancing of the buboes only alleviates the pain temporarily (*DB*: 385). All the eventualities are thoroughly recorded in Kivrin's diary, the *Domesday Book*, which in effect summarises each chapter.

The pattern is repeated with each new victim. The next to come are the members of Lord Guillaume's family, who progressively come down with the plague. The first is Rosemund, the eldest sister although only twelve years old. Whereas both she and the clerk get high fever plus ensuing derangement, Rosemund bubo is harder and larger. That is why Kivrin decides to lance it, using wine to disinfect the wound, but it seems to be of no use (*DB*: 448-9). Other heretofore unknown villagers likewise begin to develop the symptoms.

Soon afterwards Agnes, the younger sister, and Lady Imeyne, Lord Guillaume's wife, fall ill as well. News from outside is scarce, let alone physical contact with other victims. This is directly reflected in the *Domesday Book*, where Kivrin shows wide knowledge of what is happening in the manor house, while there are scattered references to the news coming from outside (*DB*: 465-467). By the arguable method of counting the strokes of bells Kivrin tries to keep count of the death rate: nine strokes for a man, three for a woman, one for a baby and then an hour of steady tolling (*DB*: 451). This progressively grows from a 50 per cent fatality rate when Lady Imeyne and Agnes develop the initial symptoms (*DB*: 467), to seventy-five per cent of casualties (thirty-one cases in the village) when Agnes falls into delirium (*DB*: 481), to a daunting eighty-five percent when Agnes dies (*DB*: 496) –all consistent with the high fatality rate usually associated with untreated pneumonic plague.

In fact, the disease could have wiped entire villages off the map, as seems to be the case in question. With the exception of Kivrin, who has had her inoculations, they all die irremediably. The last to catch the plague is Father Roche. The messianic bioheroine gives him all the treatment she knows but he soon passes away. As usual, there is little concentration on the victim's agony. On the contrary, his passing is most poetic, symbolised in the slow decay of a candle light which eventually flickers “into sudden brightness and left them in darkness” (*DB*: 543).

Finally in this group, the respect for the victims in *Unnatural Exposure* is markedly distinctive. Cornwell's alter ego clearly exhibits a distinguished professional air in the performance of an autopsy. It truly differentiates Cornwell from Preston's sickening will and, in turn, provides her novel with a more edifying aura. There is no lingering on superfluous minutia. Indeed, while Kate's autopsy abounds in unsubstantial detail for the development of the plot, the torso that is eventually identified as Crowder's mother reveals a series of clues which prove essential for solving the case. Chiefly, by thorough examination it is discovered that the corpse has been dismembered while partially dressed, contrary to the others in Virginia and Dublin. Furthermore, the segmentation has not been completed through the joints and the haemorrhage around the muscle tissue in the neck suggests the head was severed first. According to Kay, this indicates that the killer did not want to look at the cadaver's face; a deduction which eventually discloses Crowder as the killer (*UE*: 63). Therefore, for all the gruesome particularities of the autopsy on the torso, it can be said that they are perfectly justified on account of a favourable development of the story.

The next victim, a woman by the name of Lila Pruitt, is covered in the typical pustules of smallpox, which are denser on the extremities and face than on the trunk. While the narrator limits herself to describing the situation as objectively as possible, she cannot avoid imagining "her itching, aching, burning up with fever and afraid of her own nightmarish image in the mirror" (*UE*: 194). The subsequent autopsy is even less aggressive than the initial one. There is no focusing on grim technicalities whatsoever. Instead, the examiner summarises the most important findings for the reader in a most eloquent approach:

She suffered the typical degenerative changes of fatty streaks and fatty plaques of the aorta. Her heart was dilated, her congested lungs consistent with early pneumonia. She had ulcers in her mouth and lesions in her gastrointestinal tract. But it was her brain that told the most tragic story of her death. She had cortical atrophy, widening of the cerebral sulci and loss of parenchyma, the telltale hints of Alzheimer's. (*UE*: 214)

After reconsidering what her suffering might have been, including the new evidence of dementia, Kay completes her analysis by noting that "lymph nodes were swollen, spleen and liver cloudy and swollen with focal necrosis, all consistent with smallpox" (*UE*: 214). It certainly is the outcome of the autopsy that matters for this writer, not unnecessary ghastly data. The bottom line is that the victim was already

suffering from high cholesterol and Alzheimer's before contracting smallpox and this is what the autopsy is good for. It can all be abridged in a mere couple of paragraphs. The rest is simply inflating the story.

Actually, the eventual spread of the disease is very briefly told. Kay's lab assistant, Wingo, is one day reported to have gone home with the flu. In a subsequent phone conversation, he describes the symptoms of the mutantpox to his boss and reveals the source of infection, the Vita facial spray (*UE*: 305). Here his participation ends. In the epilogue, the readership is informed that he has simply passed away (*UE*: 365). Other unnamed characters, mainly inhabitants of Tangier, are also said to have contracted the disease: a girl who dies, a sick fisherman who supposedly survives, and a couple of watermen with mild cases (*UE*: 306). The readership is told that there is generalised panic all over the country. Yet, no more description of dying victims seems necessary. As for Phyllis Crowder, it is simply stated that "she looked like hell, her face pale and eyes burning with fever" (*UE*: 352). She is also sick but the writer does not consider the idea of rejoicing in the gory details of a surely painful death. She is simply said to die of "fulminating pustules" (*UE*: 361). Following her policy, Cornwell does not want to scare her readership any more than what is strictly necessary. The point has already been made with the autopsy of the torso, even if it all seems a bit hasty in the end.

4.5.2 *Victims in an Immaterialised Threat*

The victims of an immaterialised threat differ basically from the former in that there are no secondary cases; that is to say, the disease remains in the initial victim without infecting others. Nevertheless, the intrigue is maintained until the very end; the reader bearing the effects of the disease on these referential characters in mind throughout the plot. If there are ever any other victims, they do not transmit the disease, but it remains isolated and always under control.

Hence, there are only a couple of victims to be considered in *The Plague Tales*: Caroline Porter and Ted Cummings. Contrary to the previous cases, these are well-depicted characters with significant roles. For different reasons, they are chosen to fall sick: one because she is the beauty ruined by the disease who is miraculously saved by an ancient ritual, the other because he plays the anti-Faust and is forced to try his own medicine. As for Janie's aide, it only seems logical that she contracts the

bubonic plague because of her carelessness when handling the contaminated fabric. Of course, she is unaware of what is wrong with her and believes it is an ordinary bout of flu. The symptoms are more or less the same: body ache, dizziness, and nausea. But there are some that do not fit the profile, like the stiff neck, the pressure in the bladder and the strong metallic taste in her mouth (*TPT*: 329-30). It is Ted that makes her realise she may have the bacterial disease only as a way to control her. Once drugged, and combined with the disorientation caused by the plague, Caroline is nothing more than a puppet handled respectively by Ted, the Marginals, and Sarin before finally reaching Bruce and Janie. By this time, the daunting effects of the disease have left an almost unknown Caroline to her friends. In Bruce's eyes:

The woman who lay there was barely recognizable as Caroline. Her skin was as pale as chalk, but around her neck was a hideous necklace of pus-filled blackish lumps. Her lips were cracked to bloodiness, and her fingers, neatly folded around a bouquet of dried herbs, were neatly purple. (*TPT*: 595-5)

However, Alejandro's advice from the fourteenth century allows a providential recovery. Caroline ends up being one of those lucky ten percent who survive an untreated bubonic plague. The last cure of her scoured extremities is unpleasant, like the greyish liquid she is administered; yet altogether effective. Indeed, enclosing her hands and feet with maggots collected from a garbage can to let the flies undergo their metamorphosis in the patient's sick flesh cannot be regarded as really acceptable in terms of modern medicine (*TPT*: 659). Yet, Caroline walks again in a matter of days and fully recovers.

On the other hand, Ted Cummings plays a much shorter role. Actually, as a victim, it can be said that only the interaction with Caroline prior to his own accidental death can be considered. The realisation that his is no ordinary disease comes from the very unusual signs. Ironically, however, he is one of those medical authorities who can authorise extraordinary measures to control an epidemic, thus also has access to restricted knowledge. The computer analysis of his symptoms leaves no trace of doubt. He has contracted the bubonic plague and Caroline is definitely down with it too. Whatever he does is simply aimed at covering his negligence. Like in the previous case, such motivation along with the loss of lucidity because of fever lead him to commit the fatal mistake. In the words of the writer, "fatigue and discouragement overwhelmed him" (*TPT*: 342). Ted is clearly a product of the circumstances and his fall is accountable to the symptoms of this lethal

disease. Instead of dying by the bodily corruption associated with the natural development of the malady, he dies because of one of the many disorders caused by the Black Death.

Furthermore, in *The Burning Road* the victims are treated as a number of dots on a map of the United States validating Janie's philanthropic task (BR: 158). They are mostly kids from New York and all attended *Camp Meir* in the past. Also, they all received an injection to prevent them from getting a stomach infection. By that time they were all around the age of six. After that, they started suffering strange episodes of bone breaking. This is how the case of Abraham Prives, the referential head amongst this mass of victims, reaches Janie. He is now thirteen and has strangely shattered two vertebrae while playing soccer and has an antecedent of a messy break of the wrist a year before. Yet, even when Janie is in direct contact with the boy, he is given little chance. Thus, he remains unconscious during Janie's examination in the hospital room, where she methodically scraps some skin cells for DNA analysis (BR: 196). As soon as the saviour gene is available, Janie returns to the boy's room where he is still unconscious. Both Janie and Mrs. Prives keep the conversation going, Abraham being nothing but a dummy. It is arranged for him and the other boys to be taken to the foundation where they will undergo a process of gene washing, followed by surgery and recovery treatment (BR: 646). Other cases of different diseases like TB, pneumonia, HIV or DR. SAM (*Staphilococcus Aureus Mexicalis*) are likewise treated as numbers in computerised counters. Caroline is still said to suffer from an infected finger and toe from her bout of plague (BR: 158). That is all the victims are needed for in this novel.

Conversely, the casualties in *Plague of Angels* can be grouped around three main poles. First of all, the seven miners in Longyearbyen provide the compulsory historical background to base the plot on. Apart from the fact that they are all from Tromso and quite young, no other details about their lives are given. Not even their personal appearance seems to be important; they are virtually ghosts. Their purpose is simply to introduce the mostly unknown gruesome symptoms of the Spanish Lady. One of them is taken as a reference and his face is described as "blotchy maroon," with swollen eyes, and black feet as he violently coughs a weird mixture of blood and phlegm (PA: 11). This character, by the name of Tormod, has become the embodiment of the Spanish influenza; arguably the monster that is supposed to frighten the reader as the pages turn. The others are totally ignored. As long as the

image of the agonising Tormod remains present in the reader's mind, the writer has achieved his purpose. The seven young miners' brief part ends here.

The appalling effects of the virus on a human being are best seen, however, in Evelyn Branch, the villain's twin sister. Supposedly hypnotised by Magda to kill herself with an injection meant for Conor, she describes to the biohero the way he is going to die of the disease:

You'll feel a little bunged up at first, as if you've caught a headcold. Then you'll start shivering and coughing and spitting up blood. After that you'll be gasping for air, because your lungs will be filled up with fluid. I shouldn't let it frighten you. It's no worse than drowning, and at least you don't have to get wet. (PA: 476)

Yet, as if anticipating events, all these ironic words are about to become true for her a few minutes later. Once she has unwillingly shot her thumb with the vile serum, everything happens very quickly. Her dramatic death begins with her nose running blood, shortly followed by wild trembling and a progressive darkening of the face because of the acute coughing resulting in a lack of air. The final attack chokes her so strongly that she materially clutches at her throat (PA: 484-5).

Finally, a last group of victims is comprised of those present at the United Nations building when Dennis successfully performs the terrorist act. While the final statistics are not given –the fact seems to be more important than the casualties themselves, nineteen General Assembly dead delegates and over eighty sick are lying in the United Nations Plaza by the time Conor reaches the lobby of the building (PA: 529). Neither names, nor personal descriptions are given; let alone symptoms of the disease. These have already been stated and the writer simply does not want to concentrate on the gory outcome. On the contrary, Blackwood prefers to use these shallow characters to lightly exemplify the dangers of an apparently common disease without delving into the ghastly details. With the dubious exception of the mysterious Evelyn, they cannot even be classified as secondary characters. Their role in the plot is quite straightforward as attention must be focused on the confrontation between the biohero and the bioterrorist.

In *The Eleventh Plague*, however, Marr and Baldwin take a more eclectic approach in their treatment of the victims. As for the initial cases, which appear to have Rift Valley Fever but eventually turn out to be infected with anthrax, their participation in the plot is quite incidental. The son of one of the most influential

families in California enters the hospital with the classical fever, chills and breathing problems, later developing a marked swelling of the lymph nodes. Despite intensive treatment, Joey St. John's condition worsens quickly and a biopsy is performed. After his role is fulfilled, he vanishes from scene. In fact, attention is focused on his parents, who are more prominent as they deal with the doctors and Jack Bryne (*TEP*: 14-21). Later on, another girl is admitted with similar symptoms, although particular emphasis is placed on her eyes. Even though suffering from the same disease, the writers decide to use a more mundane style and give the readership an aperitif. The description of Jody Davis' eyes is certainly spectacular:

They had swollen and festered, turned the size and color of rotting plums. The thick greenish lids were pushed by the swellings until they had been forced fully open so that both pupils stared ahead, sightless, the irises a deep purplish brown, the corneas bloody and torn. Out of the corner of her lids and from each of her tear ducts oozed a brown necrotic fluid and her wrists were restrained to keep her from running her arms across her face. She was thrashing in slow motion, her sores clearly agonizing, and over and over she kept repeating she had been shot -shot in the eyes. (*TEP*: 72-3)

By now the doctors have successfully diagnosed her with anthrax and she can pass away arching her back and screaming at the top of her feeble voice. Joey St. John, who has been hidden until now, reappears to die likewise. The whole process merely takes a couple of pages (*TEP*: 74-75).

As the plot unfolds, the victimology becomes conspicuously more gruesome. The next cases are grouped in threes. Furthermore, the descriptive style also changes. While there is a third omniscient narrator, it is now the bioterrorist who reports his own written record, fantasising on how his victims must have died and sending his fancies to the biohero via e-mail. The reports are, therefore, brief and concise but do not lack grimness whatsoever. On the contrary, this grows harsher with each new account. In this manner, it is really Kameron who portrays all the suffering of his victims to Jack. Thus, the bioterrorist envisages the most grotesque happenings –the fingers of a pastor falling lose in a glove (*TEP*: 208), a mother superior delivering a fibroid (*TEP*: 210), and the penis of a parishioner falling off along with a catheter (*TEP*: 213), all of course explicable through a lack of blood supply¹²³.

On the other hand, the neurocystercosis victims also die in a most spectacular way: the lawyer crashes his speedboat and takes some other souls with

¹²³ Other than the convulsive symptoms, ergotism can also cause the death and loss of the affected tissues (“Ergot” 2009).

him (*TEP*: 273), Richard Rubin kills his wife and a secretary before collapsing (*TEP*: 278), and the Lutheran attorney sneezes out his own blood on an escalator thus smearing everyone around him (*TEP*: 280). The rational explanation for such strange deaths is a brain parasite, which can grow to the size of a baby's head (*TEP*: 278), causing derangement and excruciating pain. Those who perform the autopsies can see the mouths of the embryos moving (*TEP*: 274); those who examine the eyes of the agonising patients can even spot them alive in the eye socket (*TEP*: 282).

The death of Reverend Cato Phipps's family by means of a phytotoxin is also narrated through a report sent by e-mail. There is nothing new in the treatment of the victims but the gruesome anecdote which must make the death appealingly gory: the patient endures a vivisection since the doctors take him for dead when he is still alive (*TEP*: 315-6). The rest is more itching, twitching and writhing, as he is perfectly aware of everything in his cataplexy¹²⁴.

The next victims are also taken as a group, as many as seventy or eighty according to Kameron's prediction. Likewise, the style of narration remains the reported autobiography of the bioterrorist, who rejoices on the unexpected advent of a bout of Rift Valley Fever on some of those attending the reactionary New Christian Response Caucus lobby. There is no mention of whether these people survive the disease¹²⁵. However, at least a cameraman and a bishop die of flu-like symptoms, plus a retinal haemorrhage and grand mal seizure in the latter case (*TEP*: 349). Certainly, the tone is much less aggressive and there is no gruesome anecdote other than the retinal haemorrhage itself. Indeed, it seems as if the treatment becomes

¹²⁴ The gruesome details in the description of these victims seem to coincide with the fact that they had previously offended the villain. As it is known, they can be accounted for the microbiologist turning into a bioterrorist, who seeks revenge using the weapons that he/she knows best. This seems to be a recurrent move in the revengeful criminal. As Tony Bennett analyses detective fiction, he points out that:

In at least a third of Conan Doyle's stories, the criminal has been the victim of a preceding offence and vice versa. The victim, that is, has *asked for it*: because of his shady past and because he wanted to keep secrets, thus fending off society's 'assistance'; he is still devoted to the idea of *individual property*. (1990: 240)

This is quite evident in Kameron's victims because they have denied him the possibility of professional success while securing their social status. Thus, they have to pay for the insult to the bioterrorist and to society at large. On the other hand, other revengeful researchers like Cope and Crowder seem to have more ambiguous parameters for choosing their victims. In any case, randomness is not the only factor that counts, in clear contrast to the victims of a natural or accidental eventuality.

¹²⁵ The death-rate of haemorrhagic Rift Valley Fever is over 50%, although death in patients with only ocular disease is uncommon (CDC 2006b, WHO 2008f).

much more decent as the denouement approaches. Thus, Drew's suffering of the same disease is really discreet. Basically the medical details are given by the deceased's wife who informs Jack on the phone: "Drew Lawrence's muscle aches, shaking chills, and high fever, she told him, preceded his delirium, and finally Drew screamed 'red out,' meaning he was going blind" (*TEP*: 358). Much the same can be said of Mia's death. Even if she has been lethally dosed with aflatoxin, she is still sharp enough to consider herself a prototype since, in the bioterrorist's schedule, she should be dying in October, not September. Instead of poking at any grim particularity, the writers give her the chance to participate in the plot until the very end. Her physical decay is gradual and she remains beautiful only three paragraphs before her last expiry after peacefully falling into coma. Far from the mundane style of the previous cases, the description of her death is almost poetic in brevity and beauty: "She had been lying motionless, barely breathing, when suddenly she gasped—as all the air left her body—and trembled" (*TEP*: 401). What a huge difference with the terrible agonies of the initial child victims.

There is not much travail either in the characterisation of the victims in *Mount Dragon*. They become a mere representation of what the X-FLU gene can do. The index case here is a molecular biologist by the name of Franklin Burt, who is initially described as Senior Scientist at the GeneDyne Remote Desert Testing Facility. Coming from the Albuquerque General, he is strapped down in the *Featherwood Park* hospital with gray bloodshot eyes, fulminant psychosis, extreme delusion and rapid neuroleptisation, according to the admission report (*MD*: 21). These will be the customary symptoms for the rest of the victims. Suddenly, he develops a fit of rage against the attending doctors and gnaws at his own wrists while crying out repeatedly an incomprehensible "POOR ALPHA!" (*MD*: 24). It is later found out that he is the developer and the alpha tester of PurBlood, a GeneDyne product boasting the defective X-FLU gene which seems to be causing the malady. His participation in the plot is limited to this short introduction and subsequent quoting of his work.

The beta testers happen to be the rest of the workers in the facility, with the exception of Guy Carson and Susana Cabeza de Vaca who have arrived later. Some of these workers start developing the same symptoms described above. The first case is Rosalind Brandon-Smith, one of the lab assistants, who is attacked by an infected chimp because of a zookeeper's negligence. In her attempt to escape, she tears the

suit of a security guard and both of them are taken to the quarantine room. There, Brandon-Smith's brain materially explodes while Roger Czerny, the guard, is tested free of the virus (*MD*: 144-7). As for these victims, it is important to note a notorious restriction of liberties, when they are literally grounded in a small room and blood samples taken daily to prove their cleanness. This is a fact which takes the security guard to consider seriously the possibility of suing the company for not having informed him correctly about the risks he was assuming on accepting the job (*MD*: 144). Certainly, the atmosphere in Mount Dragon demands accountability and everyone feels responsible for his/her professional deeds while there. However, when a biological emergency takes place and a strict security protocol has to be implemented, human character inevitably fails. Those who acquire the disease show an instinctive survival impulse endangering humanity at large.

The succession of unpleasant events continues with Andrew Vanderwagon, another scientist doing research in the facility. Acute derangement leads him to materially apply Matthew's postulate: "And if thy right eye offend thee, pluck it out, and cast it from thee." Amidst a casual dinner, the researcher raises a fork, sticks it straight into his right eye socket and exerts the necessary pressure for the ocular membrane to come out (*MD*: 196). The nasty experience is garnished with some irrational fighting and screaming until the victim is restrained and sent out of the canteen for surely ineffective treatment. Somehow the biohero had already noticed the fastidious repetitive movements Vanderwagon was performing before his outburst: obsessively wiping the cutlery and meticulously squaring the knife and fork on the tablecloth. These symptoms perfectly match those presented by Rosalind Brandon-Smith when she rubs her gloves up and down her suit before the accident with the chimp (*MD*: 130). Later on, this will help the biohero understand she already had the X-FLU before being attacked by the infected animal. The obsessive movements and bloodshot eyes are the unmistakable signs that everyone in the facility, except Susanna and Guy who come later, has the X-FLU. The confirmation comes to the two researchers when watching a video file in the archive where Brent Scopes and the rest of his subordinates receive what seems to be the precious gift of PurBlood (*MD*: 288-290). They are all sick, hence susceptible to derangement. From now on, the biohero and his aide know there is only one road for them.

Other than these victims, there is but a brief mention in Levine's lecture of a Soviet worker in the Novo-Druzhina research facility who contracted a rare disease

and “literally defecated his insides out” (*MD*: 45). The recombinant agent is named *strain 232*, with a fatality rate close to a hundred percent. Its purpose in the novel is clearly to show the dangers of genetic engineering when combining lethal biological agents. Eventually, Charles Levine also contracts the X-FLU in his final struggle with Brent Scopes (*MD*: 453). There is not even time to develop the initial symptoms of the disease. Both Scopes and Levine decide to nuke the headquarters with a chemical poison plus subsequent incineration. Nor is there any mentioning of them suffering. It seems simply the right ending for the writer.

A similar reading can be made of the victims in *The Scorpion's Advance*. Although there is continuous reference to their work and some of them are even allowed to play minor parts, their real purpose, as usual, is to die in a most terrifying manner. Thus, after a brief prologue in Tel Aviv, the action moves to St. Thomas' Hospital in Surrey, England, where a twenty-two-year-old Israeli medicine student is convulsing on an E.R. bed. All the signs point at meningitis but samples of cerebrospinal fluid test negative for the presence of infective bacteria. Yet suddenly, the events precipitate with the customary spasms, and back-arching for a fulminant death (*TAS*: 15). It all happens very quickly, barely hours from the development of the first symptoms in the early evening to death around one a.m. Martin Klein's autopsy is arranged for two-thirty the next afternoon. Yet, the regular ritual of ripping open the body, extracting the internal organs and trephining the skull to reveal the brain fails to supply sustainable answers to the cause of death (*TAS*: 20-22). Needless to say, the writer could have skipped the whole process. It seems that he simply wants to alert his readers and establish the standard for comparing future victims.

Actually, there are only two more to come and both the agony and the autopsy are avoided. The Chief Animal Technician in the hospital, who has been asked to do some tests on guinea pigs, is found dead by the biohero behind the glass-panelled door of his office. Visual inspection shows evidence that he has died of the same mysterious disease: lips drawn back over his teeth and blood dripping from the mouth of a cadaver that died writhing in agony (*TAS*: 41). The post-mortem is not performed in the plot. It is simply reported to have shown no evidence as to the cause of death (*TAS*: 42). The obvious function of Allan's death is to reveal that he has also tried the Galomycin drug by mistake and that he gets infected with the deadly PZ9 plasmid through a cut when performing the autopsy on a guinea pig (*TAS*: 46). As with Klein, the combination of Galomycin and PZ9 proves lethal.

The last victim of the lethal agent is Dr. Arieh Cohen, one of Strauss' aides in Israel. Like Allan, he also contracts the agent through a cut while doing an autopsy on a sick guinea pig. Both the agony and the post-mortem are avoided and the signs of death are reduced to a writhed body and bared teeth (*TAS*: 103): the minimum to show plasmid death. It seems that his function as a victim is to show that other antibiotics, like tetracycline or ceporin, can be just as lethal as Galomycin when combined with PZ9. No other casualties from this fatal combination are mentioned.

Finally, the victims in John Case's *The First Horseman* are more unsubstantial than ever. There is but meagre reference in the North Korean interlude to a whole village being wiped off the map. The entire population of Tasi-ko, which amounts to one hundred and twenty-four inhabitants, is simply a denotative token to exemplify the massacre to come. They are unscrupulously used as guinea pigs by their own government to test the Spanish Lady variant; they are monitored for a month when an official doctor examines a dozen patients, performs a couple of autopsies and takes blood samples from four villagers, and eventually they are blasted by a napalm bomb. The only character with a name is Kang, the local nurse who witnesses the slaughter. The others are simply anonymous victims (*TFH*: 12-23).

Conversely, the five miners buried in Kopervik become a valuable trophy for Solange and his sect. There is indeed an attempt to dignify their role when Annie reveals her intention to trace their families and ask for permission to exhume the corpses, but it all goes ashtray with the intervention of The Temple of Light. In the end, they are left to form part of those millions of people who succumbed to one of the worst pandemics in world history (*TFH*: 88). In fact, by the end of the novel there is full confirmation that no victim will take a prominent part. Those who suffer from the trial tests are just statistics, like in this excerpt from the Morbidity and Mortality Weekly Report about a strange occurrence in the Los Angeles metropolitan area:

During April 4-11, 1,395 cases were reported, of which 1,011 had a documented temperature of >100 F. (37.8C) and cough. Patients ranged in age from 34 to 99 years. 67 were hospitalized; 9 had radiographic signs of pneumonia. Onset of similar symptoms was reported by 27 of 142 reporting medical care facility staff members. Unusual prolongation of acute phase noted in many patients, along with attenuated recovery phase. (*TFH*: 331)

Eventually, the threatening dispersion does not even take place and nobody, other than the anonymous victims of the trial tests, is harmed. All in all, the whole

plot seems to be designed to frighten a lot but without the writer thinking much of those who die through the action of the biological agent.

4.5.3 Partial Findings: On the Victims

As far as the victims are concerned, one common feature that seems to prevail throughout these novels irrespective of the agent is the recurrence of a characteristic symptomatology. With the logical variation depending on the nature of the disease, most victims in a biohazard novel are bound to suffer from the common headache, nausea and running nose mimicking the initial stage of a common cold, which eventually turn into several other complications quite often leading to a ghastly death. In some cases, the writer may treat the victim with a certain degree of consideration and only describe the details necessary to arrange the storyline conveniently, while others prefer punctilious precision on account of an allegedly informative purpose. More often than not, little can be done to save the lives of these doomed characters. The difference in treatment is quite evident if one focuses on the relevance of the character in the plot. It seems as if the writer unconsciously acknowledges that certain weighty characters must be spared the inherent sufferings of a haemorrhagic disease in the eyes of the reader. On the contrary, minor performers are simply denied a wider background since their purpose is to be slaughtered for the mass. In any case, all the writers appear to concentrate mainly on the physical effects of the disease on their victims, while the psychological suffering is hardly ever considered.

As for the propitiatory target, there is a range of people who are openly exposed to the action of an infective microbial pathogen. First and foremost, those at greater risk are physicians and other medical workers. Another relevant group is the people who work with BL4 agents, like the microbiologists and their respective assistants. It is curious to note that highly exposed bioheroes/-ines never acquire the disease. However, other less significant characters at higher risk, like the aides, are more likely to get it. The bioterrorists also become potential victims in the long term, precisely because they manipulate infective agents. Furthermore, an exemplary death is quite customary for them. There is likewise a large group made up of children, as it seems that the biohazard writer finds it proper to best illustrate the destructive power of a particular pathogen through the ravaged beauty of a frail child. A varied

fauna of pastors, reverends, priests and parishioners, as well as other powerful businessmen and their relatives also seem likely to suffer the rage of a possibly offended bioterrorist: bigotry certainly accounts for raising such hostility against them. And it is also inevitable to name that vast grouping generally referred to as figures: the statistical victims, although definitely greater in number, are very scarcely depicted –their power lies in their anonymity and quantity. The so-called collateral victims, like some men in black or dissident doctors should not be forgotten amongst the casualties, if ever they should be considered as such. Finally, disregarding the dwellers in third world countries who live in an utterly unsanitary environment, it seems that the rest of the victims are randomly chosen, either by fate or the villain.

In general, it appears that the biohazard writer uses these characters mainly as a source of terror: they clearly become the projection of what could happen to the reader. Herein lies the power of the victim as a strong discourse builder. In order to gather the attention of a readership who is mostly ignorant of the biological threat, the writer sees it convenient to scare through a number of fictional people who suffer the consequences of underestimated pathogens. Thus, humankind's anthropocentric principles crumble. The reader is forced to remember that certain microorganisms overwhelm the alleged apogee of creation precisely because of their simplicity.

4.6 Characters: Conclusions

After all that has been said up until now, it is evident that the biohazard writer is quite fond of a series of generic characters who, to a greater or lesser extent, appear and reappear once and again. The biohazard novel is chiefly built around solitary bioheroes/-ines or a team of these who have to disentangle a biological threat, which may have its origin in a natural or man-made source. If the latter is the case, the danger may have an accidental or purposeful cause. Then, a bioterrorist, who can act on his own, or on behalf of a more powerful bunch of conspirators, enters the scene. Both sides count on a legion of soldiers, specifically trained to deal with certain aspects of their mission. Even though casualties are inevitable in this showdown, the victims of a biological agent in question clearly illustrate a global risk, thus becoming essential characters for this kind of narrative.

An array of considerations can be made as regards the participation of and

interaction amongst these archetypal characters. First of all, both the biohero/-ine and the bioterrorist do share a number of defining features. The most significant is certainly the existence of a traumatic experience which, in one way or another, leads these people to a biological cause. In the case of the bioterrorist, it pushes him/her to bring about a biological crisis. In the case of the biohero/-ine, it takes him/her to solve a biological crisis. They are also dedicated and very accomplished in their work, truly methodical in their deeds; a strict behaviour which allows them to attain whatever goals they set themselves. Despite the considerable physical strength of some of these characters, their real potential is rather intellectual, as they prove by continually devising new stratagems; one to chase and heal, the other to avoid and harm: in a way, both are visionaries of their own kind. This ability grants them a great deal of respect from their subordinates since they are capable of doing things that elude the vast majority. As leaders, they are quite charismatic, showing immediate appeal to those who come in contact with them, irrespective of which side they are on.

The introspection into biohazard affairs, however, reveals certain positive features in the biohero/-ine, which become negative for his/her counterpart. Hence, whereas the biological puzzle highlights the protagonist's logical deduction, resourcefulness and courage, the bioterrorist is affected in such a way that a dogmatic, unempathetic and sometimes megalomaniac subject is discovered. Most often, the latter has serious social problems, driving him to a psychopathic behaviour for which the only punishment available seems to be an exemplary death: an eye for an eye.

Precisely the need to die conveniently in the course of the plot is another feature that defines some aides and crooks as well. Because some of these aides have become the right hand of the biohero/-ine, they are propitiatory victims for his/her antagonist to undermine his/her moral. The aide is mostly a lack-filler, somebody who can do certain tasks that his/her master cannot. Thus, he/she perceives things differently from his/her boss and soon opens the eyes of the protagonist to matters that he/she would not have considered. On some occasions, the sidekick and the biohero/-ine may become lovers or even get married, thus reinforcing the strength of the couple against the opponent. This is not a fact that slips the evil mind of the bioterrorist, who will do what he/she can to eliminate such a powerful piece in this particular chess game. Very often, then, one or another aide is sacrificed for the

cause, thus becoming an expiatory martyr.

Furthermore, if the bioterrorist is likely to encounter a just punishment by the end of the novel, his/her crooks are also bound to fall as the plot unfolds. The average crook is dispensable and can be kicked by the biohero/-ine or his/her aides without any need whatsoever to mourn his death or consider the possible pain of those around him. Because the crooks are rather more prone to act than to think, exactly the opposite of their counterparts, they suffer many more casualties than the aides. Amongst them, the most significant for obvious reasons are the foremen who, as lackeys of the evil protagonist, must correspondingly anticipate the fate of their respective bosses. Given the chance for them to escape without punishment, however, the reader is left with a sensation that proper justice has not been done and that the biological crime is about to be committed again somewhere else.

Therefore, both aides and crooks come to be an important group of characters that are likely to become victims of the disease. Actually, anyone in close proximity to the biological agent is logically entitled to perish, although surprisingly none of the bioheroes/-ines die directly or indirectly because of the biological crisis. However, the other groups, as mentioned above, do suffer significant casualties, these forming an important part of the archetypal victims. Not only bioterrorists or crooks, but also researchers, medical workers, law enforcers, children, clergymen, businessmen, homeless and poor dwellers in the third world count as the writer's favourites to be savagely slashed by an unrelenting pathogen. But yet again, while the children and the elderly are usually the first to fall to any infectious disease in the real world, only the former seem to be of interest to the biohazard writer. Nonetheless, disregarding the apparently peaceful death of some sidekicks, the victims are here to be materially immolated before the eyes of the reader.

All things considered, the abovementioned shows that there are five archetypal characters in the biohazard novel, namely the biohero/-ine and his/her aides, the bioterrorist and his/her crooks, and the victims. By profession, they are mainly either researchers or law enforcers. All of them are susceptible to become victims by standing too close to a biological agent, although the biohero/-ine never contracts the disease. There are striking similarities in the biohero-bioterrorist and aide-crook pairs, which is not strange since they often share profession. A distinctive fact between the good and the evil research is that the bioterrorist disregards human life and/or uses it to achieve his/her purpose. Finally, it is also evident that the man-

made biological crisis is solved conveniently with a just punishment of the evil-doers, although it is likely to be repeated again in the few cases where they escape justice.

CHAPTER 5: SPATIO-TEMPORAL POSITION

Depending on the will to shock, the writer sets the crisis farther or nearer in time and place. The concept of detachment hereby acquires outstanding strength as it signals the kind of impact sought in the readership. An author who wants an immediate shock places the event as close as possible, using familiar locations in a plot set in the present. On the contrary, a writer who wants to speculate vaguely with a biohazard event takes the action further away to a past or futuristic spot, either home or in a distant continent. In any case, the biohazard writer usually seeks amazement “by bringing together terms that at first seem ‘distant,’ then suddenly ‘close’” (Ricoeur 1984: x). The degree to which such axioms as time and place are combined results, therefore, in distant, impending and close locations.

5.1 The Distant Location

This is the most detached conception of the books analysed so far. The action is taken either back or forth in time, which implies that, even if the place is still the same, it is clearly altered by centuries of changes. Needless to say, the living conditions in the Middle Ages transform an allegedly familiar country like England into an alien land where life expectancy does not exceed forty years. In the same way, the future contexts have in store great technological advances for humankind, which nonetheless remain impotent in the face of the biological threat. In all cases, however, it appears convenient for the writer to set the action far from the present so that the scary ordeal can be perceived as a cathartic experience. It then seems as if an epidemic in a distant framework is a sort of lesser one.

Thus, the plot in *Doomsday Book* is woven around two distinct poles. One half of the chapters is dedicated to the adventures of Dunworthy and his lab tech Badri in mid twenty-first century Oxford. There is but a brief mention of people coming down with a strange malady, although the victims are never studied in detail and they are simply cited (*DB*: 270). Their purpose indeed is to add a bit of tension to the secondary plot, while Dunworthy is trying to decipher what has gone wrong with Kivrin’s mission. Yet, it is clear that the writer does not pay much attention to this futuristic location. If the characters already studied are nonessential, with the exception of the two scientists, the decoration to accompany their movements is

likewise trivial. Only the pristine lab, which is used for the time-travelling experiment, takes prominence. However, merely a console, some shields and a screen are mentioned (*DB*: 16-17).

The other half is entirely left to Kivrin's experience. Unquestionably, the laconic descriptive efforts of Willis are all set here. At least, the biohazard atmosphere is obviously enhanced. Initially, the bioheroine finds herself lost in a frozen forest, her teeth chattering, to recover consciousness in Lady Imeyne's manor house. Her first impressions of the bedroom and the coverings of her bed are dizzy since her mind is coming and going. Later on, when she is fully recovered, Kivrin provides succinct descriptions of the cottage and the adjacent buildings: a courtyard made of "ice-cold stones" (*DB*: 170), a hearth that gave no heat (*DB*: 171), a stable with wide doors and a "big stone barn" (*DB*: 172). Although cold and deprived of the basic needs of a twenty-first century dweller, the tapestries on the walls, the heavy wooden tables and benches, the screens partitioning the house into small rooms, and even the hooks on the walls to hang the cloaks (*DB*: 171) make the manor house a real palace compared with the cabins where the rest of the villagers of Skendgate live. This is quickly asserted through the protagonist's first outing, when she enters a hut to discover that inside "mingled with the barnyard smells were smoke and mildew and the nasty odor of rats" (*DB*: 176). There is nowhere to sit, no furniture but for an uneven table with some bread on it and, if only like in Lady Imeyne's, a small fire unable to produce any heat. Indeed, Willis' purpose in presenting an inhospitable location prone to an epidemic is certainly well achieved. After Kivrin's initial recollection of the England of the fourteenth century, the reader is well assured that cold, dampness, dirt and rats are about to provoke a major biological catastrophe.

There is also a visit to the village, where the inhabitants are happily preparing for Christmas. Thus, we grasp the smoke coming out of the huts, wood chopping and meat roasting (*DB*: 234). The Yule log is lit in the manor house, while the family sits around it to feast. Moreover, Father Roche gives a special mass in a refurbished church, overwhelmingly attended by the population of Skendgate. Thus, there is a conspicuous climate of joy given the circumstances. It seems as if the writer needs to prepare the advent of the devastating epidemic, which is to convert all the relative happiness into sheer misery. The curse falls swiftly and the backdrop varies correspondingly. Despite the protagonist's efforts to quarantine the house, the "Blue

Sickness” relegates everyone to bed for a sure death. With the exception of Kivrin's short escapades to treat some victims, the village materially disappears from scene, with the action concentrating on Lady Imeyne's. There is also mention of multiple bell strokes, which is how the bioheroine keeps track of the number of deaths, not only in Skendgate, but also in nearby Esthcote and Osney (*DB*: 451). These are completely ravaged by the disease, with a death rate of 100 percent –some villages materially disappearing from the maps– and the fourteenth century world, as known by Kivrin, vanishes.

Hence, the action goes back and forth in time and space in a movement that tries to sway the reader between safer and more dangerous settings. Whereas the futuristic present boasts strict laws to control immigration and thorough scans to avoid infectious diseases, the past location is dirty and chaotic, where the lack of the most basic hygiene can kill you as fast as a cutthroat or a wild animal. In biohazard terms, therefore, the former is certainly much safer than the latter: one is an unsullied lab while the other is little more than a primitive world. Nevertheless, not even the paramount sanitary measures of the future prevent the twenty-first century world from undergoing a new influenza pandemic.

A similar approach to the matter is the one used by Ann Benson in both *The Plague Tales* and *Burning Road*: two distant locations separated by seven centuries. The difference, though, is that she puts much more emphasis on the futuristic plot – which in fact is already past us– and leaves the Black Death context as a mere excuse to explain the story of the world-saving journal. For the rest, other than witnessing Alejandro's adventures in the devastated Europe of the time, the historic plot is mostly inconsequential.

In the first novel, the evil that used to scourge the fourteenth century is brought back to an allegedly prepared twenty-first century through the carelessness of a forensic archaeologist. The action wanders around Sarin's cottage, the acknowledged bridge between the two distant times; Janie's and Caroline's hotel rooms, their temporary British lodgings; the main laboratory of the Microbiology Department of the British Institute of Science, a definite source of nightmare where the pathogen is awoken and reproduces; and finally the storage facility in Leeds, where the bioheroine undergoes the invasiveness of bodyprinting. All of them have a definite purpose in the plot, and the scenes that are represented in each place are interconnected to raise the tension gradually for an eventual climax.

The action begins in Sarin's cabin, an anachronic field of past memories surrounded by the high-tech buildings of modern London. The caretaker's house is the place where Alejandro's wisdom has endured for ages for a yet unknown task, which is soon to be revealed. The Spartan decoration of wood and stone is certainly more bound to the fourteenth than to the twenty-first century, somehow signalling a perpetuation of tradition amidst the technological revolution (*TPT*: 594). That an ancient journal of medicine beats all the avant-garde gizmos of an evolved society signals a questioning of the contemporary pace of medical advances. In Benson's view, nowadays infatuation with sophistication is simply leading us to a fallible future. As already noted, this is a concept that is shared amongst many other biohazard writers, who voice a concern by many contemporary philosophers (Kass 1993, Heelan and Schulkin 1998, Richter 2004, amongst others). Sarin's cottage clearly demands respect for the knowledge gathered through centuries, which has to be mixed in the correct proportion with the undoubtedly valuable breakthroughs in medicine. It is here that Caroline is eventually taken by the Marginals and saved by the ancient ritual, thus containing the propagation of the epidemic. This improvised hospital, then, seems really out of time but not of method. Instead, the modern alternative only appears to be a chemical bullet. Yet, as if stating its inevitable doom, the place is readily devoured by flames at the end of the novel.

In the meantime, the provisional lodgings of the researcher and her aide are a couple of hotel rooms. Of the few details that we are given of Janie's cubicle, we know that it is “a small efficiency with a kitchenette and sitting area” (*TPT*: 35), with a small round table unable to hold the large amount of scientific paperwork. It is here that the bioheroine and her assistant coordinate their movements and also where the necessary phone calls are made. However Caroline's room, far from meaning a place for accomplishment, is rather one of hubris. The fact that she is an enticing woman is in due time reflected in the consideration of her closet. Indeed, here is where the cool-minded Ted Cummings falls to her enchantments and commits the deadly mistake. Thus, the place where everything could have been solved becomes instead a catalyser of events when the patient zero of the new epidemic leaves her quarantine seclusion.

Another evil location is the main laboratory of the Microbiology Department of the British Institute of Science, “surrounded by glass, and brushed chrome and white plastic laminate” (*TPT*: 85). While it cannot be said that this is the place where

it all originates, it certainly is where the *E-Coli* and the *Yersinia Pestis* exchange genes. For Benson, therefore, genetic manipulation can only mean a sure catastrophe since, sooner or later, an accident like the one presented is bound to happen. The context given for such a tragedy is quite simple: no matter how advanced the safety measures, the human being is always fallible. Even if the lab boasts a dream set of accessories, the human factor adds the random touch that leads the robust conception to crumble. Humankind is never safe, not even in a futuristic, absolutely sterile, hygienic bubble.

A further projection of such a 'Shangri-La' of biological investigation is the storage facility in Leeds, where Janie tastes the horribly invasive body-printing technique (*TPT*: 389-393). It is especially distressing that the hand scanner, a machine that is supposed to protect the common good and is present in the airport, lab and the storage facility, can eventually become the ultimate means of oppression. Thus, Benson continues with her dissertation in favour of individual rights and warns about the obsession for absolute cleanness. It seems as if, by portraying these highly sterilised yet permeable locations, the writer is calling for a reasonable amount of impurity in our lives. If evolution has been based on the perfect coexistence of living species, including the hordes of microbes either benign or malignant to us, we will have to learn to live with danger, as we have done in the past centuries. Hence, the writer deliberately shatters the bubble myth by proving its fallibility with her own protagonist. In her view, it appears that unnatural antiseptic excesses, instead of being beneficial for the human race, can only be meddlesome as well as useless.

In the sequel, the first-world location returns to the United States, where the bioheroine enjoys her Victorian house in Massachusetts. More than ever, Alejandro's adventures in fourteenth-century France become utterly insubstantial, while the real action takes place in an upcoming 2007. Like in the former novel, the basic settings swing between home and work, but conveniently switching from transitory hotel rooms to more welcoming residences and from highly sterilised microbiology laboratories to more mundane hospitals and offices. As for the former group, the protagonist is introduced blissfully trimming the shrubs of her garden to the sound of Maria Callas in the opening chapter, a state of freedom which she has zealously guarded after the body-printing incident (*BR*: 21). It is mostly here rather than in the New Alchemy Foundation that the meetings with her collaborators take place and the decisions are taken. Other than the backyard, Janie can be usually found in the

kitchen, especially in company of her aides (*BR*: 168, 239, 497). Curiously, this part of the house seems to be quite appealing to the author because even in the hotel in London the characters talk about work in the kitchenette (*TPT*: 35). This is a situation that is repeated in Caroline's house (*BR*: 117), where they also enjoy the porch swing (*BR*: 333). Discarding the brief interlude in the hotel in Reykjavik with the compulsory torrid scene, these homestead locations become the real centre of the novel where most of the talk is done. Eventually, when the epidemic makes it appropriate for a safer place to be found, Tom already has his *Camp Meir* set up to welcome the group. But in fact, it is nothing more than a new communal home where the same situations are bound to repeat. Indeed, the epilogue takes place on an open porch, as if nothing had changed at all (*BR*: 704).

On the other hand, Janie clearly does not feel at ease in the New Alchemy Foundation housing the unfathomable Chet Malin. The conspicuously oppressive atmosphere in such a place makes her avoid it as much as possible. She only enters the place to ask for authorisations or directly to confront her boss, and eventually to give him an ultimatum to redeem his mistake. Therefore, her research is done on the ground rather than in her office. Instead, the canteen becomes an ad hoc workplace, where Janie simply gets her daily hit of caffeine and reads the newspaper (*BR*: 201).

Conversely, the Jameson Memorial hospital does not bring much warmth either, although she has to pay a couple of visits to get some information on the Prives' case. The scene in the room is wholly unwelcoming, with a physically devastated boy and a sobbing mother who seems to be overwhelmed by the situation. Not even with the happy news of Janie's momentous breakthrough does the hospital change its gloomy atmosphere. Moreover, it is surrounded by cops in green suits making it look more like a prison (*BR*: 642). Thus, Janie seeks refuge in the Hebrew Book Depository, where the mother-like Myra Ross is all ears to her. This building inspires confidence because of the safety measures around it and also due to the person in charge of it. It is not merely for the book that she goes there but mainly, as is shown in the last visit when she tries in vain to convince Myra to join the expedition to *Camp Meir*, for some peace of mind:

Inside the starkly modern facility she found no chaos, no panic, just immense quiet and the same filtered, almost holy light that she'd admired in this building on her other visits. And before she got to her business, she stopped and stood in the shaft of a sky-light's beam to let the illumination wash through her. She leaned her back and closed her eyes, and let the light transfuse her with energy.

When she opened her eyes again, Myra Ross was standing in front of her. (*BR*: 648)

In sum, then, Benson's locations are surprisingly homely instead of a presupposed high-tech environment. In fact, labs and hospitals are a rather hostile milieu for the bioheroine, who usually avoids them in favour of more welcoming settings. The rest is simply left to the power of imagination: the incidents are implied in conversation over the kitchen table between the bioheroine and her sidekick.

One last novel to consider in this group is Yarbro's. The action is set in a near future and placed in the west-coast American city of Sacramento¹²⁶. In this case, however, there are only a couple of opening home scenes, where Nat and Mark's broken marriage is rendered evident. Instead, the story is developed mainly in the Westbank hospital during the first half of the novel, and the Van Dreyter's House –the alternative hospital– in the second. Both locations are used as home and workplaces. In the former, an initial area to consider is obviously the ER, where the first abnormal cases sound the alarm bells. The description, like in the previous novels, is not profuse, nor is it necessary. Mostly, the syringes, catheters or other medical paraphernalia only loiter in the reader's mind. Mark's lab is also a source of evil, where he cheats on the bioheroine with other women. Except for his private office, which is off-limits, and the examination table, where the evil doctor materially screws his girlfriends, nothing else is mentioned in the three instances when Nat is allowed in. Here, there is nothing more than talk about the immorality of the project, justified by curves in some statistical reports, which also come into consideration when Harry visits Justin's office. It is likewise poorly described as being in the eighth floor, with a nondescript table mentioned where the administrator trims his nails in a clear sign of nervousness (*ToFH*: 77). The rest of the action takes place in ill-defined rooms, corridors and lifts.

If only to mark the difference, the Van Dreyter's House is a little more colourful. To begin with, in contrast with the Westbank, there is a full paragraph describing it:

It was a big house, built on the lines that had gone out of fashion before the First World War. It had turrets and cupolas, attics and basements, a wine cellar, two kitchens, a formal drawing room and two informal salons, a tea nook, a

¹²⁶ This city is mentioned only once: "Harry looked out the huge windows toward the skyscrapers of Sacramento." (*ToFH*: 139)

formal dining room, fifteen bedrooms (not counting servants' quarters), eight bathrooms and three small apartments in the grooms' quarters in the old stable which had long since been turned into a garage. It also had its own water supply, pumped up from deep wells. (*ToFH*: 135)

With such an efficient outline, the writer states that it is a fully independent building, capable of holding the alternative doctors and welcoming any victims. However, it is also overwhelmed by the situation in time, but the point is to provide backup for the dissidents. As for the rooms enumerated above, the wine cellar, which is cool and refrigerated, is swiftly prepared to hold the Pharmacy (*ToFH*: 168), the larger kitchen is readily turned into an operating theatre (*ToFH*: 213), the formal dining room becomes the common room, “while the rest of the house, with the exception of the attic bedrooms and larger kitchen, [is] would be converted to treatment areas” (*ToFH*: 137). Meanwhile the foyer becomes an improvised admission and waiting room (*ToFH*: 142, 186), whereas the northernmost attic rooms are left for the doctors to rest in; communally, that is (*ToFH*: 218). Mostly, then, a facility with the basic needs for the dissidents to perform what the Westbank denies them.

5.1.1 Partial Findings: Defining Traits of the Distant Location

To sum up, the distant biohazard novel abounds in certain token locations; chiefly hospitals and labs with their different rooms and stations. For obvious reasons, these are only found in the futuristic plots where they function as the main places for the biohero/-ine and his/her aides to work. Thus, the concept of detachment represented through these locations is built around the idea that the more distant –in time– the source of evil, the less the harm it does. The nearby futures of London and Sacramento reinforce the warning message. It seems as if, by detaching themselves from the present, both Yarbrow and Benson cast a worrying admonition over the biological threat without criticising the current medical establishment. Apparently, the bottom line is to ask for more commitment lest the predicted events become true. In consequence, research facilities must be prepared now so that cases like those envisioned do not take place. This is probably also the reason why the future is not so far away; so that the reaction is achieved as soon as possible. Other than the working environments, the future locations also include lodgings. The

reason why the writers focus on these locations is not clear. On the one hand, some of them are mere extensions for research, where some of the paperwork is done. On the other, it seems feasible that the writers dedicate a minimum of pages for the bioheroes/-ines personal lives. The extent is of course variable, depending on the importance each writer grants to such matter. As for the past locations, it is worth mentioning the ones supplied by Willis, since Benson's Middle Ages are there to provide a general background for the real action in the future.

In this manner, two main underlying messages appear through the locations studied so far. First of all, the future does not necessarily provide more safety for humankind. Either through human incompetence or greed, by mere chance or a simple mistake, an accident is bound to happen. Moreover, the past settings show precisely that a minimum of hygiene must be maintained for a disease not to spread. The presence of such conditions, however, does not guarantee a hygienic bubble either. Incidentally, it is curious to notice that the writers who favour this configuration of locations are all women.

5.2 The Impending Location

The impending concept of novel pokes at the idea of a strange malady afflicting a particular third-world country suddenly appearing in the first world. The locations are initially detached in time and space, mostly in the introduction of the plot, but soon come to the present day. Hence, Preston considers the United States, as the core of the hygienic bubble, a kind of compulsory setting to build up the biological crisis. Indeed, an Ebola nightmare seems a perfect candidate for a best-seller. Yet, only Cook had tried it before with meagre results. A partial reason for the former's success seems to lie in the presentation of the event and its locations. What is frightening about the Reston incident is that it really took place. The author has simply novelised the plot and altered the name of some characters to protect their privacy. For the rest, it might as well have happened in any country dealing with monkeys. As is well known, an ape is the closest species to humans and there are hundreds of laboratories all over the world doing experiments with simians. After reading this real story, it is quite obvious that other similar biological accidents may have occurred in the reader's own country, perhaps even in the reader's own town.

Thus, the proximity of the location seems to account substantially for the phenomenal success of *The Hot Zone*.

Taking a close look, it is found that Preston swiftly jumps to and from distant to closer contexts in search of excitement. He begins by depicting the heavenly lands in the shadow of Mount Elgon, a far-away location next to Lake Victoria, where Kenya, Uganda and Tanzania meet. Apparently, there is nothing to worry the reader: the events are happening in the very heart of Africa and the year is 1980. In Preston's words, the mountain is "a biological island of rain forest, [...] an isolated world rising above dry plains, fifty miles across, blanketed with trees, bamboo and alpine moor" (*THZ*: 7). He continues to describe this idyllic place, with the many villages on the slopes of the mountain and its tribal inhabitants, until the French expatriate – fictionally named Charles Monet – falls ill. His fast deterioration leading to a horrific death is gruesome, yet the reader still feels safe: the incident is happening far away in place and time.

After a brief description of the Jaaxes' hometown and Fort Detrick, where they both work (*THZ*: 48-55), the writer revisits the Nzara and Yambuku outbreaks. We are sent back in time to July 1976, five hundred miles northwest of Mount Elgon in Southern Sudan, where the fast killer is met. The readership is reminded of how easily the virus could have spread worldwide. Even though at the beginning of the book Preston states that he is writing nonfiction, it is pretty obvious that he is simply taking real facts for sheer speculative means:

If the Ebola Sudan virus had managed to spread out of central Africa, it might have entered Khartoum in a few weeks, penetrated Cairo a few weeks after that, and from there it would have hopped to Athens, New York, Paris, London, Singapore –it would have gone everywhere on the planet. (*THZ*: 99)

But it did not. Far from subscribing to an objective point of view, the writer compares the Nzara outbreak with the "secret detonation of an atomic bomb" (*THZ*: 99). If the western citizenry had been terrorised by the idea of a nuclear holocaust, now it is time for the biological nightmare. Of course, they have to be compared, considerably favouring the latter, that is. Yet, instead of mentioning the fact himself, Preston puts it in the words of the reputed virologist Karl Johnson:

It would have been *exceedingly* difficult to contain that virus if it had had any major respiratory component. I did figure that if Ebola was the Andromeda strain –incredibly lethal and spread by droplet infection– there wasn't going to be any safe place in the world anyway. (*THZ*: 121)

These last words are essential for Preston's purpose because he definitely wants to scare. Please, notice the use of *if*. What he describes are possibilities, based on real facts, yes, but these cases have not happened yet. Hence, with his “imaginary non-fiction,” he is setting the path for other biohazard novelists: he is presenting a simulation of a biological event endangering humanity.

Immediately after the description of the Nzara outbreak, the writer flies to Yambuku, a town in northern Zaire by the Ebola river. By early September 1976, a filovirus nearly twice as lethal as the Ebola Sudan strain hits the Bumba region causing a new bloodbath. The mission hospital where the virus surfaces resembles the medical equivalent of a horror house: lack of basic hygienic measures, hundreds of people crowding the wards, and extreme temperatures and humidity. Especially appalling is the image of the five syringes used for hundreds of daily shots occasionally rinsed in hot water. All in all, an ideal setting for Ebola to expand. Later on, the writer describes the obstetric ward at the Yambuku Mission hospital as “the red chamber of the virus queen at the end of the earth, where the life form had amplified through mothers and their unborn children” (*THZ*: 126). Yet, it is not enough to depict the inferno. The reader must face how easily the local epidemic could have become a major pandemic. It is reminded that a nurse is sent to Kinshasa to die in a private Swedish hospital, and the nurse who takes care of her comes down with Ebola and wanders around the capital for two days. We attend to the martial quarantine imposed by president Mobutu Sese Seko and the blocking of flights from Kinshasa by European countries. In a way, a cathartic experience is undergone, where the readership watches the consequences of a natural biological event, in a distant land and time. For now, the westerners are safe and sound; but it could have been otherwise very easily.

Now that the reader knows what Ebola is and what it can do, it is time to return to the US. It is late 1987 and virologist Eugene Johnson is analysing the blood of a possible case of Ebola, a ten-year-old Danish boy who has recently died in Nairobi. The setting is now the Biosafety Level-4 lab at Fort Detrick, where Johnson safely experiments with the virus (*THZ*: 133). A considerable difference is that the pathogen is not treated as a parasite anymore, but as a predator (*THZ*: 136). There is no better context to break the ladder metaphor than a BL-4 lab. If such comparison had been made at the beginning of the book, the reader would surely have believed it

was a hyperbole. Nonetheless, it all seems too normal by now¹²⁷. It is understood that Johnson is handling a mass-killer that can eliminate nine out of ten human beings in this world. It seems appropriate that, after realising what Ebola can do free in the wild, humans lock it away where it deserves. The only problem is that the jail is here, in the first world.

In the second part of *The Hot Zone*, the plot swings between Fort Detrick and Reston. It is within the secure fences of Fort Detrick that the crisis cabinet meets. By alternating the lab and the monkey house, the reader feels that humans have the means of dealing with a close menace which, on the other hand, seems to escape our knowledge. The writer definitely wants proximity, both of the biological threat and the countermeasures. Hence, in this central part of the book the historical experience is left to enter a nearby setting. Those characters that were present in Africa in the seventies now gather forces to save humankind in a closer context. The threat is here and humans have the necessary expertise to meet it. At the same time, a touch of familiarity is also given with some scenes in the Jaaxes' house. For all the tension in the air, the Jaaxes still manage to combine their personal life with their army obligations. Thus, Nancy is waking up the children and preparing breakfast for them while she is placidly listening to John Cougar Mellencamp (*THZ*: 292-3). Jerry has already woken up at four thirty, shaved, brushed his teeth and dressed casually so as not to arouse suspicions in the neighbourhood in the same carefree mood (*THZ*: 285). By the end of the day, they hold each other on the water bed and briefly comment upon the occurrences of the nuking operation (*THZ*: 333). The point is to sell the impression that everything is under control: in spite of all the pandemonium outside, life in the Jaaxes' house goes on.

Although he is not an epidemiologist himself, Preston is willing to try and help. That is why he visits Kitum Cave and the abandoned monkey house. Especially gloomy is the description of the latter: tomb-like silence, taped doors and a most intriguing “for lease” sign (*THZ*: 410). Yet, the place is not entirely empty. Even after the thorough decontamination process, life has found its way in through some spiders

¹²⁷ When analysing the progressive introduction of the audience to the four biohazard levels in the film *Outbreak*, Richard Gwyn feels it necessary for the different pathogens to be located in different labs according to the danger they pose (2002: 95). This formulaic depiction, which seems applicable both to biohazard films and novels, adds a substantial degree of credibility to the plot. Thus, it seems a recurrent move to show what the evil pathogen can do in the wild, to then progressively get acquainted with the different labs dealing with it. In this manner, when the audience or readership reaches the BL4 lab, the gravity of the event is known and accepted.

feeding on flies and other insects. There is also a bucket full of monkey excrements probably dried with bleach. Somehow it is suggested that Ebola still lives in a reservoir in the building; perhaps in a spider. But worst of all, the writer can hear children's shouts from a nearby day-care centre. Thus, he hints at the possibility that Ebola may have become endemic in Reston, momentarily subsiding until it is time for a startling comeback. Through these last visits to the places where the battle against Ebola was fought, he is sending a clearly positive message: we all can do something in the face of a biological threat.

Instead, Preston turns from the natural to the bioterrorist scenario in *The Cobra Event*. The readership does not face the threat posed by a natural agent, but that of a mistreated fanatic who claims his revenge via lethal microbes. The story begins in New York in the late nineties¹²⁸, a familiar location for the legions of followers of the writer – a *New Yorker* and regular contributor to the renowned magazine by the same name. Even for those who have not been to the city, it is not difficult to recognise such names as Union Square, or Greenwich Village (*TCE*: 3). Moreover, the crowded morning train taking an initial victim to school is also an ordinary image for the first world readership (*TCE*: 5). It certainly looks and feels like home, and a quick familiarisation with the context is inevitable.

After being warned of the potential dangers of biological weapons and how the westerners have been lied to about them, it is time to move to the CDC headquarters in Atlanta. The setting cannot be more decadent. As if to make his point, Preston outlines a complex with a number of old buildings “deteriorating and stained with age, offering visible evidence of years of neglect by Congress and the White House” (*TCE*: 33). Alice's workplace, like those of the youngest EIS agents, are former animal rooms converted into offices. At first sight, the description of the alleged defence line against microbes generates anything but trust.

Before continuing with his lecture on the history of bioweapons, Preston takes the action to the Iraq of the late nineties, where illegal biological engineering is in process. The country is basically depicted as a large area of dust and rocks with never-ending roads vanishing into the distant horizon. Amidst this vast amount of

¹²⁸ It is not surprising that Richard Preston assigns his bioheroine a big city for her research since, as Cawelti points out, “one of the most important aspects of the hard-boiled formula is the special role of the modern city as background” (1977: 140). The same concept is applicable to Blackwood's New York or Ouellette's Seattle, for example. On the contrary, writers like Anderson, Cook, Marr and Baldwin seem to prefer more ‘on-the-move’ bioheroes/-ines.

nothing, a windowless prefabricated metal building is obviously suspicious. There is one new shocking concept: the mobile hot lab (*TCE*: 50). Whereas an illegal plant in Iraq is anything but unexpected, the fact that it can be easily transported to different locations adds a new touch of fear. It is a common assumption that the necessary equipment for such a facility must be not only expensive but also delicate. Therefore, once settled it should not be easy to move. The clearest examples that come to the reader's mind should be the decaying CDC headquarters in Atlanta or the massive installations in Fort Detrick. However, the hot lab discovered by Commander Mark Littleberry is inside a truck. What a scary surprise: Preston is warning about the possibility of a covert movable Level 4 lab –with its inevitable unwanted dwellers– anywhere. The West is not safe.

The readership is informed that, already in the eighties, during the Iran-Iraq war, Iraq initiated a bio-chemical weapons program. Even though the country had signed the Biological Weapons Convention in 1972, certain European biotechnology and pharmaceutical companies helped Iraq to develop facilities for civilian use¹²⁹. According to Preston, the French UN Inspectors were following direct orders from their government to avoid finding any more bioweapons plants (*TCE*: 128-129). A land of confusion and betrayal is exposed, where the European governments are trying to cover their guilty contracts. No developed country thus seems to evade its own responsibilities in the proliferation of strategic weapons. In this way, Iraq becomes the West's charge of conscience, its mistake; the wrong that should have never come into being. It is –was– a potential biological hell; not a small one, but one which could spill over worldwide. Instead of blaming Saddam, westerners would do better to look into the recent past of their so-called “developed” governments.

Once the compulsory debriefing is done, the subject matter is faced from a different perspective and the action comes back to New York. With the help of Ben Kly, a former mortuary van driver, the tenacious EIS Officer continues her investigations inside the entrails of the big city. The dark subway tunnels become the source of a new episode in which the daring young woman ducks fast trains and live wires so as to follow the tracks of Harmonica Man (*TCE*: 138-143). The purpose of this intrepid escapade is merely to allow the bioheroine to flaunt herself. It does not seem of much interest that she descends into the subway to find her deadly virus;

¹²⁹ Although the information could not be verified, the writer materially cites biotechnology and pharmaceutical companies from France, Spain, Germany and Switzerland (*TCE*: 126).

yet, the vividness of the moment is unquestionable. Soon afterwards, Alice pays a quick visit to Kate Moran's room to discover the mechanism of the small biological bombs (*TCE*: 150-151). It certainly appears that the pace of the action is well planned for a book which is intended to be a best-seller after Preston's outstanding debut.

Once the national emergency is confirmed, the FBI is called in. A new change of decoration is, therefore, compulsory. It must be perceived that the foremost nation in the world is prepared to meet the bioterrorist menace. First, the readership enters the command centre of the New York field office, where Frank Masaccio is in a conference room, with a series of desks facing several video screens (*TCE*: 169). It means business. A minimal description of the place is enough to emphasise the seriousness of the matter. This indeed is the sacrosanct room where the most delicate decisions concerning New York's security are taken. An air of momentousness impregnates the scene. In the meantime, though, Tom Cope is riding the city's subway and planning how to make his biological bombs as efficient as possible. The city tunnels become a magnificent location for Preston to distress the reader:

The subway was the bloodstream of the city, with connections that ran everywhere. Archimedes (Cope) liked to study connections. He stood on a platform in Times Square, watching the trains go by. Then he took the shuttle across midtown Manhattan to Grand Central Terminal [...]. There are more connections from New York City to the rest of the world than from any other city on earth. Something can explode from here to go everywhere on the planet. (*TCE*: 176-7)

Not only does the writer aim at New York's inhabitants, but at those of other major cities with similar infrastructures and, ultimately, the rest of the world. The biological fear Preston is creating is therefore valid for the great majority of citizens living anywhere on earth, whether in a developed country or not. Then, the action is taken to what Mark Littleberry describes as the 'Core' and the 'Anti-Core.' The former is placed on Governors Island, only separated from Brooklyn by the Buttermilk Channel. The latter is Cope's apartment in the centre of Manhattan. One is designed to contain the infection should any cases appear. The other is built for precisely the opposite purpose: to amplify it. Thus, the reader swings from one pole to the other, witnessing the movements of the two adversaries. The 'Evidence Core,' following the design of Littleberry and Hopkins, is full of gadgetry and the latest technological devices to study and fight the disease. So to speak, it is a portable lab

very much like the ones seen in Iraq, sent to a desert island in New York's harbour; a kind of consulate of Fort Detrick. The autopsies of the bodies of the victims are now done here, instead of New York's City morgue. The samples can be analysed quickly and safely in this location. It is also here that Cobra, “a biological missile designed to take out the brain, [...] the ultimate head cold” as Hopkins defines it (*TCE*: 252), is eventually identified as a recombinant virus which has been genetically engineered.

On the contrary the ‘Anti-Core,’ being also a Level-3 lab, holds a bioreactor filled with brainpox. This facility is designed to produce the infectious agent the former is working to stop. Without doubt, it is scary that such a deadly appliance can be so easily accommodated in an ordinary flat. As shown in the Iraqi excursion, technology has become movable, for good and bad. As many as 892 vials with viral glass capable of killing by the thousand remain patiently to be exposed to the world in Cope's apartment: a biological hell in Manhattan. The bioterrorist justifies the creation of this temple of doom because pandemics are necessary in the circle of life to keep populations in check (*TCE*: 220). Thus, the Black Death is to the deranged mind of Cope the biological event that put an end to the Middle Ages. A similar action must be taken these days. Now, any mediocre biologist has the means to create a bioreactor at home; one which could have only been housed in the greatest American or Russian facilities during the cold war. A BL3 lab is at hand. Cope's musing over a worldwide spread of his creation takes now an unexpectedly frightening air:

New York was the seed bioreactor, the cooker that would start the other cities going. This was not exactly the revenge of the rain forest; this was the revenge of molecular biology. From New York, brainpox would rocket to London and Tokyo, and it would fly to Lagos, Nigeria, and it would land in Shanghai and Singapore, and it would amplify through Calcutta, and it would get to São Paulo and Mexico City and Dacca in Bangladesh and Djakarta in Indonesia and all the great supercities of the earth. (*TCE*: 222)

Thus, the proximity factor again seems indispensable in Preston's worrying discourse. Call it New York or London, Barcelona or Moscow, Tokyo or New Delhi, Lagos or Cairo: a bioreactor can be near you. The threat, contrary to what is thought in the West, can also be here.

Before going into the last part of the book, Littleberry must uncover the nature of the beast, which happens to have two makers: one American and another Russian (*TCE*: 318). A brief introduction to the legacy of the Soviet's biowarfare

program to the Russians must be made. According to the writer, when Vladimir Pasechnik defected to Britain and talked, “it suddenly appeared that the United States had been caught flat-footed in respect to biological weapons, both in the Soviet Union and in the Middle East” (*TCE*: 300). Yet, there is one important difference between these two biological hells: the second is a by-product of the first. That is to say, the former Soviet Union exported the necessary biotechnology for Iraq to develop its own biowarfare program. Even though the same accusations were made against some European countries –not the Americans, apparently– the Soviets are deemed to have developed an extraordinary technology to weaponise hot agents, which was ultimately impossible to secure after the crisis ensuing the Communist downfall. In the writer's mind, if there is a place of doom for bioweapons, a sort of Mordor of our modern world, that is certainly Russia. This source of biological evil has allowed other countries of dubious repute to develop their own program, as Iraq did. Although no trip is made to these locations, such countries as Syria, Israel, Iran and China are explicitly compared to Iraq (*TCE*: 311). It is the perfect excuse for Preston to put the words in Littleberry's mouth and terrorise his readership:

There are plenty of other countries that are developing bioweapons. None of these countries is *that* good. There are some clever idiots out there, and sooner or later, there is going to be a very serious biological accident. Something that will make Sverdlovsk look like a kiddie ride at the park. And I think it will be global, not just one city. (*TCE*: 311-12)

Responsibility, which appears to be international, cannot be evaded. However, the Americans seem to have been able to keep their scientists from falling into the dark side. At least, there is no mention of them in this novel. The bottom line appears to be that the West has been blind to the potential use of bioweapons. Yet, ever since the Americans apparently abandoned their biowarfare program, the Communists and the Middle East have been cooking their own meals. Even worse, they have been making their hot agents more contagious, resistant and deadlier. What is shown, therefore, is a duality between the good and evil of biological research. It appears that the western block has been investigating the good side of microbiology in search of medicines and vaccines to eradicate epidemics. The eastern block, on the contrary, has been improving the rate of lethality of some hot agents. Two antagonistic poles emerge. The city of New York, where most of the action takes place, is the financial centre of the ‘coalition of the willing.’ By extension, America

stands for the good place. Its most prominent defence facilities are the civilian CDC in Atlanta and the military Fort Detrick in Maryland. In opposition, the Institute of Molecular Biology in Koltsovo in Siberia is the centre of doom in an evil nation. In addition, according to Preston, at least two other known places, Zagorsk (now Sergyev Posad), outside Moscow and Pokrov also develop bioweapons (*TCE*: 306). By extension, Russia stands for the evil side.

Robin Cook also uses the distant-near location duality to set the initial context for *Outbreak*, but the epilogue is merely a recollection of the incidents in Yambuku. The writer's intentions are very much the same: to detach his narration from everyday western life. Zaire is an exotic place, far from the developed world. Furthermore, the action takes place over a decade from the time of the book's publication in 1987. It seems as if these epidemic matters happen to poor people and should not worry the western citizen. As for the description of the place, like in *The Hot Zone* it does not abound in detail. For Cook's purposes, it is more than enough just to mention the lack of hygienic measures. One effective token that seems to have caught both Cook and Preston's attention is the rotation of syringes for vaccination (*Ob*: 3, *THZ*: 98). If the very simple sight of a needle causes immediate fear, its transformation into a vector of transmission proves to be absolutely frantic. This fabulous image contains dirt, intrusion and pain all in one: biohazard terror at its best.

Another shared idea is the excessive bureaucratisation of the authorities, which obviously results in a lack of competence. As soon as the outbreak appears, it spreads quickly due to the inefficiency of those meant to stop it. How far it can reach depends only on the proper circumstances, which are nowadays enhanced by the air-link factor. Despite the possibilities, Cook does not like to exploit such a fact and only uses it to take the disease to Kinshasa, where a dying nurse is transferred for samples. These are, in turn, readily sent to the Institut de Médecine Tropical in Antwerp, Belgium, to the Centers for Disease Control in Atlanta, and to the Microbiological Research Establishment in Porton Down, England. Other than that, Cook does not take much interest to air transportation of the disease. However, the three laboratories, especially the last two, give a sense of notoriety. Once again, a full description of the places is not needed. It seems enough to state these places, sacred in the world of epidemiology, so as to feel that humans are being guarded by the overlords of medicine (*Ob*: 7). By this time, though, the experienced reader should

know this to be a false assumption.

After the schematic yet compulsory historical background, the action is taken to the United States of 1987, where it will remain. This aspect is indeed a defining characteristic in Cook, which other writers do not share. The readership is not swayed back and forth from one pole to the other. On the other hand, this is no natural occurrence that is being narrated, but a localised use of a bioweapon in reduced and determined contexts. Thus, Cook can now concentrate on deploying his biothriller plot exclusively in the US. The first call is Los Angeles, where Dr. Rudolph Richter is successfully running his prosperous clinic. All the luxury around him certainly contrasts with the poverty left behind even on the same page (*Ob*: 8). The situation has abruptly changed to the opposite extreme, where one would not expect an exotic tropical disease to pop up. In spite of the luxury, the location is certainly much more familiar to the average reader than Zaire and is easily identified with any other large city. In other words, the dichotomy here and there makes the westerner believe the action has travelled home.

As for the CDC cliché, whereas Preston does not spend much time depicting the place, Cook decides to provide snapshots of the facility's distribution. To begin with, the economic decline denounced by his colleague is present in Marissa's office, which is laconically described as “little” (*Ob*: 151). Much the same can be said of Dubcheck's workplace which, although boasting a secretary outside, is all the same “small, and cluttered with reprinted articles stacked on the desk, on the file cabinet and on the floor” (*Ob*: 92). Sure the hard work of the epidemic investigator is never sufficiently recognised; not in the US, probably less in many other countries. However, Dr. Carbonara, the administrator of the EIS program, has a “large and comfortable [office], with one wall dominated by a huge map of the world with little red pins indicating where EIS officers were currently assigned” (*Ob*: 180). Such a difference is here to indicate the highly bureaucratised American society as well as a somehow corrupted stasis, where the well-established significantly exploit the poor. In a way, what Cook seems to state through these notorious differences is that the hard work of epidemiology is done by anonymous bioheroines like Marissa, while bureaucrats like Carbonara take the credit.

Since such an oppressive cubicle is not very inspiring, Marissa spends most of the time doing research in the library (*Ob*: 88). By the same token, whenever she has to meet anyone she does not receive them in her office but in the cafeteria (*Ob*:

90). Thus, these two places become extensions for study and personal interviews respectively. As is well known, Marissa is quite a resourceful young lady and she proves it through adapting to the circumstances. However, as soon as Ebola appears, the bioheroine's usual workplaces become the different hospitals where the localised outbreaks happen. Due to the fact that all of them are privately funded, these are mostly well-equipped. In addition, since the situation they are in is not precisely pleasant, the administrators offer the EIS officer the best possible conditions to work under. And yet, a humble researcher like Marissa, whenever she has the chance, prefers the nurses' station as her improvised campaign post, where she often retreats to take the right steps. Also, she may equally be found in the hospital chapel having a chat with the victim's relatives (*Ob*: 103), in the isolation ward interviewing patients (*Ob*: 105), or even the gloomy autopsy room attending to a most ingrate part of her job (*Ob*: 112), just to name a few. With this variety of settings, the writer seems to reinforce the idea that the job of an EIS officer, for all its neatness, also includes an amount of knowledge in certain fields which, in principle, do not seem to be associated with the profession. By moving her character to so many different places doing all these activities, Cook is apparently trying to dignify the profession. So to speak, he is paying his tribute to the epidemic investigator, a character unknown to society with a critical task on her shoulders.

Another significant contrast concerning settings in this novel comes through the habitual residence of the characters. Thus, Marissa's house in Atlanta is rented, showing the provisional condition of her job. It cannot be said that it is either high or poor standard although it is situated in one of the many residential neighbourhoods near the university. Without entering into much description, the writer simply states that "Marissa had used the term 'cute' to describe it to her parents" (*Ob*: 20). Because she spends most of the plot in different cities, she does not make much use of it and it is a place to relax in the company of Taffy, her puppy. The fact that her own resting place is violated and the poor dog killed also implies a change of home, adding a new touch of provisionality. From then on, the bioheroine relies even more on scattered hotels for her safety. But before taking a look at them, it is also interesting to note the great divergence between her small two-storey wood-frame building and Ralph's Babylonian paradise. Its very description becomes insulting:

The house itself was a three-story Victorian affair with an octagonal tower dominating the right front corner. A large porch defined by complicated

gingerbread trim, started at the tower, extended along the front of the house and swept around the left side. Above the double-doored front entrance and resting on the roof of the porch was a circular balcony roofed with a cone that complemented the one on top of the tower. (*Ob*: 24)

As it seems, there is no better place for the regular meetings of Atlanta's elite, including the prosperous medical community. It appears that the author's intention is to magnify the contrast so that the eventual punishment is gladly accepted. In a way, he is preparing the situation for Ralph and those around him to pay for their excesses. In fact, as the plot evolves, it is evident that Marissa steadily detaches herself from this world to which she does not belong.

A similar attitude as regards lodgings is Dubcheck's, Marissa's boss. The very first thing he does in Los Angeles is to take her out of the lousy Tropic motel and accommodate her in the opulent Beverly Hilton, where he has established himself (*Ob*: 71). It is a sign of power as both Dubcheck and Ralph are trying to seduce the single woman by showing off their affluence. Yet, the bioheroine is not easily impressed and prefers to gather her thoughts in less opulent dwellings. This absence of a habitual home makes it more difficult for her pursuers to trail her. Thus, after the attempts to kill her at home, she seeks an anonymous motel from where she departs to Grayson, Georgia looking for the source of the infectious agent. It is, like her job, a provisional lodging simply described as the "nearest motel" (*Ob*: 213). The next one, the Palmer House in Chicago, is a *nice* one just for the caprice (*Ob*: 237). It is definitely a major mistake since she is easily traced through her credit card. It looks as if she must be committed to frugality and no excesses are allowed to her. The subsequent Essex House in New York and Fairmont in San Francisco do not seem to exceed the average (*Ob*: 270). Furthermore, her savings amount to \$4,650, a capital with which she has to finance her tour around the country: surely not enough for Hiltons or Astorias. Therefore, modest accommodation, for the benefit of anonymity and a better output, becomes a sign of identity for the bioheroine.

Not exactly like the house of Dr. Krause –secretary of PAC– which is more like a lair for falsehood and corruption. In fact, it could as well be Ralph's given its mere description:

The house looked more like a medieval fortress than a New York luxury townhouse. Its leaded windows were narrow and covered with twisted wrought-iron grilles. The front door was protected by a stout iron gate that was fashioned after a portcullis. The fifth floor was set back and the resulting terrace was crenellated like a castle tower (*Ob*: 279).

Thus the writer displays the nature of the elitist physician, becoming a political creature to rule over his/her fellow citizens. The lair of this tyrant stands out in artifice and extravagance, signalling the extremes he/she can reach to detach him-/herself from the mass. It is a place to show the end-justifies-means attitude; a place for lying and deceiving, the home of a traitor to society. In fact, as a physician himself, Cook must be well acquainted with these mansions and their owners, which may be a reason why their depiction has more detail than the bioheroine's hotels. All in all, they are meant to house the dark side of science, capable of using bioweapons to perpetuate the higher classes in power.

Likewise, Blackwood also advocates the duality distant-close location and past-present time connection. In this novel, the historical reference is chosen as the flu pandemic of 1918, and a flashback to Norway is therefore a convenient opening. The reader is carried to the coastal town of Longyearbyen in the aforementioned year, where seven young miners arrive in the 'Forsete' steamer to work in the coal seam. They all have colds and it is quickly ascertained that they have the lethal disease. The very first night after their arrival, on the eighteenth of September, they pass away. If the low temperatures –already eleven degrees below zero at the time of the action– make the place characteristically inhospitable, the huts where the miners die do not differ much from the African ones of Cook or Preston:

There was a sharp smell of woodsmoke mingled with the sharper tang of vomit. The hut was plain, with a boarded floor and a potbellied stove in the middle, and the young men were lying in bunk beds on either side. Some of them were silent (dead). Others were coughing and shivering and gasping for breath. (*PA*: 11)

The readership is soon gripped by the plot. Even though the location is so distant in time and place, a westerner is familiar with the flu, and a comparison with the Ebola huts quickly comes to mind. Thus, Blackwood demands attention for his subject matter precisely by achieving a main goal of the biohazard writer: to shock. Once warned that a variation of the common flu can be as devastating as the worst of the infectious diseases, it is imperative to return to the present-day setting. Like Preston, Blackwood also bets on New York as a target for a bioterrorist attack. Since the biohero is not a scientist, his environment is obviously unconventional for a novel of this kind. In fact, it is not until he travels to Norway, in the last third of the book, that the concept of bioterrorism is introduced. So far, Conor has been simply

trying to regain his honour from a couple of hypnotists who eventually lead him to Labrea and Branch himself. First of all, Conor's workplace is depicted: Spurr's Fifth Avenue store. His office stands behind a massive steel door and is equipped mostly with TV monitors and video recorders, whatever a chief of security should need. His domain comprises the several stories of a large department store that claims to be New York's finest (*PA*: 32). There are no electron microscopes, spectrum analysers or test tubes; nothing but the glamour of Channel and Dior perfumes impregnating the whole building with a bouquet of refinement. Actually, the place is not meant to last. After the robbery, the biohero has to flee his small realm and take to the Big Apple's streets to catch his blackmailers.

Nor is his apartment safe. Thus, Sebastian's place becomes his real quarters, rather than the typical high-tech lab. Not only is it secure enough to hide from the police, but it also turns into his improvised office, where he makes the necessary moves to find those who have extorted him. It is here that his aides meet to reach conclusions, here that he arranges appointments with his lawyer, Davina Gambitt or Luigi Guttuso, and it is in a corner of the living room in this apartment that he connects to the Internet and gathers all the information about Branch and his sect. Then, Sebastian's becomes an excellent anonymous hideaway for the biohero to discreetly carry on his investigations. On the other hand, the quite eccentric decoration does not seem to make it appropriate for a serious ex-police captain like him. The way the flat is described, which is meant to be how Conor perceives the arabesque interior design, does not appear positive. The biohero readily notes the snowy white carpet in the bathroom, which Sebastian is so worried not to stain with blood (*PA*: 96). In such an unfavourable manner is the rest of the room regarded, holding "gilded fittings, and a spray of gilded ostrich plumes in a mock Etruscan vase," along with "matching white bathrobes hung from gilded hooks" and "a large print of a sulky Grecian athlete holding a discus where it mattered" (*PA*: 97). No better is the living room, with walls painted in faded pink and furniture "as if it had come from a French farmhouse" (*PA*: 97). Or Conor's bedroom, "lit by a single pink-shaded lamp on the night stand" (*PA*: 195). But then again it provides an ideal setting for the steamy sex scene with Lacey.

However, the apartment loses its safety after the Waldorf-Astoria shooting and Conor has to ask Luigi Guttuso for a new shelter. His new residence is now the Mafioso's hideout in Blecker street. As expected, a change in decoration is

unavoidable. Far from Sebastian's whimsicality, Guttuso's flat is absolutely conventional as far as refinement is concerned: polished teak floor, leather couches and chairs and abstract oil paintings; all shining, of course, under unblinking natural light (*PA*: 302). In spite of his dire situation, Conor seems to be favoured with certain unaffordable luxuries in his former home. No doubt he will solve the case: his resourcefulness always allows him to work in the best conditions.

Outside these itinerant workstations, the action proceeds around a variety of other locations in New York. Instead of concentrating the activity in more closed settings, the writer decides to keep the biohero constantly on the move so as to quicken the plot. Thus, there is the compulsory car chase through the streets of the metropolis (*PA*: 60-65), pursuits over the roofs of the houses (*PA*: 84-95), commotion in lunch bars (*PA*: 123), abrupt landings in the offices of artists' managers (*PA*: 109) and even the Rialto theatre (*PA*: 209), a furtive rendezvous in Central Park (*PA*: 262), plus the required shooting scene in a sumptuous hotel (*PA*: 284-286). Like in the best movies of the genre, whatever varied setting any good thriller needs is present; all swiftly mustered for the sake of gripping the readership.

Nonetheless, New York apparently becomes small for a writer who needs a trip to Norway in order to introduce the basics of the event. The initial accommodation for Conor, Eleanor and Magda still retains all the luxury. The lobby of the Bristol Hotel, in the centre of Oslo, is all marble and glass, whereas the two suits –worth five-hundred dollars each a night– boast "thick blue carpets, enormous beds, velvet drapery" along with baskets of fresh fruit (*PA*: 360). But the biohero thinks of a more affordable accommodation next to Branch's address in the Norwegian capital. At Helgesens Gate's apartment, opulence fades although Eleanor makes the necessary arrangements to make it more familiar (*PA*: 366). Yet, Norway means very hard settings for the biohero. Especially notorious are the demanding living conditions in Longyearbyen, where "nothing else could grow except lichens and stunted alpine bushes and little purple saxifrage" (*PA*: 437). The site of the exhumation is also quite ghostly, holding spectral characters in white protective suits, as if performing an alien abduction (*PA*: 446). Additionally, he is captured and tortured here, which again leaves a negative memory in the biohero's mind.

In the meantime, Branch has returned to New York where he is about to perform his final strike. Thus, the biohero follows him, if only for a quick resolution. The pomposity of the United Nations headquarters is barely described, since its only

purpose in the novel is to provide a grand location for the bioterrorist event. It only seems to matter that myriads of Japanese tourists take photographs of everything, while a Special Session of the General Assembly debates the Global Message Movement threat, conspicuously ignorant that they are soon to experience Branch's madness (*PA*: 513-4). Eventually, it appears that its most important location is the roof of the Secretariat Building with its 175 flags roaring at the wind. It is here that Conor uses his newly acquired technique to convince Branch to test his flying powers (*PA*: 521-8). The novel ends in Guttuso's apartment, where Conor goes back for a foreseeable re-encounter with Lacey, Drew and the enigmatic Magda.

Also in this group, a variation may be discerned where the action takes place exclusively in the present day. Thus, McClure sees it more convenient to start already in the UK to immediately move the action to Israel, where the plot will eventually be resolved. The protagonist basically makes his movements in Israel, although the first two chapters take place in the British St. Thomas' Hospital in Surrey. After a brief prologue in Tel Aviv where CIA's Dexter discusses Martin Klein's death with a superior, the action travels back in time and place to England. The exact date is never mentioned; the plot is simply supposed to be mid-eighties. The hospital is a source of commotion, the place where the case is disclosed and the biological agent shows its potential. Not only is the typical ER the primary setting inside (*TSA*: 10), but other rooms like the Pathology Department (*TSA*: 20) and the animal house (*TSA*: 36) are also visited. One is the setting for the compulsory crisis meeting and autopsies, whereas the other beholds the death of the chief animal technician, Ray Allan. In general, the British hospital is simply the onset of trouble, a closer context to the reader for a subsequent detachment of the action.

Then the action is taken to Israel. This is where the dichotomy between white and dark research is witnessed, embodied in the laboratories of Jacob Strauss and Sam Freedman. The one which welcomes Anderson is obviously the former, situated in a multi-storey tower block in the university campus where he resides (*TSA*: 61). As noted before, this is allegedly the headquarters of the "coalition of the willing," although it also holds the enticing Myra Freedman, a spy for her evil husband. The Barad-dûr of this confrontation is the Kalman Institute of Hadera, home to the sinful Sam Freedman. This is a stunning two-storey building in the middle of nowhere, altogether rather suspicious. As the villain takes the biohero around the facility, certain extravaganzas immediately call attention, like "one of the two semi-circular

staircases that coiled round the back of the sculpture and led to a second-floor balcony which had been designed to bridge the gap that allowed the sculpture to rise from floor to ceiling” (*TSA*: 88). Clearly, a multinational must account for such decoration, as much as for the four main labs and a high-risk facility. As he walks through the shiny corridors, the protagonist notices that “centrifuges hummed as their motors multiplied the forces of gravity; scintillation counters chattered as their trains changed samples automatically; red, green and blue lights winked at Anderson from all directions” (*TSA*: 89). It simply appears that the willing biohero and his comrades have no chance against the almighty pharmaceuticals. This is unquestionably the purpose of such a marked difference in the description of ‘The Two Towers.’

Once the contest is set, it is just a matter of letting Anderson enjoy the country –mainly putting himself and those around him at risk either on the beach (*TSA*: 94-99), Jerusalem's old city (*TSA*: 127-128) and the coral reefs of the Gulf of Aqaba (*TSA*: 154-155). There is also time for the inevitable sex scene with Mirit in a nameless hotel (*TSA*: 151-152) and a brief call at the Yad Va'shem, the Museum of the Holocaust 135-136); which on the other hand appears more like a compulsory tourist visit. In the end, only the Jan Kouros Hospice really seems to have some substance amongst the fast sequence of settings. This is where Anderson has to face his deepest fears at the sight of a leper, then to be comforted by his workmate and now also bedmate (*TSA*: 190-192). It is only after this episode that he can go back to the Kalman Institute to confront Freedman.

Continuing with the duality of far and near settings, Pierre Ouellette proposes the exotic locations of Gabon, Peru and the island of São Tomé, while the developed world is basically depicted through the American cities of Seattle, San Diego and New York. First of all, a ghostly scene is supplied in the prologue as the deserted Sea-Tac airport is described. A plane has been sealed and its passengers are dying of dehydration inside. In the meantime, an unnamed TV station is broadcasting the event and announcing an imminent shutdown. Because of the inviting title, the reader is suggested that the passengers have been quarantined and, therefore, sentenced to an agonising death (*TTP*: 3-5). Immediately afterwards the action is sent to a distant location in Port Owendo, Gabon, where a local ‘tribe’ –quickly characterised as tetracycline-resistant *Salmonella*– makes its own way in some chicken tissue, waiting to be consumed by any careless passerby. This happens to be a corrupt port official heading for Libreville, where his wife is bound to cook the unhealthy chicken (*TTP*:

7-12). The onset of a Salmonellosis infection is served. Yet, the reader is soon taken to the affluent town of La Jolla near San Diego, home to the mighty Webster Foundation. The setting now turns into a somehow familiar high-tech facility, where the failure of David Muldane at the Virtual Surgery Center is witnessed (*TTP*: 22). Leaving aside the interaction between the characters, it is interesting to find the action again in the core of the hygienic bubble, a virtual operating theatre where humankind fights its war against fate. It is subtly proposed that humans can overcome any flaw of the species provided they have the right technological means. It looks as if Internet, the great messiah of the nineties, can put together all the available computerised resources to grant us eternity.

But then a new setting is introduced: King County Jail, home to Seattle tyrant Barney Cox (*TTP*: 48-51). Already in prison, the perception of his domineering manners is noticeably aided by the lugubrious context. The writer envisages a location for a fatal outbreak along with the possible outcome of the situation. In order to captivate the reader, he proposes a fearsome world where even antisocial subjects find their chance to dominate the free lives of their fellow citizens. Democratic principles crumble under the power of epidemics. It is anticipated that soon Barney will leave his imprisonment and take command of a powerless city.

As for the second part of the book, the action mainly takes place between São Tomé, Seattle and New York. In the first location, the different agents meet, hence giving birth to an antibiotic-resistant strain of psittacosis. Meanwhile, Bennet contacts Uni's attorney in Seattle to locate Elaine, although he cannot prevent the results of her investigations reaching the office of NHI doctor John Smali in New York. Of these three settings, the distant one is of particular interest, as it describes how the EpiSim prediction becomes a reality. It is not by mere chance that the outbreak of the pneumonic epidemic starts in a third world country. Some reasons can be provided. First of all, climatic conditions in São Tomé favour the appearance and dispersion of certain diseases which do not usually reach the first world; one of them being psittacosis. The humidity in the air is high and there is contact with a number of bird species and monkeys, which become endemic reservoirs of such diseases. Furthermore, the hygienic conditions are poor, rodents are common in the cities and the high temperatures also foster the development of certain bacteria in rotten food. The Paradiso club thus becomes a perfect boiling pot to cook these ingredients in (*TTP*: 175-177). The place is crammed with young prostitutes, like

Maria Santoz, willing to exchange local pathogens with generous tourists, whereas the air inside is likewise highly charged and poorly ventilated: dinner is served.

There is yet another factor to account for a third world country being the initial outbreak: corruption. Once the disease is released and the first victims start to crowd hospitals, the worst of the human nature flourishes: money is paid to the lowest classes to dispose of the corpses; these in turn neglecting the basic standard procedures of manipulation and readily becoming new communicators (*TTP*: 217-218). All in all, the epidemic goes uncontrolled. Much the same can be said of the air link element. Like Preston, Ouellette is prone to devise a major pandemic spreading worldwide through the main airlines. Thus, the simple citation of neuralgic cities like Lisbon, Madrid, Rome and, from there on to Seattle and the rest of the world already engenders apprehension in the reader (*TTP*: 196-197). The writer does not have to go deeper into these cities, describe their inhabitants, or even take the action to these places¹³⁰. All he has to do is mingle some of the characters in the same plane and the job is done. With such a highly infectious disease, global chaos is a surety.

On the other hand, the cabin of the plane also becomes an essential, if only brief, arena. In fact, it does not need much description except for the process of air circulation inside the plane. The writer shows his most informative side by explaining how the airliner makers decided to compromise the air circulation circuit to reduce fuel consumption in the mid-eighties¹³¹. This resulted in a loss of about 50 percent of fresh air. Moreover, not all micro-organisms are stopped by HEPA (High Efficiency Particulate Air) filters. There is a meagre yet frightful one percent of them which get through, basically viruses and the smallest bacteria, like Chlamydia. After introducing these facts to a reader who is most likely ignorant of them, it is easy for Ouellette to elicit an obvious question:

Where did they –these organisms– go?

¹³⁰ The fact that these metropolises do not have to be materially described is explained by de Jong and Schuilenburg in *Mediapolis: Popular Culture and the City*. The authors consider that:

Their position is no longer primarily linked to the ground they occupy. Because they are embedded in a widespread network, Global Cities can no longer be reduced to a specific area of ground as a part of a state. (2006: 138)

Since the risk of a pandemic is global, the cities are simply part of a network where the pathogen spreads. Thus they become virtual extensions to where the disease is taken and from where it will depart towards another location. Not even names seem to matter: the biohazard will reach wherever there is an airport.

¹³¹ Such a point is verified in an article published by *Flight Global*, a leading provider of aerospace news and data (Rome 2001).

The answer is back into the cabin. When all was said and done, it took from four to seven minutes before the used air was completely replaced by outside air. And during those seven minutes of freedom, the sub-HEPA organisms rode the internal currents of dubious journeys. Most went back out the exhaust ducts. But some stuck to surfaces of clothing. Some latched onto upholstery or carpeting.

Others clung to people. And that was the core of controversy. (*TTP*: 199)

Due to a blind acquiescence in technology it has always been assumed that planes had the right means to protect their passengers from any infectious agent. We have been too optimistic. Apparently, it is the writer's purpose to open the reader's eyes. The pathogen is about to enter the bubble and there is nothing that can be done to stop it. Eventually, then, the action moves to the US, where the health authorities promptly identify the probable pandemic yet feel impotent to handle it. Unpopular measures like sealing the borders with Canada and Mexico, the suspension of international air travel as well as the unwanted martial law are eventually enforced. The American people suffer episodes of high violence from their own security forces who shoot those unwilling to stay in quarantine (*TTP*: 288-9). It is time for isolation suits to appear. Also, the media quickly echoes the epidemic in São Tomé and panic spreads all over the country and throughout the world. Some TV reports eventually show Paris in flames and soldiers taking over Moscow (*TTP*: 292).

The ensuing chaos is also predictable: busy phone lines, Internet collapse, and a state of anarchy that the National Guard can hardly control. Crooks like Barney, who builds his empire on the dumping of the dead bodies, hit the road. Much in the same way as the lowest classes of São Tomé are paid to get rid of the first cadavers, so Barney's people make their living out of an activity that the government alone cannot cope with. Certainly, it is a fair deal. Indeed his business is a product of the situation, and one that can cover any other illegal activities. Based on his sturdy workforce, Barney now feels free to negotiate with the surviving members of the government and his demands are not obviously easy to meet (*TTP*: 345). Yet, he can only win. Soon oil, liquor and other trafficking are about to diversify his income and support his evil reign. This is what has been left of the former United States, the paradigm of freedom and the safest possible world. This is what the pandemic has created, undoubtedly repeating in other places in the planet. This is what the alleged hygienic bubble has eventually come to.

Even though the resolution of the plot is certainly extremist, the world

resulting from the burst bubble appears rather credible. Not only because the readership has close precedents clearly in mind –remember the state of chaos in New Orleans after Hurricane Katrina in late 2005– but simply because the writer avoids falling into the radical panorama of total annihilation. In fact, the other two great pandemics in recent history, the Black Death in the fourteenth century and the Spanish Lady in the early twentieth, significantly decimated the world's population; nevertheless humans are still here to recall them. Therefore, Ouellette's evolution of settings from the initially unprepared, to the ensuing shocked one until the eventual aftermath of a biological catastrophe, although extreme in proposal, do not seem especially distant. The writer's proposition is nothing more than a reconsideration of some past results. By now, westerners have full confidence in their ability to fight disease, in such a way that it is believed that the hygienic bubble will remain untouched. It is quite clear that Ouellette does not concur and envisages a rather feasible alternative.

However, Case first chooses to set a biological event in the introduction in a distant country, loiter for some days in the Arctic to finally return to the States for a proper conclusion. Although the prologue takes place in the Bergmans' residence in the Hudson Valley in November 1997 (*TFH*: 1-11), the action quickly moves on to the small village of Tasi-ko in Korea's demilitarised zone a couple of months later. As expected, an unexplained epidemic is on its course and the predictable way to deal with it is outright annihilation (*TFH*: 12-23). Needless to say, a survivor reports to the authorities and then it is time to proceed to the CIA headquarters in Langley, Virginia. Of these settings, the Bergman's house is completely ignored, and the village is barely mentioned but not described, vanishing under a Napalm bomb and subsequent bulldozing. However, the writer takes a short break of a couple of chapters to recreate the spy atmosphere. The cable telegrams, suits and ties and office cubicles appear, embellished with satellite pictures, piles of transcripts and other undefined reports around the members of the so-called Blindside group (*TFH*: 24-36). Altogether, these are nothing more than expected clichés to provide the thrilling touch. Immediately afterwards, a series of chapters is dedicated to the adventures of Annie Adair and Frank Daly in Russia and Norway at the end of March of 1998. There is not much to say about these settings but for the inhospitable environment: temperatures below zero, frozen extremities and distant people. Whereas Annie faces the Spartan conditions of an icebreaker, the *Rex Mundi* (*TFH*: 67-80), Frank has to

work in his room in the Chernomoskaya hotel, since he cannot meet the expedition on time (*TFH*: 81-91). Other than this, the bottom line is to detach the reader from home, taking the action to the enticing Arctic where the monster is supposed to remain hidden waiting for its time to prey.

Nonetheless, things somehow seem to accelerate once the protagonists move back to the US. The action mainly takes place in both Frank and Annie's apartments. The former is situated in quite a lively suburb in Washington with cheerful streets full of bars and restaurants. In order to make the reader comfortable, the writer quickly states that “after Russia and Norway, Frank's Washington apartment seemed like a palace” (*TFH*: 132-3). The base of the story-line is now taken home and it has to be made patent. In the meanwhile, though, Case deliberately takes the reader on a particular tour through different locations in the United States. One of these is the wealthy street of Rodeo Drive in Los Angeles, where Susannah performs the first of the trial tests in mid April. Amidst the cream of the most expensive franchises in the world, an apparently innocent young mother delivers a load of engineered disease in a most casual manner (*TFH*: 140-146). The setting of course is not picked randomly, but to make us all aware that we are not safe: one of these days it is going to happen wherever the reader may live. The safe house of the “Operations Team” to which Sussannah belongs is likewise situated in the core of the West, in Alexandria (Virginia), barely six miles south of Washington (*TFH*: 147). Again, the place seems to prove how easily and swiftly these bioterrorists can move within one particular country, executing preconceived plans and raising no suspicions. Indeed, by the time these events are covered by the *Morbidity and Mortality Weekly Report* it has taken a week, more than enough time for the evil-doers to leave the country, if necessary¹³². The message, therefore, is quite simple: any bioterrorist has one week's time to accomplish his deployment before the authorities even notice. It really is difficult to imagine a scarier crime, not just because of the possible harm, but by its sheer stealth.

During this period as well, another couple of locations deserve mentioning. One is Madison, Wisconsin, where young talents show how easily they can be

¹³² The report Frank reads on May 23, dates back to April 18 when “the California Department of Health (CDH) initiated an investigation of an outbreak of acute respiratory illness reported by area sentinel physicians, urgent care facilities, and hospital emergency rooms in the Los Angeles metropolitan area.” (*TFH*: 331)

infatuated with power and be recruited for any alluring crusade (*TFH*: 230-235). The University is thus a place for engagement, for good and bad. Another is Daytona Beach, Florida, where the retired Gene Oberdorfer appears to be just another potential victim of the sect. The crowded beaches of the paradisiac location seem then a new propitiatory context for a bioterrorist attack: no one notices the small Cessna spraying a mist of hot agent over the holiday-makers (*TFH*: 263-264). In both cases, therefore, significant tests are performed with relevant results for Solange's organisation, which is now ready for the final blow. Hence, with the inclusion of these singular settings carefully dosed during Frank and Annie's liaison, the writer has effectively revealed one of the strongest assets of bioterrorism: the swiftness in time and place.

In the final part of the book, though, the action revolves around two definite poles: the good and evil locations. As for the former, these include Gleason (CIA)'s office, Ben Stern's apartment and an NIH lab. These places of defence against an alleged biological event demand, like in previous cases, the collaboration of law-enforcers, scholars and researchers. Both the CIA and the lab environments are already familiar to the reader, with no additions of interest to the regular paraphernalia. As for the young guru's apartment, it is plainly described as “shabby.” The only aspect the writer focuses on is the carelessness in the organisation of the many books, which lay scattered “on the floor, the tables, the windowsill, the radiators –everywhere except on bookshelves (of which there were none)” (*TFH*: 284). Altogether a rather negligent disposition not promising a positive resolution of the conflict; and indeed, the poor chap ends up desiccated in the microwave chamber. The malignant places, on the other hand, cluster round ‘The Compound,’ the Staten Island Ferry and the Boiler Feed Pump. Certainly, the former stands for the heart of the beast, the very spot where Solange takes his depraved decisions. To begin with, no one is allowed into the facility without an appointment (*TFH*: 267), which is an exclusive characteristic to sacralise it as much as possible. After such initial clarification, it is depicted as a spectacular establishment, occupying the former campus of a private school. It is the perfect place to hold the necessary research laboratories, administration offices and production facilities, not forgetting the restored Tudor mansion acting as Solange's residence (*TFH*: 309-10). On the whole, it comes to state the powerful demeanour of these organisations, counting on even more adequate resources than their counterparts to achieve the proposed objectives.

Finally, it is interesting to look at two possible places for a bioterrorist event. One is a ferry covering the line between Staten Island and Manhattan. Adequately equipped with Tommy's aerosoliser, it may readily become a lethal vessel to vitiate a large city with its deadly cargo. In the writer's mind, it is that simple to decimate the population of New York and feasibly cause a major epidemic. It may be argued that such a momentous coup would quickly alert the authorities: the event could hardly be avoided but there would be no escape for the perpetrators. On the contrary, an ordinary boat could pass largely unnoticed, thus facilitating a secret departure with a margin of one week until an initial recognition of the event. In case of failure, though, Solange has his plan B which amounts to the Boiler Feed Pump implementing Andrew's procedure. It is also a failure, but it is mostly here to illustrate the many alternatives for a bioterrorist to cause harm.

5.2.1 Partial Findings: Defining Traits of the Impending Location

All in all, it looks as if the writer who chooses the set of impending locations is more prone to showing the “battlefield” –the place the hot agent ravages, mostly in the Third World– in order to extrapolate a similar result in the present. Such locations do not differ much from the aforementioned Middle Ages settings, in the sense that the lack of economic resources inevitably leads to hygienic deficiencies. The outbreak of an epidemic is thus, like in the former cases, a matter of time. The fact that they are relatively distant in time can only mean that they are likely to happen again. Similarly, the distance between both settings comes to nothing because of the generalised advances in transportation. Thus, the air link is given great prominence as a bug bred in the tropic reaches the first world by plane. The incubation period of such an agent usually varies from one to two weeks, in which time the host is fully infective. Thus, the viability of propagation is high, as the pathogen can easily jump from person to person during this time. There is no need to spend much time depicting what happens in these metropolises: one is good for the rest. If it ever comes to the worst, an anarchic world is portrayed which not even the army can control. The leaders in such chaos become unscrupulous opportunistic characters who cannot be counteracted when the law-enforcement system crumbles. Although some bioterrorists are effectively stopped, they point to where a real danger may come from.

Other than the battlefield, workstations also occupy the writer's mind to a lesser extent. Despite giving prominence to the location where the pathogen acts, the place where it is studied does not lose any importance. Thus, the Maximum Containment Lab is a must for the writers who give the leading role of their novels to an EIS officer. Their main message is that there are many wild microscopic creatures capable of decimating humankind, and a sort of jail for such microbes becomes an essential pillar of their discourse. It is the race's ultimate response to such threat, a facility endowed with all the available technological resources where the best prepared microbiologists and epidemiologists work together against this biological evil. Despite the strictness of the access measures, not even allowing recently graduated physicians like Marissa in, the human factor always adds the possibility of danger, as shown during the Reston incident. Moreover, there is always the chance that the researcher is allured by the dark side and turns an alleged sanctuary into a factory of biological nightmares. Accordingly, there seems to be a conspicuous necessity to localise the good and evil biological research in a couple of complexes that somehow simplify the reading. Along with the labs, and given the importance of teamwork, bureaus of other law enforcers and medical and political authorities are granted minor appearances in the plot. Basically, these are devised to supply a momentous field for a cabinet crisis.

Finally, the lodgings gain importance if attention is paid to the biohero/-ine's personal life. Apparently, some coincide in that a romance is a must and a place for consecration obviously becomes essential.

5.3 The Close Location

Finally, the writer may choose to set the event as close as possible to the reader. The fact that the whole action does not abandon the US is a clear sign that he/she wants to shock as much as possible. This is no rare malady afflicting people in other countries in other times; the agent lives in the developed world, has been carelessly manipulated and now threatens to take our lives. There is, however, a certain desire in some writers –namely Crichton and the Lincoln-Preston partnership– to create a particular detached atmosphere by setting the events in the desert. It is American soil anyway but, somehow, it appears to be less American, so

to speak. Arguably a similar purpose could be read in the mountains of Oregon, where the sick Dorman seems to have found a new habitat. On the other hand, Cornwell aims straight at Virginia, even though the main biological event is enclosed on Tangier island.

Through Crichton's proposition, it is clear for all that man's meddling where he should not unleashes the deadly *Andromeda* event. To exemplify his case, he groups his settings in four tokens according to the hot zone, the military command, the civil command, and the scientific installations, also related to the military. Thus, the plot begins with the biological accident ensuing the return to earth of the satellite loaded with the deadly pathogen, and the military and governmental reaction to the threat, which is to call in a team of specialists to solve the mystery. It is logical, then, to describe first the small town in Arizona which has been devastated by *Andromeda*.

Piedmont here takes the role of the distant locations in the former plots. Actually, it is in the United States, but in a remote part of the country where living conditions are not precisely favourable. In a way, what Crichton needs is a place far from the routine of the big cities and, for that purpose, there is no better place than a forsaken town amidst the desert. The first contact with the hot zone reveals a ghost town, surrounded by low hills with occasional vegetation and the barren extension of the Mojave desert. As described by a satellite controller, the place is nothing more than "just a half-dozen wooden buildings, set out along a single main street" (*TAS*: 4). It is a cold winter night and the village, later identified as Piedmont, Arizona "population forty-eight" (*TAS*: 5), is strangely quiet, with no signs of movement except for a cloud of big birds flying in circles over the houses. The fact that it is late at night, in the middle of nowhere, generates an eerie atmosphere. Without doubt, the author signals that something bad is happening. Soon afterwards, the macabre discovery of the dead bodies of the inhabitants confirms the expectations.

Moreover, the significant appearance of a man in a white robe consolidates the idea of a ghost town. Later on, a flyby pilot sees "bodies, bodies everywhere, spreadeagled, lying in the streets" (*TAS*: 18). The concise style continues, yet it cannot be said that the information provided is insufficient. Certainly, the writer is creating a need to know in his readership, but not until chapter seven is a more detailed depiction of Piedmont given. This is when Burton and Stone are personally taken to the town in an army helicopter that the nature of the tragedy can be grasped. Through their recollections, in the debriefing sessions after the episode, they point to

silence as the most shocking feature. More than the bodies scattered all over the town, the absence of sound becomes truly bizarre. It seems impossible that any village may lose at once the natural sounds of engines, pets, and the thousand other components of the daily reverberation. Instead of concentrating on the gore, Crichton focuses on quietness as a creepy factor. A neat style, which is honoured by the remarkably quick death of the victims, who additionally do not bleed to death. By comparison, the subject matter is tackled with an agreeable succinctness, which nonetheless does not lead to poverty of explanation. While the unmistakable biological holocaust setting is quickly outlined, there is only gradual focussing onto a basic fear-raiser: sudden and multiple death.

Such a characteristic is likewise appreciated in the images of the deceased swiftly proceeding before our eyes. In merely a couple of pages, the reader enters the houses of several families to notice the above-mentioned suddenness of death, blood clotting and also an inexplicable derangement in some of the victims. This is done through short paragraphs, in a direct prose:

A house that contained a man, his wife and their young daughter, all sitting around the dinner table [...].

An old woman, her hair white, her face creased. She was smiling gently as she swung from a noose tied to a ceiling rafter [...].

Roy O. Thompson, who lived alone. From his greasy coveralls they assumed he ran the town gas station [...].

Lydia Everett, a seamstress in the town, who had quietly gone out to the back yard, sat in a chair, poured gasoline over herself, and struck a match [...].

William Arnold, a man of sixty sitting stiffly in a chair in the living room, wearing his World War I uniform. (*TAS*: 72-3)

Definitely, not much more context can be described with fewer words; a statement that is also true for the description of the other settings. As the biological menace in Piedmont takes form, there is an immediate reaction from the military, ultimately responsible for the catastrophe. The Project Scoop mission control room is situated in Vanderberg Air Force, which is vaguely depicted as "gray and lighted with fluorescent lights" (*TAS*: 7). Following the prompt schematic style, the action is immediately advanced to a briefing room where the aerial pictures are analysed. Although correspondingly dim and monotone, this room is at least a bit larger, holding the compulsory projector, screen and theatre-like chairs facing it (*TAS*: 19). Yet, the action does not last long here: the purpose of these settings is simply to state that the army is aware of the event. This explains the almost complete absence of

characterisation. As soon as the explicative goal is accomplished, the story line needs to be hastened to the residence of the civil command, i.e. Washington. And yet again, for the sake of fast action, only a chapter comprising two and a half pages is dedicated to the matter. Arguably, this is too brief an episode devoted to politicians; notwithstanding it is unavoidable for the introduction of 'Directive 7-12.' It clearly appears to indicate an unmistakable lack of trust in those elected by the people, a fact which seems to endure in biohazard writing.

After everything is in its right place, it is time to unclasp Crichton's gem; the ultra-secret base he has conceived to confront an alien microbiological invasion: Wildfire. In accordance with his singular technique, the installation is essentially outlined in a couple of pages (*TAS*: 85-6). As Hall reads the Wildfire file in the unusual rear seat of a F-104 fighter, we are introduced to the station's configuration. The place is symmetrically divided into five underground levels, each of which is more sterile than the preceding. Actually, Crichton is following the basics of microbiology as applied to maximum-security labs, devising Wildfire like Fort Detrick or the CDC equivalents. Yet, no visible signs are present, except for the fence with barbed wire enclosing a fake wooden cabin in a field of corn. Allegedly, the plant is just a US Department of Agriculture test station. Instead, the corpus of the facility is below the surface: a bunker with a nuclear security device should an accident happen. The writer means business with the proposition: he is drawing the attention of an already shocked readership by placing action inside a military stronghold with a self-destruct mechanism. For an avid reader, the state of alert is unparalleled and the location certainly plays an important part in creating a suitable atmosphere.

The journey to the core of the base comprises a thorough sterilisation process taken in five stages. The first one mirrors a hospital operating room, which is said to be clean though non-decontaminated. In the next stage, a bath in biochemical cleansers is compulsory plus a change of clothes and a minimal waiting for an hour until proceeding to the next stage, which demands a total-immersion bath, ultraviolet irradiation and tests for viral infections. In stage four, there are baths in four new biochemicals plus ultraviolet and infra-red irradiations, a new check of infections and a six-hour delay. Finally, the entrance to the most aseptic level demands the destruction of clothing twice a day, an amount of antibiotics for forty-eight hours, and daily screening for the first eight days. Furthermore, each stage emulates the

previous one in the number and location of rooms. Hence, along with the necessary rest quarters, there are also identical recreation rooms, cafeterias, libraries, operating and communication rooms in each stage. The most advanced technology of the time is available, thus facilitating transmission within the different levels and outside via xerox and audiovisual means. There are also five analogous shelters, in case of a contamination event, and different laboratories for biochemistry, pathology, microbiology and pharmacology; all fully equipped both with machines and technicians. Each stage is additionally endowed with a main room holding a variety of animals for experimentation and an additional multi-purpose laboratory. All in all, a kind of Shangri-la of biology; a dream for every researcher.

So to speak, this is where and how Crichton considers biohazard investigation should be done. Needless to say, some forty years later the necessary adjustments are still required for such a facility. Without 'Wildfire,' an *Andromeda*-like event would not be easy to control; perhaps even impossible. Such eminent researchers as the fictional characters here should all be taken under the government's wing if and when needed. Thus, each specialist must have his own laboratory, filled with the appropriate equipment and technicians. A budget restriction is out of the question: before a life-threatening event, each and every resource must be granted. Unconvincing though the event may seem, it is nonetheless possible and preparation for such a case appears to be quite logical. Furthermore, it is difficult to conceive a government leaving such a limitless expenditure without proper use. The bottom line seems to be uncompromising advocacy for the proper financial measures to be taken. The writer is simply demanding attention, lest the consequences be as terrible as he envisages.

On the other hand, the configuration of locations in *The X-Files: Antibodies* is mostly itinerant. Basically, the bioheroes investigate on the ground, the paramilitary agency deploys a mobile tactical unit and both converge on the ruins of the DyMar laboratory, which is the alpha and omega location of the action. Even though Mulder and Scully are assigned their case in the FBI Headquarters in Washington, they soon move to Portland to begin their investigation. Their first call is the city's Mercy Hospital, where they are summoned by the city's medical examiner to perform an autopsy on Vernon Ruckman. The atmosphere depicted is nothing special, with the autopsy room providing the obligatory highly sterilised setting to solve the biological puzzle in. In the following pages, the hospital becomes an improvised base for the

bioheroes where they often return to put two and two together.

However, the Syndicate's men in black have their headquarters in an ambiguous federal office building in Crystal City, Virginia, where the "Cigarette-Smoking-Man" regularly meets Lentz to issue him with the latest orders. Both men have their own offices, which are qualified as "nondescript" (*XFA*: 75, 272). A minimal outline is provided for Lentz's, which is supposedly good for the other as well:

The office had plain white walls, an interior room with no windows, no blinds – no means for anyone else to spy on him. The federal building itself sported completely unremarkable architecture, just another generic government building full of beehive offices for the unfathomable business of a sprawling bureaucracy. (*XFA*: 75)

Clearly, therefore, the building and the identical cubicles inside are set to match the secretive condition of the organisation: they are customised to fit such gloomy characters. But then as well, the men in black are prepared to hit the road any time and that is why a mobile unit is always ready to set up a 'Tactical Team Temporary Command Post.' This is basically a van, equipped with a satellite antenna and the most sophisticated computers inside to run every tracking device available. An inevitable escort of black sedans complete the picture. Yet everything must be as cryptic as possible: no sign must be given as regards the origin of the organisation.

Which is not precisely the writer's intention with the DyMar Laboratory ruins, standing for a decadent science that is explicitly represented in the desolate scene. The former cancer research facility has been purposely turned into a forsaken desert with still smouldering ashes. It is the setting where the action begins, with Dorman unwillingly killing Ruckman; and also the battleground where the monster, the men in black and the FBI couple meet. If for the former purpose, only one chapter suffices, a whole set of six chapters is dedicated to narrating the final clash. During this time, the place alternates the vaguer denomination of DyMar Lab Ruins, with the more defining DyMar Inferno (*XFA*: 251, 261). Definitely, the bygone installation or "the haunted house" as Scully would rather name it (*XFA*: 237), inspires everything but confidence and, in a way, this is Anderson's ultimate message: genetic engineering is not safe. It is simply too unstable, which the unscrupulous may easily turn into a hellhole.

Moving on to *Mount Dragon*, although the setting of the action is always the

United States, there are certainly also detached and closer locations: one in the desert of New Mexico and the other in Boston. Thus, as many as four definite locations can be distinguished where most of the incidents take place. First of all, Lab C, the core of Mount Dragon where Guy and Susanna investigate. Secondly, the Octagon, the special building designed by Brent Scopes acting as GeneDyne headquarters in Boston. Then, Charles Levine's office in Harvard, along with the lecture halls, where he produces his dissertations. And finally the desert, where the protagonists seek refuge after the destruction of the facility and are chased by the deranged Nye.

Leaving aside the introduction in the hospital where Burt is restrained and the epilogue in the desert, each of the three parts into which the book is divided has some particular locations specifically assigned to it. Thus, the action in parts one and two basically dwells between Mount Dragon, GeneDyne and Harvard. Out of these contexts, there is a visit to a TV studio, where Levine discloses his theories (*MD*: 199); the Victorian Mansion of the Boston Globe's editor, where the campaign against the scholar is crafted (*MD*: 266); and a few rides into the desert, mainly to ascertain Nye's madness and to witness Teece's death (*MD*: 151, 217). Eventually, part three is chiefly limited to the desert and the Octagon. The former is where the confrontation between the researchers and Nye takes place, whereas, in the latter setting, the struggle between Scopes and Levine unexpectedly leads to the destruction of the last vial of X-FLU.

As for the laboratory, there is not much innovation in its description. Most of what is said is stereotypical: hyper-sterilised environment, space suits, freezers holding samples of the deadliest microscopic creatures and the like. One new approach, though, is the biohero's feeling before the customary nuisances of a work like this: "the rashes that developed where the inside of the suit rubbed against bare skin; the inability to sit down comfortably; the muscular tension that came with hours of slow, careful movement" (*MD*: 104). Indeed, these are some facts that have been avoided by other writers, which certainly clash with the infatuation that novel scientists like Guy, Alice or Marissa profess for a Maximum Containment Lab. Perhaps also the inclusion of an unheard of Biosafety Level 5 is a new condition that signals an utmost safe environment. Yet, altogether it seems to be nothing but new stratagems to assure the reader that there is a secure bubble which is undoubtedly about to be breached.

The Octagon, on the other hand, seems more like another Barad-dûr in

contrast to Levine's Harvard, a kind of allegoric Rivendell in turn. Whereas one is all technology, cypherspace and extreme novelty, the other stands for academicism, classicism and, in sum, immobilism. It is rather evident that the joint writers have decided to state the dangers of business-oriented research through the marked differences in these opposed worlds. Thus, GeneDyne's headquarters stands sixty storeys above the Boston harbour, the central core being an octagonal room giving its name to the whole building. The authors dedicate two full pages to a complete depiction of the hyper-modern place (*MD*: 86-7). In them, such gadgetries as a retina scanner, a hand geometry reader, a sterilising ultraviolet light and the omnipresent overhead camera take full prominence. Outside the Octagon, several other areas are mentioned to complete the picture, such as "security offices, kitchens, infirmary, air-purifying electrostatic precipitators, and servant's quarters necessary to fill the various requirements of the octagonal room's occupant" (*MD*: 86). However, Levine's office is rather austere even in its description; barely a telephone a computer and an Internet wall jack mentioned (*MD*: 123). The only sign of progress is in the university's Percival Lecture Hall, where the scholar enjoys a fully-equipped stage with bright lights and all kind of audiovisual stuff to enlighten his students and the ubiquitous press (*MD*: 41). Any other depicting indications of Harvard amount to "great oaks and chestnut trees, and cicadas droned in the shadows," as Levine walks "inhaling the smell of freshly cut grass, the thick humidity in the air" (*MD*: 164). As mentioned, the contraposition between these two diametrically opposed settings is just to illustrate the two different approaches to research.

The remaining location is the barren immensity of the New Mexico desert; certainly, an ideal setting for the final western-like dispute. What is more, 'El Ojo del Águila' provides an incomparable spot for the compulsory hot scene between the biohero and his aide (*MD*: 429). In a way, it appears that Preston and Child would not miss the chance to use such a spectacular place for something other than merely holding the Mount Dragon facility. Thus, once this is destroyed, Carson and Susanna are left stranded fighting for their own lives while Scopes and Levine fight for the X-FLU patent in the Octagon. This second contest is much more relevant to the plot, so the scenes in the desert appear to be unnaturally elongated in order to match their equivalents in Boston. By taking the action here, the writers simply want to focus on man's struggle for survival. Other than that, the place holds no mystery.

A similar concept is Cornwell's, devised basically around the main dwellings

of her bioheroine but with particular calls on those of the bioterrorist and the victims. Hence, the core of the novel takes place either in Kay's house or her office. The former is a Tudor mansion in an old Richmond neighbourhood which, as expected, acts as a multi-purpose complex where the protagonist's personal and professional lives converge. It is known soon that Kay is as keen on gardening as on inviting colleagues or her niece home to work on the case (*UE*: 18-9). One good sample is the following paragraph:

While I cleaned up, she (Lucy) disappeared into my office. I did not disturb her for a very long time, if for no other reason that I knew she was put out with me. She wanted complete openness, and I had never been good at that, not with anyone. I felt bad, as if I had let down everyone I loved. For a while, I sat on the kitchen desk, talking to Marino on the phone, and I called to catch up with my mother. I put on a pot of decaffeinated coffee and carried two mugs down on the hall. (*UE*: 117)

In such a homely style, does Cornwell deal with a bioterrorist event. Definitely, the protagonist is quite housewifely and this is well evidenced in the many pages the writer devotes to her home, where other characters are attracted by her unquestionable charisma. She even has her own studio at home, which the rest are entitled to use if necessary. But as for her office, it is in such a miserable state. This is no novelty since, like the CDC investigators, the bottom line is to make patent the manifest disadvantage of government researchers against those privately funded. The resources available to Carson suffice to show this gaping difference. It seems that after years of complaining, the government has granted her people a proper spot in the new city's Biotech Park. Still, large quantities of paper shuffling in a temporary building seems pointless when they know a move is imminent. Even if for a momentary state, Kay's conditions are not precisely adequate, with piles of boxes lining hallways and her desk “in its usual state of avalanche” (*UE*: 50). It is no surprise, therefore, that she prefers to do much of her paperwork at home.

On the other hand, Crowder has also built her own homemade lab, which somehow points at how easily a bioterrorist event can be cooked up. Although she has all the advantages offered by the Medical College of Virginia at hand, where she runs the Pathology Electron Microscopy Lab, she opts for a mobile lab in a camper, thus joining Preston's in using the same terrifying technique. Inside, the sophisticated equipment is “neither cheap nor new” (*UE*: 343) because the bioterrorist knows quite well which is the most reliable material for her evil purposes. It is a place designed to

scare due to its utter functionality. It cannot be denied that the average reader does not expect a source of biological doom so efficiently built and ready to harm.

Finally, the decaying location of Lila Pruitt's house clearly epitomises her role as an exemplary victim, leading the way for others to follow. The rusting screen door with screeching springs announces what is to be found inside. The first impression of the protagonist, as transmitted to the reader, is the vile smell of a decomposing corpse. It is the expected for a patient dying of smallpox:

In the living room was evidence that someone had not been well for a while. Pillows and blankets were disarrayed and soiled on the couch, and on the coffee table were tissues, a thermometer, bottles of aspirin, liniment, dirty cups and plates. She had been feverish. She had ached, and had come in here to make herself comfortable and watch TV. (*UE*: 192)

These details recollected by Kay, help her make the necessary deductions to trace the way Lila had died. To her mind, the mirrors are covered with sheets, to prevent the victim from seeing her unbearable sick face. Other bloody towels lie on the bathroom floor along with a box of baking soda, which had proved useless against the dreadful pain. Likewise, the absence of a phone makes the investigator realise the impossibility of the target announcing her ailment and asking for help (*UE*: 193). All in all, it is the perfect location for the writer to exemplify the misery of the victim. No other homes are visited; the point has been made sufficiently clear.

An analogous idea for the presentation of places is the one embraced by another pair of co-writers, Marr and Baldwin. They conceive two basic spaces to present their plot –those of Bryne and Kameron, with particular visits to the different crime scenes and the main places for the aides. After a rather confusing opening scene in San Diego, the action leaps forward a couple of months in the same city. The biohero is called into action by the St. Roch hospital authorities and he soon begins his investigations in the New York State Zoonosis Laboratory in Guilderland. This is basically the place where the fight against the microbial threat is being done. It definitely lacks the aseptic aura which characterises the microbiology lab. This is not a BL-4 facility. Moreover, the kind of research done here is more academic than scientific. While there is certainly investigation into the initially unconnected cases, this is much more into paperwork and thinking than a direct study of the samples. Although there is a notorious presence of the typical gadgetry common to this kind of context, it is not made evident and hardly ever mentioned. Clearly, Bryne is a

scholar of infectious diseases, which emphasises the intellectual part of his profession. Instead, the groundwork is performed by his assistant, who is much more in contact with the laboratory stuff. Indeed, it is Drew and not Bryne who comes down with Rift Valley Fever, simply because he handles straightforwardly the biological device Kameron has expressly left for him. Thus, leaving this episode aside, the rest of the activity witnessed in Guilderland is more concerned with thought than physical action.

On the contrary, the bioterrorist has his own apartment in Manhattan, which is basically but sufficiently equipped with the necessary means to cause biological damage. Kameron's lair resembles a sort of homemade lab where material experiments are taking place. The difference in appearance is quite evident from the very first line: "Surrounded by his containers of toxins, Theodore Kameron sat in his lab, logging onto PROMED" (*TEP*: 168). In his madness, the bioterrorist even records himself in his own sleep, monitors his vital signs, diet, moods, blood and excrements; which means his lab is equipped to do so, although the actual instruments for the process are not mentioned. Furthermore, all the different animals used for the production of toxins, along with the microbial samples acquired from other American labs, are conveniently nourished and grown with a total lack the minimum safety measures, but providing Kameron with an excellent source of biological nightmares to choose from. In comparison to Bryne's, his place is more like a testing room where he devises how to implement the biblical plagues one by one.

Next to these definite poles, there are the workstations of the aides and the locations of the victims. The most significant of the first group is the FBI's Headquarters in New York, the ill-fated twenty-six Federal Plaza, home to the pertinacious Hubbard. The emblematic building is introduced quite late in the plot, in chapter seventeen out of twenty-five, merely for the agent to inform Bryne of his assistant's demise. Unexpectedly, Hubbard's small office has quite a pleasant view, boasting a privileged view over the East River bridges between Brooklyn and Manhattan (*TEP*: 354-5). It seems like the office simply has to be mentioned and briefly described. Once the compulsory law-enforcing atmosphere is ascertained, the rest of the action is taken to the former posts and the streets. One other symbolic edifice is the New York Academy of Medicine, where Mia summons a crisis cabinet to study the bioterrorist threat. Again, it appears that the medical authorities have to

do something with respect to the matter and the place is readily chosen for that means. The building roughly serves “as host to medical societies, specialty groups and Nobel prize-winning health leaders from around the world” (*TEP*: 377). For such reason, it holds the necessary CDC, USAMRIID, NIH and FBI authorities or, as the writers put it, “a small but diverse group of medical, law enforcement and military experts” (*TEP*: 377). As for its description, it is simply said to hold the third-largest medical library in the world; with the session taking place in a room overlooking Central Park (*TEP*: 377, 379). After its mission is done, it completely disappears from scene.

Due to their allegoric significance, the settings where the bioterrorist acts must also be considered. Kameron chooses to strike those who had previously supported his investigations and the locations must be in accordance with his intentions. Hence, a nunnery seems the ideal place for a Mother Superior to deliver a huge fibroid (*TEP*: 209), while the distinguished Rubin couple die in their opulent office in the heart of financial Manhattan (*TEP*: 274). Another attorney expires dramatically in Denver airport on his way to his vacation in Aspen (*TEP*: 278), whereas their colleague Rivers crashes his speedboat spectacularly on Candlewood Lake where other high-class businessmen meet (*TEP*: 270). Similarly, Reverend Cato Phipps and his family suffer a painful cataplexy in the first-class dining room of the S.S. Rio Roja cruise (*TEP*: 311). Altogether, the locations have to be grand for a major repercussion of the event. The punishment Kameron is enforcing on these high-standing members of society must be undertaken in those places where their comrades meet; only in this manner can his crusade be complete. Additionally, other victims, like pastor Ogilvie and Neil Edison, die in hospital, just to show modern medicine’s utter inability to treat Kameron's well-chosen diseases. It can therefore be said that the writers carefully select a significant place for the death of each relevant personality.

5.3.1 Partial Findings: Defining Traits of the Close Location

In essence, a working environment chiefly represented through the research lab gains prominence in such a set of locations. The logic behind it appears to be quite simple, as the immediacy of the event requires prompt action in a place meant to act against the microbial threat. Yet, human weaknesses turn the alleged first line

of defence into a source of biological nightmares. Whether it is greed or lack of knowledge, professional jealousy or a simple fatality, the fundamental philanthropic aim of a research laboratory often turns against humankind.

The work against microbes is conceived in other environments as well. Hence, the medical settings –hospitals, the office of Richmond's medical examiner, and the New York Academy of Medicine, along with the law-enforcing locations, army bases and FBI's offices, and even Levine's Harvard, provide an alternative framework for such a joint task. The latent idea behind their outline –they are barely mentioned rather than fully depicted– seems to demand implication from these groups. It is evident that in such a contingency, agile coordination is compulsory. However, through the few hints supplied in portraying the headquarters of our overlords it appears that this is not precisely the case. And, of course the White House, the greatest temple of wisdom for the elected know-it-all who supposedly care for us is presented as a lair of corruption where only personal profit matters. Despite all its flamboyance, in the view of the biohazard writer, it represents more a nuisance than a real help in a biological contingency. Certainly, there are always well-prepared hospitals like St. Roch or Mercy, but little can they do if the institutions over them hinder their professionals. Even the words spoken in such academic tokens as Harvard or the New York Academy of Medicine seem to get lost in the face of the reigning debauchery.

Additionally, the writer has to deploy his event on a clearly defined battlefield, which nonetheless seems to lose specific weight due to the above. Worth citing is Piedmont, a ghost town after the outbreak of *Andromeda*. The fact that everything remains still intact –but for the wasted human lives, that is– provides a singular feature of this kind of novel; much cleaner than its feared nuclear counterpart. As for the lodgings, only Cornwell gives Kay's Victorian house a material importance, but just to perform there everything she cannot do at work.

5.4 Locations: Conclusions

Out of the abovementioned considerations, it seems clear that the biological threat is often introduced in a distant land, either in time or space, before threatening to reach the first world. The degree of distance is relative and it depends on each

writer to set his/her novel some centuries, decades, or barely weeks from the denouement. Similarly, the reservoir of biohazard may be far away on a distant continent, in the reader's own country, or even in the reader's own hometown. Thus, the conjunction of these spatio-temporal possibilities eventually sets the action in certain common locations, such as hospitals, labs, offices and undeveloped villages. In general, these places can be classified into three major groups: battlefields, workplaces and lodgings.

As far as the first group is concerned, they are conceived as depicting the allegoric fight between humankind and a particular microbial threat. So to speak, it is the context where the bug claims a higher place in the *Tree of Life*, thus challenging man as the apogee of creation. A lack of the minimum hygienic measures seems to be a leitmotif in these locations. If in the past, they explain the uncontrollable explosion of the Black Death in the fourteenth century as seen in Skendgate. A similar reading must be made for the depiction of the Nzara and Yambuku outbreaks in the twentieth century and yet portraying close obnoxious effects. Such a concept then becomes a strong discourse builder to rationalise the epidemic threat. It is then quickly extrapolated: irrespective of the living conditions in the first world, definitely much neater than in the third world, the agent is capable of evolving and causing harm. The extrapolation is applicable to both the past-present and far-near axioms. Even without the fostering circumstances of the index location –the place where the epidemic origins– the disease progresses anyway. In other words, higher sanitary measures may prevent the outbreak of a communicable disease but may not stop it once the bubble is breached. Hence, globalisation becomes a pandemic catalyst. This is rendered evident through the air-link scare, where the airplane becomes the needle that takes the agent from the underdeveloped to the affluent world. Only a thoroughly established quarantine may avoid the infective microbe from entering the net and that means extremely rapid detection of the epidemic. Given the long incubation period of certain tropical agents, some of which last for over two weeks, the proposition becomes truly appalling. Let it not be forgotten that corruption and the generalised sluggishness of the authorities in such countries do not help much.

There may also be the case that the bubble is breached by unwise or wicked manipulation of a hibernating agent. The graves of former victims thus become a valid source of biological evil because they become the location where the careless or the unrighteous is bound to open Pandora's box. However, given such a

contingency, the epidemic menace is either not likely to materialise or is unleashed in a reduced site. Only if the media has access to the epidemic do the masses become aware of the real threat. Otherwise, life continues undisturbed. It must be stated then that the worst is only conceived by Ouellette and Crichton, who envisage anarchy in the whole world, or in a particular town, respectively.

For the others, the battlefield is mainly reduced to hospitals and labs. Because such facilities are conceived to study and stop the progression of an epidemic, they also become workstations for bioheroes/-ines and aides. In a general sense, the hospitals are initially overcome by the advent of the disease; the African episodes being of special notoriety. Yet again the impact comes with the havoc caused in the first world. It does not mean that these places are not prepared to handle the situation, but only if the victims do not exceed the dozen. Clearly, the professionals are willing to help but it seems that a number of obscure interests hamper their movements.

The lairs of such betrayers are mostly offices in public buildings, and are supposedly paid for by governmental funds. Herein again another direct criticism by the biohazard writer of the authorities: these inaccessible offices hold the Westbank administrators or the Syndicate's men in black. In contraposition, the CDC and Virginia Medical Examiner bureaus are absolutely dilapidated and the people inside have to make do with their own initiative and work extra hours at home or in cheap hotels. By emphasising such differences in the treatment of locations the writer demands respect for those who fight disease on a daily basis. And he/she certainly requests cooperation for the common good, leaving aside the personal disputes witnessed in the crisis meetings in Fort Detrick or the FBI headquarters. Other than the public, the private institutions should also contribute to the cause, but these locations are used to denounce the reigning corruption in the field. Wherever there is money, profiteering inevitably appears, as is made fairly evident in the depiction of the sumptuous Kalman Institute, the breathtaking Mount Dragon, or the double-sided Bio-Vek. Still, there is hope in the participation of such institutions as Harvard or the New York Academy of Medicine, which are portrayed as the guardians of common sense in all this controversy.

Therefore, the biohero/-ine is often forced to work with a small group of aides, who usually gather at his/her home given the apparent lack of means. By depicting the different lodgings as workstations, the writer continues with his/her

particular opprobrium. The people who dedicate their lives to the control of epidemics do not find the necessary support from the authorities and have to find better places to perform their task. Not all the bioheroes/-ines continue their work at home, however. For some, their lodging is merely a place to rest, a shelter where they seek peace of mind and gather strength to undertake their strenuous mission. They even consummate love affairs with their aides, a fact which is not taken as libellous but a necessary step to reach the ultimate goal. In the view of certain writers, it seems compulsory that the practical communion between biohero/-ine and sidekick be sanctioned through a sharing of feelings, and the protagonists' home looks like the right location to fulfil it. In other cases, this token location is merely functional, a place to eat, enjoy some leisure and sleep, like the utilitarian Wildfire base. And still some, like Mulder and Scully, do not even appear to have a specific emplacement for such basic needs.

After considering the potential locations of the biohazard novel in detail, it may be stated that there are three distinct configurations around the time and space axioms: distant, impending, and close. Similarly, three main groups of generic locations are used by the writers: the battlefield, the workstation and the lodging. The battlefield retains an intrinsic informational purpose, while the workstation and the lodging are designed to strike the reader's conscience. There is a noticeable extrapolation in both time and space, so as to show the feasibility of a breach of the hygienic bubble. Finally, a variable degree of detachment seems compulsory to generate a cathartic response.

GENERAL CONCLUSIONS

As stated in the introductory chapter, I set myself three main objectives in writing this thesis. In the first place, I wanted to prove that a novel can be taken as a serious simulation of a biological threat. Secondly, that there are a number of valid extrapolations that can be made for real life. Finally, that the biohazard novel can therefore be regarded as an effective educational tool to comply with Lederberg's premise. In order to confirm the first proposition, I analysed the common structures of each novel. Thus, I discovered that a common ground made of recurrent biological agents (what), archetypes (who), time/place locations (when/where), and scenarios (how), articulates a genuine literary discourse (why), clearly identifiable as the biohazard message. Because the three scenarios decidedly condition the nature of the conclusions, I have determined that three different subtypes of the biohazard discourse are applicable: the natural, the accident and the bioterrorist. Thus, we obtain a better-defined proposal of the people entitled to cause or fight the events, the propitiatory victims, the most likely agents involved, and where and when these incidents will probably happen.

Three subtypes of the biohazard discourse

The natural subtype of the biohazard discourse is based on the imperative need to control the current euphoria about the almighty power of medicine to defeat pathogens. Some of the diseases they cause have no corresponding vaccine or these bugs may have become resistant, mostly because of antibiotic abuse. There are too many contingencies to keep these microbes under control and the human race certainly needs a radical change of behaviour. The living conditions humans experienced in the Middle Ages are still mimicked in many third-world countries today. Thanks to globalisation, the air link and overpopulation, an emerging or re-emerging pathogen in one country can spread worldwide and cause a devastating pandemic. Such an occurrence merely depends on chance or rather fate, as the authors coincide to suggest. Although the biological threat may seem distant in time and space, the Black Death and the Spanish Flu events, to name a few, can reoccur easily as of today in the affluent world. It is not simply doctors and researchers who must prepare for the new global pandemic; even humble veterinarians or history

students, as portrayed in these novels, may have to respond to a biological event. It is a social responsibility that cannot be eluded. Chance, which favours the prepared mind, can make any human a biohero as much as it may enable any other bioterrorist to make matters even worse. It seems, therefore, logical that extreme contexts like a pandemic facilitate the eruption of antisocial oddities and attention must be paid to minimising the risk.

In like manner, those writers who base their work on a biological accident demand carefulness in the shortest term. A microbial aberration appears to be at hand. Very often, the resulting bug evolves from an initially philanthropic attempt but, instead of improving the human race, ends up threatening its existence. Ignorance is humankind's worst enemy. Professional researchers, like some of the main characters, may graduate with honours in the best universities and still be lacking the ethical principles that are mandatory for a good development of their job. Such evidence seems to support the need for humanistic subjects in the so-called scientific careers, so that newly-graduated students are not allured by those who only seek profit. The writers seem to be seeking that those many readers who share profession with the bioheroes/-ines and aides quickly empathise and behave in the same way. For the same reason, very clear examples of the dark researcher and the unwilling villain are given. The victims are mostly the elderly and infants, as they have an inherent ability to move people's feelings. Additionally, the time and place axioms are much more immediate, which seems to indicate that there is no time to waste because the threat is simply over us.

Finally, the writers of bioterrorist novels forewarn their readership about the immediacy of the next big statement. The reasons for a bioterrorist act would sway between revenge, bigotry and dogmatism and, thus, unsatisfied researchers, medical lobbies and intolerant sects should be detected and controlled. It is difficult to establish the proper mechanisms for such administration, nor do the writers mention them. However, they clearly portray a close collaboration between law enforcers and the research and medical establishments to achieve a social consensus against the use of bioweapons. As long as there is research, which of course cannot be eradicated, there will be a liability of a deviant individual altering a biological agent to enhance its killing power. Although this is unavoidable, the potential effects can be lessened provided that the necessary means are dedicated for the bioheroes/-ines to do their job effectively. It is not difficult to see how easily an unsatisfied researcher can

become a bioterrorist. It must be understood that not everybody shares the same ethical principles and that the allure of money can be too strong to resist. Hard as it may be, ways should be found so that those who work with microbes on a daily basis are satisfied with their job and cannot be tempted. There must also be stricter control over biotechnology and pharmaceutical multinationals, which may court these professionals only seeking economic profit, thus compromising humankind's existence. As it seems, there is an undeniable threat that some of these companies may be privately funded by rogue organisations or even sponsored by totalitarian regimes. Since the contest between hero and villain is not individual, many more characters are needed in this subtype of the biohazard discourse, and aides and crooks are introduced to expand the forces of both good and evil. The death of the bioterrorist is usually spectacular, in line with an agent which has been designed and improved to kill fast and in a ghastly manner. Lastly, the fact that the locations are close to the reader also seems to demand swiftness of action.

Since most of the abovementioned results derive from speculation with real biological agents, characters and locations, it appears sensible to consider these biothrillers as rather feasible propositions of how a biological threat may evolve. In fact, some of the events described have already happened in the past and, because they are cyclical –mostly the natural kind, but also the accident and bioterrorist– they are likely to occur again. It must also be said that part of the information about what the pathogens can do has been deliberately altered by some of the writers to make the novel more commercial. Yet, by and large, the information provided closely coincides with the most reputed sources. This can be ascertained through the clear connection between the chapter dedicated to the pathogens and the second appendix, where fiction and reality undoubtedly meet. A similar consideration is applicable to the second chapter and the review of the biohazard events. In other words, the three envisioned scenarios should not come as a surprise. Certainly, there has been tremendous ignorance over the matter but that is precisely a deficiency that the biohazard writer, willingly or not, redresses. Therefore, in general terms, it can be safely asserted that the sixteen biothrillers that have been studied are most educative.

Logical extrapolations for real life

The abovementioned remarks point out a series of consistent postulates that may be at issue. It is extremely difficult to read about the likeliness of a biohazard event and remain impassive. To my mind, the study of the biohazard message offers some ideas that seem most commonsensical. While they are obviously open to discussion, the different findings of this thesis seem to converge into the following precepts, which may well be considered the core of the biohazard discourse:

- **There is an imperative need to erase the *Ladder Metaphor* and the *Myth of Man as the Apogee of Creation* from the common mind**

Chiefly through the great influence of Christian thought, westerners have wrongly been led to believe that Man is the closest living entity to God. In the biohazard discourse the Universe is not hierarchical, but hitherto allegedly inferior beings, such as microbes, stand side by side with the human species. In fact, aeons have shown that viruses and bacteria are far better adapted to an ever-changing environment than other larger species which have ruled over the earth for a short time-span in evolutionary terms. This is a fundamental discourse builder of this kind of narrative. In fact, our current state of complacency seems directly linked to the already-mentioned religious manipulation. Moreover, today's euphoria on medicine and vaccines also contributes to a distorted perspective of the actual position of our species in the ecosystem. Yet, certain emerging and re-emerging pathogens, as shown in these books, have come to question humanity's alleged supremacy and teach us a lesson in humility. Prevention and not medication is the most sensible means to fight disease. As of today, humankind's degree of knowledge does not allow every single threat to be counteracted with drugs, nor will it probably do in the future. For the common good, humans had better start deconstructing the false assumption that they are, or will soon be, invincible for pathogens.

- **The affluent world is not living in a *Hygienic Bubble***

There certainly is no doubt that Fleming's discovery of penicillin in the late 1920s became the milestone that allowed humanity to fight so-far untreatable

bacterial infections. Then came streptomycin and PAS¹³³ against tuberculosis in the 1940s, idoxyuridine for herpes, virugon for influenza and methisazone for smallpox, which was eradicated in 1977. So many bacterial and viral diseases came under control in barely five decades that we thought we had somehow created a hygienic bubble, a sterilised coat which protected those who had access to medicines. While such advances have greatly contributed to the rise in our physical well-being, the bubble myth must again be deconstructed. From the biohazard message, it is understood that sexual liberation, global travel and the destruction of the ecosystem, either single-handedly or combined, are menacing the current status quo. As noticed in these sixteen fictional simulations of a biological threat, a particular agent can become resistant to current medicines, be genetically modified to elude them, or it can be simply created anew with no vaccine whatsoever to treat it. This widely ignored evidence should be promoted so that the reigning exaltation of medicine is taken moderately.

- **There is a strong likelihood that a microbial leveller emerges as Mother Nature's reaction to redress the balance in the ecosystem**

It is already happening that so far unknown diseases are coming out of the rainforest to prey on the human species. Deprived of their familiar habitat, such microbes have to find new hosts. Rare maladies that were endemic in certain tropical animals, mostly of the ape kind, are jumping species into humans in search of survival. It is a most logical reality that humans should understand. Instead, the Amazon was deforested on a rate of twice the size of Portugal between 1991 and 2000 (Centre for International Forestry Research 2004). The rational outcome of this debauchery should not surprise anyone. Furthermore, there is also the possibility that a microbe becomes indestructible or that an invincible pathogen is developed in one of the thousand experiments which are performed on a daily basis. There simply are too many chances that an *Andromeda* suddenly emerges. Both writers and epidemiologists concur: the real question is not *whether* a world-wide pandemic is to take place but *when* it is going to strike. Coexistence with microbes is inevitable. As an inherent and vital element of the ecosystem, microbial life cannot possibly be

¹³³ Para-aminosalicylic acid: an antibiotic to treat tuberculosis.

eradicated in its totality. This is a complete illusion because the cycle of life needs microbes to keep going. Indeed, the human race has become a parasite for Mother Nature and, in one way or another, it is gradually being paid back for its deeds. One could accept the allegory that a microbial entity is about to avenge the excesses of the human being but, in truth, it really seems that everything possible is being done for it to happen. By the time the next great pandemic takes place, most authors agree that it is bound to find an overabundant species that has not cared enough to take adequate countermeasures.

- **Control measures in biological research facilities should be reinforced**

As long as there appears to be a high chance that the human race is intentionally or unintentionally placed in jeopardy, research facilities all over the world should be constantly inspected. For such matters, governments should implement supervising committees made up of military and civilian experts who monitor the correct functioning of the laboratories along with the ethical integrity of the project. It is therefore necessary that these groups include not only law-enforcing and medical authorities, but also scholars in such diverse fields as psychology, anthropology, history and literature. Higher emphasis would seem to be urgently needed on filling this lack of control over the pharmaceutical multinationals and their research into biogenetics, as some of these writers coincide in depicting a wild microbial beast evolving from an alteration of the DNA. Not only the technical but also the ethical abilities of the researchers should be assessed, which should guarantee that the project conforms to righteous moral principles. Furthermore, there is a strong need for a global convention on biogenetics, establishing the guidelines of what can be considered proper research. Only in this way will the biotechnology multinationals be effectively regulated, thus reducing the risk of leakage or misuse. The human being should have the right and obligation to counteract this danger. This current leniency needs to be rethought if humans want to have a clean conscience. It is not enough to cede the responsibility to an anonymous overlord who will certify the safety of the project because governments are strongly funded by the Big Pharma. The more informed society is, the smaller the chance of manipulation and corruption.

- **An immediate change of behaviour is required**

With a population of over six billion at the turn of the millennium, humanity is rapidly becoming a propitiatory target for pathogenic invasion. It does not matter much which bacterial or viral species is about to cause the new pandemic: it is going to happen and very inefficient measures –if any at all– are being taken. The overpopulation problem cannot but magnify the chances that an emerging or re-emerging pathogen decidedly decimates the species. It is difficult to imagine it sweeping the entire human race from the earth, but a significant reduction does not seem far-fetched. Most of the threats envisioned by these authors originate in tropical Africa or South-America. A wicked combination of poverty, lack of hygiene and the right weather conditions turns these regions into pathogenic generators. Needless to say, economic resources must be dedicated to raising the standard of living in the countries of the area, while birth-control plans need reinforcing. The vast deforestation in such regions must be limited, allowing the ecosystem to recover from the harm done over the last decades. Also, the current disregard of protective means for sexual intercourse, along with sex tourism, is plainly calling for disaster. And lastly, nowadays climate change allows certain microbial species to grow in areas where they did not, slowly extending their range of action from the southern to the northern hemisphere. Whereas the tropical climate cannot be possibly changed, it is up to us to make it more difficult for harmful microbes to reach the human species. This is not justifiable environmentalism at all; it simply is the logical outcome of the texts discussed. The biohazard writer sees it imperative.

- **A general consensus must be attained**

This should imply a comprehensive commitment by as many citizens as possible. It is not enough that elite scientists set up the guidelines for the abovementioned behavioural change, but many other professions must be included. The studied writers mention scholars, researchers, physicians, policemen, private investigators, journalists, politicians, the military, and even high-school students. Everyone may have a contribution to make and no idea should be discarded however odd it may seem. When a biological menace evolves, it may take a most unexpected shift. This has been sufficiently proved so far. It must be kept in mind that the line

between biohero and bioterrorist, aide and crook has proved to be extremely thin. In the turn of a fortuitous contingency, anyone can play any of the characters above. A generalised knowledge of the different biological threats the human race is exposed to seems most compulsory. The biohazard message should be spread not to alarm, but to prevent. In this matter, many epidemiologists have pointed out that ignorance is humankind's worst enemy.

- **Better preparedness before a biological threat seems compulsory**

In general, these writers concur that we have to learn from past biological events to anticipate future ones. A universal occurrence of this kind deserves much better knowledge, for this is the key to proper action. To overcome generalised ignorance, we have to do whatever is in our hands to make the biohazard reality universally known. In this respect, this kind of narrative proves essential due to the high degree of penetration in the market. Even though the facts may be a little distorted to suit the writer's interest, the eventual goal of shaking the numb western mind is achieved. As it seems, fictional characters like Professors Haraldsen or Levine are necessary to remind us of historical events that are systematically ignored or pretended not to be known. Thus, a lesson in epidemiology is learnt while enjoying the pleasure of reading. In the process, the readership is being prepared for forthcoming biohazard situations.

Meeting Lederberg

As long as the reader can reach solid assumptions from a biothriller, it is obvious that this kind of narrative fulfills Lederberg's postulate. It also seems evident that it abides perfectly by the standards of the *Entertainment-Education Strategy* since the eventual product has a high degree of acceptance and the biohazard message is taken as far as possible. This does not mean that all the books are equally educational, but in general they all have something to contribute. Some may bestow data on pathogens re-emerging in poor regions of the planet and reaching the first world through the air link. Others, on the other hand, may envision a fanatic using a biological agent to achieve his/her plans of revenge. Yet others may include an

experiment with microbes going wrong and spreading to the human race at large. To a great extent, they all entrust the biohazard message with the power to change our minds, a cathartic response to a threat that is only fiction now, but could become a reality before long.

The words of these writers should not be taken in vain. There is a lesson to be learnt from every book, and biohazard narrative is no exception. These sixteen propositions, radical though they may seem, have the conclusive strength of history backing them. Similar incidents have already happened, and can take place any time now or in the near future. As Gould pointed out, our time was, is and will be the “age of bacteria.” The western individual has been fooled for centuries into a belief in supremacy which subsequently minimised the power of microbes. Christian thought has purposely maintained the idea that humans were made in God's image and likeness and that all the other species were inferior by comparison. Science has proved this notion to be incorrect. The biohazard novel brings this fact to mind and conveys a clear message of change that must be heeded. The cyclic patterns of history suggest that new pandemics, bioterrorist acts and biological accidents are bound to happen. It seems only logical that the message is understood and the necessary steps are taken to lessen the danger.

APPENDIX 1: A BRIEF SUMMARY OF THE BOOKS

The Andromeda Strain

(Michael Crichton, 1969)

A deadly microscopic agent is brought to the Earth by a satellite. The whole population of a small village in the Arizona desert is wiped out, except for a drunken old man and a newborn. Wildfire, a team of scientists for biohazard emergencies, is called in. They analyse the agent in a biological bunker in Flatrock, Nevada, trying to discover its apparent innocuousness in the two survivors. Meanwhile, the alien microbe threatens to spread and annihilate the US and, ultimately, the entire world. Because of contamination, the research facility is about to be destroyed with a nuclear blast, which would cause uncountable mutations of the alien pathogen. Yet, the dexterity of one of the team members avoids the catastrophe. All of a sudden, the agent turns benign and humankind is safe again.

List of characters

- Jeremy Stone: Chairman of Stanford's university bacteriology department and ideologist of the Wildfire Team.
- Peter Leavitt: A microbiologist and authority in parasitism.
- Charles Burton: Pathologist, professor at Baylor University and consultant to the NASA.
- Mark Hall: Surgeon and Odd Man of the Wildfire Team.
- Crying baby: Survivor.
- Peter Jackson: Survivor.
- Officer Martin Willis: Highway patrol officer and eventual victim.
- Dr. Alan Benedict: General physician in Piedmont and victim.
- Crane: Army private and victim.
- Shawn: Army driver and victim.

Time Of The Fourth Horseman

(Chelsea Queen Yarbro, 1976)

A number of citizens in Sacramento begin to come down with deadly diseases supposedly eradicated. The investigations of Dr. Natalie Lebbreau, who has lost her son to diphtheria, uncover a sinister government plan to control population, which happens to be supervised by Nat's husband. It basically consists of providing ineffective vaccines to the community and letting Mother Nature do the selection. Many doctors and Nat herself are dismissed from their hospitals because they refuse to collaborate. They organise in an abandoned house and establish an alternative hospital where they take care of the victims. Finally, as a tremendous epidemic rages through the city, an emissary of the alternative organisation who is already sick with polio achieves a meeting with the commanding cabinet. The novel ends with the assumption that the authorities will reconsider the plan.

List of characters

- Natalie Lebbreau: A paediatrician in the Westbank hospital who discovers the conspiracy.
- Harry Smith: A physician who treats Nat's son and joins the cause.
- Mark Howland: Nat's husband, Chief Pathologist of the Westbank and conspirator.
- Philip Howland: Mark and Nat's son and a victim of diphtheria.
- Peter Justin: Epidemiologist of the Westbank who is aware of the conspiracy and later supports the rebel doctors.
- Carol Mendosa: Rebel doctor (general medicine).
- Dave Lillijanthal: Anaesthesiologist and rebel doctor.
- Radick Lescu: Psychiatrist and rebel doctor.
- Lisa Skye: Rebel doctor (general medicine).
- Eric Patman: Immunologist who commits suicide.
- Ernest Dagstern: Chiropractor and rebel doctor.
- Stan Kooznetz: Rebel doctor (general medicine).
- Amanda Divanello: Paediatrician and rebel doctor.

- Ted Lincoln: Ambulance driver.
- Jim Braemore: Chief administrator of the Westbank and conspirator.
- Alan Mathew Reimer: Initial victim.

The Scorpion's Advance

(Ken McClure, 1986)

When Martin Klein, an Israeli medical student at the St. Thomas hospital in Surrey, England, dies unexpectedly of an unknown disease, bacteriologist Neil Anderson is asked by the hospital authorities to discover the cause of death. When another lethal case arises, Anderson travels to Tel-Aviv where he meets Dr. Jacob Strauss, a specialist who had done research on the same plasmid –PZ9– which has apparently killed the victims. There he continues his investigations with the help of Strauss' team and a young captain, Mirit Zimmerman, with whom he falls in love. As he visits Klein's relatives and more people who perform tests on PZ9 die, he is about to be killed on several occasions. When the CIA and the Mossad enter the scene, he discovers that one of Strauss' collaborators, Sam Freedman, is a white-collar biologist who was extradited to Israel as punishment for his germ warfare experiments. Finally, Anderson and Mirit secretly enter the laboratory where Freedman does his evil research, the mad scientist is arrested and the malignant plasmid is destroyed for the sake of humankind.

List of characters

- Dr. Neil Anderson: Bacteriologist who investigates the strange death of a medical student.
- Martin Klein: Israeli medical student who dies in convulsions.
- Mirit Zimmerman: Captain of the Israeli Army who helps Anderson with his investigations and becomes his lover.
- Professor Jacob Strauss: Israeli researcher and mentor of Klein who welcomes Anderson in Israel.
- Dr. Sam Freedman: Researcher in the Kalman Institute and developer of the lethal pathogen.
- Myra Freedman: Sam's wife.
- Dr. Arie Cohen: Strauss's assistant and victim.
- Ray Allan: Chief Animal Technician in St. Thomas' hospital and victim.
- Dexter: CIA agent.

- Hiram: CIA agent.
- Shula Ron: Klein's girlfriend who is murdered.
- Arab: Freedman's crook.

Outbreak
(Robin Cook, 1987)

Dr. Marissa Blumenthal, an Epidemiology Intelligence Service officer, investigates several Ebola outbreaks in different US locations. There seems to be no apparent connection but the medical centres from which the disease spreads happen to be funded by private sources. The situation gets more complicated when she finds herself being chased and almost killed by some unknown individuals. The research leads her to the Physicians' Action Congress, a lobby with strong influences, which aims at national unity against hospitals of foreign origin. A former colleague, who feigns to be helping her, is eventually revealed as the connection with the criminals. In the end, the conspiracy is unmasked and Dr. Blumenthal becomes an "international epidemiological hero" (*Outbreak*: 340).

List of characters

- Marissa Blumenthal: EIS officer investigating strange outbreaks of Ebola in private clinics across the US.
- Dr. Cyrill Dubcheck: Marissa's superior and leader of the operation.
- Tad Schockley: Lab technician in the CDC.
- Ralph Hempston: Successful ophthalmologist and member of the Physicians' Action Congress.
- Dr. Joshua Jackson: Member of the Physicians' Action Congress.
- Dr. Arnold Herberling: Member of the Physicians' Action Congress.
- Dr. Jack Krause: Member of the Physicians' Action Congress.
- Dr. Sinclair Tieman: Member of the Physicians' Action Congress.
- Paul: Crook for the Physicians' Action Congress.
- Alphonse Hicktman "Al": Crook for the Physicians' Action Congress.
- George Valhala "The Toad": Crook for the Physicians' Action Congress.
- Jake: Crook for the Physicians' Action Congress.
- John Nordyke: a Yale biology student and victim of Ebola.
- Dr. Rudolph Richter: Ophthalmologist and victim of Ebola.
- Helen Townsend: Richter's secretary, mistress and victim of Ebola.

- Alan: Lab technician and victim of Ebola.
- Dr. Carl M. Zabriski: Ophthalmologist and victim of Ebola.

Doomsday Book
(Connie Willis, 1992)

In the year 2055, Kivrin Engle, a history student, is sent back in time to a village near Oxford to study English social customs in 1320. However, an erroneous calculation sends her to 1348, just as the lethal Black Death reaches England. She is received by a distrustful Norman family whose householder is in trouble with the English monarch and has to prove her good will constantly. As plague enters the house, she is accused of being the source of distress, which she tries to refute by helping a priest attending the sick members of the family. One by one they die and she tries to save the clergyman's life by travelling to Scotland with him but, eventually, he also succumbs to the plague. Meanwhile, in the future world, an epidemic has broken out that calls for quarantine and substantially delays the rescue operation. Even though Kivrin had been previously vaccinated against the major diseases in the 1300s, she may not find the rendezvous location and remain trapped in that threatening era. Once the epidemic recedes, another expedition travels back in time, and saves her from certain death.

List of characters

- Kivrin Engle: A history student from the twenty-first century who travels back in time to study the social customs of the fourteenth century.
- Mr. Dunworthy: A professor at Balliol who unofficially tutors Kivrin.
- Badri Chaudhuri: The lab technician who mistakenly sends Kivrin to the winter of 1348.
- Gilchrist: Acting Head of the History Faculty who ultimately endorses Kivrin's research project.
- Father Roche: Skendgate's priest with whom Kivrin establishes a good relation.
- Lady Imeyne: Lord Guilleume's wife and mistress of the manor house in his absence.
- Rosemund: Elder daughter of Lady Imeyne and Lord Guilleume.
- Agnes: Younger daughter of Lady Imeyne and Lord Guilleume.

The Hot Zone
(Richard Preston, 1994)

This book narrates an outbreak of Ebola in a monkey quarantine facility in Reston, Virginia, in 1989. It is an in-depth account of the people involved in an uncommon situation, which set in motion the USAMRIID –a biowarfare division of the US army. The writer novelises the actions of these people, focusing on the deeds of Jerry and Nancy Jaax, both members of the aforementioned division. After the first logical turmoil, the facility is sterilised and all the monkeys killed with no human casualties. This biological tale provides the writer with the excuse to review other past filovirus outbreaks, and speculate over the possibility of the future emergence of tropical pathogens in western societies.

List of characters

- Colonel Gerald “Jerry” Jaax: Leader of the SWAT team that nukes the monkey house during the Reston biohazard operation.
- Lieutenant Colonel Nancy Jaax: Chief of pathology at USAMRIID during the Reston biohazard operation and Jerry’s wife.
- Eugene “Gene” Johnson: Civilian virus hunter, specialised in Ebola, who works for the Army.
- Peter Jahrling: Codiscoverer of the Reston strain of Ebola.
- Tom Geisbergt: Codiscoverer of the Reston strain of Ebola.
- Colonel Clarence James “C.J.” Peters, MD: Chief of the disease-assessment division at USAMRIID and overall leader of the operation.
- Major General Philip K. Russell, MD: The general who dispatches the military teams to Reston.
- Dr. Joseph B. McCormick: Chief of the Special Pathogens Branch of the CDC.
- Charles Monet: A French expatriate living in Kenya who dies of Marburg in January 1980 whose original name has been changed.
- Peter Cardinal: A Danish boy visiting his parents in Kenya who dies of Marburg in the summer of 1987 whose original name has been altered.

The Third Pandemic

(Pierre Ouellette, 1996)

Philip Paris, a Seattle Police Lieutenant who has lost his wife to *E. Coli* food poisoning, starts his own investigations to find the elusive killer. Meanwhile, the pessimistic predictions of Dr. Elaine Wilkes, an epidemiologist working for a private foundation financed by the gigantic Uni-Corporation, seem to come true: a pandemic caused by a lethal bacteria is spreading around the world. When Wilkes decides to inform the authorities, she starts being harassed. Paris helps her, thus discovering that a joint negotiator, a public health doctor called David Vincent Muldane, is also his wife's poisoner. At the same time, by taking advantage of the anarchy created by the pandemic, the Mafioso Barney Cox readies a plan to take control of a chaotic world. Although Paris fails to stop the capo, Cox eventually falls into the hands of an incompetent Muldane, who had failed to proceed correctly in Uni's virtual machine at the beginning of the story. Simultaneously, Paris and Wilkes begin a new life together as the pandemic recedes.

List of characters

- Philip Paris: Seattle Police Lieutenant who is ordered to arrest a fleeing investigator and eventually helps her.
- Elaine Wilkes: A researcher for Uni's Corporation who tries to hand in a disk with an oncoming pandemic simulation to the Health authorities.
- David Vincent Muldane: A Public Health worker of Seattle King County who takes the disk to the WHO, yet also performs acts of bioterrorism with the spreading pathogen.
- Bennet Rifkin: Powerful manager of the Webster Foundation, part of Uni's Corporation, who is after Elaine's disk.
- Robert Fancher: Attorney for the Corporation in Seattle.
- Barney Cox: Jailed Mafioso who is contacted by Fancher to retrieve the disk and eventually becomes the ruler of an anarchic Seattle.
- Peter Rancovich: Foundation's computer technician and bearer of the *Streptobacillus moniliformis*.

- Maria Santoz: Prostitute who shares the *Treponema pallidum* (Syphilis) with Rancovich's pathogen.
- Martin N'Dong: burier of victims in São Tomé.
- Oscar Silva: owner of the Paradiso Club.
- Steve Henry: Businessman who takes the resistant pathogen to the US.

Mount Dragon

(Douglas Preston and Lincoln Child, 1996)

Scientist Guy Carson is transferred to Mount Dragon, an elite laboratory belonging to Gene-Dyne, a biotechnology company indirectly financed by the US government, to solve the X-FLU gene mystery. This is a gene which could render the flu virus completely harmless to humankind. However, it has a side effect which, for some unknown reason, has turned the modified virus into a lethal pathogen. Along with Carson's predecessor, two other workers accidentally become infected and die. By the time Carson decides to withdraw from the project, his life is already in danger, since Brent Scopes, the evil leader behind GeneDyne, wants to negotiate with the army for the sale of what could be a magnificent bioweapon. Dr. Charles Levine, a former Carson's professor, tries to convince Scopes but both become infected with the new virus. Finally, Scopes' offer to the army is revoked and the world is safe.

List of characters

- Guy Carson: a PhD from MIT who is transferred to Mount Dragon to continue Burt's work.
- Susana Cabeza de Vaca: Guy's lab assistant.
- Charles Levine: Professor of theoretical genetics, spokesman of the Foundation for Genetic Policy, former professor of Guy and declared enemy of Scopes.
- Brentwood Scopes: founder of GeneDyne, the corporation which owns Mount Dragon.
- Franklin Burt: Molecular biologist who discovers PurBlood in his search for an antidote to X-FLU and becomes the index case.
- Andrew Vanderwagon: Researcher in Mount Dragon and victim.
- Rosalind Brandon-Smith: Lab assistant in Mount Dragon and victim.
- Roger Czerny: guard who is held in quarantine with Rosalind Brandon-Smith.
- Nye: Security Director of Mount Dragon.
- Mike Marr: Deputy Security Director.
- Spencer Fairley: Scope's secretary.

The Plague Tales

(Ann Benson, 1997)

In the year 2005, scientific researcher Janie Crowe travels to Britain to perform some groundwork that would lead to her certification for forensic archaeology. Unfortunately, the soil she digs contains the Black Death bacterium, which has been lying dormant for seven centuries. A laboratory accident puts *Palmerella Coli* –a common enterobacteria– in contact with the *Yersinia Pestis* – Black Death, thus giving birth to a new microbial monster in a world where antibiotics have become redundant. However, only two people are infected: the director of the Institute, who dies of a fatal sedative dose, and Janie’s assistant. Finally, Janie and her British colleague Bruce, take Caroline to the excavation site where a mysterious man keeps an old book enclosing the only way to cure the young woman.

This book was, in fact, the journal of a fourteenth-century physician and had been kept by different generations until the time has come to use it. The physician was Alejandro Canches, a Spanish Jew who had to flee his country and reached Avignon by the time the Black Death was spreading over Europe. There he was appointed to save the English royal family from dying of the plague. Once in England and having achieved his original purpose, he has to escape again to avoid being burnt. However, the experience is not in vain, for he comes into contact with a witch who teaches him the secrets that will be written in his journal. This book will later save the twenty-first century world from having to undergo the Black Death again.

List of characters

- Janie Crowe: forensic archaeology researcher who accidentally unleashes a dormant *Yersinia Pestis* in an ultra-clean twenty-first century England.
- Caroline Porter: Janie’s assistant.
- Bruce Ransom: Assistant Director of the Microbiology Department of the British Institute of Science.
- Ted Cummins: Director of the main laboratory of the Microbiology Department of the British Institute of Science.

- Michael Rosow: Lieutenant of the London Branch of the International Biological Police.
- Alejandro Canches: A fourteenth-century Spanish Jewish physician who owns a journal with an effective treatment for the Black Death.
- Sarah: witch in the fourteenth century who discovers an effective treatment for the Black Death.
- Robert Sarin: A mentally retarded man who guards Alejandro's book in 2005.

The X-Files: Antibodies

(Kevin J. Anderson, 1997)

A disease-ravaged body is found in the smouldering ruins of the DyMar genetic research lab. FBI agents Fox Mulder and Dana Scully follow the trace of Jeremy Dorman, survivor and primary suspect, all along State Highway 22 as it crosses Oregon. Another body is found inside a truck and in the cabin of Dorman's associate. Meanwhile, the Syndicate's men in black are on the move to neutralise the fugitive. Dorman is after the correct prototypes of some nanomachines developed to save Jody Kennessy, the son of his associate, from leukaemia. However, the working prototypes are inside the Kennessy's dog, a black Labrador. In the final confrontation back in the DyMar ruins, Dorman turns into a giant monster relentlessly crushing the deceitful men in black. Only the dog can defeat him. In the end, Jody is saved and the world remains ignorant of the scientific breakthrough in another X-file episode.

List of characters

- Fox Mulder: FBI agent.
- Dana Scully: FBI agent.
- Jeremy Dorman: Fugitive genetic researcher with unstable prototypes of the nanomachines.
- Patrice Kennessy: Wife of Dorman's associate and eventual victim.
- Jody Kennessy: Patrice's son who is sick with leukaemia and eventually saved by the stable prototypes.
- Vader: Kennessy's dog and carrier of the stable prototypes.
- Vernon Ruckman: Dymar guard and victim.
- Wayne Hykaway: Truck driver and victim.
- Men in black: The Syndicate's deployment force.
- Adam Lentz: Leader of the men in black.
- "Cigarette-Smoking Man": Conspirator involved in the Syndicate.

Unnatural Exposure
(Patricia Cornwell, 1997)

When the dismembered corpse of an elderly woman appears, there is evidence that she was already seriously ill with a viral disease that caused her death. By the time another body is found, it appears that a serial killer is using genetically-modified smallpox. Dr. Kay Scarpetta, Richmond's Chief Medical Examiner, tries to find the connection between the bodies. After some investigations and one more victim, Kay's assistant, the murderer is found to be Dr. Phyllis Crowder, a British microbiologist working for the Medical College of Virginia, where Kay had done her residency. Eventually, Dr. Crowder admits her crimes and dies a few days later of the modified smallpox.

List of characters

- Dr. Kay Scarpetta: Richmond's Chief Medical Examiner who investigates a couple of smallpox deaths.
- Wingo: Kay's lab assistant and victim.
- Pete Marino: Commander of Richmond's city police department's homicide squad.
- Lucy Farinelly: Kay's niece and FBI agent for the Hostage Rescue Team.
- Benton Wesley: FBI agent and Kay's occasional love affair.
- Dr. Phyllis Crowder: Microbiologist in the Medical College of Virginia and bioterrorist.
- Lila Pruitt: Victim of engineered smallpox.

The Cobra Event
(Richard Preston, 1997)

Dr. Alice Austen, an EIS officer, travels to New York to study the strange deaths of a young girl and a homeless man by a previously unknown virus. As more cases appear, the bioheroine realises that the biological agent could have been genetically manipulated to become more effective. It all seems to be the work of a maniac who has been testing a biological weapon on some citizens to prepare a final blow designed to kill thousands. In a desperate race against time, Austen, helped by the FBI and the NY police, searches the city to avoid a major catastrophe. Eventually, the madman is neutralised and his plan largely aborted with minor casualties.

List of characters

- Alice Austen: EIS officer who is sent to New York to investigate the unusual deaths of a young girl and a homeless man.
- Dr. Lex Nathanson: Chief Medical Examiner of New York.
- Glenn Dudley: Nathanson's deputy.
- Ben Kly: Morgue attendant.
- Frank Masaccio: Assistant director of the FBI and head of the New York field office.
- Mark Littleberry: A retired medical doctor in the United States Navy with experience in biowarfare
- Will Hopkins: Leader of Reachdeep, a special operations unit of the FBI to deal with biological events.
- Tom Cope: Molecular biologist who wants to redress overpopulation through a pandemic with an engineered pathogen named "Cobra."
- Kate Moran: A young girl who dies of Cobra.
- Harmonica Man: A homeless man who dies of Cobra.
- Lem: Another homeless friend of Harmonica Man who also becomes a victim.
- Penny Zecker: A woman who trades in the market and a victim of Cobra.

- Peter Talides: Kate's art teacher and victim of Cobra.
- Hector Ramirez: A young boy who dies of Cobra.

The Eleventh Plague

(John S. Marr and John Baldwin, 1998)

After a young boy dies of a strange disease in San Diego, New York virologist Dr. Jack Bryne is called to determine the cause of death. As he arrives in California, another young girl dies of the same disease, which is later identified as anthrax. In the following months, there are more victims of similar exotic infections, such as botulism or Rift Valley Fever, in other American states. Dr. Bryne's investigations aim at an unknown serial killer who is trying to re-enact the ten biblical plagues. However, the FBI suspects that Bryne himself is the killer and he is obliged to find the madman, both to avoid more victims and to prove his innocence. The criminal appears to be Theodore "Ted" Kameron, a sexually-distressed doctor specialised in organic toxins, who has been repudiated by his former Christian sponsors. In return for their bigotry, Dr. Kameron punishes them with the biblical plagues and readies a final blow in his hidden lab in Manhattan. Yet, Jack Bryne finds him soon enough to avoid the Tenth plague ravaging the city of New York.

List of characters

- Dr. Jack Bryne: A noted virologist who investigates a series of strange deaths from infectious diseases which appear to be connected.
- Drew Lawrence: Bryne's lab assistant and victim of Rift Valley Fever.
- Victoria Wade: TV reporter.
- Dr. Mia Hart: Bryne's wife and reputed epidemiologist who eventually becomes a victim of Rift Valley Fever.
- Scott Hubbard: FBI agent who suspects Bryne but ultimately helps him crack the Biblical puzzle.
- Shmuel Berger: gifted student who helps Bryne with his knowledge of the Torah.
- Theodore Kameron: Deranged former CDC researcher who plans to re-enact the Ten Plagues of Egypt with biological agents.
- Joey St. John: Son of a former supporter of Kameron who dies of anthrax.
- Jody Davis: A girl who dies of anthrax.

- Pastor Thomas Matthew Ogilvie: Victim of ergotism.
- Mother Superior: Victim of ergotism.
- Ed Rivers: Lawyer and a victim of neurocystercicosis.
- Richard Rubin: Jew victim of neurocystercicosis.
- Edna Rubin: Jew victim of neurocystercicosis.
- Dan Hammer: Lutheran attorney and a victim of neurocystercicosis.
- Reverend Cato Phipps: Victim of phytotoxin.
- Neil Edison: Phipps parishioner and a victim of ergotism.

The First Horseman

(John Case, 1998)

Reporter Frank Daly joins an expedition to Longyearbyen in Norway to recover the corpses of some miners who fell victim of the Spanish Flu pandemic in 1918. Although he does not know it, the CIA has also infiltrated some secret agents into the expedition seeking to uncover a mysterious connection to the recent disappearance of a North Korean town. However, by the time they reach the graveyard, the bodies are gone. Daly traces his investigations towards an ecological sect, the Temple of Light, ruled by the guru Luc Solange. These cultists, helped by the North-Korean government, aim to re-establish the natural order by producing a new flu pandemic, which would considerably reduce the number of “the human parasite.” Fortunately, Daly and his helpers unmask the criminals just in time to prevent the global massacre.

List of characters

- Frank Daly: A journalist of the *Washington Post* who uncovers the joint Temple of Light-North Korean conspiracy.
- Annie Adair: A microbiologist of the Kopervik expedition who helps Frank in his investigation.
- Neal Gleason: A FBI agent with liaison responsibilities to the CIA who investigates the Tasi-Ko incident.
- Ben Stern: A graduate student writing a thesis on new religions.
- Luc Solange: Leader of the Temple of Light, who wants to redress overpopulation by initiating a Spanish Flu pandemic.
- Susannah Demjanuk: A member of the sect’s Operations Team.
- Thomas Reckmeyer: Another member of the Operations Team.
- Belinda Barron: Deputy chief of the Temple’s Special Projects unit.
- Vaughn Abelard: A young physician and a member of the Operations Team.
- Etienne “The Frenchman Moussin”: A member of the sect’s Operations Team.
- Saul: Director of the Temple’s Office of Special Affairs.
- Antonio: A deputy of the sect in charge of research.

- Veroushka: Solange's mistress and Head of recruitment in the sect.
- Andrew: An engineering student who adds chemicals to a boiler feed pump in return for the sect paying his studies.
- Gene Oberdorfer: A retired pilot in Daytona Beach and member of the sect who performs a trial test with his Cessna.
- The Bergmans: Parents of a defector from the sect who are tortured and killed in the prologue.

Plague Of Angels
(Alan Blackwood, 1999)

A lethal robbery takes place in a large Fifth Avenue store and its security director, ex-cop Conor O’Neil, is charged with the crime. To clear his name, he travels to a Norwegian settlement where some victims of the Spanish Flu are buried in the permafrost. There, he discovers that Dennis Branch, the leader of a religious sect called the Global Message Movement, wants to obtain the deadly virus to re-enact the catastrophe. The sect intends to clear the world of infidels and submit all other religions. However, Branch’s twin sister, the disfigured brain behind the leader’s evil deeds, is the first to die of the new disease. The extremist leader manages to release the pathogen in the United Nations building but Conor discovers him and there is a final confrontation. To prove his strong convictions, Branch jumps from the roof and dies. Finally, Conor is granted a notarised affidavit that demonstrates his innocence.

List of characters

- Conor O’Neil: Chief Security Officer of a Fifth Avenue store and former captain of New York’s police who has to clean his reputation after a grand robbery.
- Lacey: Conor’s girlfriend.
- Sebastian: Lacey’s friend who provides a safe apartment.
- Ric: Sebastian’s couple.
- Eleanor Bronsky: Theatrical agent who contacts Sydney.
- Sydney Randall: Former stage hypnotist who introduces Conor into the technique.
- Davina Gambitt: Millionaire who has lost money in the robbery and supports Conor’s cause.
- Michael Baer: Conor’s lawyer.
- Luigi Guttuso: Mafia Capo who owes a favour to Conor.
- Professor Jorn Haraldsen: Epidemiologist who enlightens Conor about the 1918 Spanish Flu pandemic.
- Magda Slanic “Hetti”: former stage hypnotist who participates in the robbery

and then supports Conor.

- Ramon Perez “Hypnos”: former stage hypnotist who participates in the robbery.
- Dennis Evelyn Branch: Founder and leader of Global Message Movement, a sect aspiring to agglutinate all unbelievers in search of the only true God.
- Evelyn Branch: Twin sister of Dennis and mastermind behind the re-enactment of the Spanish Flu.
- Victor Labrea: International investment banker and right hand of Branch.
- Lieutenant Drew Slyman: Suspected of being one of the three leaders of the “49th Street Golf Club,” an illegal police force busted by Conor.
- Darrell Bussman: Store’s Operation Manager.
- Salvatore Morales: Conor’s deputy.
- Gary Motson “Angel Gabriel”: Crook for the Global Message Movement.
- Yapko: Crook for the Global Message Movement.
- Jed: Crook for the Global Message Movement.

Burning Road
(Ann Benson, 1999)

This novel is a sequel to *The Plague Tales*. In 2007, Dr. Janie Crowe is back in the States working for the New Alchemy Foundation as a research assistant. The association receives a call for help from the Jameson Memorial Hospital for a young boy who has suffered a strange shattering of the vertebrae. The case is assigned to Janie but, strangely enough, as she discovers thirty other incidents concerning Jewish boys, her immediate superior alleges budget restrictions to put aside the affair. Moreover, Janie starts being harassed –her house is broken into and eventually burnt– and a close connection dies strangely. Nevertheless, a mysterious girl called Kristina, who works for an agency of concerned citizens against genetic manipulation, offers Janie her assistance. Together, they devise a solution for the boys by extracting a sample gene from one of Alejandro’s hairs found in the journal and substituting the defective gene. The procedure appears to be equally good enough to put an end to a new plague of antibiotic-resistant bacteria which is threatening the future world. In the end, her head’s father and Malin himself emerge as the authors of the genetic accident.

In the other plot, set in 1358, physician Alejandro Canches, who is established with Kate –the illegitimate daughter of king Edward Plantagenet– in the north of France, meets rebel leader Guillaume Karle. After healing him of the serious injuries Karle suffered in his last encounter with Charles of Navarre, the dissenter leads Alejandro and Kate to Paris, where the former seeks answers to some unknown Hebrew instructions in his journal. There he is taken prisoner by Guy DeChauliac, a former physician to Pope Clement, who advised him on Alejandro being sent to England to protect the royal family against the Black Death. To escape from his confinement, Alejandro feigns a love affair with Elizabeth, countess of Ulster, and is helped again by Karle, who gathers a rogue army to fight Charles of Navarre. However, he is betrayed and killed, but not before having left Kate pregnant. Eventually, after a hasty return to Paris, Alejandro goes back to Avignon where he meets his Spanish family, Kate remains in Paris where she serves in Elizabeth’s house, and her son is raised in Avignon by her Jewish foster family.

List of characters

- Janie Crowe: Research associate for the New Alchemy Foundation.
- Caroline Porter: Janie's assistant.
- Michael Rosow: Former biocop and Caroline's husband.
- Bruce Ransom: Janie's love affair in Britain.
- Tom Macalester: Attorney dealing with Janie's legal matters and forthcoming consort.
- Kristina Warger: Tom's daughter and Janie's expert in genetics.
- Myra Ross: Curator of the National Hebrew Book Depository.
- Chet Malin: Janie's supervisor in the New Alchemy Foundation and eventual hinderer of her investigations.

APPENDIX 2: FACTSHEETS

What follows is a summary of relevant information about the different diseases that have been studied in this thesis. Being no expert, I have basically summarised the data from the given sources for the sake of clarity. It is not a comprehensive catalogue; only the necessary for a correct following of the work is provided. More material can be easily found at the WHO and CDC webpages, doing some online research or browsing *Fields Virology*. For obvious reasons, nothing could be found about non-existent agents other than the data supplied by the writer's imagination.

Anthrax

Anthrax is primarily a disease of herbivorous mammals, although other mammals and some birds can contract it. Humans generally acquire the disease directly or indirectly from infected animals, or occupational exposure to infected or contaminated animal products. There are no documented cases of person-to-person transmission. The causative agent is *Bacillus anthracis*, the spores of which can survive in the environment for years or decades, awaiting uptake by the next host. The disease still exists in animals and humans in most countries of sub-Saharan Africa and Asia, in several southern European countries, in the Americas, and certain areas of Australia. Disease outbreaks in animals also occur sporadically in other countries.

There are three types of anthrax in humans: cutaneous anthrax, acquired when a spore enters the skin through a cut or an abrasion; gastrointestinal tract anthrax, contracted from eating contaminated food, primarily meat from an animal that died of the disease; and pulmonary anthrax from breathing in airborne anthrax spores. The cutaneous form accounts for 95% or more of human cases globally. All three types are potentially fatal if not treated promptly.

Source: WHO 2001, CDC 2008a.

Diphtheria

Diphtheria is an infectious disease spread from person to person by inhaling respiratory droplets from the throat expelled through coughing and sneezing. The disease normally breaks out two to five days after infection. Diphtheria usually affects the tonsils, pharynx, larynx and occasionally the skin. Symptoms range from a moderately sore throat to toxic life-threatening diphtheria of the larynx or of the lower and upper respiratory tracts. Diphtheria is often complicated by diphtheric myocarditis (toxic damage to the heart muscles) and neuritis (toxic damage to peripheral nerves). The disease can be fatal –between 5% and 10% of diphtheria patients die, even if properly treated. Untreated, the disease claims even more lives.

Untreated patients are infectious for two to three weeks. Treatment consists of immediate administration of diphtheria antitoxin and antibiotics. Antibiotic treatment usually renders patients non-infectious within twenty-four hours. Unless immunised, children and adults may repeatedly be infected with the disease. The most effective method of control is mass immunisation of the entire population. Those individuals who are in close contact with a sick person should be identified and treated immediately with antibiotics. The disease should be diagnosed early and immediate treatment and hospitalisation should be followed in order to prevent complications and death.

Source: WHO 2000.

Ebola Haemorrhagic Fever

Ebola virus, of the Filoviridae family, is comprised of four distinct subtypes: Zaire, Sudan, Côte d'Ivoire and Reston. Three subtypes, occurring in the Democratic Republic of the Congo (formerly Zaire), Sudan and Côte d'Ivoire, can cause illness in humans. Ebola haemorrhagic fever (EHF) is a febrile haemorrhagic illness which causes death in 50-90% of all clinically ill cases. Human infection with the Ebola Reston subtype has only caused asymptomatic illness, meaning that those who contract the disease do not experience clinical illness. The natural reservoir of the Ebola virus seems to reside in the rain forests of the African continent and areas of the Western Pacific.

The Ebola virus is transmitted by direct contact with the blood, secretions, organs or other bodily fluids of infected persons. The infection of human cases with the Ebola virus has been documented through the handling of infected cynomolgus monkeys, chimpanzees, gorillas, and forest antelopes as in Côte d'Ivoire, the Republic of Congo and Gabon. Health care workers have frequently been infected while treating Ebola patients, through close contact without the use of correct infection control precautions and adequate barrier nursing procedures. The incubation period ranges from two to twenty-one days. The symptoms are often characterised by the sudden onset of fever, intense weakness, muscle pain, headache and sore throat. This is often followed by vomiting, diarrhoea, rash, impaired kidney and liver function, and in some cases, both internal and external bleeding.

Severe cases require intensive supportive care, as patients are frequently dehydrated and in need of intravenous fluids or oral rehydration with solutions containing electrolytes. No specific treatment or vaccine is yet available for Ebola haemorrhagic fever. Several vaccine candidates are being tested but it could be several years before any are available. A new drug therapy has shown early promise in laboratory studies and is currently being evaluated further. However, this too will take several years. Experimental studies involving the use of hyper-immune sera on animals have demonstrated no protection against the disease.

Source: WHO 2008b.

Influenza

Influenza is caused by a virus that mainly attacks the upper respiratory tract. The currently circulating influenza viruses that cause human disease are divided into two groups: A and B. Influenza A has two subtypes which are important for humans: A (H3N2) and A (H1N1), of which the former is currently associated with most deaths. The infection usually lasts for about a week. It is characterised by a sudden onset of high fever, myalgia, headache and severe malaise, non-productive cough, sore throat, and rhinitis. Most people recover within one to two weeks without requiring any medical treatment. In the very young, the elderly and people suffering from medical conditions such as lung diseases, diabetes, cancer, kidney or heart problems, influenza poses a serious risk. In these people, the infection may lead to severe complications with underlying diseases, pneumonia and death.

The virus is easily passed from person to person through the air by droplets and small particles excreted when infected individuals cough or sneeze. The influenza virus enters the body through the nose or throat. It then takes between one and four days for the person to develop symptoms. Someone suffering from influenza can be infectious from the day before they develop symptoms until seven days afterwards. The disease spreads very quickly amongst the population, especially in crowded circumstances. Cold and dry weather enables the virus to survive longer outside the body than in other conditions and, as a consequence, seasonal epidemics in temperate areas appear in winter. For most people influenza is an upper respiratory tract infection that lasts several days and requires symptomatic treatment only. Within days, the person's body will eliminate the virus. Respiratory illness caused by influenza is difficult to distinguish from illness caused by other respiratory pathogens on the basis of symptoms alone.

Source: WHO 2003.

Marburg

Marburg haemorrhagic fever is a viral haemorrhagic fever and a severe and highly fatal disease caused by a virus from the same family as the one that causes Ebola haemorrhagic fever. It was first identified in 1967 when outbreaks of hemorrhagic fever occurred simultaneously in laboratories in Marburg and Frankfurt in Germany and Belgrade in the ex-Yugoslavia from infected monkeys imported from Uganda. After an incubation period of five to ten days, the onset of the disease is sudden and is marked by fever, chills, headache, and myalgia. Around the fifth day after the onset of symptoms, a maculopapular rash, most prominent on the trunk (chest, back, stomach), may occur. Nausea, vomiting, chest pain, a sore throat, abdominal pain, and diarrhoea then may appear. Symptoms become increasingly severe and may include jaundice, inflammation of the pancreas, severe weight loss, delirium, shock, liver failure, massive haemorrhaging, and multi-organ dysfunction. Because many of the signs and symptoms of Marburg hemorrhagic fever are similar to those of other infectious diseases, such as malaria or typhoid fever, it can be difficult to diagnose.

The Marburg virus is transmitted by direct contact with the blood, body fluids and tissues of infected persons. Transmission of the Marburg virus also occurred by handling ill or dead infected wild animals (monkeys, fruit bats). Recovery from Marburg hemorrhagic fever may be prolonged and accompanied by orchitis, recurrent hepatitis, transverse myelitis or uvetis. The case-fatality rate for Marburg hemorrhagic fever is between 23-25%.

Source: WHO 2008c, CDC 2006a.

Plague

Plague is a zoonotic disease mainly circulating among small animals and their fleas. The bacteria *Yersinia pestis* can also infect humans. It is transmitted between animals and humans by the bite of infected fleas, direct contact, inhalation and rarely, ingestion of infective materials. Plague can be a very severe disease in people, with a case-fatality ratio of 30-60% if left untreated. Infected persons usually start with “flu-like” symptoms after an incubation period of three to seven days. Patients typically experience the sudden onset of fever, chills, head and body-aches and weakness, vomiting and nausea.

Clinical plague infection manifests itself in three forms depending on the route of infection: bubonic, septicaemic and pneumonic. The bubonic is the most common form of plague resulting from the bite of an infective flea. The plague bacillus enters the skin from the site of the bite and travels through the lymphatic system to the nearest lymph node. The lymph node then becomes inflamed because the plague bacteria, *Yersinia pestis*, will replicate here in high numbers. The swollen lymph node is called a "bubo" which is very painful and can become suppurated as an open sore in advanced stages of infection. The septicaemic form of plague occurs when infection spreads directly through the bloodstream without evidence of a "bubo." More commonly advanced stages of bubonic plague will result in the presence of *Yersinia pestis* in the blood. Septicaemic plague may result from flea bites and from direct contact with infective materials through cracks in the skin. The pneumonic form of plague is the most virulent and least common form of plague. Typically, the pneumonic form is due to a secondary spread from advanced infection of an initial bubonic form. Primary pneumonic plague results from inhalation of aerosolised infective droplets and can be transmitted from human to human without involvement of fleas or animals. Untreated pneumonic plague has a very high case-fatality ratio.

Source: WHO 2008d.

Psittacosis

Psittacosis is a disease caused by the bacterium *Chlamydia psittaci*. The clinical features in humans include fever, chills, headache, muscle aches, and a dry cough. Pneumonia is often evident on chest x-ray. The most common sequelae are endocarditis, hepatitis, and occasional neurologic complications. Severe pneumonia requiring intensive-care support may also occur. Fatal cases have been reported. Infection is acquired by inhaling dried secretions from infected birds. The incubation period is five to nineteen days. Although all birds are susceptible, pet birds (parrots, parakeets, macaws, and cockatiels) and poultry (turkeys and ducks) are most frequently involved in transmission to humans. Groups at higher risk are bird owners, pet shop employees, and veterinarians, but outbreaks of psittacosis in poultry processing plants have also been reported.

Annual incidence varies considerably because of periodic outbreaks. A decline in reported cases since 1988 may be the result of improved diagnostic tests that distinguish *Chlamydia psittaci* from the more common *Chlamydia pneumoniae* infection. Diagnosis of psittacosis can be difficult. Antibiotic treatment may prevent an antibody response, thus limiting diagnosis by serologic methods. Infected birds are often asymptomatic. Tracebacks of infected birds to distributors and breeders is not often possible because of limited regulation of the pet bird industry.

Source: CDC 2008e.

Poliomyelitis

Polio (poliomyelitis) is a highly infectious disease caused by a virus, which mainly affects children under five years of age. It invades the nervous system, and can cause total paralysis in a matter of hours. The virus enters the body through the mouth and multiplies in the intestine. Initial symptoms are fever, fatigue, headache, vomiting, stiffness in the neck and pain in the limbs. There is no cure for polio, it can only be prevented. The polio vaccine, given in multiple doses, can protect a child for life. One in two hundred infections leads to irreversible paralysis (usually in the legs). Among those paralysed, 5% to 10% die when their breathing muscles become immobilised.

Polio cases have decreased by over 99% since 1988, from an estimated 350,000 cases then, to 1997 reported cases in 2006. The reduction is the result of the global effort to eradicate the disease. In 2008, only four countries in the world remain polio-endemic, down from more than 125 in 1988. The remaining countries are Afghanistan, India, Nigeria and Pakistan. Persistent pockets of polio transmission in northern India, northern Nigeria and the border between Afghanistan and Pakistan are the current focus of the polio eradication initiative. As long as a single child remains infected, children in all countries are at risk of contracting polio. Between 2003 and 2005, 25 previously polio-free countries were re-infected due to imports of the virus. In most countries, the global effort has expanded capacities to tackle other infectious diseases by building effective surveillance and immunisation systems. Knowledge of the poliovirus has expanded with aggressive research carried out under the eradication effort. Success for the effort hinges on closing a substantial funding gap to finance the next steps of the global eradication initiative.

Source: WHO 2008e.

Rift Valley Fever

Rift Valley Fever (RVF) is a viral zoonosis that primarily affects animals but also has the capacity to infect humans. Infection can cause severe disease in both animals and humans, leading to high rates of disease and death. RVF virus is a member of the Phlebovirus genus, one of the five genera in the family Bunyaviridae. The virus was first identified in 1931 during an investigation into an epidemic among sheep on a farm in the Rift Valley of Kenya. Since then, outbreaks have been reported in sub-Saharan and North Africa. In 1997-98, a major outbreak occurred in Kenya, Somalia and Tanzania and in September 2000, RVF cases were confirmed in Saudi Arabia and Yemen, marking the first reported occurrence of the disease outside the African continent and raising concerns that it could extend to other parts of Asia and Europe.

The incubation period for RVF varies from two to six days. Those infected either experience no detectable symptoms or develop a mild form of the disease characterised by a feverish syndrome with sudden onset of flu-like fever, muscle pain, joint pain and headache. Some patients develop stiffness in the neck, sensitivity to light, loss of appetite and vomiting; in these patients the disease, in its early stages, may be mistaken for meningitis. The symptoms of RVF usually last from four to seven days, after which time the immune response becomes detectable with the appearance of antibodies and the virus gradually disappears from the blood. While most human cases are relatively mild, a small percentage of patients develop a much more severe form of the disease. This usually appears as one or more of three distinct syndromes: ocular (eye) disease (0.5-2% of patients), meningoencephalitis (less than 1%) or haemorrhagic fever (less than 1%). The total case fatality rate has varied widely between different epidemics but, overall, has been less than 1% in those documented. Most fatalities occur in patients who develop the haemorrhagic icterus form.

Source: WHO 2008f, CDC 2006b.

Smallpox

Smallpox is an acute contagious disease caused by the variola virus, a member of the orthopoxvirus family. Through the success of the global eradication campaign, smallpox was finally pushed back to the horn of Africa and then to a single last natural case, which occurred in Somalia in 1977. The global eradication of smallpox was certified, based on intense verification activities in countries, by a commission of eminent scientists in December 1979 and subsequently endorsed by the World Health Assembly in 1980.

Smallpox had two main forms: *Variola major* and *Variola minor*. The two forms showed similar lesions. The disease followed a milder course in *Variola minor*, which had a case-fatality rate of less than one per cent. The fatality rate of *Variola major* was around 30%. There were two rare forms of smallpox: haemorrhagic and malignant. In the former, the rash was accompanied by haemorrhage into the mucous membranes and the skin. Malignant smallpox was characterised by lesions that did not develop to the pustular stage but remained soft and flat. It was almost invariably fatal.

The incubation period of smallpox is usually twelve to fourteen days. During this period, the person looks and feels healthy and cannot infect others. The incubation period is followed by the sudden onset of influenza-like symptoms including fever, malaise, headache, prostration, severe back pain and, less often, abdominal pain and vomiting. Two to three days later, the temperature falls and the patient feels somewhat better, at which time the characteristic rash appears, first on the face, hands and forearms and then after a few days progressing to the trunk. Lesions also develop in the mucous membranes of the nose and mouth, and ulcerate very soon after their formation, releasing large amounts of virus into the mouth and throat. The centrifugal distribution of lesions, more prominent on the face and extremities than on the trunk, is a distinctive diagnostic feature of smallpox and gives the trained eye cause to suspect the disease. Lesions progress from macules to papules to vesicles to pustules. All lesions in a given area progress together through these stages. From eight to fourteen days after the onset of symptoms, the pustules form scabs which leave depressed depigmented scars upon healing.

Source: CDC 2007a, WHO 2008g.

APPENDIX 3: AVAILABLE FIGURES OF BEST-SELLING BIOHAZARD BOOKS

The available bestselling lists including some of the works cited in this thesis are shown below. Obviously, the position achieved does not reflect the quality of the books, as that is mainly a subjective question. Instead, what it shows is the undeniable appeal of this kind of narrative and, therefore, its potential in accordance with the *Entertainment-Education Strategy*.

AUTHOR	TITLE	WEEKS IN TOP 150	ENTERED TOP 150	PEAK POSITION	LAST APPEARED
Primary Sources					
Preston, Richard	<i>The Hot Zone</i>	81	29/09/94	3	02/05/96
Crichton, Michael	<i>The Andromeda Strain</i>	3	27/01/94	137	06/07/95
Preston, Douglas and Lincoln Child	<i>Mount Dragon</i>	3	15/05/97	110	29/05/97
Case, John	<i>The Eleventh Plague</i>	6	19/06/97	80	15/07/99
Cornwell, Patricia	<i>Unnatural Exposure</i>	35	24/07/97	1	24/01/08
Preston, Richard	<i>The Cobra Event</i>	17	13/11/97	19	12/11/98
Anderson, Kevin J.	<i>The X-Files: Antibodies</i>	3	23/04/98	136	07/05/98
Benson, Ann	<i>The Plague Tales</i>	3	21/05/98	117	04/06/98
Secondary Sources					
Garrett, Laurie	The Coming Plague	3	25/05/95	96	07/04/96
Preston, Richard	The Demon in the Freezer	2	17/10/02	65	24/10/02

Source: "Best-Selling Books Database." *Usatoday*. 2009. Retrieved 22 February 2009.
 <<http://content.usatoday.com/life/books/booksdatabase/default.aspx>>.

1969 FICTION BESTSELLERS

Author	Title
1. Roth, Philip	<i>Portnoy's Complaint</i>
2. Puzo, Mario	<i>The Godfather</i> <i>The Love Machine</i>
3. Susann, Jacqueline	
4. Robbins, Harold	<i>The Inheritors</i> <i>The Andromeda Strain</i>
5. Crichton, Michael	

1997 FICTION BESTSELLERS

Author	Title
1. Grisham, John	<i>The Partner</i>
2. Frazier, Charles	<i>Cold Mountain</i>
3. Steel, Danielle	<i>The Ghost</i>
4. Steel, Danielle	<i>The Ranch</i> <i>Special Delivery</i>
5. Steel, Danielle	<i>Unnatural Exposure</i>
6. Cornwell, Patricia	

Source: "1960s Bestsellers." Caderbooks. 2009. Retrieved 3 March 2009. <<http://www.caderbooks.com/best60.html>>.

Source: "1990s Bestsellers." Caderbooks. 2009. Retrieved 3 March 2009. <<http://www.caderbooks.com/best90.htm>>.

WORKS CITED

1. Primary Sources

- Anderson, Kevin J. The X-Files: Antibodies. London: Voyager, 1998 (1997).
- Benson, Ann. The Plague Tales. New York: Dell Books, 1998 (1997).
- Burning Road. New York: Dell Books, 2000 (1999).
- Blackwood, Alan. Plague of Angels. London: Corgi Books, 1999.
- Case, John. The First Horseman. London: Arrow Books, 1999 (1998).
- Cook, Robin. Outbreak. New York: Berkley Books, 1988 (1987).
- Cornwell, Patricia. Unnatural Exposure. London: Warner Books, 1998 (1997).
- Crichton, Michael. The Andromeda Strain. New York: Ballantine Books, 1993 (1969).
- Marr, John S. and John Baldwin. The Eleventh Plague. New York: HarperCollins, 1999 (1998).
- McClure, Ken. The Scorpion's Advance. London: Pocket Books, 1998 (1986).
- Ouellette, Pierre. The Third Pandemic. London: Hodder and Stoughton, 1997 (1996).
- Preston, Richard. The Hot Zone. New York: Anchor Books, 1995 (1994).
- The Cobra Event. New York: Orion Books, 1998 (1997).
- Preston, Douglas and Lincoln Child. Mount Dragon. London: Bantam Books, 1997 (1996).
- Willis, Connie. Doomsday Book. New York: Bantam Books, 1994 (1992).
- Yarbro, Chelsea Quinn. Time of The Fourth Horseman. New York: Ace Books, 1977 (1976).

2. Secondary Sources

- Alibek, Kenneth. "Statement on Terrorist and Intelligence Operations and its Potential Impact on the U.S. Economy before the Joint Economic Committee of the United States Congress." United States House of Representatives. 20 May 1998. Retrieved 9 July 2008. <<http://www.house.gov/jec/hearings/>

- intell/alibek.htm>.
- and Stephen Handleman. Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World-Told from Inside by the Man Who Ran It. New York: Random House, 1999.
- Allen, Garland E. "Was Nazi eugenics created in the US?" Nature. EMBO Reports, 2004: 5. 5. 451-452.
- American Philosophical Society. "Eugenics Records Office Record." American Philosophical Society. 2007. Retrieved 12 December 2007. <<http://www.amphilsoc.org/library/mole/e/ero.htm>>.
- Arizona Department of Health Services. "History of Biowarfare and Bioterrorism." Arizona Department of Health Services. 2005. Retrieved 9 July 2008. <http://www.azdhs.gov/phs/edc/edrp/es/bthistor2.htm#bt_20>.
- Asimov, Isaac. Asimov's Guide to the Bible: The Old Testament. New York: Avon Books, 1969 (1997).
- Australian Broadcasting Corporation. "On the Trail of the Black Death." Australian Broadcasting Corporation. 22 January 2004. Retrieved 9 July 2008. <<http://www.abc.net.au/science/features/blackdeath/default.htm>>.
- Bal, Mieke. Narratology: Introduction to the Theory of Narrative. Toronto: University of Toronto Press, 2004 (1985).
- Baranov, Vadim V. et al. "Special Services Against the Ordinary People." Baranov Family. 2001-9. Retrieved 30 January 2009. <http://www.baranovfamily.org/announcements_eng.html>.
- Barquet, Nicolau and Pere Domingo. "Smallpox: The Triumph over the Most Terrible of the Ministers of Death." Annals of Internal Medicine. 15 October 1997. 127. 8: 635-642.
- Barthes, Roland. "The Death of the Author." Aspen. 1967. 5-6. 3: 1.
- Baum, Larry. "The Deadliest Fall." Idea Explore. 16 November 2004. Retrieved 21 December 2007. <<http://www.ideaexplore.net/news/041116.html>>.
- BBC News. "Breakthrough on Ebola vaccine." British Broadcasting Corporation. 23 August 2006. Retrieved 8 November 2007. <<http://news.bbc.co.uk/2/hi/>

- health/health/3126365.stm>.
- . "Britain's Anthrax Island." British Broadcasting Corporation. 25 July 2001. Retrieved 9 July 2008. <<http://news.bbc.co.uk/1/hi/scotland/1457035.stm>>.
- . "Hidden History of US Germ Testing." British Broadcasting Corporation. 13 February 2006. Retrieved 9 July 2008. <http://news.bbc.co.uk/1/hi/programmes/file_on_4/4701196.stm>.
- . "Living with Anthrax Island." British Broadcasting Corporation. 8 November 2001. Retrieved 9 July 2008. <http://news.bbc.co.uk/2/hi/uk_news/1643031.stm>.
- Beam, Thomas E. and Linette R. Sparacino, eds. Military Medical Ethics, Volume 2. Washington: Office of the Surgeon General, 2003.
- Bennett, Tony. Popular Fiction: Technology, Ideology, Production, Reading. London: Routledge, 1990.
- Berger, Arthur A. Popular Culture Genres: Theories and Texts. Thousand Oaks: Sage, 1992.
- Berrigan, Frida. "Inspect This: America's Own Secret Bioweapons Programme." In These Times. 31 January 2003. Retrieved 9 July 2008. <<http://www.inthesetimes.com/article/288/>>.
- Billings, Molly. "The Influenza Pandemic of 1918." Stanford University. February 2005. Retrieved 12 December 2007. <<http://virus.stanford.edu/uda/index.html>>.
- Blum, William. Rogue State: A Guide to the World's Only Superpower. Monroe: Common Courage Press, 2000.
- Bomb Shelter. "Biological Weapons Effects." Bomb Shelter. 2001-8. Retrieved 5 September 2008. <<http://www.bomb-shelter.net/biological-weapons>>.
- Brewer, Marilyn B. and Wendi Gardner. "Who is This "We"? Levels of Collective Identity and Self Representations." Organizational Identity. Hatch, Mari Jo and Majken Schultz, eds. New York: Oxford University Press, 2004.
- Brown, David. "SARS Cases in Asia Show Labs' Risks." The Washington Post. 29 May 2004. Retrieved 4 December 2008. <<http://www.washingtonpost.com/>

wp-dyn/articles/A64645-2004May28.html>.

Brown, Jonathan. "Poison umbrella murder case is reopened." The Independent. 20 June 2008. Retrieved 10 October 2008. <<http://www.independent.co.uk/news/uk/crime/poison-umbrella-murder-case-is-reopened-851022.html>>.

Browne, Ray B. Rituals and Ceremonies in Popular Culture. Bowling Green: Bowling Green University Popular Press, 1980.

----- "Hero with 2000 Faces." Profiles of Popular Culture: A Reader. Ed. Ray B. Browne. Madison: University of Wisconsin Press, 2005. 16-23.

Burns, John F. "Calm Returns to Indian City hit by Plague." The New York Times. 26 September 1994. Retrieved 9 July 2008. <<http://query.nytimes.com/gst/fullpage.html?res=9F02E4DD133AF935A1575AC0A962958260&sec=&spn=&pagewanted=print>>.

----- "With Old Skills and New, India Battles the Plague." The New York Times. 29 September 1994. Retrieved on 19 December 2008. <<http://query.nytimes.com/gst/fullpage.html?res=9A0CE3D7113AF93AA1575AC0A962958260>>.

Butner Blogspot. "I'll Take that Bet and Raise you 100." Butner blogspot. 1 March 2008. Retrieved 5 December 2008. <<http://butnerblogspot.wordpress.com/2008/03/01/ill-take-that-bet-and-raise-you-100/#comment-323>>.

Cader Books. "Bestseller list 1950-1995." Cader Books. Retrieved 3 March 2009. <<http://www.caderbooks.com/bestintro.html>>.

Campbell, Grant L. and James M. Hughes. "Plague in India: A New Warning from an Old Nemesis." Annals of Internal Medicine. 15 January 1995. 122.2: 151-153.

Canadian Broadcasting Corporation. "CBC News Indepth: Biological Weapons." Canadian Broadcasting Corporation. 18 February 2004. Retrieved 11 July 2007. <http://www.cbc.ca/news/background/bioweapons/biowar_timeline.html>.

Canadian Security Intelligence Service. "Report No. 2000/05: Biological Weapons Proliferation." Canadian Security Intelligence Service. 9 June 2000. Retrieved 9 July 2008. <<http://www.csis-scrs.gc.ca/pblctns/prspctvs/200005->

eng.asp>.

Carus, W. Seth. Bioterrorism and Biocrimes: The Illicit Use of Biological Agents Since 1900. 28 February 2001. Retrieved 9 December 2008. <http://www.ndu.edu/centercounter/Full_Doc.pdf>.

Cawelty, John G. Adventure, Mystery and Romance: Formula Stories as Art and Popular Culture. Chicago: The University of Chicago Press, 1977 (1976).

CBW Info. "Anthrax: Essential Data." CBW Info. 1999. Retrieved 9 July 2008. <<http://www.cbwinfo.com/Biological/Pathogens/BA.html#0000>>.

Centre for International Forestry Research. "Free of Mad Cow and Foot-and-Mouth, Amazonian Cattle Find Favor Abroad; Study Says Dramatic Growth in Exports Primary Culprit in Huge Rainforest Losses in Brazil." Centre for International Forestry Research. 2 April 2004. Retrieved 18 June 2008. <http://www.cifor.cgiar.org/PressRoom/MediaRelease/2004/2004_04_02.htm?&pf=1>.

Centers for Disease Control and Prevention. "Anthrax." Centers for Disease Control and Prevention. 2008a. Retrieved 5 September 2008. <<http://www.bt.cdc.gov/agent/anthrax/index.asp>>.

----- "Avian Influenza A Virus Infections of Humans." Centers for Disease Control and Prevention. 2008b. Retrieved 9 September 2008. <<http://www.cdc.gov/flu/avian/gen-info/avian-flu-humans.htm>>.

----- "CJD (Creutzfeldt-Jakob Disease, Classic)." Centers for Disease Control and Prevention. 2009a. Retrieved 9 July 2008. <<http://www.cdc.gov/ncidod/dvrd/vcjd/epidemiology.htm>>.

----- "Disease Listing: Escherichia Coli General Information." Centers for Disease Control and Prevention. 2008c. Retrieved 30 July 2008. <http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html>.

----- "Epidemic Intelligence Service Homepage." Centers for Disease Control and Prevention. 2009b. Retrieved 18 February 2009. <<http://www.cdc.gov/eis>>.

----- "Filoviruses." Centers for Disease Control and Prevention. 2004a. Retrieved 8 November 2007. <<http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/filoviruses.htm>>.

- "Glossary of Terms." Centers for Disease Control and Prevention. 2009c. Retrieved 3 March 2009. <<http://www.cdc.gov/ncidod/dvrd/spb/mnpages/glossary.htm>>.
- "Known Cases and Outbreaks of Ebola Hemorrhagic Fever in Chronological Order." Centers for Disease Control and Prevention. 2008d. Retrieved 11 October 2008. <<http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola/ebolatable.htm>>.
- "Marburg Haemorrhagic Fever Factsheet." Centers for Disease Control and Prevention. 2006a. Retrieved 3 December 2008. <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/Fact_Sheets/Marburg%20Hemorrhagic%20Fever%20Fact%20Sheet.pdf>.
- "Morbidity and Mortality Weekly Report." Centers for Disease Control and Prevention. 2009d. Accessed 14 August 2009. <<http://www.cdc.gov/mmwr/>>.
- "Novel H1N1 Flu: International Situation Update." Centers for Disease Control and Prevention. 2009e. Retrieved 6 August 2009. <<http://www.cdc.gov/h1n1flu/updates/international>>.
- "Psittacosis." Centers for Disease Control and Prevention. 2008e. Retrieved 12 May 2008. <http://www.cdc.gov/ncidod/dbmd/diseaseinfo/psittacosis_t.htm>.
- "Rift Valley Fever." Centers for Disease Control and Prevention. 2006b. Retrieved 5 September 2008. <<http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/rvf.htm>>.
- "Smallpox Disease Overview." Centers for Disease Control and Prevention. 6 2007a. Retrieved 5 September 2008. <<http://www.bt.cdc.gov/agent/smallpox/overview/disease-facts.asp>>.
- "Smallpox Vaccine Overview." Centers for Disease Control and Prevention. 6 2007b. Retrieved 9 July 2008. <<http://www.bt.cdc.gov/agent/smallpox/vaccination/facts.asp>>.
- "vCJD (Variant Creutzfeldt-Jakob Disease)." Centers for Disease Control and Prevention. 2007c. Retrieved 9 July 2008. <<http://www.cdc.gov/ncidod/dvrd/vcjd/epidemiology.htm>>.

- , "Viral Hemorrhagic Fevers." Centers for Disease Control and Prevention – Special Pathogens Branch. 2004b. Retrieved 8 November 2007. <<http://www.cdc.gov/Ncidod/dvrd/spb/mnpages/dispages/vhf.htm>>.
- Central Intelligence Agency. "Biological Warfare (BW) Accident in Sverdlovsk." The National Security Archive. 28 January 1980. Retrieved 11 October 2008. <<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB61/Sverd6.pdf>>.
- , "Swaziland." CIA World Factbook. 2009. Retrieved 6 March 2009. <<https://www.cia.gov/library/publications/the-worldfactbook/fields/2102.html>>.
- Cockburn, Alexander and St. Clair, Jeffrey, eds. "Germ War: The US Record." CounterPunch. 1998-1999. Retrieved 9 July 2008. <<http://www.counterpunch.org/germwar.html>>.
- Committee on Research Standards and Practices to Prevent the Destructive Application of Biotechnology, National Research Council. Biotechnology Research in an Age of Terrorism. Washington: The National Academies Press, 2004.
- Croddy, Eric. "Chinese Chemical Warfare Capabilities." US National Intelligence Council. 5 November 1999. Retrieved 4 December 2008. <http://www.dni.gov/nic/confreports_chinawmd.html>.
- and James J. Wirtz. Weapons of Mass Destruction: An Encyclopedia of Worldwide Policy, Technology, and History. ABC-CLIO, 2005.
- Crosby, Alfred W. Epidemic and Peace, 1918. Westport: Greenwood Press, 1976.
- Culler, Jonathan. Literary Theory: A very short introduction. Oxford University Press: Oxford, 1997.
- Custance, Arthur C. Man in Adam and in Christ. 2nd online edition: 2001 (1975). Retrieved 26 November 2008. <<http://www.custance.org/Library/Volume3/>>.
- Darwin, Charles. On the Origin of Species: By Means of Natural Selection or the Preservation of Favoured Races in the Struggle for Life. New York: Dover Publications, 2006 (1859).
- Dawkins, Richard. The God Delusion. London: Bantam Press, 2006.

- De Jong, Alex and Marc Schuilenburg. Mediapolis: Popular Culture and the City. Rotterdam: 010 Publishers, 2006.
- Democratic Underground. "Rhoads Injected Puerto Ricans with Cancer Cells." Democratic Underground. 22 March 2005. Retrieved 22 December 2008. <http://www.democraticunderground.com/discuss/duboard.php?az=show_msg&forum=104&topic_id=3312956&mesg_id=3327364>.
- Derrida, Jacques. Writing and Difference. London: Routledge, 2002 (1967).
- Dove, George N. "The Suspense Process." Symbiosis: Popular Culture and Other Fields. Browne, Ray B. and Marshall W. Fishwick, eds. University of Wisconsin Press: Madison, 1988.
- Eccleston, Paul. "Climate change will allow tropical disease to spread to Europe." The Daily Telegraph. 7 October 2008. Retrieved 1 December 2008. <<http://www.telegraph.co.uk/earth/earthnews/3352974/Climate-change-will-allow-tropical-disease-to-spread-to-Europe.html>>.
- "Scientists devise list of potential threats to UK." The Daily Telegraph. 20 March 2008. Retrieved 1 December 2008. <<http://www.telegraph.co.uk/earth/earthnews/3336741/Scientists-devise-list-of-potential-threats-to-UK.html>>.
- Eldredge, Niles and Stephen Jay Gould. "Punctuated equilibria: an alternative to phyletic gradualism." Schopf, T. ed. Models in Paleobiology. San Francisco: Freeman Cooper 1972. 82-115.
- El Mundo. "Resucita el virus de la gripe española." El Mundo. 8 October 2004. Retrieved 24 December 2007. <<http://www.elmundo.es/elmundosalud/2004/10/07/biociencia/1097173979.html>>.
- Endicott, S, and Hagerman, E. The United States and Biological Warfare: Secrets from the Early Cold War and Korea. Indianapolis: Indiana University Press, 1999.
- Epstein, Ron. "Genetic Engineering and its Dangers." Professor Ron Epstein's Online Educational Resources. Revised March, 2004. Retrieved 3 December 2008. <<http://online.sfsu.edu/~rone/GEessays/gedanger.htm>>.
- "Ergot." Encyclopaedia Britannica. 2009. Retrieved on 24 August 2009. <<http://www.britannica.com/EBchecked/topic/191313/ergot#ref=ref216388>>.

- European Commission. “Joint Report on Social Protection and Social Inclusion 2007.” Europa.eu. 19 February 2007. Retrieved 27 November 2008. <<http://www.europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/66&format=PDF&aged=0&language=EN&guiLanguage=en>>.
- “Father Hosea’s Concerns.” Luke2219.wordpress.com. 2007. Retrieved 29 November 2007. <<http://luke2219.files.wordpress.com/2007/03/ladder.jpg>>.
- Fenner, F., et al. Smallpox and its Eradication. Geneva: World Health Organization, 1988. Retrieved 4 December 2008. <<http://whqlibdoc.who.int/smallpox/9241561106.pdf>>.
- Fenster, Mark. Conspiracy Theories: Secrecy and Power in American Culture. Minneapolis: University of Minnesota Press, 2008 (1999).
- Flaccus, Gillian. “Oregon Town Never Recovered from Scare.” The Associated Press. 19 October 2001. Retrieved 9 July 2008. <<http://www.rickross.com/reference/rajneesh/rajneesh8.html>>.
- Foucault, Michel. “Discourse and Truth: The Problematization of Parrhesia.” Foucault.info. 2008. Retrieved 26 November 2008. <<http://foucault.info/documents/parrhesia/foucault.DT2.parrhesiaEuripides.en.html>>.
- Freud, Sigmund. “A Difficulty in the Path of Psychoanalysis.” The Standard Edition of the Complete Psychological Works of Sigmund Freud. Volume XVII. London: Hogarth Press, 1955 (1917). 135-144.
- Frye, Northrop. Anatomy of Criticism. Princeton: Princeton University Press, 1973 (1957).
- Gad, Shayne C. Handbook of Pharmaceutical Biotechnology. New Jersey: Wiley, 2007.
- Garenne, Michel and Andrew Noymer. “Grippe espagnole de 1918: conséquences démographiques à long terme.” Institut Pasteur. Retrieved 12 December 2007. <http://www.pasteur.fr/infosci/conf/CRC/Grippe_CRC.ppt>.
- Garrett, Laurie. The Coming Plague: Newly Emerging Diseases in a World out of Balance. New York: Penguin, 1995 (1994).
- Garza, Alex. “Inhalational Anthrax – What does Anthrax look like?” Logical Images.

2008. Retrieved 5 September 2008. <<http://www.logicalimages.com/resourcesBTAgentsAnthraxInh.htm>>.
- Genentech. "First Successful Laboratory Production of Human Insulin Announced." Genentech. 6 September 1978. Retrieved 2 December 2008. <<http://www.gene.com/gene/news/pressreleases/display.do?method=print&id=4160>>.
- Global Security. "Al Hakam: Iraq Special Weapons Facilities." Global Security. 2007a. Retrieved 22 November 2007. <http://www.globalsecurity.org/wmd/world/iraq/al_hakum.htm>.
- "Al Manal: Iraq Special Weapons Facilities." Global Security. 2007b. Retrieved 22 November 2007. <http://www.globalsecurity.org/wmd/world/iraq/al_manal.htm>.
- "Obolensk." Global Security. 2007c. Retrieved 29 November 2007. <<http://www.globalsecurity.org/wmd/world/russia/obolensk.htm>>.
- "Biological Weapons – United States." Global Security. 2008. Retrieved 17 December 2008. <<http://www.globalsecurity.org/wmd/systems/bw.htm>>.
- Gold, Hal. Unit 731: Testimony. Singapore: Yenbooks, 1996.
- Golshan. "Puerto Ricans Outraged Over Secret Medical Experiments." Golshan Full Persian Page Dedicated to Progressive Points of View. 24 September 2002. Retrieved 22 December 2008. <<http://www.golshan.com/english/articles/20021024c.txt>>.
- Gould, Stephen Jay. "The Evolution of Life on the Earth." Scientific American. October, 1994. 84-91.
- Greenpeace International. "Say no to Genetic Engineering." Greenpeace International. 2008. Retrieved 3 December 2008. <<http://www.greenpeace.org/international/campaigns/genetic-engineering>>.
- Grenke, Arthur. God, Greed and Genocide: The Holocaust through the Centuries. Washington: New Academia Publishing, 2005.
- Grmek, Mirko et al. History of AIDS: Emergence and Origin of a Modern Pandemic. Princeton: Princeton University Press, 1990.

- Gwyn, Richard. Communicating Health and Illness. London: Sage, 2002.
- Hamilton, Jack and Tom Walker. "Dane named as umbrella killer." The Sunday Times. 5 June 2005. Retrieved 10 October 2008.
<<http://www.timesonline.co.uk/tol/news/uk/article530164.ece>>.
- Hawkes, N. "Smallpox death in Britain challenges presumption of laboratory safety." Science. 2 March 1979. 203: 855-856.
- Health News Network. "A History of US Secret Human Experimentation." Health News Network. 1998. Retrieved 9 July 2008.
<<http://www.healthnewsnet.com/humanexperiments.html>>.
- Heelan, Patrick A. and Jay Schulkin. "Hermeneutical Philosophy and Pragmatism: A Philosophy of Science." Philosophy of Technology: the Technological Condition. Ed. Scharff Robert C. and Val Dusek. Oxford: Blackwell Publishing 2004 (2003). 138-153.
- Highfield, Roger. "Britain is hotspot of new germs says new study." The Daily Telegraph. 21 February 2008. Retrieved 1 December 2008.
<<http://www.telegraph.co.uk/scienceandtechnology/science/sciencenews/3326352/Britain-is-hotspot-of-new-germs-says-new-study.html>>.
- Horowitz, Leonard G. "The CIA and the West Nile Virus." Conspiracy Planet. 2005. Retrieved 24 December 2007. <<http://www.conspiracyplanet.com/channel.cfm?channelid=8&contentid=56&page=2>>.
- HSI Journal of Homeland Security. "Interview Dr. Ken Alibek." HSI Journal of Homeland Security. 28 September 2000. Retrieved 29 November 2007.
<<http://www.homelandsecurity.org/journal/Default.aspx?oid=2&ocat=4>>.
- International Commission. "Ebola haemorrhagic fever in Zaire, 1976." Bulletin of the World Health Organization. 1978. 56 (2): 271-293.
- International Society for Infectious Diseases. "Promed-mail." Promedmail. 2008. Retrieved 30 July 2008. <<http://www.promedmail.org>>.
- Jung, Carl G. Man and His Symbols. New York: Dell, 1968 (1964).
- K, Jim. The Chlamydia Pneumoniae Handbook. Chlamydia Pneumoniae Help and Treatment. 2006. Retrieved 9 July 2008. <<http://www.cpnhelp.org/cpnbook>>.

- Kannabus, Annabel and Sarah Allen. "The Origins of HIV and the First Cases of AIDS." Avert. 2007. Retrieved 9 July 2008. <<http://www.avert.org/origin-aids-hiv.htm>>.
- Karlen, Arno. Man and Microbes: Disease and Plagues in History and Modern Times. New York: Touchtone 1996 (1995).
- Kass, Leon R. "The Problem of Technology." Technology in the Western Political Tradition. Melzer, Arthur M. et al. ed. New York: Cornell University Press, 1993. 1-26.
- Koprowski, Hilary, and Michael B. A. Oldstone eds. Microbe Hunters-Then and Now. Bloomington: Medi-Ed Press, 1996.
- Kristof, Nicholas D. "Unlocking a Deadly Secret." Centurychina. 1996-7. Retrieved 5 September 2008. <<http://centurychina.com/wiihist/germwar/germwar.htm>>.
- Lamb, Robert A. and Robert M. Krug. "Orthomyxoviridae: The Viruses and their Replication." Fields, Bernard N. ed. et al. Fields Virology. 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2001. Vol. 1: 1216-1253.
- Lanza, Robert. "A New Theory of the Universe." The American Scholar. 1 March 2007. Retrieved 9 July 2008. <<http://www.theamericanscholar.org/a-new-theory-of-the-universe/print/>>.
- Lederberg, Joshua, ed. et al. Emerging Infections: Microbial Threats to Health in the United States. Washington: Institute of Medicine, 1992.
- Livingston, Neil. The War Against Terrorism. New York: Lexington Books, 1982.
- Lyon, Elizabeth. A Writer's Guide to Fiction. New York: Perigee, 2004.
- Mackenzie, Debora. "Marburg and Ebola vaccine success in monkeys." NewScientist. 5 June 2005. Retrieved 8 November 2007. <<http://www.newscientist.com/article/dn7466-marburg-and-ebola-vaccine-success-in-monkeys.html>>.
- Mann, Jonathan. "The Global Picture of AIDS." International AIDS Society. 1988. Retrieved 9 July 2008. <<http://www.aegis.com/conferences/iac/1988/K2.html>>.
- Masur, Louis P. "Stephen Jay Gould's Vision of History." McRae, Murdo W. ed. The

- Literature of Science: Perspectives on Popular Scientific Writing. Athens GA: University of Georgia Press, 1997 (1993). 113-31.
- Meltzer, Martin I., Nancy J. Cox and Keiji Fukuda. "Modeling the Economic Impact of Pandemic Influenza in the United States: Implications for Setting Priorities for Intervention." Emerging Infectious Diseases. 1999. 5. 5: 659-671.
- Meselson, Matthew et al. "The Sverdlovsk Anthrax Outbreak of 1979." Science. 18 November 1994. 266: 1202-8.
- MethodX. "John Climacus." Upper Room. 2007. Accessed 18 December 2008. <http://www.upperroom.org/methodx/thelife/saints.asp?act=showitem&item_id=351037>.
- Miller, Judith. "In A Gamble, U.S. Supports Russian Germ Warfare Scientists." The New York Times. 20 June 2000. Retrieved 22 December 2008. <<http://query.nytimes.com/gst/fullpage.html?res=9B02E3D61531F933A15755C0A9669C8B63&sec=&spon=&pagewanted=print>>.
- and William J. Broad. "Iranians, Bioweapons in Mind, Lure Needy Ex-Soviet Scientists." The New York Times. 8 December 1998. Retrieved 22 December 2008. <<http://query.nytimes.com/gst/fullpage.html?res=9A0DE3DE143AF93BA35751C1A96E958260&sec=&spon=&pagewanted=print>>.
- et al. "U.S. Germ Warfare Research Pushes Treaty Limits." The New York Times. 4 September 2001. Retrieved 15 November 2007. <<http://query.nytimes.com/gst/fullpage.html?res=9E02E1D71639F937A3575AC0A9679C8B63&sec=&spon=&pagewanted=print>>.
- Miller, William I. Eye for an Eye. New York: Cambridge University Press, 2006.
- Mirsky, Steve. "Re-emerging Diseases: Gone today, here tomorrow?" 21stC. 1997. Retrieved 5 September 2008. <<http://www.columbia.edu/cu/21stC/issue-2.3/mirsky.html>>.
- "Narcissistic Personality Disorder." The Free Encyclopedia. 2007. Retrieved 27 November 2007. <<http://encyclopedia.thefreedictionary.com/Narcissistic+personality+disorder>>.
- National Institute of Allergy and Infectious Diseases. "Antimicrobial (Drug) Resistance." *National Institute of Allergy and Infectious Diseases*. 8 October

2008. Retrieved 24 December 2008. <<http://www3.niaid.nih.gov/topics/AntimicrobialResistance/default.htm>>.
- , “Emerging and Re-emerging Infectious Diseases.” National Institute of Allergy and Infectious Diseases. 2008b. Retrieved 13 March 2008. <<http://www3.niaid.nih.gov/research/topics/emerging/list.htm>>.
- National Institute of Neurological Disorders and Stroke. “Lesch-Nyhan Syndrome Information Page.” National Institute of Neurological Disorders and Stroke. 2008. Retrieved 8 August 2008. <http://www.ninds.nih.gov/disorders/lesch_nyhan/lesch_nyhan.htm>.
- National Institutes of Health. “Peter B. Jahrling, PhD. – Biographical Sketch.” National Institutes of Health. 2008. Retrieved 4 August 2008. <<http://www1.od.nih.gov/oir/demystifyingMed/DM07/Speakers>>.
- Netlink. “Campaign to Ban Genetically Engineered Foods.” Netlink. 2008. Retrieved 3 December 2008. <<http://www.netlink.de/gen/>>.
- Nuclear Threat Initiative. “South Africa Biological Overview.” Nuclear Threat Initiative. May 2007. Retrieved 9 July 2008. <http://www.nti.org/e_research/profiles/SAfrica/Biological/index.html>.
- Osteogenesis Imperfecta Foundation. “Fast Facts on Osteogenesis Imperfecta.” Osteogenesis Imperfecta Foundation. 2007. Retrieved 27 November 2007. <<http://www.oif.org/site/PageServer?pagename=FastFacts>>.
- Owen, Mike. “Psittacosis.” Birds n Ways. 1997. Retrieved 9 July 2008. <<http://www.birdsnways.com/articles/psittico.htm>>.
- New York Academy of Sciences. “Biodefense.” New York Academy of Sciences. 2008. Retrieved 4 August 2008. <<http://www.nyas.org/biodef/speakers.asp>>.
- Piccolo, Cynthia M. “Death on a Grand Scale.” MedHunters. 19 July 2004. Retrieved 9 November 2007. <<http://www.medhunters.com/articles/deathOnAGrandScale.html>>.
- Potter, C.W. “A History of Influenza.” Journal of Applied Microbiology. 2001: Vol. 91, No 4. 572-9.
- Preston, Richard. “The Bioweaponeers.” The New Yorker. 9 March 1998. 52-65.

- , "The Demon in the Freezer." The New Yorker. 17 July 1999. 44-61.
- Procopius. History of the Wars. New York: Cosimo, 2007.
- Propp, Vladimir. Morphology of the Folktale. Austin: University of Texas Press, 2003 (1968).
- Public Broadcasting Service. "Global Guide to Bioweapons." Public Broadcasting Service. November 2001. Retrieved 27 November 2007. <http://www.pbs.org/wgbh/nova/bioterror/glob_nf.html>.
- , "The Living Weapon." Public Broadcasting Service. 15 December 2006. Retrieved 9 July 2008. <<http://www.pbs.org/wgbh/amex/weapon/timeline/index.html>>.
- Purver, Ron. "Chemical and Biological Terrorism: The Threat According to the Open Literature." Canadian Intelligence Security Service. June 1995. Modified 25 April 2008. Retrieved 9 July 2008. <<http://www.csis-scrs.gc.ca/pblctns/thr/cbtrrrsm02-eng.asp>>.
- Richmond, Julius B. "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention." U.S. Department of Health, Education and Welfare, Public Health Service Office of the Assistant Secretary for Health and Surgeon General DHEW (PHS). Publication No. 79-55071. 1979. Retrieved 23 November 2008. <http://profiles.nlm.nih.gov/NN/B/B/G/K/_/nnbbgk.pdf>.
- Ricoeur, Paul. Time and Narrative, Volume 1. Trans. McLaughlin, Kathleen and David Pellauer. Chicago: University of Chicago Press, 1984 (1983).
- Rome, Tom G. "Invisible Danger." Flight Global. 2001. Retrieved 9 July 2008. <<http://www.flightglobal.com/articles/2001/03/01/128480/invisible-danger.html>>.
- Ryan, Frank. Virus X. London: Harper Collins, 1998 (1996).
- Said, Edward. Orientalism. London: Penguin, 2003 (1978).
- Sanchez et al. "Reemergence of Ebola Virus in Africa." Emerging Infectious Diseases. 1995. 1. 3: 96-100.
- Saxon, Wolfgang. "V. Pasechnik, 64, Is Dead; Germ Expert Who Defected." The

- New York Times. 23 November 2001. Retrieved 30 January 2009. <<http://query.nytimes.com/gst/fullpage.html?res=9F01E4D9153AF930A15752C1A9679C8B63>>.
- Schoenstadt, Arthur. "Rhinovirus." Emedtv. 3 December 2008. Retrieved 9 January 2009. <<http://virus.emedtv.com/rhinovirus/rhinovirus.html>>.
- Science Daily. "Evolution Is Deterministic, Not Random, Biologists Conclude From Multi-species Study." Science Daily. 19 November 2007. Retrieved 18 March 2008. <<http://www.sciencedaily.com/releases/2007/11/071119123929.htm>>.
- "Vaccine Enters Human Trial." Science Daily. 19 November 2003. Retrieved 8 November 2007. <<http://www.sciencedaily.com/releases/2003/11/031119075818.htm>>.
- Shapiro, Roger L. et al. "Botulism in the United States: A Clinical and Epidemiologic Review." Annals of Internal Medicine. 1 August 1998. 129.3: 221-228.
- Shingal, Arvind and Everett Rogers. Entertainment-Education: A Communication Strategy for Social Change. Taylor and Francis: London, 1999.
- and Michael J. Cody (eds.) Entertainment Education and Social Change. Lawrence Erlbaum: New Jersey, 2004.
- Sky Highway. "A History of Secret Human Experimentation." Sky Highway. 2008. Retrieved 9 July 2008. <http://www.skyhighway.com/~chemtrails911/docs/human_experiments.html>.
- Smith, Christine A. "Plague in the Ancient World: A Study from Thucydides to Justinian." Loyola University New Orleans. 2008. Retrieved 9 July 2008. <<http://www.loyno.edu/~history/journal/1996-7/Smith.html>>.
- Smith, Rebecca. "Climate change could lead to a surge in Legionnaires' disease." The Daily Telegraph. 12 December 2008. Retrieved 12 December 2008. <<http://www.telegraph.co.uk/earth/earthnews/3351921/Climate-change-could-lead-to-a-surge-in-Legionnaires%27-disease.html>>.
- Staar, Richard F. Foreign Policies of the Soviet Union. Stanford: Hoover Institution Press, 1991.
- St. Athanasius Orthodox Church. "St. John Climacus Ladder of Divine Ascent." St.

- Athanasius Orthodox Church. 2005. Accessed 18 December 2008. <<http://staoc.ca/ladder.html>>.
- Taubenberger, Jeffery K. and David M. Morens. "1918 Influenza: The Mother of all Pandemics." Emerging Infectious Diseases. January 2006. 12.1: 15-22.
- Texas Department of State Health Services. "History of Smallpox – Smallpox Through the Ages." Texas Department of State Health Services. 30 March 2007. Retrieved 9 July 2008. <http://www.dshs.state.tx.us/preparedness/bt_public_history_smallpox.shtm>.
- The ALS Association. "What is ALS." The ALS Association. 2007. Retrieved 27 November 2007. <<http://www.alsa.org/als/what.cfm>>.
- The Biological and Toxin Weapons Convention Website. "Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction." 10 April 1972. The Biological and Toxin Weapons Convention Website. 2008. Retrieved 15 November 2008. <<http://www.opbw.org/convention/documents/btwctext.pdf>>.
- The Daily Telegraph. "Vladimir Pasechnik." The Daily Telegraph. 29 November 2001. Retrieved 9 July 2008. <<http://www.telegraph.co.uk/news/obituaries/1363752/Vladimir-Pasechnik.html>>.
- The Economist. "New Light on Georgi Markov's Murder." The Economist. 4 September 2008. Retrieved 9 December 2008. <http://www.economist.com/world/europe/displaystory.cfm?story_id=12056788>.
- "Piccadilly Circus." The Economist. 4 September 2008. Retrieved 10 October 2008. <http://www.economist.com/world/europe/PrinterFriendly.cfm?story_id=12056788>.
- The Federation of American Scientists. "History of United States' Biological Weapons Program." The Federation of American Scientists. 19 October 2000. Retrieved 9 July 2008. <<http://www.fas.org/nuke/guide/usa/cbw/bw.htm>>.
- The Gideons International. Holy Bible, King James version. [No place]: National Publishing Company, 1978.
- The New York Times. "Surat: A Victim of its Open Sewers." The New York Times.

- 25 September 1994. Retrieved on 19 December 2008. <<http://query.nytimes.com/gst/fullpage.html?res=9F00E0DB123AF936A1575AC0A962958260>>.
- The Project on Emerging Nanotechnologies. "Nanotechnology Project." The Project on Emerging Nanotechnologies. 2009. Retrieved 26 February 2009. <http://www.nanotechproject.org/inventories/consumer/analysis_draft/>.
- The University of Texas. "Joseph B. McCormick M.D." The University of Texas. 2008. Retrieved 4 August 2008. <<http://www.uth.tmc.edu/gsbs/tutorial/mccormick.html>>.
- The Wall Street Journal. "Ex-Soviet Biological Weapons Lab Finds Itself In Demand." 9 January 2002. UCLA Department of Epidemiology. 4 November 2002. Retrieved 29 November 2007. <<http://www.ph.ucla.edu/epi/bioter/exsovietbiolabscollab.html>>.
- Thomas, Gordon. "Dead Scientists." Steve Quayle News Alert. 23 November 2003. Retrieved 30 January 2009. <http://www.stevequayle.com/News.alert/03_Disease/031121.dead.scientists.html>.
- Thompson, Steve. Home page. University of Florida. 2007. Retrieved 29 November 2007. <<http://bio.fsu.edu/~stevet/pictures/Haeckel.jpg>>.
- Thomson Prentice Global Health Histories. "Health, history and hard choices: Funding dilemmas in a fast-changing world." World Health Organisation. August 2006. Retrieved 27 November 2008. <http://www.who.int/global_health_histories/seminars/presentation07.pdf>.
- Threadgold, Terry. "Cultural Studies, Critical Theory and Critical Discourse Analysis: Histories, Remembering and Futures." Linguistik Online. 2004. Retrieved 24 November 2008. <http://www.linguistik-online.de/14_03/threadgold.html>.
- Thucydides. History of the Peloponnesian War. London: Penguin Classics, 1972.
- Time. "Banning the Germs." Time. 5 December 1969. Retrieved 15 November 2007. <<http://www.time.com/time/magazine/article/0,9171,901632,00.html?iid=chix-sphere>>.
- Tjio, Joe Hin and Albert Levan. "The Chromosome Number of Man." Hereditas.

1956. 42: 1-6.

Trustees of Boston University. "Bioterrorism in History 1984: Rajneesh Cult Attacks Local Salad Bar." Wbur. 2002. Retrieved 9 July 2008. <http://www.wbur.org/special/specialcoverage/feature_bio.asp>.

Tuchman, Barbara W. A Distant Mirror: The Calamitous 14th Century. New York: Ballantine Books, 1987 (1978).

Un aids. "2007 AIDS Epidemic Update." Un aids. December 2007. Retrieved 9 July 2008. <http://data.unaids.org/pub/EPISlides/2007/2007_epiupdate_en.pdf>.

United Press International. "Black Death-Type Bacteria Found In Trash." United Press International. 7 May 2007. Retrieved 24 December 2007. <<http://www.physorg.com/news97780475.html>>.

University of Bradford. Department of Peace Studies. "Text of the Biological and Toxin Weapons Convention." (Geneva, 17 June 1925). University of Bradford. 9 December 2008. Retrieved 22 December 2008. <<http://www.brad.ac.uk/acad/sbtwc/keytext/genprot.htm>>.

Usa Today. "Best-Selling Books Database." Usa Today. Retrieved 22 February 2009. <<http://content.usatoday.com/life/books/booksdatabase/default.aspx>>.

US Department of Defense. "Chemical and Biological Defense Program: Annual Report to Congress." US Department of Defense. 28 March 2000. Retrieved July 2008. <<http://www.defenselink.mil/pubs/chembio02012000.pdf>>.

US Food and Drug Administration. "Facts about Antibiotic Resistance." US Food and Drug Administration. 2008. Retrieved 24 December 2008. <http://www.fda.gov/oc/opacom/hottopics/antiresist_facts.html>.

US National Academies of Sciences. "Summary Statement of the Asilomar Conference on Recombinant DNA Molecules." US National Academy of Sciences. 2 August 2005. Retrieved 27 November 2007. <http://profiles.nlm.nih.gov/qq/B/C/G/D/_/qqbcgd.pdf>.

Van Riper, A. Bowdoin. Science in Popular Culture: A Reference Guide. Westport: Greenwood Press, 2002.

Wade, Nicholas. "Ideas and Trends: Ebola's Vengeance; Microbes into Infinity." The

- New York Times. 14 May 1995. Retrieved 8 November 2007. <<http://query.nytimes.com/gst/fullpage.html?sec=health&res=990CEFDA1439F937A25756C0A963958260>>.
- Walsh, Nick P. "Markov's umbrella assassin revealed." The Guardian. 6 June 2005. Retrieved 10 October 2008. <<http://www.guardian.co.uk/world/2005/jun/06/nickpatonwalsh>>.
- Wamper, Robert A. and Thomas S. Blanton. The September 11th Sourcebooks (Volume V: Anthrax at Sverdlovsk, 1979). The National Security Archive, Electronic Briefing Book No. 61. 15 November 2001. Retrieved 11 October 2008. <<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB61/>>.
- Warner, John ed. Department of Defense Anthrax Vaccine Immunization Program: Congressional Hearings. DIANE Publishing, 2001.
- Washington State Department of Health. "Giardia Fact Sheet." Washington State Department of Health. 2007. Retrieved 27 November 2007. <<http://www.doh.wa.gov/ehspl/factsheet/giardia.htm>>.
- Watchdog on Science. "Unreported Biological Accidents." Watchdog on Science. 3 March 2008. Retrieved 5 December 2008. <<http://watchdogonscience.blogspot.com/2008/03/unreported-biological-accidents.html>>.
- Weeden, Catherine R. et al. "Biological Control: A Guide to Natural Enemies in North America." Cornell University. 2008. Retrieved 5 September 2008. <<http://www.nysaes.cornell.edu/ent/biocontrol/pathogens/viruses.html>>.
- Weiner, Tim. "Soviet Defector Warns of Biological Weapons." The New York Times. 25 February 1998. Retrieved 9 July 2008. <<http://query.nytimes.com/gst/fullpage.html?sec=health&res=9C00E4DD123EF936A15751C0A96E958260>>.
- Wheelis, Mark. "Biological Warfare at the 1346 Siege of Caffa." Emerging Infectious Diseases. 26 July 2002. 8:9: 971-975. Retrieved 9 July 2008. <<http://www.cdc.gov/ncidod/EID/vol8no9/pdf/01-0536.pdf>>.
- "Biological Warfare before 1914." University of California. 1999. Retrieved 9 July 2008. <http://microbiology.ucdavis.edu/faculty/mwheelis/BW_before>

_1914.pdf>.

Wildlife Conservation Society. "The Deadly Dozen: Wildlife Diseases in the Age of Climate Change." Wildlife Conservation Society. 2008. Retrieved 7 August 2009. <http://archive.wcs.org/media/file/DEADLYdozen_screen.pdf>.

Williams, Bronwyn T. and Amy A. Zenger. Popular Culture and Representations of Literacy. New York: Routledge, 2007.

Williams, Peter and David Wallace D. Unit 731: Japan's Secret Biological Warfare in World War II. New York: Free Press, 1989.

Wisconsin Project on Nuclear Arms Control. "Iraq's Biological Weapon Program." Wisconsin Project on Nuclear Arms Control. August 2006. Retrieved 9 July 2008. <<http://www.iraqwatch.org/profiles/biological.html>>.

World Health Organization. Anthrax in Humans and Animals. Geneva: WHO Press, 2008a.

----- "Anthrax." World Health Organization. 2001. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/fs264/en/print.html>>.

----- "Diphtheria." World Health Organization. 2000. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/fs089/en/>>.

----- "Ebola Haemorrhagic Fever – Ebola Outbreak Chronology (fact sheet n° 103)." World Health Organization. 2008b. Retrieved December 2008. <<http://www.who.int/mediacentre/factsheets/fs103/en/index1.html>>.

----- "Influenza." World Health Organization. 2003. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/fs211/en/print.html>>.

----- "Marburg Haemorrhagic Fever." World Health Organization. 2008c. Retrieved 4 December 2008. <http://www.who.int/mediacentre/factsheets/fs_marburg/en/print.html>.

----- "Plague." World Health Organization. 2008d. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/fs267/en/print.html>>.

----- "Poliomyelitis." World Health Organization. 2008e. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/fs114/en/>>.

- Regional Office for South-East Asia. "Combating Emerging Infectious Diseases." World Health Organization. New Delhi: 2005a. Retrieved 19 December 2008. <http://www.searo.who.int/LinkFiles/Avian_Flu_combating_emerging_diseases.pdf>.
- "Rift Valley Fever." World Health Organization. 2008f. Retrieved 5 September 2008. <<http://www.who.int/mediacentre/factsheets/fs207/en>>.
- "Seasonal, Animal and Pandemic Influenza: An Overview." World Health Organization. 2009a. Retrieved 6 August 2009. <<http://whoinfluenza.infocollections.org/documents/s15546e/s15546e.pdf>>.
- "Pandemic (H1N1) 2009 – update 72." World Health Organization. 2009b. Retrieved 4 November 2009. <http://www.who.int/csr/don/2009_10_30/en/index.html>.
- "Smallpox." World Health Organization. 2008g. Retrieved 12 May 2008. <<http://www.who.int/mediacentre/factsheets/smallpox/en/>>.
- "WHO Establishing Smallpox Vaccine Reserve." World Health Organization. 2005b. Retrieved 9 July 2008. <http://www.who.int/mediacentre/news/notes/2005/np_wha02/en/>.
- and International Study Team. "Ebola Haemorrhagic Fever in Sudan, 1976." Bulletin of the World Health Organization. 1978. 56. 2: 247-70.
- Wu, Tien-wei. "A Preliminary Review of Studies of Japanese Biological Warfare and Unit 731 in the United States." Century China. 1997. Retrieved 9 July 2008. <<http://www.centurychina.com/wiihist/germwar/731rev.htm>>.
- WW2pacific. "Japanese Unit 731 Biological Warfare Unit." WW2Pacific. 21 January 2001. Retrieved 9 July 2008. <<http://www.ww2pacific.com/unit731.html>>.