Ebola Goes Pop: The Filovirus from Literature into Film

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In 1976, an outbreak of viral hemorrhagic fever occurred in the Yambuku region of Zaire near the Ebola River. Taking its name from the river, the virus that caused the outbreak is one of the filoviruses, so called because under the microscope they look like threads or filaments. In the years following the outbreak, the U.S. public has become increasingly fascinated with the Ebola virus, as shown by a variety of books and films that treat the topic. Robin Cook's novel Outbreak (1987) is an early example. Although the novelist was praised by Donovan Fitzpatrick as "nimble at stitching together the ingredients of terror, suspense, intrigue and medical expertise," perhaps the reason the novel failed fully to turn his readers' imagination on to Ebola is that, as this reviewer notes, Cook "is less adroit as a stylist." Or, more likely, it is because he devotes more attention to his human characters and plot than he does to characterizing the virus.

This is emphatically not true of Richard Preston's nonfiction piece for the New Yorker that followed in the fall of 1992. It was this magazine publication, detailing in gaudy prose the recent outbreaks of viral hemorrhagic fever caused by Ebola and a related virus, Marburg, that ignited some public interest and spurred the film industry into action: "Within weeks of the article's publication, Preston was talking to Hollywood producers. The real-life virus oozed with movie possibilities." Preston expanded the New Yorker article into the best-selling book, The Hot Zone, and sold film rights to
Twentieth Century Fox. Meanwhile, Arnold Kopelson at Warner Brothers became interested in Ebola, and for a while both studios had films on the subject in the works. The Ebola frenzy had begun in earnest. The Fox version, which was to have starred Robert Redford and Jodie Foster, never made it onto the screen because of difficulties with the writing and disagreements among the principals. The Warner Brothers version, called *Outbreak* but having nothing to do with Cook's novel, was released in 1995 and starred Dustin Hoffman, Rene Russo, Morgan Freeman, Donald Sutherland, and Cuba Gooding, Jr. In May 1995, a made-for-TV movie (based on Cook's novel and titled *Robin Cook's "Virus"*), starring William Devane and Nicollette Sheridan, was aired on nbc.

Almost as if responding to a cue, a real outbreak of Ebola hemorrhagic fever occurred in Kikwit, Zaire, in the spring of 1995, "caus[ing] a related fever on the Internet." Media reaction was predictable, prompting John Schwartz of the *Washington Post* to take the networks to task: "The national obsession with Ebola and the potential for similar diseases to appear has led to a sort of Cuisinart effect. ABC's 'Nightline' and other news programs even used scenes from the fictional movie 'Outbreak' to sharpen reports on the [spring 1995] Zairian Ebola outbreak....The result of blending of fact and fiction: an epidemic of heightened apprehension and misinformation." Once the outbreak was over, cnn and pbs's *Nova* aired specials on the event, cnn treating it flamboyantly as a detective story in which the goal was to capture the serial killer, Ebola. *Nova's* version, as one might expect, proceeded along somewhat less lurid lines.

While it was Preston's *New Yorker* article that ostensibly triggered the fierce and sudden interest in the Ebola virus, it alone does not explain our fascination with books and films about virological disasters or near disasters. When the public mind takes hold of an idea as tenaciously as it has embraced the Ebola literature, it is very likely that it has somehow been prepared, perhaps by recent historical or cultural events, for this embrace. The new idea may fill a psychological need, directly or
indirectly, of which we are barely conscious. What, then, are the factors that insure our receptivity to the facts and fictions about the Ebola virus? This essay will attempt to provide some answers to that question.

Preston's *Hot Zone* traces the known history of Ebola and its "sister" virus, Marburg, in African outbreaks as a prologue to his examination of Ebola Reston, a mutation of the known strains of Ebola virus, which infected imported monkeys under quarantine in the "monkey house" in Reston, Virginia. The discovery of this virus so close to home and the seat of government led to a near panic situation calling for investigation by usamriid (United States Army Research Institute of Infectious Diseases) and by the cdc (Centers for Disease Control), which played a lesser role in the crisis. Preston focuses his attention on two principal players in the drama, Lieutenant Colonel Nancy Jaax, veterinary pathologist, and her husband, Colonel Jerry Jaax, chief of the veterinary division, both at usamriid. The crisis was resolved when it was confirmed that humans do not contract Ebola Reston, though it is highly infectious and virulent in monkeys. And, of course, the danger of the virus mutating is always present. The entire population of the monkey house had to be sacrificed, and strong disinfective measures were taken. The book ends with a return to Africa and Preston's conjectures about the disappearance of the Ebola virus into an unknown host in the African rain forest and how that may ultimately affect the human race.

Cook's novel *Outbreak* (which preceded *The Hot Zone* by seven years) and *Virus*, the tv movie made from it, are substantially identical in plot. Both open with a historical account of the outbreak of Ebola in the Yambuku Mission Hospital in the Bumba region of Zaire, an account that the film replays impressionistically with jungle sounds and images followed by shots of a man obviously ill...
Film and novel move quickly into the fictional present day: a young pediatrician, Marissa Blumenthal, recently come to the CDC, is sent out to investigate a report of an unknown illness in a hospital in Los Angeles. Outbreaks of what proves to be Ebola occur in several large cities in the United States, but Marissa is relieved of her duty as investigator fairly early in the sequence for reasons that she finds suspicious. As might be expected, it proves true that she is getting much too close to a conspiracy, in this case a plot on the part of conservative physicians to discredit HMO-run hospitals, where these viral outbreaks occur, to be unsafe. These doctors are opposed to HMOs partly because they feel that they will undermine the traditional way medicine is practiced in this country and partly (perhaps mainly) because the growth of HMOs will work against their power and economic interests. The waters are muddied by Marissa's affair with one of the moving forces behind the conservative physicians' political action group and by her conflict with a superior, who feels Marissa is not professionally competent to handle such investigations. Finally her dismissal is ordered by a Congressman who receives heavy support from the conservative physicians. By this time, Marissa has turned bloodhound in the true tradition of detective fiction, and, donning a trenchcoat (in the film), she flouts the law for a good cause by breaking into the maximum containment lab to confirm that a vial of Ebola virus has been stolen. After several close calls in the lab and in pursuing the investigation elsewhere, she finally emerges not only with her life but with her reputation enhanced and her position restored.

The film *Outbreak* takes off from the Preston book, but does so rather by sleight of hand, since Warner Brothers had not purchased the rights to *The Hot Zone* and the story of Nancy and Jerry Jaax, as Fox had done. The film does feature a couple (now divorced) who work in the same high-danger field, hot-zone (Biosafety Level 4) virology, but only Sam Daniels (Dustin Hoffman) works for USAMRIID; his ex-wife, Robby (Rene Russo), holds a similar position at the CDC. *Outbreak* goes *The Hot Zone* one better by starring a yet more powerful and dangerous virus than Ebola: as the
camera peers into the microscope, it focuses on the Motaba virus, one that also causes viral hemorrhagic fever, but can do in five hours what it takes Ebola two days to accomplish. And Motaba is called upon to play several roles in the film. We first see it in the full seriousness of an outbreak in an African village in the Motaba River Valley in 1967. Two U.S. doctors, dressed in protective gear and identifiable only by their voices, take blood samples and promise to send aid. A plane comes in close; the personnel of the primitive hospital believe aid is coming, but the plane drops a bomb on the village instead, destroying it utterly. A quick switch brings us to the present and another African outbreak. Sam has been assigned to go to the Motaba River Valley to look into an outbreak of a deadly viral disease. Once there, he is told by a local physician that the village is dead. He is the only living human inhabitant of the village other than a local witch doctor holding an incantatory communion with divine forces on a distant hill. The witch doctor was spared, the physician tells Sam, because he spent a week in a cave, believing that the gods had been awakened by the cutting of trees to build a new road and, in anger, had sent the sickness as punishment.

Shortly thereafter, a monkey is smuggled into the United States, and this illegal act causes an outbreak of Motaba virus in this country. The virus, predictably, spreads, and we find that there is a conspiracy between Major General Donald McClintock (played in fine sinister form by Donald Sutherland) and Sam's superior officer, General Ford (played by Morgan Freeman). If we have been paying close attention, we recognize their voices as those of the two doctors from the earlier outbreak. Once the two are found by the camera's eye, we see clearly that the Army chain of command has placed the sympathetic African American physician (Freeman's character) in a position that grows increasingly uncomfortable in his acquiescence to the silver-haired McClintock, whose makeup reveals him as preternaturally white--cold and evil, a polar icecap of a man. These two physicians, military officers both, have developed an antibody serum against the Motaba virus, but they keep this a secret in order to protect Motaba's effectiveness as a weapon of
biological warfare. Naturally, Sam has to be kept off the track of the developing outbreak in the United States to keep him from making the connection, but the cdc has meanwhile assigned his ex-wife, Robby, to its arm of the case.

Like Marissa Blumenthal, Sam has suspicions and goals that can only be met by defying orders, which he does by flying to Cedar Creek, California, where the newest outbreak has occurred. At last having discovered that there is a vaccine for the original Motaba virus, but that the virus has since mutated, Sam becomes frantic in his search for the host when Robby comes down with the viral fever. He and his trainee-accomplice make off with an Army helicopter, and after a harrowing confrontation in the sky with two helicopters sent by Major General McClintock to bring them down and as a result of some very lucky guesses, they finally find the host monkey, which has in its body antibodies against both strains of Motaba. With McClintock prepared to destroy Cedar Creek in the same way the African town in which the virus first cropped up was destroyed, and with only minutes to spare, Sam dissuades the pilot who is carrying the bomb destined for Cedar Creek from carrying out his orders and thereby saves the town. His group goes to work to prepare the antiserum, and miraculously Robby gets it in time to survive the virus. (John Simon notes in his review of *Outbreak* that "Robby, the Saint Joan of the Communicable Disease Center [*sic*], gets motaba and starts dying of it, albeit at a speed considerably slower than anyone else, which allows--you guessed it--for a happy ending.")\(^9\) Having thus performed two roles--that of villain in the Motaba River Valley outbreak in Africa and that of deadly weapon in the aborted biological warfare conspiracy--the virus is ready to perform its third role in this drama, that of Cupid. The film ends with the love between Sam and Robby fully restored.
The production of fiction and film about the Ebola virus shows an escalation of interest that can be attributed to several factors. Although scientists such as Karl Johnson, formerly of the cdc, may find these viruses "beautiful," this is probably not the appeal they have for the average reader and filmgoer in this country. Johnson finds that his fear of viruses is dissolved in his close contemplation of them: "The fear is lessened as you begin to see the essence of the beauty. Looking at Ebola under an electron microscope is like looking at a gorgeously wrought ice castle. The thing is so cold. So totally pure" (p. 84; see fig. 1). It is more probable that the publication in 1994 of two hefty books on the threat of medical apocalypse (Preston's *The Hot Zone* and the broader, less popularized, more scholarly *The Coming Plague* by Laurie Garrett) have been responsible for focusing the nation's attention on the destructive potential of the virus. Certainly Preston's book has been more widely read, and his often hyperactive imagery has undoubtedly energized his readers' imagination as far as Ebola is concerned. For example, inside Kitum Cave, a site connected with an early Marburg victim Preston calls Charles Monet, there can be found elephant dung, bat guano, and "crystals...as sharp as hypodermic syringes" (p. 9).

Later, when Monet is approaching the final stages of the disease, "The human virus bomb explodes....Then comes a sound like a bedsheet being torn in half, which is the sound of his bowels opening and venting blood from the anus. The blood is mixed with intestinal lining. He has sloughed his gut....Monet has crashed and is bleeding [End Page 154] out" (pp. 16-17). Ebola blood "looks as if it has been buzzed in an electric blender" (p. 74), and a particular strain of the virus "showed a kind of obscenity you see only in nature...so extreme that it dissolves imperceptibly into beauty" (p.}
95). Ebola Zaire "seemed to emerge out of the stillness of an implacable force brooding on an inscrutable intention" (pp. 69-70), Preston tells us (invoking un cited a passage from Conrad's *Heart of Darkness*), a Protean force that has "retreated to the heart of the bush, where undoubtedly it lives to this day...able to shift its shape, able to mutate and become a new thing, with the potential to enter the human species in a new form" (p. 69).

It is also necessary to consider our response to Ebola in the context of aids. When asked by a *Newsweek* interviewer why "people are so fascinated by viruses these days," Richard Preston replied, "There's a deep curiosity, there's a sense of horror. And I also think that in the backs of people's minds, ever present, is the aids virus." It is thus possible that the threat of aids, very real to U.S. audiences, has prompted us to play out our fears in films and fiction that are, though more terrifying, more remote for us in the 1990s than aids is. Perhaps it is true of our interest in the filoviruses, as Susan Sontag suggests (in talking about aids), that the taste for worst-case scenarios reflects the need to master fear of what is felt to be uncontrollable. It also expresses an imaginative complicity with disaster. The sense of cultural distress or failure gives rise to the desire for a clean sweep, a tabula rasa. No one wants a plague, of course. But, yes, it would be a chance to begin again. And beginning again--that is very modern, very American, too.

In a discussion of two versions of a science fiction film, *The Thing* (1951 and 1982), Edward Guerrero notes "the shifts from a 1950s political paranoia to a 1980s ecospheric paranoia registered [in these and] in a wide variety of films." While the earlier film focused on the Cold War and "threats of communist subversion of the body politic," he sees films in the 1980s as portraying "biological threats of the pandemic spread of bacterial and viral agents through our physical bodies." In short, aids "has been transcoded into the imagination of science fiction and horror cinema." In the 1982 version, a person's body may be penetrated by minute particles of "The Thing," whose
presence may linger undetected for a very long time while it takes control, an analogy, Guerrero feels, for the "long period of asymptomatic latency" of aids. In this it does not much resemble Ebola, but at [End Page 155] its climax, when it is "unmasked" by being "diagnosed, it violently explodes out of the colonized body into a spreading mass of tentacles, flesh, and splattering bloody fluids" in an exaggerated parody of the "human virus bomb" that "explodes" when Charles Monet has "sloughed his gut" (Preston, 16-17) as well as of "the visual stigmata and suffering" that characterize the final stages of aids. 14

Even though the filoviruses are all too real, they are surely not immune to inclusion in horror films. It seems certain that Guerrero would find in the corpus of works about Ebola under discussion here another transcoding of aids, for he concludes his essay "on an open, if not grim, note":

for the transcoded representation of aids in science fiction and horror films, and media in general, seems to be at its inception for the sad and obvious reason that the literal disease has yet to be contained. Most certainly, we will see the continuing refinement of all of the codes and metaphors explored in this essay as well as the cinematic eruption from our political unconscious of many more xenomorphic and metamorphosing monsters analogizing uncomfortable and at the same time alluring epidemiological and etiological kernels related to the disease. [italics added] 15

Surely the prevalence in the films of hypodermic needles (medical invaders of the body's perimeters) mimics the sexual penetration implicated in the spread of sexually-transmitted aids. This is particularly threatening in Virus, where a hypodermic syringe containing the Ebola virus is used as a weapon in an attempt to stop Marissa's investigation; and again, in Outbreak, where Robby contracts Motaba by accidentally piercing her protective gloves. The filoviruses are, certainly, not appealing in
themselves, but both films contain footage that foregrounds through closeup shots the allure of monkeys whose endearing qualities cause or nearly cause disaster: Marissa is sidetracked from sacrificing the monkey she believes to be the carrier of Ebola (Virus; see fig. 2); and the smuggled monkey causes the outbreak when it is lovingly released to the wild and later is clearly seen as a threat to the little girl who discovers it in the woods behind her house (Outbreak, the film).

Frank Rich, writing in the New York Times in December 1992, after the publication of Preston's October article in the New Yorker and after the release in November of Bram Stoker's "Dracula," takes note of what he calls "the new blood culture." The Dracula film, he suggests, is "opera for the new blood culture[:] the bizarre pop byproduct of a [End Page 156] national obsession with all bodily fluids...of a country that has awakened to the fact that the most insidious post-cold-war enemy is a virus," by which he means hiv. "Its undiminished threat," he contends, "has made the connection between sex and death, an eternal nexus of high culture, into a pop fixation." 16 Rich locates the source of the new "blood culture" in a "trickle-down anxiety," pointing out that "aids awareness--specifically, the awareness that the disease is not the exclusive property of homosexuals, drug users and hemophiliacs--has increased exponentially in the year of Magic Johnson." 17 Although Rich does not mention Ebola, it certainly feeds into the blood culture he evokes in his pictures of "unsafe sex [that] is depicted as an exchange of blood with lubricious vampire vixens, and not even babies are immune to the threat. At times vampires appear as mist and fog--vaporized fluids that can invade unsuspecting bloodstreams" as the Ebola virus has been seen to do. Rich states that the Dracula film "touches every 1992 blood button it can." 18 Certainly this is true as well of the works dealing with Ebola that are considered here, as is seen, for instance, in the shocking scene in Outbreak where a medical worker is splattered with infected blood from the centrifuge he is operating. 19 And like aids in the body of Magic Johnson, the Ebola virus is seen as an infectious agent that does not confine itself to a particular stigmatizable population. In fact, it may be considered quite the opposite. Ebola
outbreaks, as Laurie Garrett points out in *The Coming Plague*, occur often in "poorly run hospitals operating under conditions of extreme deprivation." This insure that the primary risk group is not one that is stigmatized and "othered," but consists, rather, of medical workers, a prestigious group that might be considered a level of near-aristocracy in even a democratic society.

Thus, our imagination has been readied for literature and film dealing with emerging viruses by heightened aids awareness about the dangers of direct contact with another's bodily fluids and by dramatic and accessible books about the Ebola virus. Viveca Gretton and Tom Orman point out, however, that aids, "the most pressing health crisis in recent memory, ironically enough, rarely figures in mainstream male melodramas, mainly because aids and aids-related illness cannot be divorced from explicit political issues concerning sexuality, homophobia, education, and the allocation of research funds and health care resources." Bernard Weinraub, in an article heralding the film that was [End Page 157] to become *Philadelphia*, notes the same lack and finds this surprising, considering that Hollywood has been unusually supportive of aids causes. The Hollywood film industry has tended, he says, to avoid difficult subjects in recent years, preferring instead films that can count on a wider acceptability. Increasing awareness and knowledge of aids is discordant with the reluctance to reflect these concerns on the screen. The Ebola virus might serve to resolve the discord by providing a usable transcoding device for exploring the blood fear that we must certainly see as underlying what Rich terms "the new blood culture." It is also true that the consciousness of the U.S. public has become increasingly medicalized: as Ralph (the physician who is both her lover and betrayer in Cook's *Outbreak*) says to Marissa, "Watching the nightly news these
days gives one a medical education." 23 Joy Gould Boyum, invoking a viewer-response theory analogous to reader-response theory in literary criticism, talks about the "ideal viewer" of a film adaptation of a novel being one "whose resymbolization of a particular novel will mesh with the resymbolized novel up there on the screen." 24 Analogically, the ideal viewer of any film might be the one whose resymbolization of reality will mesh with what is seen "up there on the screen." Is it not true that, over the last decade or so, the moviegoing audience as a whole, with its growing understanding of and exposure to aids in particular and medical matters in general, has become more of an "ideal viewer" for these virus films?

This does not, of course, mean that every viewer stands as an expert before these works on medical topics, but it is true, I think, that most of us feel we have acquired some expertise as a result of the medical information we are exposed to through the media and in the films we watch and the books we read. This educated posture, however spurious it may be in some cases, brings about a receptivity to issues presented in the documentary genre. Although not interested in defining genre precisely, Leland Poague presents a theory of apprehending and learning about genres based on the concept of "innateness" as it is developed in Chomskyian linguistics. He argues that

we have an innate and quite specific capacity unlike other learning capacities to recognize particular literary and generic categories and rules as they operate in actual discourse and to construct, on the basis of a very finite amount of data, a few works per genre, a "grammar" of such rules and conventions appropriate for the understanding and appreciation of the vast majority of the works we subsequently encounter and/or create. 25 [End Page 158]

*The Hot Zone*, however inflammatory Preston's style, is of course a factual account of the Ebola virus in Africa and in Reston, Virginia. Cook's novel *Outbreak*, the TV movie *Virus*, and the film
Outbreak are all fictions, but all, to some extent, attempt to snare the reader or viewer into believing that they are documentary versions of Ebola outbreaks.

All four works begin in Africa, where Ebola was first seen. Probably because Preston's book is overtly nonfiction, he can allow himself opening descriptions of the landscape in prose that is showy, sometimes ominous, while the novelist, because he wants to clothe his plot in the mantle of reality, takes a more plainly "factual" stance, describing the outbreak in Zaire in 1976 as though through diary entries. Both films declare the importance of their subject while at the same time announcing their commitment to reliability by beginning with authoritative quotations:

The single biggest threat to man's continued dominance on the planet is the virus.
Joshua Lederberg, Ph.D. Nobel laureate (Outbreak)

The virus is mankind's ultimate predator.
Robin Cook, M.D. (Virus)

Both films cut instantly to jungle footage with jungle noises (in the case of Virus also accompanied by a jungly musical score). Both films make extensive use throughout of subtitles giving dates and locations of events. These techniques are ploys to activate our innate expectations of the documentary genre and to lull us into a willing suspension of disbelief, thus inducing our acceptance of the incredible events that are to follow (and, in the fictive works, many of these events are "unbelievable" in the worst sense of the word).

What we have, then, is a mixture of genres, which, at its best, can in itself serve to expand audience awareness leading to an enlarged experience of the work. Nadine McGann suggests in an interview
with John Greyson, a gay filmmaker, that he uses the mixed-genre technique consciously (though in a reverse of the pattern described above): "You often make documentaries that are framed within another story that is some sort of drama....The mixing of genres seems to make it possible to address these issues on different levels within the same tape." 26 There is also, of course, the danger that the audience will hopelessly confuse fact and fiction and emerge from the viewing experience with an arsenal of half-truths. Whether the fictional story and details about the real virus actually serve to reinforce one another in this case is another question, one that will be discussed below in a somewhat different context. John Simon feels that the mix in the film Outbreak, in any case, is not successful artistically:

Why are disaster movies almost always disasters? A disaster must be treated coolly, in documentary fashion, to ring true. But Hollywood dreads documentaries, and assumes that people want a rattling good story with characters they can "identify with." And that is how trouble is born: Outbreak, which could have been a good disaster film, is an artistic catastrophe. 27 Clearly in Simon's view the fictive elements, at least in this case, prove almost as damaging to the good disaster film as they are to the news story, as noted earlier by journalist John Schwartz. 28

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The presentation of hot-zone virology in terms of its scientific and technological aspect is common to all the works under discussion and is an element involved in the seduction of the viewer toward the conclusion that all the works belong in the realm of fact and therefore in the genre of the documentary. Here the issue of good science/bad science becomes entangled with Hollywood
science, and it cannot be denied that Hollywood science is very convincing in many respects. Several reviewers have taken delight in pointing out the improbability (read "impossibility") of Sam's extracting antibodies against any virus in the time or the quantity required to save his ex-wife, Robby, not to mention all the inhabitants of the town of Cedar Creek, California. Nonetheless, Wolfgang Petersen was aiming for as much accuracy as possible because, as he rather pedantically, if misleadingly, said, it's "an educational thing." 29 In the same article, Mary Roach stresses the role of Donna Cline, "Hollywood's top medical adviser," who was hired to instill as much accuracy in *Outbreak* as possible. Apparently unable to return scientific accuracy to the manufacture of antibodies at the climax of the film, Cline "focuse[d] on the scene-by-scene details: dialogue, props, makeup, costumes." 30 For example, she ensured that 1967 vintage stethoscopes were used for the African flashbacks and, in the interests of authenticity, ran up a bill of $8,000 for IV supplies alone! "There's [End Page 160] a ninety-second rolling shot through the biocontainment labs, virologically correct down to their 1.2 milliliter screw-top cryovials," for instance, but "when it's a question of drama versus medical minutia, [Cline will] sometimes compromise. 'Take last week's body bag shot,' she says. 'The last thing we see as the orderlies zip up the bags on these dead characters is their faces. Well, in reality, the head goes at the other end and the last thing you see is the toe tag.'" 31

The look of scientific accuracy imparted to *Outbreak* by Donna Cline has been little more than a cosmetic facelift. As Robin Cook points out in an interview in which he is asked to compare *Outbreak* with *Virus*, the latter makes the former look "like child's play, which unfortunately it is." He further remarks that *Outbreak* "suffers from [having] not much of a story, and it's totally unrealistic. In that sense, it does a disservice. As a writer and a physician too, dealing with a subject like a virus, you should at least be scientifically correct." *Outbreak*, he says, is "totally the opposite," presenting the "false idea that you somehow can come up with vaccines miraculously." 32 Cook, of course, is a trained physician, and as he understandably says, would "feel vulnerable to derision from
colleagues if the story isn't authentic." 33 Whether the moviegoing public is somehow poorly served by fiction based on bad science is perhaps a more difficult question, but certainly one worth asking. If it is true, as is widely believed, that we develop our ethical standards from the stories our society values, then we must also take into account the clarity with which those stories render reality.

To a considerable degree, the virus has taken the place of the nuclear bomb as a threat of destruction that animated film and fiction during the Cold War and after. In both cases the fear is of power that inheres in invisibility: neither nuclear particles nor viruses are visible to the unaided eye; and both partake of the mystery that invisibility bestows. A major difference in a real-life scenario between these two destroyers is that nuclear violence must somehow be perpetrated by a human agent, while the virus is largely self-actuating. This distinction is not, interestingly enough, as significant to the "story" in which the virus is implicated as one might imagine. In the novel and films under discussion here, the virus poses its threat not through its own power, but as a means of destruction wielded by human hands. 34

Even in *The Hot Zone*, a work of non-fiction, human agency is implicated in the spread of the disease, however accidentally or involuntarily it may involve itself in that process. Not only may one person pass the virus to another because of unprotected human contact (the virus is spread through contact with infected body fluids), but the [End Page 161] hospital itself may be implicated, as it was in the 1976 Ebola outbreak in Zaire, where Ebola "savaged patients and snaked like chain lightning out from the hospital through patients' families....In some cases, the medical system may intensify the outbreak, like a lens that focuses sunlight on a heap of tinder" (Preston, 68). As pointed out above, Laurie Garett also notes that "poorly run hospitals...were the amplifiers of microbial invasions." 35
In the fictive works we see many conventions characteristic of the kind of suspense film in which disaster is threatened through the misuse of power by people in high places. James Bowman, asserting his annoyance with "message movies" in a review of *Outbreak*, finds that "[t]hey became an annoyance in the sixties, a pain in the seventies, a disease in the eighties, and look like becoming a plague in the nineties." These message movies, he states, "draw on a more general Hollywood paranoia about government that is the most common element in films with a political message....[In *Outbreak,*] [f]inding a cure for the horrible disease turns out to be a piece of cake. The real drama lies--see if you can guess--in a deadly military plot to cover up the fact that the virus was the subject of its experimentation with biological warfare." 36 John Simon, too, faults the film for its reliance on "a conspiracy theory, that old standby," feeling that it caters slavishly to audience expectations in that "though people are dying with horrendous symptoms right and left, no child ever does: our filmmakers know exactly what a red-blooded American audience will tolerate, and what it won't." 37 The use of conspiracy in the fictive works is rather a double-edged sword: on the one hand, there is optimism in the notion that if human beings started the disaster rolling, then somehow neutralizing the bad guys will avert the catastrophe; on the other hand, the virus has the capacity to become a plague, and plagues have been sent as a response by the gods to human evil since the days of antiquity. Blood guilt of one sort or another is responsible for evoking the vengeance of the gods in most Greek tragedies (and the "bleeding out" caused by Ebola can be seen as a clear modern image of blood guilt), so a conspiracy that involves the spread of the Ebola virus considered in that way presages a pessimistic end.
What draws the works under discussion together, besides the fact of their being about the filoviruses, is their imagery. The imagery in the films is especially important because the images in a work, whether filmic or literary, most influence our reaction to it. Although all the works open on the African scene, it is clear (because Cook's novel Outbreak starts differently, with terse journal-type entries) that the opening pages of The Hot Zone have dictated the establishing shots of both films: views of the jungle, cutting quickly to close-up shots of monkeys. Africa, particularly the jungle, has a history of suggesting darkness, impenetrability and mystery--all laced with evil--to the colonialist mind. Conrad's Heart of Darkness has become almost archetypal in this respect. To some degree, the unfortunate qualities of this image are mitigated in the film Outbreak, where the African physician tells the U.S. medical team that, according to a native medicine man, the virus had been brought to the village by someone who was working with white men, cutting down trees "where no man should be." The medicine man viewed the viral outbreak as a punishment: the gods who were awakened from their sleep were angry.

The quick cut to monkeys is interesting in that it invites several interpretations. Because The Hot Zone focused so strongly on Ebola Reston, the strain brought to the United States by infected monkeys, there would seem to be a natural association between monkeys and the virus in Preston's book. It is, however, not at all certain that monkeys are the host animal for the strains of Ebola that do infect humans. The infected monkeys quarantined in the monkey house in Reston were macaques; the monkeys shown on screen are, however, capuchins, much smaller than macaques and much cuter, somewhat resembling Siamese cats (fig. 2). One might easily wish for one as a house pet. The domestication of monkeys is subtly indicated, too, in Virus, where a monkey-like figurine sits contemplatively on Marissa's kitchen counter, shown as a bit of background in a quick scene near the beginning, but, like Chekhov's gun on the mantle, it comes back more ominously later in the film. One cannot help remembering that Camus's The Plague begins with the discovery of rats (definitely
not cute, and differing from the capuchins also in that they are dead), and it's hard to forget that it was animals who announced the coming plague. The viewer is thus drawn to contradictory interpretations: should we love the animal for its alluring cuteness or loathe it for the evil it may presumably (but in reality probably does not) house? Is this the seductive nature of evil, perhaps? 38

Protective gear is another resonant image used in all these works (fig. 3). Preston's book establishes it clearly as one of the major appurtenances of the Biosafety Level 4 laboratory and one that must be frequently inspected for holes or tears in order to maintain the integrity of the virologist's armor against the dangerous atmosphere of the lab. Preston tells of a close call Nancy Jaax had when she stabbed a needle through both layers of protective gloves. Although she does not contract Ebola as a result, Outbreak's Robby, in a similar situation, is unable to decontaminate herself despite the immediate application of disinfectant. Protective gear functions as a powerful image in The Hot Zone, when workers entering the monkey house in order to disinfect it are instructed not to don their suits where they can be seen because that will inflame the press and cause panic among the citizens of Reston. The matter of protective gear is well and interestingly handled in the novel and the films as well. Cook uses Marissa's inexperience (she does not have access to the maximum containment lab and has persuaded her friend Tad to take her in there anyway) to instruct both her and the reader about the use of the suits and the lab: the process of dressing, of disinfecting, and of hooking up to the oxygen. The exposure to the different levels of biohazard are wonderfully filmed in Outbreak as well, and are "[a]ctually the best part of the film...where we are led, [End Page 164] documentary fashion, through different laboratories devoted to the study of ever more contagious diseases, until we reach the fourth level--those for which there is no known cure." 39 A long tracking shot takes the viewer into each Biosafety level, showing the increased precautions of each level. This is particularly evident in the degree of facial protection: there is a progression from no mask in Biosafety Level 1 through the simple cotton mask to cover nose and mouth in Level 2; a
more complex nose and mouth mask in Level 3; to a full helmet in Biosafety Level 4, a laboratory that is only reached over a long walkway raised above the heads of the other workers, emphasizing both the importance and the isolation of those who work with the most hazardous viruses.

Rich speaks of the "fetishization of the condom, the blood's ubiquitous defender [as] an inevitable product of the blood culture." 40 In these works the protective suit of Biosafety Level 4 functions certainly as an analog to the condom, protecting, as it does, the entire body from the bodily fluids and infectious agents of the Other. The concern for tears and other chinks in the armor provided by the delicate fabric that allows the worker to be protected, yet still to move effectively, is analogous, as well, to the fear of the loss of the protection of the thin membrane that shields the condom's wearer, while still permitting him to enjoy sexual pleasure. Near the end of Outbreak, Sam strokes the transparent shield over Robby's face in an act of condomized sexuality, and later, once the monkey from which they will draw antibodies has been captured, Robby returns that gesture. Sam, presumably sure now that antibodies will be available, ignores all the dictates of safe sex and removes his protective helmet so that Robby may touch his skin.

Protective gear may also serve as a mask or disguise, and as such it mimics the victim of Ebola, one of whose symptoms is that the face assumes the qualities of a mask. In speaking of the patient he calls Charles Monet, Preston says, "His face lost all appearance of life and set itself into an expressionless mask, with the eyeballs fixed, paralytic, and staring....He began to look like a zombie" (p. 11). Marissa's attackers in the maximum containment lab in Virus are particularly threatening in that they are masked by protective helmets and are thus unidentifiable. In the film Outbreak, the masking quality of the protective gear is used to fullest advantage, with the medical workers appearing in protective suits of pastel blue and yellow, while the Army personnel (clearly cast as villains in this piece) appear more ominously suited in dark camouflage attire. When the Army
invades Cedar Creek, many of the soldiers are wearing gas masks, which hide their faces and blot out their individuality, not only rendering them indistinguishable from one another but also giving them the appearance of cloned invaders from a distant planet.

The preoccupation of the postmodern mind with technology and the replication of images that can be manipulated to various transformative ends finds a reflection in the ability of the virus to multiply and, through multiplication, to transform tissues and organs, and ultimately the entire human being. This is doubtless another of the reasons these narratives are received with so much interest in the 1990s. Preston describes the virus as the "replicative Other" (p. 50), explaining that "[o]nce the virus enters the cell...[i]t switches on and begins to replicate....[V]iruses can bud through a cell wall, like drips coming out of a faucet--drip, drip, drip, drip, copy, copy, copy, copy....Compact, hard, logical, totally selfish, the virus is dedicated to making copies of itself....The prime directive is to replicate" (pp. 58-59). The virus is a [End Page 166] living analog of the atom, which holds the secret of nuclear war. The danger of both inheres in their invisibility to the naked eye, a quality that allows the virus to infiltrate and wreak changes upon the human body or, analogously, the atom (as a weapon of subversive agents) to enter and transform the body politic without being seen. Each requires elaborate technology to detect its presence. The slides of Ebola, shown in both films, are the result of intense magnification, and these slides may themselves, of course, be replicated endlessly through the use of state-of-the-art technology.

The Ebola virus and its predations upon the body are often described in terms of food imagery. It is, of course, common for physicians to represent bodily phenomena in terms of the size and texture of ordinary foodstuffs in order to ground their description in familiar experience. Richard Selzer marks this practice among doctors in a humorous discussion of the hunger of pathologists:
The truth is that pathology is less an occupation concerned with diagnosis, than a preoccupation with the oddments and endments of the flesh. So famished are its practitioners for specimens that, in time, they become themselves a confusion of hungers. Hence their reprehensible penchant for comparing the manifestations of disease to items of food. As in "cheesy pus," "coffee-ground vomitus," "nutmeg liver," "currant jelly stool, and the peau d'orange breast of cancer. In this, they have the precedent of Petronius who likened the perianal warts of his boy-lovers unto an "orchard of figs." Let a pathologist read aloud his reports, and every decent gorge rises. Tumors are the size of grapes, walnuts, plums, eggs, lemons, oranges, grapefruit, and melons. Pumpkin and watermelon being invoked only for the rare ovarian cyst. And while it is not, strictly speaking, one of the edibility, toothpaste is the favorite simile for the stools passed in obstructive jaundice. Toothpaste and stool! A sophomoric misalliance indeed. 41

While the charm of Selzer's reflection lies in the genteel squeamishness that informs it, Preston's purpose is quite different: he aims neither for Selzer's humor nor for the physician's practicality of expression. Rather, he exploits the descriptive strategy common among physicians by allowing his images of the ravages of Ebola to stray luridly and nauseatingly into the kitchen. For instance, the organs of monkeys that have died of the virus are described as "soup" (p. 175) and "mush" (p. 212). Ebola is touted as the "perfect parasite" because it turns every part [End Page 167] of the human body into "a digested slime" (p. 72). More colorful images portray the effect of the virus on the body as "gumbo" and "jelly" (p. 43) and the rash that accompanies the viral infection as "tapioca pudding" (p. 73). Culturing the virus is compared to making beer (p. 122), Ebola blood "looks as if it has been buzzed in an electric blender" (p. 74), and the virus itself resembles "noodles that [have] been cooked al dente" (p. 257).

The probable purpose of these nauseatingly vivid comparisons is to move the discussion of the virus
and its effect on the human body from the realm of scientific language to a world that is universally apprehendable through the senses. The use of food analogies has, in addition, other less obvious effects. Heather Schell finds "the reduction of humans to food" a "frightening dissolution" of the boundary between human beings and other forms of life. In her view, eradication of boundaries, which serves to destroy the distinction between self and Other, triggers a fear of social change in Western, first-world minds. She notes that most of Preston's images show human tissue as "prepared food" and pictures the virus as "'cooking' inside hosts!" 42 This is indeed an uncomfortable relocation of human beings in the food chain! A related effect of these images is to bring into play the element of vampirism that Rich detects in the new blood culture, with, of course, the virus playing the part of the vampire. In any case, the overall impression produced by Preston's use of food to describe Ebola and its depredations is to bring into sharp focus in human terms the contrast between the nourishing and the detrimental, health and illness, life and death.

The films have forborne to enter into the food play that Preston indulges in; in fact, they stop short of imaging Ebola in any of its advanced stages, being content to show merely reddened eyes and skin and discreet bleeding from facial orifices. In discussing Donna Cline's role in promoting the medical realism in *Outbreak*, Mary Roach raises questions about portraying the ravages of this shocking disease in a naturalistic fashion: "Does Jane Q. Public want to see necrogenic concavities and desquamating skin lesions in Technicolor on a fifty-foot screen? At what point does medical veracity cross the thin, seeping line into gore?" 43 Nonetheless the food analogy is subtly drawn in *Virus*, when the camera slowly pans, without visible disruption, from the vials in Marissa's lab to the bottles on the counter in her kitchen, where she has begun to prepare dinner for her treacherous lover, Ralph. It is worth noting that the monkey-like figurine, whose presence was described above, presides dangerously over Marissa's food preparation. [End Page 168]
It is interesting, too, that so many of Preston's tropes for presenting the virus in *The Hot Zone* serve to anthropomorphize it, imputing to it human motivation and volition. It is seen as a trio of sisters: "The Ebolas were named Ebola Zaire and Ebola Sudan. Marburg was the mildest of the three filovirus sisters" (p. 27). Ebola Zaire is a "slate wiper" (p. 27), like other viruses, "attempting [italics added] to convert the host into *itself* [sic]" (p. 13). The virus is ingenious, becoming a "Trojan horse" (p. 58) in the human cell, "compact, hard, logical, totally selfish" (p. 59), and making the cell "pregnant" (p. 138). The virus is pictured as an equal combatant in the field that is often thought to be most characteristic of the human, the search for knowledge: medical workers often do not "care to do research on Ebola because they [do] not want Ebola to do research on them" (p. 45). In Preston's perhaps most lurid image, a team of medical workers walks into an abandoned birthing room and finds the presumptuous virus taking a seat at the summit of aristocratic hierarchy: "The team had discovered the red chamber of the virus queen at the end of the earth" (p. 86). In the Preston book anthropomorphization serves to aggrandize the virus, sometimes imputing to it a powerful classical presence (as in the case of the allusion to the Three Sisters or Fates), in order to demonstrate its power over victims and medical workers alike.

In the film *Outbreak*, however, anthropomorphization seems to serve somewhat the opposite purpose: to reduce it to size, to attempt to tame it. When Major Salt (the rookie virologist, played by Cuba Gooding, Jr.) magnifies and isolates the Motaba virus, he offers Sam and Casey (Kevin Spacey) a look at it, introducing it as "Mr. Motaba, up close and personal." As the camera zooms in on the image, Sam says, "You have to love its simplicity....it's one-billionth of our size and it's beating us." Casey's rejoinder again attempts to bring it into a manageable perspective: "So what do you want to do, take it to dinner?" to which Sam replies, "No, kill it," suggesting that it, like people and animals, is mortal, that its self-replicative power can be controlled.
Perhaps the strongest and most controversial set of images used in Preston's book are the images of warfare, suggesting, as they do, the idea that the virus has replaced nuclear warfare as foremost in our panoply of fears. A few examples will demonstrate the power of the military images used in The Hot Zone. Charles Monet, victim of the Marburg virus in 1980, is described as "a human virus bomb" (p. 15) and "an Exocet missile that struck the hospital below the water line" (p. 32). During the last phase of his illness, "the human virus bomb explodes," and he has "crashed and bled out" (p. 16). When Ebola [End Page 169] erupts in Sudan, "what happened [there] could be compared to the secret detonation of an atomic bomb" (pp. 68-69). Death by filovirus is described as "terminal meltdown" (p. 272), and after death a "sort of shock-related meltdown occurs [in which] the corpse's connective tissue, skin, and organs...begin to liquefy" (p. 75). When Nancy Jaax, veterinary pathologist at usamriid, examines virus-infected monkey liver slides under the microscope, she finds that "[t]hey were blitzed and pock-marked, as if the liver had been carpet bombed" (p. 168). This is vivid language, and its hyperactivity may also make it dangerous language. The use of military metaphors has an ethical dimension that has been noted by Susan Sontag: "the effect of the military imagery on thinking about sickness and health is far from inconsequential. It overmobilizes, it overdescribes, and it powerfully contributes to the excommunicating and stigmatizing of the ill." 44 Further, it is a dubious practice to bring the military and the medical into such close conjunction, particularly in a case such as this, one that must involve a consideration of the relationship between first- and third-world ideas, traditions, and interests, a connection deplored by the isolated medicine man seen on screen near the start of Outbreak.

War imagery dominates in the film Outbreak. One of the earliest events in the movie is the 1967 bombing of the village ravaged by Motaba, an act that is discovered to have been perpetrated by Generals McClintock and Ford after they have obtained Motaba blood samples that they will use to manufacture antibodies and store as a biological weapon for future use. Although one cannot say that
These men are the United States Army, they clearly cast the Army in a bad light. They easily demonstrate that they have the clout to mobilize sufficient military power to enforce a quarantine in Cedar Creek, where the Motaba virus has erupted. And the evil McClintock has the power to persuade the President and the Pentagon that the town should be firebombed, telling them at a meeting in Washington to "be compassionate, but be compassionate globally." His intention, of course, is to preserve the biological weapon that he and Ford have clandestinely created and secretly stored. The Army enters the town at night, dark-clad and riding in tanks, trucks, and helicopters—a frightening scene. As the quarantine continues, those who are ill are taken from their homes and sent or taken to a makeshift Red Cross hospital that has been set up, not to treat them, for that is not possible, but, in a devotion to procedure that is suggestive of the Nazi doctors, to take blood samples and direct them to tents where they will stay until they die. The march into the hospital is slow—a death march—and the Holocaust [End Page 170] imagery is heightened when, once inside the hospital, they are directed outside again to their new (and final) quarters. The ill and dying, straggling slowly along, stand in sharp contrast to the Army personnel looming dark, strong, and faceless (because gasmasked), an irresistible force against humanity. The analogy to the Holocaust is complete when a barn that has been loaded to the rafters with body bags is torched and burns to the ground in seconds.

The reflection of human agency or responsibility in the outbreaks of emerging viruses is consonant with the idea that plagues have something to tell us about human behavior, an idea at least as old as Biblical and classical times. Richard Preston's language reflects that association, often incorporating
older concepts in up-to-date imagery. It would, however, be easy to overemphasize this aspect of his work. Generally, at least during the major portion of the book, for Preston the villain is clearly the virus; the heroes are the medical workers who risk their lives caring for the ill and attempting to pin down the virus and its host. This is, however, not true of the films and fiction under consideration. In these cases, the villains are clearly human, and the virus is employed as a deadly weapon in the pursuit of private and unethical ends. Cook's novel and the TV movie made from it, although set in the context of the CDC, a government-supported agency, show this evil in the persons of private individuals who are working to subvert public power and interest through terrorist acts in order to undermine the growing institution of managed care. Petersen's film, on the other hand, implicates high-ranking officers of the United States Army who, through any means, seek to maintain the nation in readiness to conduct biological warfare, a crime on a far larger scale. The fear both works engender is fear of human evil in its lack of regard for the welfare of others, rather than the fear we might feel toward a rogue virus. The power of the virus, however, remains fully intact: it is no more thrown into question than would be the power of the nuclear bomb.

The largest ethical issue that hangs over all of these works is one that is not directly discussed by any one of them: what is the role played by Western capitalism and Western medicine in these outbreaks of viral fever? If, as mentioned earlier, hospitals are implicated in the amplification of the virus, we must question what we are doing when we export Western medicine to non-Western countries. Western medicine, [End Page 171] to be effective, must be practiced rigorously and expensively. As Preston implies, tribal ways of handling an outbreak of viral disease, such as isolation of the ill and burning huts in which people have died, may be more effective (p. 87). In a more encompassing sense, we must question the result of exporting Western technology to Africa and other non-Western countries, particularly, as it has so often been done, to provide for the removal of raw materials and
and the exploitation of cheap labor. As Preston suggests in a passage that places the emerging viruses directly on stage in what might be a Greek tragedy, "aids is the revenge of the rain forest. It is only the first act of the revenge" (p. 289). Other viruses are waiting in the wings. The rather purple prose he uses in his final pages clearly embodies the Greek idea of unavoidable fate in the revenge tragedy he foresees: "In a sense, the earth is mounting an immune response against the human species...Ebola [has] risen..., flashed its colors, fed, and subsided into the forest. It will be back" (pp. 287, 291).

The idea that humans are being punished for their uncontrolled replication and their behavior as *homo economicus* is present in the films we have been discussing as well. The warning of the witch doctor in what serves as a prologue to *Outbreak*--that the gods are angry and sending a plague as a punishment for cutting down the trees--is worth listening to. Both *Virus* and *The Hot Zone* give credence to the idea that a global consciousness is necessary to understand the viral outbreaks of recent times; the film *Outbreak*, however, does not complete the frame as *The Hot Zone* and *Virus* do, with a return to Africa. *Virus* emphasizes humanity's culpability in the spread of dangerous viruses by ending with an admonitory message. It closes with these words superimposed on jungle footage and backed by jungle sounds:

Ebola is a real virus.

No one knows when it might reappear... as it did in Zaire.

Scientists think thousands of these viruses wait, hidden in the deep forests throughout the world. [End Page 172]

They are simply the earth's defense systems against the most dangerous of invaders... Man.

There is a quick and final cut to the monkey seen at the beginning, and it
is the monkey who has the final, if ambiguous, word: a scream.

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Notes


4. Robert Preston, The Hot Zone (New York: Random House, 1994). Subsequent quotations are from this edition and will be cited parenthetically in the text.


6. Subsequent references to this film will abbreviate the title as Virus.
7. Aldo A. Benini and Janet K. Bradford, "Ebola Strikes the Global Village: The Virus, the Media, the Organized Response" [pamphlet] (San Luis Obispo, Calif.: Social Sciences Department, California Polytechnic State University, 1995), 8.


14. Ibid., 89, for all quoted material except Preston.

15. Ibid., 93.

17. Ibid., 11.

18. Ibid.

19. In the film Stonewall (1996), a character shoots himself while in bed, splattering both his gay lover and the bedclothes very liberally with blood. In the context of aids and the gay culture, this scene both "touches every [1990s] blood button" and creates a feeling of nostalgia for the days before 1980, when blood was just blood and not a possible death sentence.

20. Garrett, 220.


27. Simon, 64.

28. Heather Schell, in a recent article titled "Outburst! A Chilling True Story about Emerging-Virus Narratives and Pandemic Social Change" (Configurations 5, no. 1 [winter 1997]: 93-133), discusses the way the "apparently distinct genres" of virology journal articles, popular science writing, and science fiction are "mutually, minutely entangled" (p. 98). She feels that it is no longer possible to view these genres separately. Each is contaminated by the others in what Schell calls "genre interpenetration" (p. 100). Although we deal with some of the same texts, Schell's thesis is that the current Western preoccupation with emerging viruses and the metaphors that are used to discuss them reflect a fear of social change.


30. Ibid.

31. Ibid., 84, 82.


34. William T. Close's Ebola: A Documentary Novel of Its First Explosion (New York: Fawcett, 1995) defies this pattern. The book concerns the close interaction between a group of Belgian nuns living and working in the hospital and members of the indigenous population of Zaire during an
Ebola outbreak. The novel focuses on one nun in particular and emphasizes the emotional toll that living with an epidemic exacts.

35. Garrett, 220.


37. Simon, 65.

38. It is interesting to notice the ubiquitous and semiotic presence of monkeys in the recent film *12 Monkeys*, in which the hero is time warped from the future to the present to discover how it happened that a virus struck the human race and drove what was left of it to seek refuge underground. It is thought that a group called the 12 Monkeys was responsible.


42. Schell, 120-21.

43. Roach, 79.

44. Sontag, 182.