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Double-Take: A Second Look at Cloning, Science Fiction and Law

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Double-Take: A Second Look at Cloning, Science Fiction and Law

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I. INTRODUCTION

On film or in print, science fiction creates a world of its own,¹ a world that may offer an enticing and imaginative portrayal of our future or mirror or distort our ideas of the current day.² Its success in doing so is the measure of its believability. Books such as the *Robot* novels of Isaac Asimov³ and the *Dune* novels of Frank Herbert,⁴ large parts of the works of such writers as Ray Bradbury,⁵ Stanislaw Lem,⁶ and Robert A. Heinlein,⁷ films such as *Star Wars*⁸ and its sequels, television series such as the original *Star Trek* and its film and

1. On the creation of science fiction worlds, see Albert Wendland, *Science, Myth, and the Fictional Creation of Alien Worlds* (1980) (Studies in Speculative Fiction; 12).

2. Science fiction writers do not necessarily believe, however, that this world bears any resemblance to the future. "[S]cience fiction does not really try to predict the future. That is a fact. It's not debatable. That is not the role of science fiction, to predict the future. Science fiction books are not judged on whether they come true or not. Because if that were the case there'd be one science fiction book. The right one." Philip K. Dick, *quoted in* Gregg Rickman, "Philip K. Dick on *Blade Runner: They Did Sight Stimulation On My Brain*," in *Retrofitting Blade Runner* 103, 106 (Judith B. Kerman ed. 1991).

3. Among the Asimov novels which present an android fully capable of functioning in human society are the Lije Bailey "detective" novels: *The Caves of Steel* (1954); *The Naked Sun* (1957); *The Robots of Dawn* (1950); and the related *I, Robot* (1950). Contrast with Lieutenant Commander Data's statement to Lieutenant Yar that he is as "fully functional" as a human male. *Star Trek: The Next Generation: The Naked Now* (Paramount TV television broadcast, Oct. 5, 1987).

4. Frank Herbert, *Dune* (1965); *Dune Messiah* (1969); *Children of Dune* (1976); *God Emperor of Dune* (1981).

5. Ray Bradbury, *The Martian Chronicles* (1950).

6. Lem's novels, written during the Communist regime, include *Solaris* (1970), in which a space expedition discovers the true nature of another planet, and *The Invincible* (1973), about the adventures of a spaceship crew and its highly unusual craft. Another of Lem's recurring themes is the nature of reality and the effect of human perception on behavior. See, e.g., *The Chain of Chance* (1978) (in which a detective attempts to solve the mystery of a seemingly unrelated series of deaths); *The Investigation* (1974) (in which the narrator investigates the reasons behind the movements of corpses around the English countryside).

7. *Stranger in a Strange Land* (1961). Other writers interested in rights in a science fiction context include: Orson Scott Card (*Ender's Game* (1985)), John Brunner (*The Shockwave Rider* (1975)), William Gibson (*Neuromancer* (1994)), H. Beam Piper (*Little Fuzzy* (1962) and *Fuzzy Sapiens* (1984)), and James Blish (*A Case of Conscience* (1958)).

8. (Twentieth Century Fox 1977); *Star Wars, The Empire Strikes Back* (Twentieth Century Fox/Lucasfilm Entertainment 1981) and *The Return of the Jedi* (Twentieth Century Fox/Lucasfilm Entertainment 1984) are the invention of the wonderfully creative George Lucas. They have recently been rereleased with some additional footage.

television progeny,⁹ *The X-Files*,¹⁰ and many others, provide insights into our own culture through their depiction of alternative cultures, worlds and future adventures. They offer a world sufficiently coherent¹¹ to allow the viewer to suspend disbelief at least for an hour or two. The glue holding such fantastic stories together is the success with which the writers create a coherent vision of an alternate world or future. Further, the experiences of the characters, while futuristic or incredible in vision, must address questions relevant to our present day experiences in order to engage our sympathies.

When we venture into these fantasy universes and take their challenges for our own, we demand that their internal coherence offer us enough interest to maintain our attention. Science fiction fans, increasingly more sophisticated, object to gadgets that defy the laws of physics, or alien life forms which ignore the tenets of basic biology without plausible explanation. Some writers,

9. *Star Trek* (NBC television broadcast, 1966-1969) was the creation of the late Gene Roddenberry (1921-1991) and engendered seven Paramount movies: *Star Trek: The Motion Picture* (Paramount Pictures 1980), *Star Trek 2: The Wrath of Khan* (Paramount Pictures 1982), *Star Trek 3: The Search For Spock* (Paramount Pictures 1983), *Star Trek IV: The Voyage Home* (Paramount Pictures 1987), *Star Trek V: The Undiscovered Country* (Paramount Pictures 1991), *Star Trek VI: The Final Frontier* (Paramount Pictures 1993), *Star Trek: Generations* (Paramount Pictures 1994), and *Star Trek: First Contact* (Paramount Pictures 1998), and the sequel television series, *Star Trek: The Next Generation* (Paramount TV television broadcast, 1987-1994), *Star Trek: Deep Space Nine* (Paramount TV television broadcast, 1993-current) and *Star Trek: Voyager* (Paramount TV television broadcast, 1995-current). Other recent science fiction series dealing with human rights issues have included: *Battlestar Galactica* (Universal TV television broadcast, 1978) (heavily derivative of the *Star Wars* movies, to the extent that George Lucas threatened a lawsuit (See *Star Wars R2D2 Did Not Infringe Copyright to Robots in Silent Running*, 3 Ent'l L. Rep. (July 1, 1981) (available in LEXIS Library NEWS, File ARCNWS)); *Lost In Space* (Twentieth Century Fox Television/CBS television broadcast, 1965-1968) (an underrated series primarily because of its dreadful special effects, but an interesting look at the possibilities of space colonization); *Babylon 5* (Warner Brothers television broadcast, 1994-current); *Sea Quest* (The Sci-Fi Channel television broadcast, 1997-current); the British series *Blake's Seven* (BBC television broadcast, 1978-1981); and *Space 1999* (ITC Corporation television broadcast, 1975-1977). There were also comedy science fiction series, including the British entry *Red Dwarf* (BBC television broadcast, 1988), about the lone survivor of an ill-fated space mission doomed to spend his remaining days with alien life forms and the holographic image of a superior officer who detests him, and the little-known and short-lived *Quark* (Columbia Pictures TV television broadcast, 1978), about a spacegoing garbage scow collecting intergalactic trash and encountering alien life forms. The distinction between the two was not always immediately apparent.

10. (Fox television broadcast, 1993-current).

11. Indeed, some viewers (called "Trekkies") are so wrapped up in this alternate universe that *Star Trek* captain William Shatner urged them to "get a life" during a memorable *Saturday Night Live* appearance (NBC television broadcast, Dec. 20, 1986). "[A] lot of people sneer at Trekkies, accuse them of existing in a state of arrested development, call them nerds and stuff. And, yes, there are a lot of oddballs attracted to the *Star Trek* phenomenon." Rosie DiManno, *Trekkie-Fest Draws the Real Space Cadets*, *Toronto Star*, July 28, 1991, at A1. *Star Trek* fans don't necessarily leave their logical faculties at the door, however; see Phil Farrand's "Nitpicker's Guide" series, including *The Nitpicker's Guide for Next Generation Trekkers* (1993) and *The Nitpicker's Guide for Classic Trekkers* (1994), which demonstrate both love for the show and a desire for good writing and for rational thinking.

including both amateur and professional¹² scientists, have noted this phenomenon.¹³

The claim for "hard" scientific accuracy in [science fiction] has been made too often to document. In a [science fiction] story one cannot have an Earthman walking in a swimsuit on the surface of Mars; one should not ignore the workings of such background hardware as life-support systems, radiation shields, and propulsion engines (one cannot go to the moon today by rising dewdrops). . . . If [science fiction] is to be scientific, it must assume science's role of explaining nature "in its own terms" of showing the supernatural to be natural after all.¹⁴

A visit to the Official X-files Fan Forum,¹⁵ for example, shows that viewers evaluate each episode for character and plot consistency. They greet lapses in continuity, flaws in story development, or errors in elaboration of the science, technology or Chris Carter's own X-files mythology¹⁶ with derision. Anyone who has attended a *Star Trek* or other science fiction convention knows that avid fans (or fen, as they are referred to) can describe futuristic minutiae while participating in often rancorous discussion of the overall issues of social commentary presented by various shows and films.¹⁷

As the representation of the future, or of an alternate present, science fiction addresses the psychological and philosophical questions that human beings pose about the universe and their place in it. Driven by the urge to settle these questions, writers of these films and television series imagine scenarios in which they address issues based on differing economic, social, religious and technological values. The stories critique current events and social trends, and also reflect the conscious or unconscious biases of the writer(s). The end of the film or television show presents possibilities for resolving the issues addressed, or leaves the viewer with a dire warning for the future should present conditions continue.

Science fiction television shows and films reflect both the emotional and instinctive responses we have to our environment, while overtly providing a reasoned, and imaginative statement about how and why our world exists.

12. Granted, some of the *Star Trek* movies, notably *Star Trek: The Motion Picture*, offer mediocre plots but the special effects are wonderful. They require a willing suspension of disbelief, however, since some of the space-age wonders depicted are physically impossible according to experts. See "*Trek*" *Warps Time, Space*, USA Today, Mar. 22, 1989, at 1A.

13. On the verisimilitude of the physics and biology of the original *Star Trek*, see Cindy Schreuder, *TV Show Beamed Hope into American Culture*, Orlando Sentinel Trib., Sept. 1, 1991, at A1.

14. Wendland, *supra* note 1, at 12.

15. (visited Mar. 25, 1999) <<http://www.thexfilesfanclub.com>>.

16. See (visited Feb. 7, 1999) <<http://bbs.foxworld.com/x-index.html>>.

17. See Henry Jenkins, *Textual Poachers* (1992), or any of the collections in the Best of *Trek* series (e.g. *The Best of Trek*, volume 18 (Walter Irwin and G. B. Love, eds., 1996)). On *Star Trek* fans see (visited Apr. 6, 1999) <<http://www.altculture.com/aentries/trekkers.html>>.

Generally, the conclusions reached seek to address common human concerns.¹⁸ Often those concerns include a desire to "improve" the species or to exploit human potential to its fullest, or alternatively to protect human beings from slavery, degradation and deterioration on the part of those who would "debase" the species in an attempt to control it. In either case, very human concerns about social, ethical, religious and legal controls guide decision making.¹⁹ These include preferred choices, acceptable social limits, and intellectual, social, physical, and emotional requirements that humans need not only to survive, but also to thrive individually or collectively.

Such preferred controls and acceptable limits may take the form of physical control (through regulation of movement, for example), social, religious, or moral controls (through regulation of marriage or other relationships), or biological controls (through genetic manipulation and/or cloning which implicate both physical and social controls as well). Further, since the publication of *Frankenstein*,²⁰ fictional descriptions of attempts to alleviate human suffering as well as improve the human condition, a favorite subject of religious and social philosophers for many centuries, have taken the form of cautionary tales of the creation of new or altered life forms, suggesting that if one of humanity's favorite daydreams, "playing God," might someday be within reach, we must be ready to face and control the consequences.²¹ That so much discussion in all forums now takes place with regard to the possibility and desirability of creating "artificial life" or "artificial intelligence" testifies to the continued interest we have in exploiting our own potential as creators and controllers of our destiny. Yet the thought that by cloning ourselves we could approximate immortality directly conflicts with our feeling that death, for humans, is inevitable.

Yet the same *strictures* which apply to the presentation of the hard and social sciences with regard to science fiction worlds do not seem to apply in the area of law, so that we have in the same story scrupulously accurate (or at least not violently *inaccurate*) portrayals of science and psychology, and wildly distorted views of law, based on what its author believes would be the acceptable norms governing her imaginary society. Since for the most part these stories are cautionary tales about the dangers of legally and morally unregulated science and its practitioners, corrupt politicians and greedy business people,

18. That the premises from which these answers are derived are generally accepted as accurate is obvious from the discussions on such USENET lists as: rec.arts.sf.announce; rec.arts.sf.fandom; rec.arts.sf.marketplace; rec.arts.sf.misc; rec.arts.sf.movies; rec.arts.sf.reviews; rec.arts.sf.science; rec.arts.sf.starwars; rec.arts.sf.tv; rec.arts.sf.written; rec.arts.startrek.current; rec.arts.startrek.fandom; rec.arts.startrek.info; rec.arts.startrek.misc; rec.arts.startrek.reviews; rec.arts.startrek.tech. Television series like *Star Trek* and films like *Star Wars* and *Blade Runner* shape viewers' impressions on the proper role and likely efficacy of law.

19. On amoral uses of science and technology and their consequences, see Alexandra Aldridge, *The Scientific World View in Dystopia* (1984) (Studies in Speculative Fiction; 3).

20. Mary Shelley, *Frankenstein* (1816).

21. On science in Shelley's novel, see Samuel Holmes Vasbinder, *Scientific Attitudes in Mary Shelley's Frankenstein* (1984) (Studies in Speculative Fiction; 8).

we can discern some uniformity in science fiction messages about the desirability of cloning.

This Essay explores some science fiction images of the "man-made" creation of life through cloning, and by extension genetic manipulation, its science and technology, and its practitioners. Because the television series *Star Trek* and *The X-Files* are so popular and their influence so pervasive, we examine some of their episodes to identify what attitudes their writers exhibit toward the question of cloning and genetic manipulation. We suggest some parallels between the treatment of cloning in science fiction and in legal and social responses to the possible use of such science and technology.

Further, we argue that the generalized fear of "mad science," of unintended consequences, and of the individual's inability or unwillingness to make ethical choices focuses attention on the negative outcomes of cloning and, by extension, may contribute to inappropriate or badly designed legislation. Positive outcomes (the cure for an inherited disease, genetic screening in the womb to prevent premature death or congenital defects) remain underemphasized. The lack of positive images of cloning and genetic manipulation mirror a lack of trust in science and scientists that has developed over the past thirty years. Premature speculations about the undesirable, though still unrealized consequences of cloning further induce non-scientists to fear science. Rather than work with scientists to identify clear limits and correct mistaken assumptions about scientific research and the scientific method, they tend to reject such research and use of scientific knowledge altogether. The interaction between law and popular culture is still generally unexplored, but we hope that we make a small contribution to that end.

II. COPIES' RIGHTS AND COPY WRONGS: THE FEAR OF CLONES IN POPULAR CULTURE

As technology offers us brave new worlds²² of science, medicine, and engineering, it outstrips the ability of law, ethics, and religion to deal with the moral questions presented. Perhaps nowhere is this dysfunction more evident than in the science fiction speculations of such television series as the various *Star Treks*, *The X-Files*, and their related films. Both shows examine uses of technology and science to create alternative methods of human reproduction, and the characters ultimately reject them, even though they rarely reject other types of scientific intervention to better the human condition. Particularly common are stories involving genetic manipulation,²³ specifically cloning, and cross-species

22. The phrase "brave new world" first appears in William Shakespeare's *The Tempest*, Act V, Scene i, line 183: "O brave new world, That has such people in't!" Aldous Huxley adopted it as a title for his dystopian novel *Brave New World* (1932).

23. In general, genetic manipulation refers to a variety of ways of altering the DNA of a organism. It can apply to changes made to a single gene or a group of genes, or may involve altering the organism's entire genome (the complement of DNA). Such changes to the genome might

manipulations (that is, manufacture of gene products in a host other than the original) (heterologous expression), the use of pharmaceuticals, viruses, vaccines, antibiotics, and hybridization as the proposed mechanisms that might lead to the creation of artificial life and examinations of the legal status of those creations.

Scientists, lawyers and the public all tend to see the dangers or benefits of reproducing life through asexual means without a corresponding recognition of the rights and responsibilities involved.²⁴ Popular culture uniformly condemns the utility of developing cloning as a method of reproduction or of extending life, postulating that it leads to self-worship, arrogance, and eventually, the extinction of the race.

Ironically, we reject a method of reproduction which could offer the promise of eliminating "bad genes" because it might lead to, or its practice exacerbate "bad character." Some people view cloning as a means to propagate what they consider to be "bad" lifestyles, as in the case of "queer cloning," a method through which homosexuals could reproduce themselves. While the expense of cloning would seem to make this practice prohibitive except in the cases of the wealthy, expansion of the technology would bring it within reach of many people; therefore the possibility of spreading "queer culture" would also spread homosexuality, and with it, additional evil.²⁵

Cloning also brings out our fear of the unauthorized use of our bodies, particularly for men. Since men have great experience of imposing their reproductive will on women (because women have the singular ability to bear children), but not of having women's will imposed on them in similar fashion, their objections seem much more intense. The unauthorized use of our own likenesses (via photography for example, a type of "cloning" through technology) leads to violent arguments about the invasion of privacy and the rights of publicity in Western European nations, and the fear of the theft of souls through this medium, expressed by some African cultures.²⁶

be heritable (capable of being passed to subsequent generations) if the genes are altered in reproductive tissues (for example eggs and sperm), or may be somatic (not heritable, if the genes are manipulated only in non-reproductive tissues, such as in the skin, liver, or hair). Many countries currently maintain official agencies which overview and provide guidelines for genetic manipulations, for example, the Genetic Manipulation Advisory Committee (GMAC), Australia. See (visited Feb. 6, 1999) <<http://www.dist.gov.au/science/gmac/backgrnd.htm>>.

24. For a quick survey of the parade of horrors, see Jean Bethke Elstain, *To Clone or Not to Clone*, in *Clones and Clones* 181 (Martha Nussbaum, ed. 1998).

25. On the possible economics of cloning, see Eric Posner and Richard A. Posner, *The Demand for Human Cloning*, in *Clones and Clones*, *supra* note 24, at 233.

26. This Masai belief may be disappearing with the influx of Western tourists. "Laws against photographing the Masai tribe in East Africa stem from the tribe's traditional belief that cameras capture their souls. While many Masai apparently still hold to this, many of the ones who live in areas frequented by tourists have transformed themselves into willing photo opportunities to raise some quick cash." John Flinn, *Picture Imperfect: Masai, Tourists Set Dignity Aside to Capture Kodak Moments*, Fort Worth Star-Telegram, June 21, 1998, at 7.

On the other hand, we claim the right to use our own bodies as we please. More and more objections are raised to the regulation of "victimless" crimes²⁷—prostitution for example,²⁸ or the sale of organs,²⁹ particularly in non-Western European dominated cultures. Why then should we maintain a taboo on cloning oneself? Surely, although we might argue that this kind of reproduction implicates only the wishes of the person cloned, the practice of cloning does implicate responsibilities and traditions, not only of individuals but of society. At what point should society prohibit such a practice? The question is currently open for debate in real life, but in science fiction, it seems fairly clearly answered already. Cloning in science fiction is generally regarded as either unacceptable or unworkable, for ethical, philosophical and political reasons.

As we examine these issues and how they are presented in science fiction, we will identify some important questions, among them, what is a clone? What is individuality? Which fears about cloning are true, based in solid scientific objections to the practice? And which are the result of moral, or philosophical, or ethical, or religious, or instinctual taboos? Which are based on fear or misunderstanding of the science involved, or distress over possible social and legal disruption?

Images of new life created by cloning or other genetic manipulation are generated by both rational and irrational fears of science and technology, and of the scientists practicing at the forefront of knowledge. We will also speculate on the future of this technology, and the impact of current and proposed legislation in the area, and discuss mistaken assumptions that underlie some proposed legislation.

III. THE BASIC BIOLOGY OF CLONING

The oldest means of altering organisms is through selective breeding of individual plants or animals for desired traits. This is the mainstay of all modern agriculture, and a method familiar to the non-scientist. For example, breeding for specific traits can give better milk-producing cows, rosebushes with larger or more fragrant flowers, or bacteria that perform fermentation processes more efficiently.

27. On "overcriminalization," see Stuart P. Green, *Why It's a Crime to Tear the Tag Off a Mattress: Overcriminalization and the Moral Content of Regulatory Offenses*, 46 Emory L.J. 1533 (1997).

28. On prostitution, see Michael Conant, *Federalism, the Mann Act, and the Imperative to Decriminalize Prostitution*, 5 Cornell J.L. & Pol'y 99 (1996).

29. On organ sale and donation, see, e.g., Gloria J. Banks, *Legal & Ethical Safeguards: Protection of Society's Most Vulnerable Participants in a Commercialized Organ Transplantation System*, 21 Am. J. L. & Med. 45 (1995), or Howard J. Schwartz, *Bioethical and Legal Considerations in Increasing the Supply of Transplantable Organs: From UAGA to "Baby Fae"*, 10 Am. J. L. & Med. 397 (1985). Organ transplants from animals are another matter. See F. Morgan, *Babe the Magnificent Organ Donor? The Perils and Promises Surrounding Xenotransplantation*, 124 J. Contemp. Health L. & Pol'y 127 (1997), or the recent *Ally McBeal* episode featuring a lawsuit against an emergency room physician who transplanted a pig's organ into an unconscious patient.

However, breeding is an inefficient process because it mixes entire genomes and fails to allow breeders to isolate the particular traits that interest them. Thus, inheritance of a specific trait depends on the probability that the trait is passed to any specific organism in the next generation; the traditional breeder is an experimenter who cannot ensure that the trait will indeed be inherited. Hence, one of the driving forces to understand genetics is to develop and use technology that can manipulate and use specific genes.

Fittingly, the word "clone" has multiple, related meanings. "Clone" is derived from the Greek term "clon," which means "twig."³⁰ In this sense, a twig shares the genetic information of its parent, but is in no way a copy. From the perspective of a layperson, a clone is an organism that is genetically identical to another organism. That is, the word "clone" is perceived as equivalent to "copy." While fitting within the more formal, scientific definition of a clone, this type of cloning is a special case and is not the most common manifestation of cloning. Further, although the popular press may imply that cloning can only arise through human intervention, like the research which resulted in the cloned sheep Dolly's birth, we deal with human "clones" in daily life all the time. We are all familiar with the phenomenon of identical twins, triplets, quadruplets, or quintuplets, each of whom would be a clone of the others in a particular set.³¹ We recognize that each multiple is an individual, and do not think of them as "clones" because we do not perceive any intentional human intervention in their origin.

From the biologist's perspective, the word "clone" is jargon: a term that refers to any duplication of DNA.³² Cloning, therefore, can occur on a variety of scales. It may involve copying small pieces of DNA, whole genes, chromosomes, or the entire genetic complement of an organism (its genome). For a molecular biologist, to "clone" a gene is to remove physically and isolate it for study. A gene taken from one cell and duplicated in another cell, then, produces a clone. Cloning a multicellular organism involves the transfer of a cell's nucleus, which houses the genome of the organism to be cloned, to an egg of another organism, from which the nucleus has been removed. The new, synthetic egg may then develop in the usual fashion to produce a whole organism. When applied to tissue culture, the isolation of cells from a tissue can produce a cell line, where repeated culture of cells over time leads to a genetically identical population very useful for research. Ecologists and population biologists recognize that many organisms preferentially reproduce "clonally" or asexually, including aphids, bacteria, fungi,³³ and

30. See 3 Oxford English Dictionary 342 (1989). On social, psychological and emotional meanings of the copy, see Hillel Schwartz, *The Culture of the Copy: Striking Likenesses, Unreasonable Facsimiles* (1996).

31. One of the most famous examples is that of the Dionne quintuplets. See James Brough, *We Were Five* (1965).

32. On cloning generally see (visited Feb. 6, 1999) <<http://bioethics.gov/pubs/>>.

33. See Michael J. Pelzar, Jr. et al., *Microbiology* 119 (4th ed., 1977).

aspen.³⁴ To a developmental biologist, when an egg and a sperm merge, through the first critical cell divisions, all cells are identical, and could be considered clones. However, as they differentiate into specific tissues, by the turning on and off of different genes, the cells become functionally distinct and are no longer "clones." Horticulturists are familiar with the technique of cutting and culturing of a leaf or other plant part in order to propagate their favorite varieties; this procedure, simply put, is cloning.

If cloning is so common, what specific technologies and advancements have brought it to the attention of legislators and the public? The potential for whole organism cloning, in particular human cloning, is the primary type of cloning of interest. The recent technological advancement was whole organism cloning of a mammal. Whereas DNA from one organism can be transferred to another through various methods and replicated easily, what has been more difficult is getting one nucleus transferred to another egg, in toto, and then getting the reproductive machinery to work properly to allow gestation. The process has been done since the 1950s, starting with the simple genomes of bacteria, then plants, frogs and some invertebrates, and lately, with mammals such as mice, sheep, and cattle. Thus, an adult sheep cell nucleus was transferred to a recipient sheep egg cell without a nucleus, and the famous Dolly was born.³⁵

Very recently, a group in South Korea reported cloning human DNA and generating the earliest stage embryo (8-cell stage), but this claim has not been substantiated.³⁶ If these scientists have actually succeeded in cloning a human embryo, the current world-wide ethical debate over the procedure will only become more vociferous.

IV. SOCIAL COMMENTARY AND SCIENCE: THE REPRODUCTION OF HUMAN LIFE THROUGH CLONING AS SEEN IN THE MEDIA

That cloning arouses fears is obvious from the attention and furor that accompanied the Roslyn Institute's announcement of Dolly's birth. "[D]ebates

34. On yeast, *see id.* at 325. Aphids, bees, and some lizards can reproduce parthenogenically. On aphids *see* Michael Begon et al., *Ecology: Individuals, Populations, and Communities* 187 (1986); on bees *see* Peter H. Raven and George B. Johnson, *Biology* 851 (1986); on lizards *see* Raven and Johnson, *supra*, at 422; mushrooms, yeast, some reptiles, and aspen are only some of the examples. Aspens, ferns and coral can reproduce clonally. *See* Begon et al., *supra*, at 195. "The major aquatic weed problems of the world are caused by plants that multiply as clones and fragment and fall to pieces as they grow. Duckweeds, the water hyacinth, Canadian pond weed and the water fern *Salvinia* are all examples of organisms that disperse their modules, and in which the product of a single zygote may disperse through the water courses of an entire nation." Begon et al., *supra*, at 196. On ferns *see* Begon et al., *supra*, at 195. Note that in *The X-Files* episode *End Game*, Mulder's supposed cloned sister lived with many other clones on a secluded farm tending bees. The symbolism is obvious.

35. *See* Gina Kolata, *Clone: The Road to Dolly and the Path Ahead* (1998).

36. *Why Cloning a Genius May Yield a Dud*, *Toronto Star*, Feb. 21, 1999, available in LEXIS NEWS Library, CURNWS File.

prompted by last year's cloning of Dolly the sheep evoked images of a crazed Dr. Frankenstein building a monster, of loathsome infant freaks in medical labs and museums, or of soulless duplicates of a Hitler or Saddam Hussein.³⁷ Australia,³⁸ England,³⁹ the United States,⁴⁰ and other national governments immediately began hearings on the advisability and the legality of human cloning.⁴¹ Scientists advising the Australian government fear that outright banning will "drive cloning research underground" or to private research companies, just as it has in the United States.⁴² Amid all the controversy, Dolly's "dad," Ian Wilmut, urges that animal cloning be severely limited to meet carefully defined goals: to treat or cure genetic or other disease.⁴³

Like many other scientists and philosophers, Wilmut publicly rejected the notion of human cloning while at Princeton University. Wilmut suggested three potential reasons for cloning people—to treat infertility, to bring back a lost relative and to copy a desired person—and rejected all three on ethical grounds. "I do understand the motivation of the first two; the third, I do not," Wilmut said. "I have not heard a reason of copying a person that is acceptable," he said. "It is not an acceptable way of treating that child," he added, referring to the stigma and expectations that would likely be attached to a cloned child. The element of chance presents the most troubling dilemma in the process of cloning, Wilmut said. "Chance events may keep that person from developing into the original. Surely this is going to create some tension," he noted. To prevent human cloning, Wilmut called for regulation by an authoritative body, "whether it be by individual hospitals, or on the state or federal level," he said. Though he offered his opinions, Wilmut said, "My main purpose is to help you form your own opinions."⁴⁴

37. August Gribbin, *Human Cloning Draws Nearer as Ethicists Seek to Draw Rules; With Bans Ineffectual, Market for Babies Drives Research*, Wash. Times, Nov. 9, 1998, at A1.

38. *Science Academy Calls for Cloning Research Regulation*, available in AAP Newsfeed, Mar. 17, 1999, LEXIS NEWS Library, CURNWS File, (hereinafter *Science Academy*).

39. Stuart Wavell, *The Sparks Fly When Crystal Balls Collide*, Sunday Times of London, Mar. 14, 1999.

40. Testimony of Arthur L. Caplan, *The Ethics of Stem Cell Research*, Subcomm. on Labor, Health and Human Services of the Senate Comm. on Appropriations, Jan. 14, 1999.

41. The British Government has already issued some reports and position papers on the matter. Philip Webster and Peter Riddell, *Tighter Cloning Control on the Way*, The Times of London, Feb. 2, 1999, available in LEXIS NEWS Library, CURNWS File.

42. *Science Academy*, *supra* note 38. On the ineffectiveness of government jawboning against cloning, see also August Gribbin, *Human Cloning Draws Nearer as Ethicists Seek to Draw Rules; With Bans Ineffectual, Market for Babies Drives Research*, Wash. Times, Nov. 9, 1998, at A1. The American Bar Association regularly issues reports documenting its concern over whole-hearted adoption of possibly problematic advances in biotechnology. Robert A. Stein, *New Laws for New Technology*, 85 A.B.A. J. 92 (1999).

43. Alli Brayton, *Wilmut Defends Cloning Research, Encourages Caution at Princeton*, Daily Princetonian, Mar. 1, 1999.

44. Brayton, *supra* note 43.

Wilmot's statement highlights the mixed emotions that we feel regarding the possibilities offered by cloning. The focus on duplication of an entire human being, rather than simply one or two organs, from an "original" cell gets to the heart of at least some of the conflicts we feel. We do not simply see cloning as a new variant on *in vitro* fertilization,⁴⁵ which was developed medically to aid infertile couples to have children, that is, to create new, original, lives. Instead, we regard it as the possible production of a "copy" of an already existing individual. "Normally occurring twins" do not bother us, although the theme of "good twin/evil twin" is familiar from the movies, as is the possibility for deceit through the substitution of one twin for the other. We are already familiar with the disturbing images of "evil twins," both in the movies and in real life. For example, Bette Davis plays good and evil twins in the film *Dead Ringer*,⁴⁶ a role recreated by Jane Seymour in *Dark Mirror*.⁴⁷ The good twin/evil twin dichotomy continues to be popular, as evidenced by the film *Lives of the Twins*,⁴⁸ based on a true story. Finally, Hayley Mills plays good twins seeking to reunite their parents in Walt Disney's *The Parent Trap*,⁴⁹ based on a children's novel.⁵⁰ How much more troubling is the clone, an "unnatural" twin?

That "cloning" has numerous connotations, symbolisms and analogies, most of them negative, and that new technologies constantly offer us additional possibilities for meaning, only exacerbates the situation. Photography creates "clones" in that it recreates likenesses. The possibility of parallel universes suggests that we all have many clones existing in alternate dimensions, but of

45. Although this technique too was greeted with a great public outcry, and still continues to cause debate. See Tony Hope et al., *Should Older Women Be Offered In Vitro Fertilisation? An Ethical Debate*, 310 Br. Med. J. 1455 (1995).

46. (Warner Bros. 1964).

47. (ABC television broadcast, 1984). Another film on the same subject is *Brotherly Love* (CBS television broadcast, 1985), starring Judd Hirsch as a good twin living an exemplary life and an evil, psychotic twin out to frame him for murder. At one point the "good twin," Ben Ryder, explains to his wife that the evil twin "Harry Brand" is angry because Ben had refused to make a false confession to an earlier crime in order to confuse the police so that they would refuse to arrest either twin, a favorite "good twin/evil twin" plot device. It was used also in the *Columbo* episode *Double Shock* (Universal TV television broadcast, 1973).

48. *Dead Ringers* (Mantle Clinic II/Morgan Creek Productions 1988), inspired in part by the lives of twin gynecologists Stewart and Cyril Marcus (see Vern Perry, *Bizarre (Squared): "Dead Ringers" Package Doubles Your Pleasure*, Orange County Register, Sept. 27, 1996, at 19); *Lives of the Twins* (MCA Home Video 1991) (based on the novel by Rosamund Smith (Joyce Carol Oates), *Lives of the Twins* (1987)). Another true story made into film was that of the criminal twins, The Krays (Fugitive Features 1990). The good twin, evil twin theme appears in films such as *Nazi Agent* (MGM 1942) (one twin a Nazi, the other an Allied loyalist). The *Columbo* mystery movie *Double Shock* (Universal TV television broadcast, 1973) features criminal twins who plan a murder. Earlier, Shakespeare used the "twin" gambit in *The Comedy of Errors*, updated as the Rodgers and Hart musical *The Boys From Syracuse*.

49. (Walt Disney Pictures 1961).

50. Erich Kastner, *Das Doppelte Lottchen* (1949).

course those clones would think of us as the clones.⁵¹ Audio technology offers us "is it live? Or is it Memorex?" Now that many of us have internet-created persona, which personality is the original? And which is the simulcrum? Or is the simulcrum also an original?⁵² Is it even "real"? What is "real"? In the context of the 'net, does this question even have any meaning? What is "real" may be wholly dependent on the property in question and the perspective or expectations of the owner. An individual who purchases a high-quality knock-off Louis Vuitton purse or pair of Nike sneakers at a fraction of the cost of the "real thing" may be quite satisfied with the purchase. Similarly, a "pirated" copy of software or a musical compact disc may have been duplicated with extremely high fidelity to the original, and certainly is "real" in the sense that it performs identically.

Other examples of the distrust of "cloning" exist in society. In the arts, we value some replicas (clones) of artistic works highly—witness the prices paid for limited edition prints of works by famous (and not so famous) artists.⁵³ Yet in the case of other pieces of art, we are adamant about knowing whether a particular painting, for example, is an original. We do not value other replicas if they are copies intended to deceive. When are copies valuable, and when are they not? Is the intent of their creator the crucial factor? If they are "bad" (deceitful) copies, intended to lead someone astray are they "illegitimate clones"? Some artistic clones are intended to make us laugh—or think, as in the case of parodies. The Separated at Birth books take the notion of twinning (cloning) to new heights (or depths). We are amused by resemblances between things and people that we know intellectually are not the same. The forced comparison makes us reconsider reality. We laugh when we see a child copying the stance, gestures or other physical manifestations of its parent. We recognize the reinforcement of the individual echoed in the continuity of the next generation. However, we may be uneasy in the presence of an exact replica, such as a clone, even when the replica is an identical twin. We need to know which person is which individual.⁵⁴

51. On parallel and anti-matter universes, see David Deutsch, *The Fabric of Reality: The Science of Parallel Universes and Its Implications* (1997); Michio Kaku, *Hyperspace: A Scientific Odyssey Through Parallel Universes, Time Warps, and the Tenth Dimension* (1994); George Gale, *Cosmological Fecundity: Theories of Multiple Universes, Invisible Cosmology and Philosophy* (J. Leslie ed., 1990).

52. On the question of "reality" within the internet context, see Julian Dibbell, *A Rape in Cyberspace* (discussing the "reality" of a sexual attack performed by an internet character on other characters in a MOO), in *My Tiny Life* (1999).

53. *Hundreds of Original Works of Fine Art Available at Park West Gallery Public Auction in Markham, Ontario*, Canada NewsWire, Mar. 26, 1999. Note that among the items for sale are "lithographs" and animation "cells," which by definition are not original works of art.

54. As a teaching assistant at The University of Michigan, co-author Dr. Isabel Corcos once had three sets of identical twins enrolled in the same course. Adding to the confusion was the fact that each set of twins chose the same major, same classes, and remarkably similar choices for the required term papers. Plagiarized writing assignments were not an issue, however.

Some religions suggest that cloning steals souls.⁵⁵ The Catholic Church worries that clones may not have the same claim to souls as their "originals." Some cultures fear twins,⁵⁶ although not the American—Twinsburg, Ohio is a town devoted to the celebration of twindom, and holds a festival every year designed to celebrate twins who are "most" and "least" alike, among other things.⁵⁷ Many cultures are fascinated by them—the attention lavished on quintuplets, sextuplets and other multiples indicates the awe in which we still hold women who give birth to baby facsimiles.

The social sciences may offer other definitions. Parapsychology suggests that ghosts, if they exist, may be clones of a certain type, representing the spiritual twins of formerly physical beings. In popular culture, ghosts are a recurring subject and a recurring interest. Mythology and legend offer us clones with a vengeance (split personalities) in the guise of werewolves, or vampires.

In education, the call has been raised to "clone" children by imposing school uniforms, on the theory that much of the violence in schools today is a result of anger and envy over clothes and other possessions.⁵⁸ Make everyone alike, the theory goes, and you eliminate the impetus toward envy and violence. Of course, too much likeness breeds violence itself—consider the case of Nazi Germany, which attempted to eliminate by force all individuals who did not fit a certain phenotype and genotype.⁵⁹ The common theme is the perceived loss of identity from having, or being, a clone.⁶⁰

Closer to home, American culture values and celebrates individuality, even while it strives for equality in housing, education, and workplace opportunity. Part of our desire to provide sameness, that is, a minimum level of care or opportunity, surely arises from progressive notions of the duties of the modern state toward its citizens. Yet these notions battle continually with the individualist ideas that we cherish, true or not, about American history: the Minutemen and other guerillas during the American Revolution, the "winning of the West," the building of railroads—and fortunes. "Yankee individualism" and the "can do it" attitude represent our celebration of what is different, even as we also cherish the melting pot and the town meeting. We fear and dislike those who are not like us, yet we are suspicious of those who are. Novels like *The Stepford Wives*⁶¹ and *Invasion of the Body Snatchers*⁶² are obvious examples. While illogical, this feeling expresses the same tensions apparent in the great debate in

55. See Elstain, *supra* note 24.

56. In particular the Yoruba of Southwestern Nigeria.

57. Daryn Kagan and Kathy Kronenberger, *Twinsburg, Ohio Celebrates Its Annual Twins Day*, CNN Newscast, Aug. 3, 1998 (Transcript number 98080316V09).

58. Michael Wagner, *School Uniforms Spreading Across St. John; Principals Cite Better Behavior*, Times-Picayune, Mar. 30, 1999, at B1.

59. See generally James M. Glass, "Life Unworthy of Life": Racial Phobia and Mass Murder in Hitler's Germany (1997).

60. See also *infra* note 88 and accompanying text.

61. Ira Levin (1972).

62. Jack Finney (1955).

law over individuality and equality. Should the law give effect to equality through recognition of individual rights, allowing those who are able to excel to do so, or should it mandate a minimum standard of life, due to all? This kind of debate ultimately leads to the differences of opinion apparent in the individualist credos of the Enterprise crew in *Star Trek* which celebrate the one (regardless of IDIC)⁶³ and novels like *The Cloning of Joanna May*,⁶⁴ and condemn approaches like that of the Borg⁶⁵ and the collectivist vision of George Orwell's *1984*.⁶⁶

A. Social Commentary in Science Fiction

Science fiction has always critiqued modern day society, and popular targets have included both government and law.⁶⁷ Written science fiction has concerned itself with social criticism and the postulation of a better (although sometimes worse) world since its invention by Savinien, Cyrano de Bergerac⁶⁸ in his *Voyage dans la lune*.⁶⁹ Utopias have been around since before Plato wrote his account of *Atlantis*⁷⁰ even though they had no official name until Sir

63. In an attempt to appeal to the diversity of its audience as well as suggest the multicultural worlds we may encounter in space, *Star Trek* presents a self-contained world (the Enterprise) on which beings of diverse races and accomplishments share a common goal: the exploration and colonization of the Universe. Both the writers and the fans refer to this concept as "infinite diversity in infinite combinations" ("IDIC"). The writers credit the "Vulcan" civilization with identifying this concept. See Elizabeth Rigel, *The Neglected Whole, Or, "Never Heard of You": Part I, in The Best of the Best of Star Trek II—27* (Walter Irwin and G. B. Love eds., 1992).

64. Fay Weldon (1990).

65. For a discussion of the Borg, see p. 1087.

66. (1948).

67. For a history of science fiction literature, see Brian W. Aldiss, *Trillion Year Spree: The History of Science Fiction* (1986).

68. Cyrano de Bérgerac (1619-1655) wrote *Histoire Comique des Etats et Empires de la Lune* (1656) and *Histoire Comique des Etats et Empire du Soleil* (1661). Although Cyrano's purpose was to satirize the politics and mores of the day, he employed many devices which have become standard in science fiction, such as traveling by rocket ship. The real Cyrano is better known to lovers of literature as the protagonist of a romantic play by Edmond de Rostand, *Cyrano de Bérgerac* (1897) and to moviegoers as the inspiration for the Steve Martin character in *Roxanne* (Roxanne was Cyrano's love interest both in life and in the Rostand play). Interestingly, in one episode of *Star Trek: The Next Generation* the crew is putting on *Cyrano de Bérgerac* under the direction of Beverly Crusher. The crewmember playing Cyrano is the social misfit Lieutenant Barclay.

69. (Garnier-Flammarion 1970).

70. More invented the punning term "Utopia" to describe his imaginary perfect world, from the Greek *eu*, meaning happy and *topos*, meaning place, as well as from *u* or *ou*, meaning no, and *topos*. James J. Greene, Introduction to *Utopia and Other Essential Writings of Thomas More* [15] (Meridian/Penguin ed., 1967). Other famous literary Utopias include Samuel Butler's *Erewhon* ("Nowhere" spelled backwards, more or less). Arguably, however, the concept of utopias, though unnamed, originated with Plato's description of Atlantis, or even before. The opposite of a utopia, a *dystopia*, is illustrated by works such as Aldous Huxley's *Brave New World* (1942) (the title taken from Shakespeare's *The Tempest*, itself a utopian vision), H. G. Wells' *The Time Machine* (1964), and George Orwell's *Nineteen Eighty Four* (1946). For a history of the utopian phenomenon, see

Thomas More's eponymous work of 1515.⁷¹ Famous science fiction critiques include Samuel Butler's *Erewhon* (an anagram of "nowhere").⁷² Authors dissatisfied with the status quo have long used the device of fictionalized travel literature, particularly disguised as "recently discovered" manuscripts⁷³ as a mechanism for social critique, especially in societies which limit free speech.⁷⁴

The need to alleviate human suffering and improve the human condition has been a favorite subject of religious and social philosophers for many centuries. Science fiction is an excellent forum for exploring such social issues because it offers an unlimited opportunity to imagine and explore consequences. The creation of new life forms often is used as a plot element to portray horror, where the new life is uncontrollable and, typically, malevolent. Another common theme is the exploration of what it means to be "human" or even, what it means to be "alive." Ever since the publication of Shelley's *Frankenstein*, creation of new or altered life forms has been extensively explored as symbolic of our own strivings. This classic tale presents one of humanity's favorite nightmares: "playing God" or "tampering with Mother Nature" gives rise to terrifying consequences. That so much discussion in all forums now takes place with regard to the possibility and desirability of creating "artificial life" testifies to the continued interest we have in exploiting our own potential as creators and controllers of our destiny.

"Gadgets" science fiction, while popular with some readers, does not carry the intellectual or critical weight of these works and has fallen in some disfavor

Frank Manuel and Fritz Manuel, *Utopian Thought in the Western World* (1979), or for a quick overview, among other recent works, Robert Nisbet, *History of the Idea of Progress* (1980).

71. On law in Utopia see Jon Bing, *A Lawyer in Utopia*, in *Scandinavian Views on Science Fiction* 70 (Cay Dollerup, ed. 1977) (*Anglica et Americana*; 4); Robert H. Bork, *Law, Morality, and Thomas More*, 23 *Moreana* 85 (1986); Jacques Doyon, *La Loi Dans l'Utopie de More*, 27 *Moreana* 95 (1990) and Eugene R. Hammond, *Nature—Reason—Justice in Utopia and Gulliver's Travels*, 22 *SEL: Studies in English Literature, 1500-1900* 446 (1982).

72. On law in *Erewhon*, see Philip Jenkins, *Erewhon: A Manifesto of the Rehabilitative Ideal*, 11 *Crim. Just.* 35 (1983).

73. This device is still in use. See Umberto Eco, *The Island of the Day Before* (William Weaver trans., Penguin, 1996).

74. Again, Utopia is an obvious example. Later ones include: Montesquieu's *Les Lettres Persanes* (1748) (a Turkish potentate visits the court of France's king Louis XV and documents his observations and analyses of Western philosophy and life), Jonathan Swift's *Gulliver's Travels* (Bantam Classics 1984) (an eighteenth century Englishman has fantastic adventures in all sorts of foreign societies), Stanislas Lem, and James Hilton's *Lost Horizon* (1937) (filmed, Columbia Pictures, 1937) (a plane goes down in an Asian mountain range and the survivors are rescued by the mysterious inhabitants of a hidden paradise). However, one can trace the genre back to Plato's stories of Atlantis, and even to Greek, Roman, and other mythologies. Most of these critiques masquerade as travel literature or as memoirs of putative travelers or alien (as in foreign) visitors "as told to" the author in order to escape government censorship. However, some writers like Swift prefer to employ satire in their work. The resulting exaggeration is much less likely to be excused as "tall tales" and the critique is much more pointed, and for the author and publisher, much more dangerous.

in the past two decades.⁷⁵ By contrast, the various *Star Trek* series, which appeal to the other senses, as well as films such as *Blade Runner*,⁷⁶ *Logan's Run*,⁷⁷ *Planet of the Apes*,⁷⁸ and *Gattaca*⁷⁹ are excellent examples of science fiction addressing moral and ethical questions about our society, and our own fears about the dark side of human nature.

B. *The Fear of Aliens*

Much speculative fiction revolves around fear of aliens, their technology, and our assumptions about their intent toward us.⁸⁰ As a mechanism to overcome the fear of the humans in the story, the aliens often take on human form, frequently the identical form of someone known to the human characters. To heighten our own fear, the story's creators often use cloning or similar devices to emphasize how easily we can be fooled, and thus overcome, by the enemies within our midst.

Some films suggest that our natural tendency is to misinterpret the intentions of non-hostile aliens as in *Starman*⁸¹ or *ET: The Extraterrestrial*,⁸² in which part of the plot involves the need of the friendly alien to escape fearful humans or evade government officials. *Saturday Night Live's* *The Coneheads*,⁸³ the characters created by Jane Curtin and Dan Akroyd, try to live in peace and raise their offspring while keeping their (illegal alien) identities secret from the United States Immigration and Naturalization Service, as does "Uncle Martin" in the 60's series *My Favorite Martian*,⁸⁴ and the characters in the currently popular series *3rd Rock From the Sun*.⁸⁵ In these stories, the humans threaten the

75. Jules Verne's seemingly fantastical tales of voyages to the moon and to the center of the earth using elaborate technologies spring to mind; however, some of the technological innovations he predicted are now reality. Television and film science fiction still often rely heavily on "gadgets," however, primarily to cut down on production costs. See Laurence M. Krauss, *The Physics of Star Trek* 65 (1995).

76. (Embassy Pictures 1982).

77. (United Artists/MGM 1976).

78. (Twentieth Century Fox 1968).

79. (Columbia Pictures 1997).

80. Fear of alien invasions and takeover seems to track both a lack of confidence in the ability of governments to deal with natural and manmade disaster as well as fear of the future. See generally Mark Jancovich, *Rational Fears: American Horror Films of the 1950s* (1996), and David Kral, *Screams of Reason* (1998).

81. Also called John Carpenter's *Starman* (Columbia Pictures 1984), it starred Jeff Bridges. A series with the same name and starring Robert Hays ran from 1986 to 1987.

82. (Universal Pictures 1982).

83. The Coneheads later had their own feature film (Paramount Pictures 1993).

84. (visited Mar. 23, 1999) <<http://www.aol.com/decnique/martian.htm>> or (visited Mar. 23, 1999) <<http://www3.sympatico.ca/rgosselin/favmarti.htm>>. The star of that series, Ray Walston, went on to portray Judge Bone on *Picket Fences* and the gardener Boothby on *Star Trek: The Next Generation: The First Duty* (Paramount TV television broadcast, Mar. 30, 1992) and *Star Trek: Voyager* (United/Paramount TV television broadcast, 1995).

85. (Carsey/Werner Productions television broadcast, 1996-current). See also the Nickelodeon

aliens, representing our own tendency to racism and hatred of things with which we feel we have nothing in common.

The fear that cloning and genetic manipulation leads inevitably to a loss of individuality permeates many science fiction and horror stories. The *Stepford Wives*⁸⁶ is a prime example.⁸⁷ In real life, many adolescents have trouble resisting peer pressure to conform—to be “clones”—or else feel safer as “clones” in dress and behavior than they do as individuals.⁸⁸

While instinctive fear is essential to protecting someone from danger, it can also disable the individual from logical thought. The *War of the Worlds*⁸⁹ film and series, as well as the film *V*,⁹⁰ dealing with alien invasions, and *The Andromeda Strain*,⁹¹ dealing with the potentially devastating threat of an unstoppable virus, are all films which suggest that warlike or controlling tendencies are not exclusively human failings. However, we can take natural caution to extremes.

Another science fiction theme which bears directly on our subject is that of human rights. Rights that humans hold dear (at least in our society) are brought up for critique using other life forms as foil: racism, slavery and cultural differences were scrutinized in the short-lived series police/science fiction drama *Alien Nation*,⁹² where “modern day” humans attempted to live side-by-side with the alien Newcomers. The series dealt with those issues that clearly comment on our own failings as a society, and offered an examination of likely human reaction to constant interaction with non-human but sentient and humanoid creatures. In most episodes, *Alien Nation* emphasizes the essential need for both the rule of law and justice, and the obligation to extend them to the Newcomers. *Alien Nation*'s primary message is the necessity for subduing the human instinct to fear “the alien,” control the propensity towards racism and slavery, and, instead, greet alien beings with respect and peace, if not with affection. In such series, the urge toward individuality is at war with the desire to conform and the need to feel a part of the larger culture. Such a conflict is relevant to the changes that cloning and other techniques will bring, requiring the reconsideration of the definition of “life.” Legislation and justice must ultimately address the questions of “who” we are and what “we” means.

series *The Journey of Allen Strange* (Nickelodeon television broadcast, 1997-current), which traces the attempts of a stranded space traveler to get home while masquerading as an earth teenager.

86. Ira Levin, *The Stepford Wives* (1991); *The Stepford Wives* (Palomar Pictures 1975).

87. Although it is also clearly about the human male's presumably universal desire to control the female.

88. See, e.g., J. Thomas Zhang, *Modernization Theory Revisited: A Cross-Cultural Study of Adolescent Conformity to Significant Others in Mainland China, Taiwan, and the USA*, 29 *Adolescence* 885 (1994).

89. (Paramount Pictures 1953).

90. (Warner Bros. TV television broadcast, 1984-1985).

91. (Universal Pictures 1971).

92. (Fox television broadcast, Sept. 18, 1988-May 7, 1990).

Star Trek uses the device of alien life forms to address the question "what is life?" or, in legal terms, "what process is due to this life form?" in numerous episodes.⁹³ Frequently the questions center on the origins of the life form (as in episodes that discuss the rights of "created" or artificial life such as the nanites⁹⁴ or of the Enterprise itself⁹⁵). Those rights which "naturally created life-forms" (humans and humanoids) assume are automatically theirs are not necessarily extended to other life forms, as episodes such as *The Measure of a Man*⁹⁶ and *Up the Long Ladder*⁹⁷ demonstrate. In contrast, *The X-Files* presents many forms of life, but normally discusses them only from the point of view of the series heroes, Mulder and Scully. Generally the only exceptions occur when the particular life form is at risk of subjugation from its group or by a human organization, hence the series' fascination with conspiracies, disbelief on the part of Fox Mulder and Dana Scully's friends and acquaintances, and government secrecy.

Shows like *Star Trek* and *The X-Files* also suggest that technology is, in itself, amoral, but that individuals have a tendency to exploit it for unethical purposes, a theme also sounded in many science fiction novels and films. The public trust in science and scientists that held sway during the latter part of the nineteenth and first few decades of the twentieth centuries⁹⁸ has dissipated, to be replaced by a mistrust of both science and intellectualism, which are often perceived as elitism. Those individuals who possess secret knowledge (in this case knowledge and understanding of science and technology) are both dangerous and easily led into temptation. Knowledge is power, and power corrupts, a caveat that we see in the recurring character of the "mad scientist" in science fiction.

C. *Images of the Mad Scientist and the Sorcerer's Apprentice: Uncontrolled Experimentation and Unintended Consequences in Science Fiction*

Since the early nineteenth century, science and technology have provided new targets for evaluation. Thus, we might expect that a recurring archetypal character in much science fiction would be the scientist, usually humorless, power-mad and maniacal. He or she wrong-headedly manipulates research to create a "better" human being, a technological handmaiden that gets out of control, or a doomsday weapon or some other "improvement" that results in a Faustian bargain. The

93. *Star Trek* as well has many episodes exploring the balancing of individual and social rights. See Paul Joseph and Sharon Carton, *The Law of the Federation: Images of Law, Lawyers, and the Legal System in "Star Trek: The Next Generation,"* 24 U. Tol. L. Rev. 43 (1992); Michael P. Scharf and Lawrence D. Robert, *The Interstellar Relations of the Federation: International Law and "Star Trek: The Next Generation,"* 25 U. Tol. L. Rev. 577 (1994).

94. *Star Trek: The Next Generation: Evolution* (NBC television broadcast, Sept. 25, 1989).

95. *Star Trek: The Next Generation: Emergence* (NBC television broadcast, May 22, 1994).

96. (NBC television broadcast, Feb. 13, 1989).

97. (NBC television broadcast, May 22, 1989).

98. Brian Silver, *The Ascent of Science* (1998).

extremely pro-scientific attitudes exemplified in the fiction and movies of the 1940s that supported development of the atomic bomb and portrayed scientists as the saviors of the free world metamorphosed into cultural attacks on those scientists in the 1950s and 1960s, with portrayals of scientists as traitors (as J. Robert Oppenheimer was portrayed⁹⁹) because of their regret for their participation in development of the Bomb, or re-invigorated Dr. Frankenstein's. The transition of the scientist to traitor because of his dislike of war to the scientist as traitor because of his embracing of Communism was an easy one for filmmakers and writers to make.¹⁰⁰ Films such as *Invasion of the Body Snatchers* that showed the ease with which aliens (read Communists) could take over even the educated (read doctors and scientists) in a community were a clear message to American movie-goers.¹⁰¹

As far back as *Frankenstein*, in which a physician/scientist experiments with creating life, writers have presented the public with fictional accounts of the scientific spirit run amok. Science seems in such cases to have no effective social or ethical check; it becomes an intellectual disease that incapacitates the moral sense in its victims. There are many films and shows that explore the dangers of tampering with nature by attempting to rival its powers. *Frankenstein*¹⁰² is one classic story, as is Robert Louis Stevenson's *The Strange Tale of Dr. Jekyll and Mr. Hyde*,¹⁰³ in which an ambitious physician turns himself into a hideous killer through the course of his experimentation. Similarly, *The Island of Dr. Moreau*¹⁰⁴ and *The Fly*¹⁰⁵ show scientists trying to create new life or modify existing life and coming to very bad ends. The symbolism is clear; meddling with the natural order of things is dangerous and would best be avoided. On the other hand, *Starman*, a film in which a benevolent alien visits Earth subtly demonstrates that it is acceptable to create new life in the more standard, non-scientific, way. The *Starman*, who has taken on the form of the heroine's late husband, falls in love with her, and "miraculously" is able to render her fertile and give her the child she was unable to conceive with her human husband. The details are left to the imagination, but the message is that this type of new life is to be welcomed.

In contrast, the science fiction horror film *Demon Seed*¹⁰⁶ involves the involuntary artificial impregnation of a woman by a computer-controlled house. Her scientist/engineer/architect husband has created a home run by a vastly superior computer, which becomes sentient and wishes to reproduce. The new life created is intended to be frightening, and all of the plot elements conspire to

99. See Rachel L. Holloway, *In the Matter of J. Robert Oppenheimer: Politics, Rhetoric and Self-Defense* (1993).

100. On monster movies generally see David J. Skal, *The Monster Show* (1993).

101. See generally Jancovich, *supra* note 80.

102. Mary Shelley (1816).

103. Robert Louis Stevenson (1866).

104. (American Int'l Pictures 1977); (NewLine Cinema 1996).

105. (Twentieth Century Fox 1958); (Brooksfilms 1986).

106. (MGM 1977).

produce this image. The technology-mad husband has created a monster, and he and his family fall victim to it.

Popular culture, particularly fiction, foreshadowed what we think of as the mad scientist's maniacal experimentation with genetic manipulation in such works as *The Island of Doctor Moreau*.¹⁰⁷ H. G. Wells' cautionary tale about the researcher who tries to create hybrid animal-humans seemed like the most fanciful kind of fiction at the time, yet Wells, like Jules Verne, was not so far off the mark as a predictor of scientific possibilities. As discussed previously, the longest recognized method of altering organisms is through selective breeding of individual plants or animals for desired traits.

With recent successes in their application of new breeding technologies, scientists have naturally wondered whether they can improve the human condition by making artificial, or animal-based medicines (insulin for example)¹⁰⁸ or by creating stronger or less defect prone humans through transgenesis.¹⁰⁹ Thus, Dr. Moreau's island, at least as far as the crossbreeding of species is concerned, is perhaps not so far removed as it seemed in the early part of the twentieth century.

Similarly, films such as *The Terminator*,¹¹⁰ *Total Recall*,¹¹¹ and *The Planet of the Apes* series¹¹² depict future worlds destroyed by science and

107. Herbert George Wells, *The Island of Dr. Moreau* (1896). The work has been filmed several times, notably in 1977 (*The Island of Dr. Moreau* (Goodtimes Home Video 1996) and featuring Michael York and Burt Lancaster), and in 1997 (*The Island of Dr. Moreau* (New Line Home Video 1997), featuring Val Kilmer and Marlon Brando). Several dissertations and scholarly works examine the scientific imagery and political control in the novel, including Jon Paul Henry, *The Demonology of Instinct: Allegory and Setting in H. G. Wells' The Island of Dr. Moreau* (1981) (Master's thesis, Simon Fraser University) (on file with author), Bernard Loing, *H. G. Wells à l'Œuvre: Les débuts d'un écrivain (1894-1900): Essai d'analyse des mécanismes de la création littéraire par l'étude génétique et l'interprétation de trois œuvres initiales: The Time Machine (1895), The Island of Dr. Moreau (1896), Love and Mr. Levisham (1900) (1984) (Etudes anglaises; 89) (on file with author) and Mark A. Poltera, *Central Leadership Controls in 1984, Swastika Night, the Island of Dr. Moreau and the Wizard of Oz (1998)* (Master's thesis, University of Wyoming) (on file with author). Tim J. Kelly spoofed the work in his play *Crazy, Mixed-Up Island of Dr. Moreau* (1977).*

108. *Study reveals side effects of synthetic insulin*, AAP Newsfeed, Mar. 10, 1999, available in LEXIS NEWS Library, CURNWS File.

109. Colin Tudge, *Growing Pains: Biotechnological Innovations*, 127 *New Statesman* 34 (1998). Some commentators have discerned levels of acceptance of transgenic research. See *Moral Attitudes Outlined*, *The Evening Standard*, Nov. 25, 1997, at 11.

110. (Cinema '84 1984).

111. (Tri-Star Pictures 1990). Based on the Philip K. Dick story, "We Can Remember It For You Wholesale," in *Collected Stories of Philip K. Dick* (1990). Another Dick novel on the same theme is *We Can Build You* (1994), in which an entrepreneurial builder of androids creates replicas ("simulcra") of celebrities. Dick's novel *Do Androids Dream of Electric Sheep?* (1968) became the cult movie *Blade Runner*. One of the best books of essays on *Blade Runner* is *Retrofitting Blade Runner*, which includes Joseph Francavilla, "The Android as Doppelgänger," and Brooks Landon, "There's Some of Me in You: *Blade Runner* and the Adaptation of Science Fiction Literature into Film," in *Retrofitting Blade Runner: Issues in Ridley Scott's Blade Runner and Philip K. Dick's Do Androids Dream of Electric Sheep?* (Judith Kerman, ed. 1991).

112. (Twentieth Century Fox Television television broadcast, May 6, 1994).

technology run amok, whereas *The Fly* exemplifies the classic story of a deluded scientist playing God who ends up a victim of his own horrific experiments.¹¹³ In the first *Star Wars* film, Princess Leia pleads with Obi-wan Kenobi to assist her as he did her father "in the Clone Wars," presumably a devastating conflict of some sort,¹¹⁴ suggesting that mad scientists and mad governments combined to try to destroy the galaxy.

Such novels and films drive home the danger of unintended, unwelcome consequences that are so much a part of mad scientist mythology. If those who practice maverick science have no operative internal moral mechanism, and law provides none from the outside, what force can withstand the evil unintended consequences? Given this irrational but understandable view of the scientific process and the people who practice it, we can comprehend public unease about the way science is done. When we do not trust scientists, wisely or unwisely, for rational or irrational reasons, we find it difficult to know when the potential dangers of scientific advance have been considered fully. The reactionary response to the possibility that "mad cow disease" jumps easily or inevitably to the human population is based on a realistic fear that some diseases are zoonotic, communicable between species.¹¹⁵ These fears move into the irrational zone when predicated on the allegation that the use of pesticides and herbicides is uniformly bad (a zero tolerance policy), that the entire beef supply is contaminated, and that there is no level of safety that can be assessed and implemented.¹¹⁶

Many science fiction stories and movies depict humans as victims of their own hatred, stupidity, or bad luck. In *Planet of the Apes*, both the series and the films,¹¹⁷ humans precipitate their own destruction by meddling with nature and contaminating their environment with atomic bombs.¹¹⁸ Similarly, in

113. Another film on this subject is *Altered States* (Warner Bros. 1980) with a script by Paddy Chayevsky, and directed by Ken Russell. It starred the durable William Hurt and Blair Brown.

114. It may be explained in the upcoming "prequels" that George Lucas has promised his fans. See *Star Wars* (visited Mar. 31, 1999) <<http://www.starwars.com>>.

115. See, e.g., E. P. Gibbs, *The Public Health Risks Associated With Wild and Feral Swine*, 16 *Review of Science and Technology* 594 (1997) or B. B. Chonel, *New Emerging Zoonoses: A Challenge and an Opportunity for the Veterinary Profession*, 21 *Comparative Immunology and Microbiology of Infectious Diseases* 1 (1998).

116. See Georgina Ferry, *Mad Cows and Loopy Lambs*, *HMS Beagle*, Oct. 30, 1998 (visited Mar. 13, 1999) <<http://www.biomednet.com/hmsbeagle/41/people/pressbox.htm>>. See also Dorothy Nelkin *Selling Science: How the Press Covers Science and Technology* (1995) (discussing how the media covers and hypes environmental disasters).

117. *Planet of the Apes* (Twentieth Century Fox 1968) (also called *Monkey Planet*); *Beneath the Planet of the Apes* (Twentieth Century Fox 1970); *Escape from the Planet of the Apes* (Twentieth Century Fox 1971); *Conquest of the Planet of the Apes* (Twentieth Century Fox 1972); *Battle for the Planet of the Apes* (Twentieth Century Fox 1973); TV series *Back to the Planet of the Apes* (Twentieth Century Fox TV television broadcast, 1974). A remake is due from Twentieth Century Fox in 1999.

118. See also films like *On the Beach* (United Artists 1959), based on the Nevil Shute novel, *The Day After* (TVM 1983), and *Testament* (TVM 1983). Note also the number of horror films predicated on the possibility of atomic radiation causing genetic damage that creates monster species

WarGames,¹¹⁹ Colossus: The Forbin Project,¹²⁰ and the various Terminator movies,¹²¹ humans cause their own problems by unleashing machines that become "smart" and destructive.¹²² Jurassic Park gives us a world where dinosaurs run wild. The theme of the film is that we are unable to predict the ecological impacts of cloning extinct species (referred to by environmental lawyers as unintended consequences), and that the subsequent inability to control the new and very hungry creations causes destruction and loss of life. Interestingly, the author of *Jurassic Park*, Michael Crichton, views his work as portraying scientists in a positive light. His opinion is that the villain is the greedy businessman who exploits, but does not truly understand what he is about to unleash.¹²³ The unintended outcome is due to the uses of the science, not to the discovery that cloning a dinosaur is possible. But the story would not be nearly as much fun if Richard Attenborough cloned dinosaurs as entrees for a Jurassic Café. The popular reaction to such unintended consequences is a demand for more control immediately, whether or not it is advisable.¹²⁴

Images of scientists meddling with the domain of God, or Nature and the creation of life, are often used to foreshadow our doom. Yet the emphasis on bad and/or unanticipated outcomes in science fiction, evident as early as *Frankenstein*, and reinforced by works such as *Dr. Jekyll and Mr. Hyde*,¹²⁵ invites us to overlook the fact that unanticipated changes may have favorable consequences for humanity.

The current focus on genetic manipulation automatically gives rise to what appears to be an instinctive and widespread fear that "tampering with nature" is inherently bad,¹²⁶ for two reasons. First the "Frankenstein's monster" and the "Sorcerer's Apprentice" syndromes, the fear of unintended or uncontrollable consequences, are well-grounded. Misuse of, lack of understanding of, or overdependence on science and technology could create directly or via complex cascades such things as pollution, uncontrollable new plants, diseases resistant to available drugs, new diseases or syndromes.¹²⁷ However, we should also

like giant ants (for example *Them!* (Warner Bros. 1954)). See also Jancovich, *supra* note 80.

119. (MGM 1983).

120. (Universal Pictures 1969).

121. *The Terminator* (Cinema '84 1984); *Terminator 2: Judgment Day* (Le Studio Canal 1991); *T2 3-D: Battle Across Time* (Landmark Entertainment Group 1996).

122. See also *Star Trek: The Ultimate Computer* (NBC television broadcast, Mar. 8, 1968); *The X-Files: The Ghost in the Machine* (Fox television broadcast, Oct. 29, 1993).

123. See *Ritual Abuse, Hot Air, and Missed Opportunities*, Michael Crichton, 283 *Science* 1461 (1999). Note that the lawyer becomes a dinosaur's lunch in this movie; we leave consideration of whether that is an unintended consequence for another article.

124. On the science involved in *Jurassic Park*, see Robert DeSalle and David Lindley, *The Science of Jurassic Park, or How to Build a Dinosaur* (1997).

125. Robert Louis Stevenson, *The Strange Case of Dr. Jekyll and Mr. Hyde* (Dover Reprints 1991).

126. See Peter Huber, *Herod II*, *Forbes*, Jan. 11, 1999, at 94; Nigel Williams, *U.K. Government Tries to Reassure Wary Public*, 282 *Science* 856 (1998).

127. For example, over-sensitivity to chemicals, perfumes and dyes, which are everywhere in

consider that we may also obtain "good" unanticipated outcomes, particularly if the scientific research involved is carefully regulated and controlled.¹²⁸

The space program by itself provided a wealth of new inventions including advances in robotics, new metal alloys, aircraft control systems and construction materials, and a new version of a heart pump,¹²⁹ not to mention the development of an array of preserved food items.¹³⁰ Elsewhere, unexpected new uses of drugs for disease amelioration also provide unexpected benefits for a higher quality of living. Both Viagra and Rogaine are drugs whose side effects became the actual use for which these drugs are now prescribed.¹³¹ The infamous thalidomide, previously prescribed for morning sickness, which physicians discovered causes severe birth defects in utero, is actually a relatively safe drug when used by non-pregnant women and is currently being evaluated for use in AIDS patients and transplant recipients.¹³² We also conveniently forget that since humans moved from being hunter-gatherers to being farmers,¹³³ humans have intentionally manipulated nature and genetics through selective breeding of crops and livestock. As a general matter, few people object to higher crop yields and a greater variety of foods available as Earth's population grows.

our society. See Holly Borne, Comment, *The Need for Regulation Mandating the Labeling of Inactive Ingredients in Pharmaceuticals*, 8 Admin. L.J. 291 (1994).

128. In *At Home in the Universe* (1995), Stuart Kaufman reflects on the fact that science cannot foresee all consequences. Different aspects of our very nature, Kaufman postulates, as *Homo sapiens* (man the wise), *Homo habilis* (man the able, as toolmaker) and *Homo ludens* (man the playful) all contribute to successful scientific exploration. *H. ludens* and *H. habilis* will always motivate us to pursue the technologically feasible, but *H. sapiens* never will be capable of calculating all of the consequences. Kaufman, *supra*, at 131-48.

129. See *Nasa Space Shuttle* (visited Mar. 23, 1999) <<http://spaceflight.nasa.gov/shuttle/benefits/>>.

130. See *NASA Space Shuttle* (visited Mar. 23, 1999) <<http://spaceflight.nasa.gov/shuttle/reference/factsheets/food.html>>. Many of us recall with some fondness, the SpaceFood Stick, a snack item popularized by astronauts and devoured by star-struck children in the late 1960s and early 70s.

131. On Viagra as a treatment for hypertension see R. Kirsten et al., *Clinical Pharmacokinetics of Vasodilators. Part I*, 33 J. Am. Coll. Cardiol. 273 (1999). As a treatment for erectile dysfunction, see R. A. Kloner, *Viagra: What Every Physician Should Know*, 77 Ear, Nose & Throat J. 883 (1998). On the use of Rogaine for hair growth, see J. Shapiro and V. H. Price, *Hair Regrowth. Therapeutic Agents*, 16 Dermatol. Clin. 341 (1998). On the initial testing of Rogaine for hypertension see R. Kirsten, et al., *Clinical Pharmacokinetics of Vasodilators, Part I*, 34 Clinical Pharmacokinetics. 457 (1998).

132. See Mark Babineck, *Thalidomide Use Resurges as Miracle Cure for Disease/Drug Once Caused 10,000 Births With Deformities, But Now Helps AIDS Victims*, Austin American-Statesman, Mar. 21, 1999, at B3. On the use of thalidomide as treatment for other diseases and disorders, see G. B. Vogelsang, *Acute and Chronic Graft-Versus-Host Disease*, 5 Curr. Opinions in Oncology 276 (1993); M. E. McGarvey et al., *Emerging Treatments for Epidemic (AIDS-Related) Kaposi's Sarcoma*, 10 Curr. Opinions in Oncology 413 (1998).

133. See, e.g., James A. Montmarquet, *The Idea of Agrarianism: From Hunter-Gatherer to Agrarian Radical in Western Culture* (1989).

Similarly, to question what is the appropriate level of antibiotics, hormones or other supplement, in a food population to prevent health risks is a rational notion, but to advocate complete bans on antibiotic use seems extreme given potential benefits to society in the form of increasing yields of food to feed and increasing necessity for medication to care for an ever-expanding world population with great disparity of disposable income. In Idaho, a public debate is currently underway regarding the safety of child immunizations against such commonplace diseases as measles and whooping cough.¹³⁴ Reassurances that child deaths are infrequent as a result of vaccinations hardly comforts those parents who have lost infants, and these parents are now attempting to defeat the state's proclaimed policy to reach a ninety percent immunization rate within a few years, even though a ninety-percent rate is essential to guard against lethal outbreaks of these diseases, which would potentially kill far more youngsters. Many scientists would consider that the harm caused by inaction is understandable but irrationally favored over which they believe to be the probable lesser harm generated through action. Their position necessarily pits them against individuals who fear injury to their children and legislatures which fear the resulting public outcry.

Finally, we also sense instinctively that in "playing God" mankind is able to unravel the mysteries of genetics and life. Although the resulting discoveries hold much promise for improving the human condition, perhaps we would have less wonderment in our everyday lives. Such a view is one of the themes in John Horgan's book, *The End of Science*.¹³⁵ Cloning and other "artificial" reproductive techniques suggest to many that the literal creation of life in our own image is an offense to the teachings of many religions and ethical belief systems.¹³⁶ To many people, the potential for reductionist science to explain who we are and how we act on the basis of atoms and molecules is unsettling. Aren't we ultimately more than that? Indeed the "we" and the "I" necessitates that we believe that we are.

Still, consideration of possible, and possibly unpleasant, outcomes from a new technology or scientific discovery is critical to planning how to deal with our advancements, and science fiction assists us by illustrating the extremes to which unscrupulous scientists or governments may go to make undisciplined use of science or technology. We may also encounter an undefined but nevertheless legitimate fear of change itself, and change is the hallmark of technology. Certainly, Luddite sentiments have been in evidence for centuries, and genetic engineering is the the new-fangled technology to be scorned, ridiculed and abhorred. These examples illustrate two kinds of fears about science and new

134. *Effort to Increase Child Immunization is Under Attack in Idaho*, N.Y. Times, Mar. 7, 1999, at A25.

135. John Horgan, *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age* (1997).

136. See *Clones and Clones: Facts and Fantasies About Human Cloning* (1998).

technology, the rational and the irrational. The distinction is not always clear, but is critical to the competent drafting of legislation.

D. Truth and Consequences: Specific Images of Cloning, Genetic Manipulation, Mad Scientists, and Unintended Consequences in Science and Science Fiction

Since the advent of molecular biology, genetic manipulation has become more sophisticated, permitting experimentation with individual genes. Common examples of successful single or multiple gene manipulations includes expressing insulin in bacteria to provide large, economic quantities, driving costs down and making insulin for treatment of diabetes. Another use familiar to farmers is the availability of insect-resistant and herbicide-tolerant plants such as newly developed varieties of corn, cotton, rice, soybeans and potatoes, which promise lower costs and higher yields, and also reduce the load of traditional chemical insecticides in the soil. Other scientific initiatives underway include identification of gene function, and subsequent targeting of the gene for manipulation (direct via molecular biology or indirect via drugs). The Human Genome Project is such a project, but scientists are similarly characterizing other, smaller, non-human genomes for medical and agricultural applications. Examples include the fruit fly, *Drosophila melanogaster*, the nematode, *Caenorhabditis elegans*, the common house mouse, *Mus musculus*, and *Arabidopsis thaliana*, a well-studied plant used in numerous genetic studies. These examples illustrate just a few of the potential benefits of this new technology of genetic manipulation.

Contemplation of these scientific advances leads us to imagine both wonderful benefits and dreadful harms as a result of their application. This tendency again illustrates the two kinds of fears about science and new technology, the rational and the irrational. As with any new discovery or invention, risks associated with unintended consequences abound.

Similarly, the fear of causing havoc and destruction illustrated by some of the films and books we discuss highlights a rational fear: the concern that we cannot predict what will come from new developments and that we might make costly mistakes. For example, introducing a new species to an ecological zone can have devastating effects on the indigenous life.¹³⁷ We have seen such disasters numerous times in our past, from the introduction of devastating diseases from one human population to another, to the over-running of Australia

137. Twelve pairs of European rabbits were released on a ranch in the territory of Victoria, Australia, in 1859. By 1900 the population had increased to several hundred million and had spread throughout most of the country. See Robert E. Ricklefs, *Ecology* 570-71 (1973). Zebra mussels, which were not an intentional introduction, are nevertheless also now an economic and ecological hazard. For an amusing, nay, hilarious portrayal of ecological bunny disaster, see the film *Night of the Lepus* (MGM 1972) in which common cottontails are injected with hormones and turned into 150 pound, 5 feet tall, carnivorous, cattle munching menaces. Based on Russell Braddon, *The Year of the Angry Rabbit* (1964).

by rabbits which are better competitors in the environment there than the indigenous marsupials, and which lack natural predators. Similarly, those beautiful orchids introduced to the Hawaiian islands which have had a nasty impact on the diversity of the local flora, crowding out indigenous plant life.¹³⁸ Numerous other examples exist,¹³⁹ and demonstrate that hesitancy to release new, genetically engineered plant life into the unregulated world outside the scientist's laboratory is based on rational considerations.

However, while caution is advisable, intransigence is not, especially when it arises from fears of the adverse impacts of an as yet untested scientific or technological advance without reasoned consideration of 1) the actual probability¹⁴⁰ that these impacts are inevitable; 2) the probability that they can be controlled; 3) the probability that their benefits might outweigh their costs; and 4) the probability that, even if adverse, the choice to explore these impacts and use this science or technology is an individual, and not a societal, one. It is the rare scientist who claims impossibility with certainty, rather, all things are possible, but events may have vanishingly small probabilities of occurring. Irrational fears often arise from our fear of the unknown and our lack of understanding of the real ability of science to predict outcomes. The contention that all, or nearly all, outcomes of scientific or technological advance are both unpredictable and unwelcome is an irrational view of science. Equally irrational is the contention that unless all things are predictable, we are bound to stumble on the one really bad event, the truly devastating unintended consequence that will destroy society.¹⁴¹ This fear has a parallel in law: the "parade of horrors. . ."¹⁴² It arises both because scientists may have great difficulty in communicating their discoveries to the lay public,¹⁴³ and because they may be perceived as pursuers of knowledge without regard for the eventual use of their discoveries. This is further compounded by the fact that science is not a

138. See Herbert G. Baker et al., *Ecology of Biological Invasions of North America and Hawaii* (1986); Brenda Z. Guiberson, *Exotic Species: Invaders of Paradise* (1999).

139. See Robert S. Devine, *Alien Invasions: America's Battle With Non-Native Plants and Animals* (1998); Mark Williamson, *Biological Invasions* (1996).

140. Scientists prefer to speak in terms of probability rather than possibility.

141. The clock on the cover of the *Bulletin of Atomic Scientists* that represents the likelihood of the world's destruction from nuclear war is rational only to the extent that it reasonably predicts the likely behavior of governments and individuals with potential control of such weapons. See Steve Rhodes, *Catching Up With . . . the Doomsday Clock*, *The Baltimore Sun*, Sept. 6, 1998, at 3F.

142. *Id.*

143. Few gifted "doers" of science are equally gifted when faced with the necessity of explaining their work to non-specialists, thus the spectacular success of such scientific popularizers as Carl Sagan and Isaac Asimov. Albert Einstein was one of the very few scientific geniuses capable of explaining his own work better than anyone else. See Albert Einstein, *The World As I See It* (1964). Physicist Richard Feynman's "*Surely You're Joking, Mr. Feynman!*": *Adventures of a Curious Character* (1977) reached a wide audience, and Stephen Hawking's *A Brief History of Time* (1988) is a best-seller, although the number of people who have actually read the book is probably somewhat fewer than the number who have purchased it. Hawking made a guest appearance on *Star Trek: The Next Generation: Descent, Part I* (Paramount television broadcast, June 12, 1993).

completely predictable enterprise. The "Mad Scientist," whose lust for new discoveries outweighs his or her¹⁴⁴ common sense, ethical upbringing, and/or sanity thus is the personification in popular culture for this fear.¹⁴⁵ Not only is this individual devoid of common sense, but his or her quantitatively greater knowledge also presents a danger to organized society. Within a year of the announcement of Ian Wilmut's successful cloning project, for example, the United States National Bioethics Advisory Commission had requested comprehensive surveys of the religious, ethical, legal and philosophical issues with regard to cloning. The fears that mad science would overtake religious and moral scruples against the practice are clearly evident.¹⁴⁶

The call for legislation, rather than the free market or ethical or religious restrictions, indicates the extent to which the public and lawmakers have lost faith in the previously traditional image of the selfless, dedicated scientist and replaced it with the more cynical view of the grasping, amoral researcher. Within a month of Dolly's appearance, the British House of Commons had already prepared a report on the advisability of cloning.¹⁴⁷ Nevertheless, some couples are already considering cloning as an alternative to adoption, donor insemination, or continued infertility.¹⁴⁸ An angry and frightened response issued from David Alton, a member of the British upper House. "[T]here is a 'real danger' of creating 'a cloned person who won't be authentically human but won't be anything else, either—a sort of living dead if you like.'"¹⁴⁹ Why

144. Scientists as portrayed in popular culture are almost uniformly male. However, for a view of the image of female scientists in fiction, see Alison Sinclair, *Stealing the Fire: Women Scientists in Fiction* (visited Oct. 11, 1999) <<http://www.biomednet.com/hmsbeagle/47/booksof/essay.htm>>. Mark Jancovich also points out that Pat Medford in *Them!* is a strong female scientist character. Jancovich, *supra* note 80, at 28, 58-64.

145. See M. Z. Ribalow, *Script Doctors*, 38 *The Sciences* 26-31 (1998).

146. See Dan W. Brock, *Cloning Human Beings: An Assessment of the Ethical Issues Pro and Con*, in *Clones and Clones*, *supra* note 24, at 141; National Bioethics Advisory Commission, *Religious Perspectives*, in *Clones and Clones*, *supra* note 24, at 165. See also Press Release: WHO Director Condemns Human Cloning (Mar. 11, 1997).

147. See Arlene Judith Klotzko, *We Can Rebuild*, *New Scientist*, Feb. 27, 1999, at 52.

148. See Rita Delfiner, *Childless Pair Mulls a Clone of Their Own*, *N.Y. Post*, Feb. 9, 1999, at O20.

149. Delfiner, *supra* note 148. A similar reaction arose recently in response to a laboratory study that demonstrated monarch butterfly larvae could be killed by pollen from a particular type of corn genetically engineered to kill insect pests (J.E. Losey et al., *Transgenic pollen harms monarch larvae*, 399 *Nature* 214 (1999); see also L. Hansen and J. Obryki, *Non-target effects of Bt corn pollen on the monarch butterfly (Lepidoptera: Danaidae)*, poster presentation at the Entomological Society of America's North Central Branch 1999 annual meeting in Ames, Iowa). Although unintended, this was not an unexpected finding from a scientific perspective because the crop was specifically engineered to kill insect pests closely related taxonomically to monarchs. Based largely on this single, well-publicized study, the EU immediately placed a *de facto* 2-year moratorium on registration of new genetically modified organisms (GMOs) (EU Environmental Council, June 24, 1999), sales of soybeans were delayed in Brazil (Sixth Federal Court Ruling, Brazil, June 21, 1999), and lawsuits and petitions were filed against the Environmental Protection Agency by Greenpeace (see <http://www.greenpeace.org> for numerous press releases, for example

Lord Alton should believe that a cloned individual, a twin, would be less than "authentically human" is unclear except that he seems to be emphasizing that the origin of the individual is dispositive of its right to claim basic freedom. What is significant is that he should make such a statement precisely calculated to appeal to the public's darkest fears.

At the same time, public fears of food made unsafe through genetic manipulation caused the British government to issue reassurances that it would investigate and if necessary, regulate the use of biotechnology in agriculture.

Mr Byers, the minister responsible for science, said that the Government faced a huge challenge in restoring confidence in what science and the scientists were doing. Some of the areas they were involved in "are debates about the very nature of life itself." He said that although science was important in keeping Britain at the leading edge of technology, it had to be done in a way "that takes the public with the scientists." He said that there had to be far more openness about what the scientists were up to. "We do know that scientists can do things that are unacceptable. There has to be a degree of regulation," Mr Byers said. He made clear that the Government's main concerns were genetically modified food, cloning and biotechnology—the use of genetic engineering to produce drugs and crops. "We know from what happened with BSE that scientists and the politicians have to be far more open about what they are doing and why they are doing it. The public does not trust us because of BSE. They say that the Government had all the information and it was covered up and that ministers were not honest about what the impact was."¹⁵⁰

All the fears exhibited on the floors of national legislatures, in the popular press, and at town meetings are echoed in science fiction, along with the added element of horror and inevitable destruction.

<http://www.greenpeace.org/pressreleases/geneng/1999jun24.html> (last visited Sept. 2, 1999), and the Environmental Defense Fund (petition submitted to the EPA on July 13, 1999, http://www.edf.org/pubs/edf-letter/1999/jan/h_yard.html (last visited Sept. 29, 1999)). Subsequent, closer study of the issue may well reveal that, while a hazard exists, the actual impact on so-called "non-target" insects under natural conditions is exceedingly small (see *The World is Still Safe for Butterflies*, Wall St. J., June 25, 1999, at A18; see also Mike Brannon, *Monarch Butterfly Population on the Rise Across America*, AP Newswires, Sept. 27, 1999).

150. Philip Webster and Peter Riddell, *Tighter Cloning Control on Way*, The Times of London, Feb. 2, 1999 (LEXIS NEWS Library, CURNWS File). BSE (bovine spongiform encephaly) is a naturally occurring, poorly characterized disease of the brain. It should not be confused with BST (bovine somatotropin), a growth hormone additive used by the cattle industry. See <http://www.ifst.org/hotop8a.htm>.

The element of horror is typical of science fiction films as well. Alien and its sequels,¹⁵¹ *The Thing*¹⁵² and its remakes (as well as the *X-Files* episode *Ice*,¹⁵³ which draws heavily from John Campbell's short story), *The War of the Worlds*,¹⁵⁴ *Event Horizon*,¹⁵⁵ *Predator*,¹⁵⁶ *Species*,¹⁵⁷ *Mad Max*,¹⁵⁸ and *The Terminator*¹⁵⁹ all postulate alternate life that is malignant, evil and terrifying. Humans are frail, and our fear of the unknown is highlighted. However, on occasion we also see examples of "good" scientists, devoted to their careers, who fight against unethical or illegal behavior on the part of their colleagues or the government. One of the most noticeable evolutions in the portrayal of scientific research in the *Star Trek* series is the progression from the lack of competent women scientists (nurse Christine Chapel is the only recurring female character who has any scientific training) in the original *Star Trek* to the relative abundance of them in the three spin-off series.¹⁶⁰ In particular, Beverly Crusher, the chief medical officer in *Star Trek: The Next Generation*, and Jadzia Dax, the science officer on *Deep Space 9*, are admirable examples of the compassionate and dedicated scientist. These two show especial advancement since they have senses of humor, families and love lives, and also solve scientific problems creatively; three things that tend to be absent in the portrayal of women scientists as a whole.¹⁶¹ In one *Star Trek: The Next Generation* episode, Dr. Crusher actively opposes a visiting female physician's desire to experiment on a paraplegic Lieutenant Worf with a dangerous procedure.¹⁶²

Finally, since mad scientists cannot normally take over the world on their own, we also see a parade of business people and other entrepreneurs available to assist them. Thus the public has also developed a general distrust of pharmaceutical, biotechnology, and high technology industries when they perceive that private industry has little consideration for anything beyond making a profit. Its interest in acquiring capital coupled with its control of scientific knowledge through employment of clever researchers who prefer large salaries to years of drudgery in government service or in

151. *Alien* (Brandywine Productions Ltd. 1979); *Aliens* (Brandywine Productions Ltd. 1986); *Alien 3* (Brandywine Productions Ltd. 1992); *Alien Resurrection* (Brandywine Productions Ltd. 1997).

152. (RKO Radio Pictures 1951).

153. (Fox television broadcast, Nov. 5, 1993).

154. (Paramount Pictures 1953)

155. (Paramount Pictures 1997).

156. (Twentieth Century Fox 1987).

157. (MGM 1995).

158. (Kennedy Miller Productions 1979).

159. (Cinema '84 1984).

160. On gender in *Star Trek* see Robin Roberts, *A New Species: Gender and Science in Science Fiction* (1993); *Sexual Generations: Star Trek the Next Generation and Gender* (forthcoming 1999).

161. The portrayal of women scientists on television and in movies in general leaves much to be desired. However, for a survey of women scientists in history see Margaret Alic, *Hypatia's Heritage* (1986).

162. *Star Trek: The Next Generation: Ethics* (NBC television broadcast, Mar. 2, 1992).

uninspiring educational institutions looks like the worst of all possible worlds.¹⁶³ Again, this reflects the popular perception of science and technology-based industries and research, and is mirrored often both in science fiction media and in initial legislative and other responses to scientific breakthroughs.

The fear that power-hungry, venal, or inefficient regulators, money hungry businesses and one track minded scientists intentionally disregard rational public objections to real, but delayed, physical injuries appears in such films as *The China Syndrome*.¹⁶⁴ Consider the scene in which the public attendees at a hearing are ignored by the regulators because they do not have the appropriate scientific or political information to combat the influence of the power plant developer. In *Alien*,¹⁶⁵ the scientist Ash represents the interests of The Company, which wants only to exploit the potential value of the alien being on the planet.¹⁶⁶ The consequence of bringing this alien into contact with humans is disaster, as the sequels *Aliens*, *Alien 3*, and *Alien Resurrection* profitably demonstrate.

163. Two of us regard this as simply another example of the irrational beliefs shared by bleeding-heart, tree-hugging liberals. One of us is normal.

164. (Columbia Pictures 1979). Other films include *Lois Gibbs and the Love Canal* (TVM 1982) and *A Civil Action* (Walt Disney Productions/Paramount Pictures 1998), based on the book by Jonathan Harr (1996). See also Christine A. Corcos, *Who Ya Gonna C(S)ite?: Ghostbusters and the Environmental Regulation Debate*, 13 *J. Land Use & Env't'l L.* 231 (1998).

165. *Alien* (Brandywine Productions Ltd. 1979); *Aliens* (Brandywine Productions Ltd. 1986); *Alien 3* (Brandywine Productions Ltd. 1992); *Alien Resurrection* (Brandywine Productions Ltd. 1997).

166. Significantly, Ash is an android. The android as helper or menace is a very common theme in science fiction and film. Films which portray androids without humans' best interests at heart include *Blade Runner* (Columbia Pictures 1982); and *The Companion* (MCA Home Video 1994) (a romance writer takes along the "perfect man" on a retreat to write her next novel). Television likes the notion of an android, and they are featured as far back as the series *My Living Doll* (Jack Chertok Television Productions television broadcast, 1964-1965) (in which Julie Newmar came to prominence as the beautiful robot for whom humans "did not compute"); the police sitcom *Holmes and Yoyo* (ABC television broadcast, 1976-1977); the sadly shortlived satiric *Quark* (Columbia Pictures Television television broadcast, 1978) which featured Richard Benjamin as the captain of a space going garbage scow. See also *Android* (New World Pictures 1982); *Star Wars* (Twentieth Century Fox 1977), and its sequels; *Star Trek: I, Mudd* (NBC television broadcast, Nov. 3, 1967); and *Star Trek: The Next Generation* (Paramount TV television broadcast, 1987-1994) (the series character Commander Data); *Making Mr. Right* (Orion Pictures 1987); *Mandroid* (Full Moon Ent. 1993); the TV movies: *Not Quite Human* (Walt Disney Pictures 1987); *Not Quite Human II* (Walt Disney Pictures 1989); and *Still Not Quite Human* (Walt Disney Pictures 1992); *The Questor Tapes* (Universal TV television broadcast, 1973); *Robocop* (Orion Pictures 1987) and *Robocop 2* (Orion Pictures 1990); the TV series *Small Wonder* (Twentieth Century Fox TV television broadcast, 1985-1989); *Superman IV: The Quest for Peace* (Warner Bros. 1987) (Superman faces "Nuclear Man," an android powered by solar energy); *The Tomorrow Man* (1996); and *Virtuosity* (Paramount Pictures 1995). For others, search the Internet Movie Database <<http://www.imdb.com>>. On *Star Wars* see (visited Mar. 11, 1999) <<http://www.starwars.com/>>.

V. MIRROR, MIRROR: SOME EXAMPLES OF IMAGES OF CLONING IN
POPULAR CULTURE AND SCIENCE FICTION

A. *Aliens, American Society, and the "Invasion Narratives" of the 1950s*¹⁶⁷

For many years writers did not fully comprehend the origins or differences among twins, and twins continue to be a favorite literary device, down to the "good twin/bad twin" dichotomy. Shakespeare uses twins in *Twelfth Night*; even though they are fraternal, and of different genders, they easily confuse onlookers. Twins are also a common mystery fiction device; the lost twin being a means to mess up an otherwise conventional plot, so much so that in "The Ten Rules of Detective Fiction," Monsignor Ronald Knox announced that it was no longer an "acceptable" ploy.¹⁶⁸

Cloning (the artificial creation of twins) as a concept unites many of humankind's most deeply rooted fears and deeply cherished hopes.¹⁶⁹ In the image of two beings phenotypically and genotypically so much alike we see the "evil twin" of legend, a category which includes the doppelganger, the Golem, and the good twin/bad twin dichotomy so beloved of Hollywood which resonates in real life. We have recently had the case of Sunny and Gina Han, in which one twin conspired to murder the other and take over her identity.¹⁷⁰ Farther afield, but no less frightening, we see the desperate evil of psychological twinning, in which one individual's "good nature" and "bad nature" are divided, giving us the very obvious lessons of *Star Trek's The Enemy Within* (the "good Kirk, bad Kirk" episode, in which Kirk is split into two physically identical but morally opposite halves).¹⁷¹ We currently celebrate the uniqueness of twins and multiples. Twinning is a favorite Madison Avenue gimmick, and while we value its amusement and amazement value, we also recognize that it incorporates deceit. The twin with the Toni¹⁷² might steal her sister's boyfriend, not to

167. Jancovich, *supra* note 80, at 10.

168. In *Murder for Pleasure* (Howard Haycraft ed., 1941).

169. While two of the authors of this essay are sisters, we are not twins, and we are not particularly alike. Nevertheless we share certain characteristics. Our mother frequently remarks that she cannot tell us apart over the phone. We would attribute this problem to her hearing, except that one of us has cats who seem to have the same problem. Clearly, we have one fear demonstrated here—the fear that we will not be able to tell clones apart. The fear of deceit—or the lack of certainty—"Which child is this? Who am I talking to?," "What human stands before me? Can I trust her to know where the cat food is?"—is a profoundly disturbing one, even in the context of unlike but genetically related individuals.

170. See generally Greg Hernandez, *Identical Stories*, L.A. Times Magazine, July 12, 1998, at 20 ("The Han twins share good looks, book smarts—and the belief that one sister didn't really plot to kill the other.").

171. (NBC television broadcast, Oct. 6, 1966).

172. On twins with Tonis as an advertising gimmick, see Betsy Carter and Elaine Sciolino, *Wave of the Past*, Newsweek, Sept. 8, 1975, at 9.

mention that the twins acting in concert might thoroughly confuse their parents and teachers.

But in no era was the image of cloning or twinning as a disguise for alien invasion more evident than in the "invasion narratives" of the 1950s. In these "scary alien" stories, humans work frantically to destroy the aliens, a task made much more difficult because the aliens resemble human beings so closely, and little consideration is given to trying to make peace or find another solution. In many cases, the alien symbolizes a perceived real-life threat. Perhaps the most famous example occurs in the first version of *Invasion of the Body Snatchers*,¹⁷³ in which the pod people who impersonate the residents of a small California town symbolize the Communists suspected of busily infiltrating American life. The 1978 remake, *Invasion of the Body Snatchers*,¹⁷⁴ emphasizes human fear of literal aliens, following on the wave of hugely popular science fiction movies like *Star Wars*, as well as fear of our own, darker-selves, which often must be vanquished. The third remake, *Body Snatchers*,¹⁷⁵ emphasizes even more clearly the twin dangers of the loss of individuality and the dangers of isolation. As several characters, aliens having now taken human form, say to the movie's protagonists, "Where are you going to run? There's nobody like you left."

Movie critic and historian Mark Jancovich points out that in *I Married a Monster From Outer Space*,¹⁷⁶ the same substitution strategy leads to the destruction of the aliens, as they begin to identify emotionally with the humans they impersonate.¹⁷⁷ That so many stories emphasize the horror and evil of the unknown clearly shows that while we all like a good scary story, we also have many unresolved fears regarding the physical and emotional implications of space travel.

The *Thing From Another World*,¹⁷⁸ (*Thing 1*), based on a novella by John Campbell,¹⁷⁹ represents the dangers of adopting Communism. By adopting the physical appearance of an individual in the story, the *Thing* hides its true nature and successfully infiltrates the human population. Its ability to disguise itself as someone known prevents the real humans in the story from recognizing the danger it poses. Psychologically, it symbolizes the result that many humans fear would be brought about by cloning. One cannot tell which is the "real human" and which is the human dominated by the *Thing*. Likewise, if an entire population parrots a political, social, or religious message, seemingly without deviation, outsiders cannot tell whether the speakers truly believe what they are

173. (Republic Home Video 1988). Based on the novel by Jack Finney, *The Body Snatchers* (1955).

174. (MGM/UA Home Video 1992).

175. (Warner Bros. 1993).

176. (Paramount Pictures Home Video 1998).

177. Jancovich, *supra* note 80.

178. *The Thing from Another World* (aka *The Thing*) (Winchester Pictures Corp. 1951).

179. John W. Campbell, *Who Goes There?* (1948).

all saying, or whether they have some other agenda. John Carpenter's *The Thing*,¹⁸⁰ (*Thing 2*), represents the danger from within even more obviously. In *Thing 1* and *Thing 2*, biological colonization occurs although the ambient social atmospheres of the 1950s and the 1980s were radically different.¹⁸¹ The *Thing* itself in both films, and in *The X-Files* episode based on the same story may be a robot¹⁸² or it may be an alien, but it is clearly a being of some sort that can imitate, and therefore overcome, humans that oppose it. It can take on any form, from dog to man, thus emphasizing that it is the ultimate danger—the imitation that can *almost* not be differentiated from the original. Like the Fifth Columnists of Nazi Europe and the American Communist moles of the 1950s,¹⁸³ the *Thing* is the danger that overtakes before we are aware that we are under attack. Compare this danger with the fears expressed by the protagonists in *Invasion of the Body Snatchers*: “[T]here is no difference you can actually see. . . .”¹⁸⁴ Interestingly, while xenophobia is one of the recurring themes in science fiction (as it is in fiction and film generally), so is the fear of the inability to distinguish the “alien” or “foreign” individual. If we are unwilling to accept those who look different (for example in *Alien Nation*), we are seemingly even more afraid of the consequences of those who look the same as we, and may therefore be disguising an even more fundamental difference.

[P]robably no area of horror has created more problems for those who search for distinct genre classifications than the invasion narratives of the 1950s with their overt hybridisation of horror and science fiction. In this group of texts, the human world is threatened by a destructive force from some previously uncharted region, usually outer space, the depths of the sea, or the desert. Not only are these films distinguished from science fiction due to the supposed inaccuracy or implausibility of their action or locations, they are often distinguished from science fiction for being anti-scientific in their attitude. For many writers on science fiction, the genre is founded upon a respect for scientific activities and an attitude of hope and wonder at the possibilities which

180. (Universal Pictures 1982).

181. *Thing 1* and *Thing 2*, a la Dr. Seuss, represent the dangers of technology run amuck, in *The Cat in the Hat*. When the children leave the door unlocked, the Cat (like dangerous technology) comes in uninvited. Complete chaos is an unintended consequence. The pink bathtub ring in *The Cat in the Hat Comes Back* is another unintended consequence that invades the entire house. But we digress, as authors do/So here we leave/Things 1 and 2 (who might very well be clones, so we may be back to them later.) See Dr. Seuss, *The Cat in the Hat* (1966); Dr. Seuss, *The Cat in the Hat Comes Back* (1968).

182. See Jancovich, *supra* note 80, at 27 (citing Jack Biskind).

183. See Jancovich, *supra* note 80. The substitution of aliens for Fifth Columnists and moles is part of Jancovich's argument. Note also that in *The Invasion of the Body Snatchers*, Jack Finney (1955), the invaders have been compared to Fifth Columnists. See Jancovich, *supra* note 80, at 64-65.

184. Jancovich, *supra* note 80, at 66 (citing the original novel).

they offer. In contrast, the 1950s invasion narratives are often criticized for displaying a fear of science.¹⁸⁵

B. Themes and Images in Specific Films, Shows and Fiction

1. Cloning in Contemporary Science Fiction: The Case of Joanna May

Cloning appears in several novels as well, as a solution to world problems, though never a successful one, a result that might be expected from the world outcry over the successful cloning of Dolly.¹⁸⁶ David Rorvik, a free-lance writer, published *In His Image: The Cloning of a Man*,¹⁸⁷ claiming it to be nonfiction.¹⁸⁸ Eminent scientists emphatically denied that such cloning was possible given the contemporary state of the science.¹⁸⁹ Yet the public fear that scientists would actually accomplish cloning in secret persisted,¹⁹⁰ another expression of the distrust of science, but a result made inevitable by the fact that much of that same public demanded and continues to demand that human cloning be outlawed. When human curiosity is stifled, it expresses itself by bursting forth eventually in unintended ways.

Naomi Mitchison's *Solution Three*¹⁹¹ popularized the term "clone," introduced by her brother, the scientist J.B.S. Haldane¹⁹² and suggested that a cloned world would inevitably destroy itself. Other "cloning" novels included Ira Levin's thriller, *The Boys From Brazil*,¹⁹³ which postulated an entire generation of baby Hitlers, and Gene Wolfe's *The Fifth Head of Cerberus*.¹⁹⁴ Even Dr. Seuss presents clones as potential bringers of chaos; The Cat in the Hat's co-conspirators Thing 1 and Thing 2 cheerfully lead children down the path of intriguingly least resistance—that is, away from parental (societal) rules into indulgence and anarchy.

Finally, Fay Weldon explores the "my sister, my daughter" debate¹⁹⁵ in *The Cloning of Joanna May*.¹⁹⁶ The unhappily married, then unhappily

185. Jancovich, *supra* note 80, at 10-11.

186. On Dolly see Kolata, *supra* note 35.

187. (1976).

188. Steve Weinberg, *The Shame of Publishing*, The Baltimore Sun, Aug. 2, 1998, at 11F. See also Kolata, *supra* note 35, at 99-101.

189. Kolata, *supra* note 35, at 99-101.

190. *Id.* at 105.

191. (1975).

192. Kolata, *supra* note 35, at 95.

193. (1976).

194. (1981). See also Kolata, *supra* note 35, at 114-15.

195. See the scene in Roman Polanski's *Chinatown* (Paramount Home Video 1990), in which Faye Dunaway ("Mrs Evelyn Mulray") admits, albeit confusingly, to Jack Nicholson as "Jake Gittes," that her daughter is the result of incest.

196. Fay Weldon, *The Cloning of Joanna May* (1989).

divorced, and childless Joanna discovers that her power-mad, control happy ex-husband Carl has "cloned" her by having an egg extracted and four babies produced, after his attempts to clone an "ancient Egyptian" have failed. Joanna's reaction is surprise, then horror.

I am horrified, I am terrified, I don't know what to do with myself at all, whatever means myself now. I don't want to meet myself, I'm sure. I would look at myself with critical eyes, confound myself. I would see what I don't want to see, myself when young. I would see not immortality, but the inevitability of age and death. As I am, so they will become. Why bother? Why bother with them, why bother with me? What's the point? I can't bear it. I have to bear it. I can't even kill myself—they will go on. Now night will never fall.¹⁹⁷

For Joanna, the critical concern is that she was not consulted about the cloning; indeed, her husband has told her repeatedly that he does not want children. The consequent betrayal is that much more significant. She believes her current, much younger lover, a gardener with musical ambitions, would be unable to understand the situation.¹⁹⁸ Here, the "horticulturalist," the traditional user of cloning mechanisms, is represented as not only another individual incapable of understanding her concerns but also as a male, like her husband, incapable of understanding that reproduction for women seems to be ultimately a woman's choice. Joanna's friend Angela provides vindication for her feelings.

"You mean you didn't even know, Joanna?" "No." "Cloned, and not known it?" "That's right." "Well, I wouldn't like that." "Neither do I, Angela. That's why I'm calling." "Poor Joanna." "Because you know how all this time I've been complaining about having nothing—no children, no career, no family, no husband, nothing I've earned or worked for myself: a whole life wasted—" "Yes, I do, Joanna—" "Well, there was a kind of pride in that, Angela. It was my singularity. He has taken away my singularity. He has shovelled all these bits and pieces at me, and I hate it."¹⁹⁹

The reaction of others to Carl May's enterprising response to his desire for control over Joanna is equally negative. Further, the law's reaction is completely unsatisfactory, as Weldon makes clear. Faced with the truth about the baby she

197. *Id.* at 121.

198. *Id.* at 127:

It was difficult to convey the extraordinary and drastic nature of Carl's world to a young man whose concerns were so very horticultural. . . . He would be positive about the matter of the clones, which she was not sure she wanted him to be. He would say, "Well, you always wanted a family: now you have them. Sisters and daughters both," and if she complained that it was altogether too sudden, and done against her will besides, and Carl May's behaviour outrageous, he would have told her not to be so negative. . . .

199. *Id.* at 127-28.

is carrying, who is one of Joanna's clones, one surrogate mother's outraged husband considers legal action only to discover that "lawyers would not take on his case: he was excitable and it sounded like sheer fantasy to them, a tale told by a guilty wife. In the end he gave up."²⁰⁰

Weldon presents cloning as a completely unacceptable alternative to sexual reproduction, partly because of the law's inability to deal with the problem and partly because scientists engaged in cloning research have no ethical or legal accountability. When Joanna confronts the physician who has assisted her husband with his project, and charges him with a lack of respect and understanding for her pain, his amorality becomes quite clear.

"Your life's passion, Dr. Holly," said Joanna May, "has had quite an effect on me. Tell me, if someone came to you and asked you to grow a human with frog's legs, would you do it?" "It wouldn't be a very practical proposition, Mrs. May," said Dr. Holly, his shrewd eyes crinkling with artificial mirth. "We have to respect the laws of physics. Such a creature wouldn't jump—it would be top heavy. And it wouldn't look very nice." "I was not talking about practicalities, Dr. Holly, nor aesthetics." "You mean the ethical considerations? Rest assured we would not. We are not in the business, Mrs. May, of creating monstrosities, but of removing disease and, in the fullness of time, and with all possible ethical and legal safeguards, mental illness—a tricky area, mind you, because what is defined as mental illness differs, as we know, from society to society, culture to culture: what seems insane to one nation is mere dissent in another—but no doubt we'll come to terms with it. And eventually we will have to tackle the genetic basis of behavioral problems, and that too will be ethically and politically tricky. But nowhere does anyone wish to create monstrosities, Mrs. May. Do I look like a mad scientist to you? No, of course not! Don't you go believing what you read in the gutter press." Dr. Holly smiled benignly. Joanna May did not smile back.²⁰¹

Holly refuses to accept that the cloning, the result of an illegal harvesting of her egg, (illegal because she did not consent) was a violation of Joanna's rights and challenges her position that the babies are "hers" in any sense of the word, thus that they have any commonality with her. By doing so he tries to allay her fear that the clones diminish her in some respect.

"I think 'my babies' is an unfortunate misnomer, Mrs. May. I don't think ownership comes into it. Does a woman's egg, once fertilized, belong to her, or to the next generation?" "Mine wasn't fertilized," said

200. *Id.* at 89.

201. *Id.* at 194-95. Note that "Holly" represents a plant (the holly) which needs both male and female to reproduce, i.e. it cannot reproduce asexually.

Joanna May, "that was the point. It was jiggled into life. So, yes, I reckon it was mine." "I should point out," said Dr. Holly, "that there was no question of illegality, since as I remember there was no actual pregnancy. But these are interesting points; for lawyers to decide, not us. And, as I say, I am no longer personally engaged in genetic engineering. It's a young man's field, these days." He felt discouraged and resolved that he would stay with the study of brain cells. They at least would not turn up years later to pester and reproach him.²⁰²

Of course, the point is that such decisions are ultimately not legal ones, but ethical and philosophical ones, and they are indeed for "us" to decide. Joanna's continued attack on him results in Dr. Holly's further justifications. He refuses to acknowledge that his actions constituted an unethical seizure of Joanna's individuality and identity, even though he eventually adopts the language that indicates that he accepts that Joanna is the clones' mother, when it suits him to do so.

"Our major concern at the time," said Dr. Holly benignly, "was in the successful implanting of fertilized eggs into stranger wombs, and testing the efficacy of certain immuno-suppressive drugs, rather than in personality studies, or making any contribution to the nurture-nature debate." "The records, Dr. Holly." "I must say here and now, Mrs. May, I would be happier if the request for information came from the child, rather than the natural parent." "I am not a parent, I am a twin." "You could look at it like that," said Dr. Holly. "These personal and ethical ramifications do keep emerging—one hardly thought about them at the time. But, as I say, in ordinary adoption cases, the natural mother and child are brought together by the relevant agency only at the request of the child. The mother gave up certain rights, knowingly and willingly, when she gave up the child to adoption." "I neither knowingly nor willingly consented to anything at all," said Joanna May, "wriggle as you want, and I want those records now or I'll blow the whole disgraceful thing wide open. . . ." "There is nothing to blow open," said Dr. Holly. "Nothing that was no approved by the district medical ethics council at the time." But he allowed her access to his records just the same.²⁰³

Similarly, the clones feel bereft of any traditional world view once they discover one another's existences as well as Joanna's. Further, they begin to think of Dr. Holly as their progenitor, in that he forced their development and arranged for their births.

202. *Id.* at 195-96.

203. *Id.* at 197.

The clones left, still angry: they blamed the bearer of bad news for the news: and the bad news was they were not who they thought they were, and that is always difficult to accept, no matter how little you may like being who you thought you were. Dr. Holly had given them life and they'd drained the life out of him. . . . Children do it to parents every day of their lives, to pay them out for not providing a perfect world to live in. They felt their own unreasonableness and it made them irritable rather than guilty. They felt the inherent guilt of the female, but not powerfully; being four that guilt was quartered. That was a great advance.²⁰⁴

Joanna's concerns about individuality and her feeling that something precious has been seized from her are natural human concerns. Are we the same people we were born? The common wisdom is that everything we may become is within us at the moment of birth. Yet many thousands of our cells are replaced every year. Can we really say we are the same people if our insides are replaced periodically? Is a computer whose boards and wires are completely replaced and upgraded but whose outside remains intact the same computer? Clones, because they will have different life experiences from each other and the parent, under normal circumstances will be no less individuals than we currently consider identical twins (both socially and legally). Only if there is, say, mass production of clones might there be so little heterogeneity in experience that the clones might actually be indistinguishable after observation of their behaviors. However, this is really not likely as even the rare instances of multiple, identical births (sextuplets and the like) show that these genetically identical people are not indistinguishable.

Feminist legal scholars and ethicists have echoed Weldon's concerns. Feminist thinking fears cloning as yet another method of male domination over women. In her essay *Sasha* Andrea Dworkin worries over precisely that eventuality.

In a world in which cloning works, only compliant women will live. Cloning is the absolute power over reproduction that men have wanted and have destroyed generations upon generations of women to approximate. This, of course, is not the logical social consequence. The technology used to make the cloned sheep is perfectly adequate to induce parthenogenesis such that women could, if we choose, reproduce ourselves—and eventually this would be an all-female world, which would, probably, end at least rape, prostitution, incest, and forced pregnancy. Men would not have to be killed—an important point, since we seem so reluctant to kill them. They would just die out over time. But they won't, will they? If they did not already have the real power over reproductive technologies, they would take it—using the violence

204. *Id.* at 236.

that we will not use. But they do have it, don't they? They have it and they will use it. Women with attitudes will die or be killed or be exiled or marginalized to eventual death—well, just like now, but as transition, a gynocidal devastation. Within reach is a world with fewer but better women. They can be used exclusively for reproduction; they can be genetically copied; they will be captives as women mostly have been; and the defiant will be rooted out, the ambitious purged, the rebellious destroyed. Every man will be able to have the girl he wants when and how he wants her; and women finally will be less than human, as low and objectlike as men have wanted us to be, without will or freedom or dignity.²⁰⁵

2. The X-Files and Star Trek

Star Trek often uses the device of new or alien life forms to address the question “what is life?” or, in legal terms, “what process is due to this life form?” The show also has many episodes exploring the balancing of individual and social rights.²⁰⁶ In their travels, the *Star Trek* crew encounters a variety of worlds, cultures and associated “natural orders” to compare with our own. In contrast, *The X-Files* presents many forms of life, but normally discusses them only from the point of view of the series heroes, Mulder and Scully. Typically, they either kill the life form, or it runs, crawls, or oozes into hiding. Generally the only exceptions occur when the particular life form is at risk of subjugation by a human organization, hence the series' fascination with conspiracies, disbelief on the part of Mulder and Scully's friends and acquaintances, and government secrecy. In the *X-Files*, the natural order of this world clearly takes precedence over that of aliens, and intrusions or exceptions are rarely tolerated. However, cloning and genetic manipulation in general are used extensively to advance the mythology of Chris Carter's universe.

Unlike many shows in which artistic license extends freely into the depiction of supposedly current scientific procedures, science and technology in *The X-Files* relatively closely models the real world. The show clearly has good science advisors who present working laboratories, techniques, and the like, in a realistic way. For example, the forensic methods that are either shown or mentioned briefly such as Southern blotting,²⁰⁷ PCR,²⁰⁸ or other DNA typing generally are accurately portrayed. The labs tend to be very typical, if cleaner,

205. Andrea Dworkin, *Sasha*, in *Clones and Clones*, *supra* note 24, at 76. Indeed, the dominance of men over women used as “breeders” is the theme of Margaret Atwood's post-apocalyptic *The Handmaid's Tale* (1988).

206. Thomas Richards points out, perhaps unnecessarily obviously, that *Star Trek* takes individuality very seriously. See Thomas Richards, *The Meaning of Star Trek* 63-101 (1997).

207. See J. Sambrook et al, *Molecular Cloning: A Laboratory Manual* 14.5 (2d ed. 1989).

208. *Id.* at 14.2-14.3 (as technique); at 14.5 (for forensics).

examples of real life research laboratories and the characters' dialogue is liberally peppered with the jargon of science. As in the *Star Trek* universe, there are both "good" and "bad" scientists in *The X-Files*, and many of the episodes do revolve in some way around the misuse of science and technology and show a fairly typical fear of what "mad" scientists can accomplish

However, scientists are as varied in their portrayal as they can be in real life. We meet scientists like Dana Scully (an M.D.), who uses the scientific method to explain or clarify the mysteries that she and Fox Mulder encounter. Scully is clearly intelligent, competent as both a scientist and FBI agent, and has a sense of humor. There are other scientists along the way such as Dr. Bambi Berenboim and Dr. Alexander Ivanov, those portrayed in *The War of the Coprophages*,²⁰⁹ who are presented as dedicated and intelligent researchers simply exploring their particular universes. The image of science here is that it can be exciting and fun, although many of the characters are stereotypical scientific nerds. On the other hand, many real scientists have a sort of focused "nerd-essential" quality to them, so the stereotype is not without some basis in reality. Some of the X-file scientists are honest and loyal but brainwashed individuals inadvertently helping the "great conspiracy" that permeates Mulder's world, and many of them are villains as well, who actively work to use their discoveries in an unethical and evil way. Examples include the German and Japanese scientists involved in the mysterious experiments featured in *Paper Clip*²¹⁰ whose nefarious doings are not only sanctioned but actively encouraged by the United States Government.²¹¹

a. Send in the Clones: Cloning, Identity, and Genetic Manipulation in the Star Trek Universe

Cloning in *Star Trek*²¹² often takes one of two forms. Either it is the result of the splitting of an individual²¹³ into two, with complementary personalities, as in the original *Star Trek*'s *The Enemy Within* episode. These episodes make use of the "Dr. Jekyll and Mr. Hyde" theme in which the human personality divides into good and evil. Or, the episodes present real cloning, and the ethical and social objections that arise from such practices.

When artificial clones appear in the original *Star Trek*, they represent an unacceptable alternative to the effects of death or disease. In the episode *What are Little Girls Made Of?*,²¹⁴ the Enterprise crew makes a call on scientist Dr.

209. (Fox television broadcast, Jan. 5, 1996).

210. (Fox television broadcast, Sept. 29, 1995).

211. See also *supra* notes 144-166 and accompanying text.

212. On the hard sciences in *Star Trek*, see Lawrence M. Krauss, *The Physics of Star Trek* (1996), and *Beyond Star Trek: Physics From Alien Invasions to the End of Time* (1997).

213. Thomas Richards points out, perhaps unnecessarily obviously, that *Star Trek* takes individuality very seriously. See Richards, *supra* note 206, at 63-101.

214. (NBC television broadcast, Oct. 20, 1966).

Roger Korby, a former lover of Nurse Chapel's, who has literally gone mad from his long period of exile from other human beings. All the other beings on the planet are androids, as the crew soon discovers. Korby himself is an android, except for his brain; he has recreated himself in an effort to recapture his own humanity and Christine Chapel's love for him. His demand that she see beyond the wires and electrical circuits that make up his body to remember the "real" Roger is impossible for her; she sees only the imitation, thus, feels no emotional connection to the android Roger.

Androids as an effective alternative to physical death pose interesting legal questions. Assuming that the brain, the only physical part that would presumably need to be transferred in order to maintain identity, can be moved with no injury to such an artificial creature, physically more powerful and possibly indestructible android bodies might wipe out most of the estate planning and probate law practices in the world. No physical death means no inheritance by subsequent generations. People would go on working for centuries, which would either result in a tremendous increase in the world economy or tremendous poverty as the population exceeded the earth's capacity to support it.²¹⁵ Physical (sexual) reproduction by androids is probably out of the question, but cloning would provide an alternative. What then are the implications for individual identity and increasing world population?

We must credit *Star Trek: The Next Generation* with creating the technological equivalent of the biologically accidental clone (twins). In the episode *Second Chances*,²¹⁶ in which a malfunctioning transporter splits Lieutenant Riker into William and Thomas, the writers explore the problems of the "twin paradox," based on Einstein's relativity theory, as well as the emotional and social problems attendant on an individual's discovery that he has a twin he never knew.²¹⁷ Riker's dislike of the "duplicate Riker" seems to stem from his feeling that, unlike a twin produced through normal biological methods, this twin can truly compete with him, and does—for Counselor Troi's love, for the adulation and popularity previously enjoyed only by the "original" Riker. The "duplicate Riker's" long isolation has made him an eager rival. In *The Metaphysics of Star Trek*,²¹⁸ Richard Hanley discusses the logical impossibility

215. This scenario presumes that colonization of other worlds is not underway in significant numbers. In addition, androids would not need food, but presumably would need other sorts of energy.

216. Athena Andreadis explores the cloning phenomenon in some depth in *To Seek Out New Life: The Biology of Star Trek* 203-08 (1998). Other recent books on the same or similar topics are: Susan Jenkins and Richard Jenkins, *Life Signs: The Biology of Star Trek* (1998); and Robert Sekuler and Randolph Blake, *Star Trek on the Brain* (1998) (which focuses on the neurological aspects of *Star Trek* biology).

217. Jenkins and Jenkins point out that the "original" Ryker has an "instinctive dislike of his doppelgänger. Identical twins typically report the opposite sensation—they feel a close emotional bond. They enjoy and desire each other's company." Jenkins and Jenkins, *supra* note 216, at 123.

218. (1998).

that both of these Rikers could be the "real" Riker, as Lieutenant LaForge tells Picard.

La Forge is correct in one sense but mistaken in another. He is correct that each of the two materialized subjects counts as a real *person*; each has all the attributes necessary for personhood, by a reasonable standard. But if La Forge is claiming that each of them is the real *Riker*—the Riker that existed just before transport on that fateful day—then he surely is mistaken. Call the subject materialized on board the *Potemkin* Riker1 and the subject materialized on the planet surface Riker2. There are four possibilities: 1. Riker1=Riker, and Riker2=Riker 2. Riker1=Riker, and Riker2 (not equal to) Riker 3. Riker1 (not equal to) Riker, and Riker2=Riker 4. Riker1 (not equal to) Riker, and Riker2 (not equal to) Riker. . . . [W]e can show that given the principle of transivity of identity, since Riker1 does not equal Riker2 (by imprisoning one, you do not thereby imprison the other), neither Riker1 nor Riker2 is identical to the original Riker. . . . Hence William T. Riker ceased to exist on the day he fissioned. Assuming no further fissions occurred, Commander Riker is identical to Riker1, and Lieutenant Riker2. The irony is that the individual who lectured the Mariposans on the importance of uniqueness (something they clearly had learned to live without) was Riker1, who unknowingly had at that very moment a twin much more like himself than any mere clone could be!²¹⁹

What Riker1 (to use Hanley's terminology) seems to object to in this episode are the claims that Riker2 makes on his life and accomplishments. Having successfully returned to the *Potemkin* oblivious to the problem just created, Riker1 has continued to operate in a universe in which he is the only, the original, the unique Riker. Surely then, the sudden appearance of Riker2 who shares Riker1's experiences and memories up to the point, ironically, at which Riker2 was created is understandable. Here we can discern some of the instinctive antipathy some people feel for the possibility of genetic cloning—they fear, irrationally, that a clone will resemble them to the point that they must question ownership of their own accomplishments and lives.

Similarly, the revulsion that the crew feels with regard to the cloned individuals in *Up the Long Ladder* reflects the fear that too many of one type of individual can lead, not to harmony, but to tyranny.

My speculative diagnosis of the common sense fear of duplication is that it really has nothing whatever to do with uniqueness. When we imagine clones or duplicates, we conjure up pictures of vast armies of creatures all looking and thinking alike. These creatures of our imaginations are not frightening because they are similar but rather

219. Richard Hanley, *The Metaphysics of Star Trek* 170 (1997).

because they appear to lack the freedom to determine the path their lives will take. We suppose them to be ready slaves to an iron will, since winning the heart and mind of one of them is winning them all. We imagine them to be like the Borg of *The Next Generation* series, effectively a collective consciousness with no room for individualism.²²⁰

But, as the Mariposan official in *Up the Long Ladder* points out, and Hanley emphasizes, "it doesn't seem to harm you in the slightest [to have an artificially created twin]—unless you feel that you have missed out on knowing your twin."²²¹ In fact, as Hanley suggests, the kind of cloning presented in *Second Chances* is actually the possibility of immortality." "[I]f Riker had known that he was about to fission, this wouldn't have been the end of the world for him, even though he would cease to exist."²²²

Similarly, the *Star Trek* crew uses technology to clone individuals who have died or have a terminal illness,²²³ using the transporter's memory banks and the computer's files on crew member DNA.²²⁴ These "accidental" clones do not pose a tremendous philosophical problem for the characters in the episodes, because they are intentional reproductions of the original made, presumably, with the implied consent of the individuals being cloned.

However, the question of *intentional* cloning for the purposes of reproduction does seem to be a dilemma. The *Star Trek* characters uniformly reject cloning as such a method, both for ethical reasons and for genetic ones. In *Up the Long Ladder*, Pulaski and Riker are cloned without their consent; neither the doctor nor the lieutenant questions that such unauthorized use of their bodies is illegal, therefore the (adult) clones can be disposed of.²²⁵ The assumption seems to be that these clones do not have the legal status of human beings or their sentient equivalents in the *Star Trek* universe, perhaps because they are still "unborn," that is, they are still within the equipment that maintains their bodily functions. Riker and Pulaski do not view the disposal of the clones as murder. Nor do they agree to replenish the gene pool of the dying colony with their own genetic material in order to permit the colony to continue its chosen method of reproduction. Instead they impose another method, the "good old fashioned way" resulting from sexual intercourse.

220. *Id.* at 173-74.

221. *Id.* at 174.

222. *Id.* at 176.

223. Andreadis, *supra* note 216, at 204-05.

224. "Accidental clones" result from a massive computer malfunction in *Star Trek: The Next Generation's A Fistful of Datas* (Paramount TV television broadcast, Nov. 9, 1992).

225. Jenkins and Jenkins, *supra* note 216, at 122-23, point out that this part of the plot results in a "king-size blooper. . . . [O]rganisms produced by cloning . . . are embryos. They take as long to mature as do babies that result from ordinary sexual reproduction."

The question of ownership of cells seems settled in the *Star Trek* universe but it is unsettled as a matter of law in the United States. Recently, an uproar over the ownership of cell lines unique to a particular tribe indigenous to New Guinea was resolved when the National Institutes of Health gave up its claim to a patent issued in 1995.²²⁶ The California Supreme Court has refused to recognize the very right that Pulaski and Riker claim, in a celebrated case that rejected a California businessman's right to share in the profits from genetic products developed from his cancerous cells.²²⁷

If Pulaski and Riker are correct in their assertion that the cells the Mariposans have tried to harvest actually belong to them, then the use of clones or cloned material to supplement or repair damage to the "original" individual would seem settled. Growing and harvesting cloned organs would seem to be permissible assuming the consent of the clonee. What is still not clear is the status of a completely cloned individual. If he is breathing on his own, but is perhaps not conscious (as is the case with the Riker and Pulaski adult clones), can his organs be harvested? If so, what is the line between the donor clone used for spare parts and the clone who has acquired self-ness, therefore individuality, even if he resembles another living (or deceased) human?

Even cloning in the name of political and social harmony is forbidden in the *Star Trek* universe. In the episode *Rightful Heir*, the clone of Kahless intended to lead the Klingons to greater glory is ultimately rejected by the Federation as unauthorized,²²⁸ primarily because Kahless, unlike Coke[®], is not "the real thing." If that decision is based on the fact that he is not the *first* Kahless chronologically (assuming that our present time line holds), then he is not "the real thing" in the sense that he is not the "original." But if the decision is based on some other criterion, including some question about the purity of his genetic makeup, then the Federation is surely wrong. "First in time, first in right" holds for mortgage law. It may not be a sufficient legal basis for denying human rights to clones.

Star Trek also postulates that genetic error is much more likely with cloning than is acceptable,²²⁹ which may be true if the genetic material used is "past its sell date," or rather older than optimum. *Up the Long Ladder* calls the problem of such genetic mutation "replicative fading," a term which presently does not exist in science. Genetic alteration occurs as a matter of course. Biologists call this kind of alteration "mutation" when it occurs in a single gene or organism, and "evolution" when it occurs in the context of an entire

226. See Sally Lehrman, *NIH Forfeits Rights to Patent on Papua New Guinea Cell Line*, *Biotechnology Newswatch*, Jan. 6, 1997, available in LEXIS NEWS Library, CURNWS File; and Darrell A. Posey, *Protecting Indigenous Peoples' Rights to Biodiversity*, 38 *Environment* 6 (1996).

227. See *Moore v. Regents*, 793 P.2d 479 (Cal. 1990) (holding that while a patient has no proprietary rights in cell line developed from his tissues, he may have claim for breach of duty against physician based on failure to inform him of value of product potentially derived from cells).

228. Andreadis, *supra* note 216, at 207, discusses this episode.

229. *Id.* at 208.

population or species. Artificial genetic alteration in cells or organisms occurs in the laboratory in a number of ways. Researchers may use radiation, chemicals, or the physical removal or rearrangement of genes using the techniques of molecular biology. The outcome of both naturally occurring and artificially induced genetic manipulation is the alteration of gene "expression," the physical manifestation of a gene's potential. Whether the gene makes more, less, or none of its product, usually a protein, or whether the gene makes a completely new product is the result of genetic alteration.

In the various *Star Trek: The Next Generation* episodes which feature the android Lieutenant Commander Data and his "twin" Lore, we also see the playing out of the traditional views of the good and evil twin. Lore is a flawed version of Data, as their creator Dr. Noonian Soong makes clear. Lore seems to have a strong sense of self, a strong individuality, and a great inclination to use both. However, his assumptions that he has free will and the ability to make his own destiny would seem to run afoul of some of Starfleet's beliefs about the individuality and rights of androids. The episode *Measure of a Man* makes clear that at least some Starfleet officers believe that Commander Data is simply capital equipment, setting up the possibility that Data might find himself with fewer "rights" than Lore simply by virtue of the fact that he is part of the military. Whether we can speak of Data and Lore as "clones" is an interesting question, since generally we assume that clones are organic living beings, and one of the great unanswered questions is whether Data and Lore are "living" in the generally accepted human sense.

Star Trek also suggests that clones are unacceptable not only because they are artificially created identicals, therefore guilty of stealing some sort of individuality from the originals, but because they come second chronologically to the "originals." In the *Voyager* episode *Assignment: Oblivion*,²³⁰ the crew is horrified to discover that they are all duplicates of the original *Voyager* crew created during a visit by the ship to an inhospitable planet. These duplicates only realize they are not the "originals" when both they and the ship begin to deteriorate physically. Widespread depression and unease follow, and the duplicate Captain Janeway realizes they will not likely survive either their continued voyage towards Earth, or an emergency return to their planet of origin. In a telling moment, she attempts to send a general recording of the crew's adventures into space so that they will not have lived and died unknown. However, the ship is destroyed before she is successful. The final scene involves the "real" *Voyager* arriving to find the wreckage of the duplicate *Voyager*, but never knowing who they have encountered and leaving in ignorance. For the viewer, the second (the real) *Voyager* is the "clone," since it is the copy, and also the second in time. Thus, the first *Voyager* must be destroyed, in order for the universe to return to its proper order.

230. (Paramount TV television broadcast, Mar. 3, 1999).

What is interesting about the episode is the clear image of the cloning/duplication of the crew presented. They are depicted as flawed and unable to survive in any atmosphere beyond their own planet, and apparently very ignorant too, since they have apparently had many adventures without ever becoming aware that they were "copies." This seems unlikely as once it occurs to the crew members, they very rapidly perform biological tests that show their bodies are comprised of chemicals not found in the normal human complement. The duplicated crew is completely unhappy with its discovery, clearly playing up the idea that to be the first, or the original, is best.

Contrasted with the *Star Trek* crew's approach to the question of cloning and individuality is that of the Federation's newest enemy, the Borg, a quasi-mechanical, quasi-sentient collective. The Borg symbolize our fear of things that are not only identical but in perfect synchronicity. Perfect equality at the expense of individuality is not an exchange we are prepared to make. "Flawed" individuals would be eliminated, and as all humans are flawed, it speaks to our unease that we could be excluded from "the good things in life" simply because we do not measure up to the single standard imposed by a society that valued only identical drones. Interestingly, though, it is clear that the Borg would not be a viable society, or powerful and feared, if they did not have the capacity to evolve by assimilating others' technology.

Note that the Borg represent the complete loss of individuality. The Collective, in which all Borg belong, intertwines all their minds and thoughts. They are the ultimate team players; indeed there is no "they" there, in the sense that there are no individuals to become a group. The Borg drones perform different tasks in the Collective, and are essentially clones. And although the Borg as a species evolve by assimilating the personalities as well as the technology and knowledge of other species, the humanoid Borgs also are grown in tanks as a form of reproduction, and once "born" develop and grow. Again, the similarity to cloning is obvious. They make formidable enemies because they are technologically advanced and can adapt their weaponry and responses swiftly to the infinitely diverse humans and aliens of the Federation, as well as the various beings inhabiting the Delta quadrant of the *Voyager* series which they encounter.

That the Borg are such unappetizing characters is yet another indication that in the *Star Trek* universe we want neither too much nor too little similarity. We are aiming for "just right." Ultimately the Federation, and we, reject Borg societal values because they do not value what others have created. They do not recognize the ownership of individual creation. Patent law, copyright law, and *droit moral de l'auteur* would be complete mysteries to them.

b. Genetic Enhancement, the Level Playing Field and Law

As an aside, *Star Trek: Deep Space 9*'s Julien Bashir, the station's doctor, is found to be a genetically manipulated human, which is considered shameful and potentially disqualifies him from Star Fleet, apparently because his

advantages are akin to cheating. Why this should be objectionable is unclear, since other species have both physical and intellectual superiority over humans. Vulcans, for example, are smarter, stronger, and more logical than humans, as we know from Mr. Spock. However, this dislike of manipulation exemplifies our current societal desires for creating equality and fostering the illusion of a level playing field for people. Perhaps exceptional strength and intelligence are acceptable only when they occur "naturally."

Similarly, the recent film *Gattaca*²³¹ highlights the use of genetic information and design to postulate a world where the most manipulated and perfect humans have all the advantages, a natural corollary to our current concern that genetic testing leads to embryo selection and misuse of information could cause insurance companies to refuse coverage to "at risk" persons, or cause discrimination in the workplace by employers who know too much about their employees' lives.

Such concerns already are quite real. The now common practice in the United States of pre-employment urine testing among private employers has led some individuals to sabotage the system by selling "urine kits" over the Internet that are guaranteed to test negative for a variety of drugs and conditions, ensuring that potential employees pass these intrusive tests.²³² The Icelandic government has approved the establishment of a commercially accessible database of its citizens' entire health records, a plan that has already engendered a great deal of criticism.²³³ The possibility that parents and physicians could engage in embryo selection or genetic therapy *in utero* in order to obtain the most desirable combination of genes in an attempt to create "perfect" children is already being voiced in the media and in the scientific press.²³⁴

Gattaca's message is that "perfect" people (in the genetic sense) are not always the "best" (in the moral sense). The genetically challenged hero develops many skills because he has to in order to achieve his potential and to compete with what has become the upper-class privileged of society.²³⁵ While this film

231. For a review see Jim Kling, *Celluloid Genetics*, (last modified Dec. 19, 1997) <<http://www.biomednet.com/hmsbeagle/22/people/pressbox.htm>>.

232. See, e.g., the website for Drug Testing Solutions, (visited Mar. 11, 1999) <<http://urnegative.com/>> which advertises "Pass a urine drug test or the hair drug test. Guaranteed negative results or we'll refund your money. 'You are negative' are the words you want to hear when receiving your test results. We provide several ways to solve the problem of drug testing, one is designed to help you. We provide a legitimate service to people like yourself. We can help you pass the drug test and we back up that claim with a money back guarantee!"

233. Martin Enserink, *Opponents Criticize Iceland's Database*, 282 *Science* 859 (1998) and see http://abcnews.go.com/onair/worldnewstonight/wnt9902/8_ice/and.html (last visited Nov. 12, 1999); <http://www.igc.org/trac/corner/worldnews/other/291.html> (last visited Jan. 12, 1999).

234. Sharon Begley, *Designer Babies*, *Newsweek*, Nov. 9, 1998, at 61-62; Barbara Katz Rothman, *On Order, in Clones and Clones*, *supra* note 24, at 280.

235. Note that most utopian novels and dystopian novels postulate exactly the opposite, that the move is toward egalitarianism rather than class distinctions. *But see Star Trek: The Cloud-Minders* (NBC television broadcast, Feb. 28, 1969).

does not deal specifically with cloning, it does warn of a less than desirable outcome for government-mandated control of genetic research, and genetic manipulation.

c. *The X-Files: Unintended Consequences and Genetic Manipulation*

The *X-Files* episode *Eve*²³⁶ gives us both a deluded scientist who believes that she can control hereditary mental disorders of her clones through appropriate drug therapies and behavior modification, and genetic engineering gone astray.²³⁷ The scientist herself is the product of overly ambitious genetic manipulation. The plot highlights a fear that there is something inherently defective about genetically created super-intelligent beings; abnormally high intelligence inevitably leads to antisocial behavior.²³⁸

In the parody episode, *Post-Modern Prometheus*, Mulder and Scully investigate a monster living in the woods. This monster is a genetic misfit created by an obsessed scientist who meddles simply because "he can." The episode's theme is that scientists are amoral, and indifferent to the more positive human emotions like love and self-sacrifice. This scientist's personality is in contrast to that of his own father, who has cared for the monster, Mutato, all his life and has educated him and attempted to help "cure" him. The scientist moves from amorality to immorality when he kills his own father in a rage over Mutato's impregnation of his own wife and another woman.

In Mutato's exile from society there is no subtlety; the episode clearly references the film *Mask*.²³⁹ Scully comments on the stereotyping of the scientist as irresponsible and arrogant (clearly the character here is both). On the other hand, the father and Mutato drug and have sex with unconscious women, an issue not addressed in the episode.

Finally, *The X-Files* occasionally explores some unlikely possibilities resulting from naturally occurring cloning gone awry in such episodes as *Roland*, which postulates that twinning could go so far wrong that one twin could somehow "siphon" intelligence away from the other in the womb, resulting in superior intelligence for the one and severe mental impairment for the other. While intriguing, this particular possibility is not a likely one.²⁴⁰

236. (Fox television broadcast, Dec. 10, 1993).

237. *X-Files* science has already engendered two books: Jeanne Cavelos, *The Science of the X-Files* (1998); and Anne Simon, *The Real Science Behind the X-Files: Microbes, Media Rights, and Mutants* (1999).

238. Another episode, which does not involve cloning but shows unintended consequences is *Soft Light*, in which Dr. Chester Ray Banton accidentally acquires the ability to "disappear" people through his research into dark matter. *The X-Files: Soft Light* (Fox television broadcast, May 5, 1995).

239. (Universal Pictures 1985).

240. Fortunately for one of this article's authors, who is a twin (albeit a fraternal one).

Note that in *The X-Files* some scientists succeed in controlling the possible unintended consequences of their work. Indeed, the conspiracy against humanity that Mulder lays at the door of the Cigarette-Smoking Man would not be nearly so horrific if its creators did not have as much control as they do over its outcome. But some scientists still struggle with the unexpected and unwanted outcomes of their Faustian bargains.

d. Fictional and Real Cloning, and the Law

The genetic manipulation that forms the basis for the action in *Post-Modern Prometheus*,²⁴¹ for example, has some basis in biology, and has already been addressed to some extent in United States state law.²⁴² The scientist in question has some protection for engaging in such activity, and the villagers have some protection from the consequences of his actions, depending on geographical location. Similarly, Dr. Sally Kendrick, the physician who creates the "Eves" in her own image in *Eve*²⁴³ and Dr. Prince involved with the "Samanthas" (the supposed clones of Mulder's missing sister) in *End Game*²⁴⁴ may arguably have some freedom to carry on the kind of research that results in these clones. Nevertheless, the kind of experimentation that they and Dr. Pollidori,²⁴⁵ the mad scientist in *Post-Modern Prometheus*, carry on raises fundamental questions about the kind of research using human subjects that we are prepared to countenance, and illustrates the fears that the public has about science gone wild. For example, New York apparently welcomes the careful investigation of genetic mysteries, as indicated in its legislative findings.

The legislature finds that new techniques of genetic manipulation which allow researchers to accomplish exchanges of genetic material between unlike organisms offer great potential for expanding human knowledge of genetics but also may present significant risks to public health, to the environment and to the health of research workers. These experiments are being conducted at research institutions in New York, including universities, hospitals and industrial facilities. Industry plans to mass-produce recombinant organisms should such organisms be found to have

241. *The X-Files: Post-Modern Prometheus* (Fox television broadcast, Nov. 30, 1997).

242. Many countries currently maintain official agencies which overview and provide guidelines for genetic manipulations, for example, the Genetic Manipulation Advisory Committee (GMAC), Australia (see (visited Feb. 6, 1999) <<http://www.dist.gov.au/science/gmac/backgrnd.htm>>). President Corazon Aquino of the Philippines issued Executive Order No. 430 establishing a National Committee on Biosafety of the Philippines to monitor and guide the country's use of genetic technology. See (visited Apr. 6, 1999) <<http://www.dost.gov.ph/DOST/NCBP/preface.html>>.

243. *The X-Files: Eve* (Fox television broadcast, Dec. 10, 1993).

244. *The X-Files: End Game* (Fox television broadcast, Feb. 17, 1995).

245. Dr. John Polidori was the physician who accompanied Lord Byron on his European voyages and was present when Mary Shelley discussed the idea for her novel *Frankenstein*. See Kral, *supra* note 80.

commercial uses. Such research and production should only be conducted under safe conditions as prescribed by the commissioner.²⁴⁶

Yet California has made its reservations about human cloning and attendant research law, placing a firm ban on human cloning and delegitimizing further research in the area.

(a) No person shall clone a human being. (b) No person shall purchase or sell an ovum, zygote, embryo, or fetus for the purpose of cloning a human being. (c) For purposes of this section, "clone" means the practice of creating or attempting to create a human being by transferring the nucleus from a human cell from whatever source into a human egg cell from which the nucleus has been removed for the purpose of, or to implant, the resulting product to initiate a pregnancy that could result in the birth of a human being.²⁴⁷

Thus, depending on the United States state in which Pollidori finds himself, his initial research may or may not be protected. Michigan's law does not, for example, prohibit cell-based research,²⁴⁸ but results that look "human" would be proscribed, even though neither the donor of the tissues, nor apparently the resulting being would have a private right of action against Pollidori.²⁴⁹ Intent seems to be the key under the Michigan statute. Certainly Kendrick's research would not be, since she carried on her experimentation at the California clinic at which she was employed after the law was passed. Both Pollidori and Kendrick would face having their medical licenses revoked under either the California²⁵⁰ or Michigan²⁵¹ statutes. Note that in *Eve* the director of the fertility clinic that had employed her points out that for her "unethical conduct" Kendrick was dismissed.

Under international law, the ban against cloning is somewhat more clearly defined. UNESCO has already announced guidelines to assist UN member states in defining the limits of acceptable research,²⁵² in an attempt to enable nations to examine the question dispassionately. This intent to consider all the questions

246. N.Y. Pub. Health Law § 3220 (McKinney 1998).

247. Cal. Health & Safety Code § 24185 (West 1999). The ban exists until January 1, 2003.

248. (2) Subsection (1) does not prohibit scientific research or cell-based therapies not specifically prohibited by that subsection. Mich. Stat. Ann. § 14.15(16274) (Law Co-Op. 1998); Mich. Comp. Laws § 333.16274 (1998).

249. (4) This section does not give a person a private right of action. Mich. Stat. Ann. § 14.15(16274) (Law Co-Op. 1998); Mich. Comp. Laws § 333.16274 (1998).

250. (a) A violation of Section 24185 of the Health and Safety Code, relating to human cloning, constitutes unprofessional conduct. Cal. Bus. & Prof. Code § 2260.5 (West 1999).

251. (3) A licensee or registrant who violates subsection (1) is subject to the administrative penalties prescribed in sections 16221 and 16226 and to the civil penalty prescribed in section 16275. Mich. Stat. Ann. § 14.15(16274) (Law Co-Op. 1998); Mich. Code Ann. § 333.16274 (1998).

252. Declaration on the Human Genome. See *Academic Press Daily Inscight* (visited Apr. 6, 1999) <<http://www.apnet.com/inscight/11141997/graphb.htm>>.

involved with due consideration for the benefits and disadvantages is one that the California statute states specifically, in contrast to the negative and disapproving tone that *Star Trek*, *The X-Files* and other science fiction media express.

It is the intent of the Legislature to place a five-year moratorium on the cloning of an entire human being in order to evaluate the profound medical, ethical, and social implications that such a possibility raises. It is not the intent of the Legislature that this moratorium apply to the cloning of human cells, human tissue, or human organs that would not result in the replication of an entire human being. During this moratorium period, the State Director of Health Services should be called upon to establish a panel of representatives from the fields of medicine, religion, biotechnology, genetics, law, bioethics, and the general public to evaluate those implications, review public policy, and advise the Legislature and the Governor in this area.²⁵³

Agent Scully herself is a victim of this experimentation; her eggs are harvested and used to create a line of clones as well as to create an alien-human hybrid in the episodes *Christmas Carol*²⁵⁴ and *Emily*.²⁵⁵

The kind of cloning in both *Eve* and *End Game* is presumably created through parthenogenesis, where the egg (female genetic complement) only is used for creation of the new life form. Should the girls in *Eve* have children, each child will be related fifty percent to each clone. The normal genetic relationship between an aunt and niece is only twenty-five percent. The kind of genetic inbreeding that might eventually result from such cloning is the kind that incest laws are written to prevent. But as *Eve* and other science fiction stories involving cloning show us, the law is deficient in that it presupposes for the most part that biological and legal relationships are co-extensive. Thus, this one example demonstrates that the law is woefully unprepared to address the questions that science fiction only partly fancifully puts before us.

For example, the state of California prohibits marriage within certain degrees of genetic/biological relationship. The purposes are twofold: to prevent sexual intercourse and other behaviors between persons of the same biological family that have traditionally been prohibited either for religious or for ethical reasons, and to prevent the genetic injury that might occur to children.²⁵⁶

Persons being within the degrees of consanguinity within which marriages are declared by law to be incestuous and void, who intermar-

²⁵³. See 1977 Cal. Stat. 688.

²⁵⁴. *The X-Files: Christmas Carol* (Fox television broadcast, Dec. 7, 1997).

²⁵⁵. *The X-Files: Emily* (Fox television broadcast, Dec. 14, 1997).

²⁵⁶. For example, *The X-Files* episode *Home* considers the results of generations of incestuous intercourse (Fox television broadcast, Oct. 11, 1996).

ry with each other, or who commit fornication or adultery with each other, are punishable by imprisonment in the state prison.²⁵⁷

That the intent is to guard against genetic consequences is made clear by the interpretation of California courts that "[t]he Legislature, by expressly including relationships between brothers and sisters of the half blood and not so specifying as to more distant relatives, intended by [California Penal Code § 285] (incest), as applied with [California Civil Code § 59] (codification of degrees of consanguinity), to condemn sexual relations between persons related by the half blood only when they are brothers and sisters, and to exclude more distant relatives."²⁵⁸ According to a later case, this section is applicable to persons whom the state "deems to be related" whether they are biologically related or not.²⁵⁹

But courts may take a strict view even when the persons involved guard against the consequences of sexual intercourse. A Massachusetts brother and sister's marriage was invalidated in 1979 when they were found guilty of incest, even though they had been legally adopted by two separate families, reared separately, and had gotten to know each other only in adulthood. That the two were completely bewildered by the opposition of both family and the law to their marriage is clear from their reactions to the court proceeding.

"How can you have a brother-sister relationship after 23 years?" Pittorino asked during an interview with *The Lawrence Eagle Tribune*. "We saw each other as boy-girl But I can't say at this time whether it was right or wrong. If they hadn't split us up, we wouldn't be in this mess. We felt legally the state separated us and put us up for adoption. Legally we were not brother and sister." Goddu added, "It's too late for Vicki and I to change our feelings."²⁶⁰

The couple was sentenced to probation and allowed to live together, but as brother and sister, not as husband and wife.²⁶¹ Another, more egregious example is that of a Milwaukee, Wisconsin brother and sister whose parental rights were terminated. Their family, like that of the family in *Home*,²⁶² had a history of incestuous relationships.

The brother and sister were born and raised in Wisconsin, but grew up in separate homes. . . . The biological family described in court records

257. Cal. Pen. Code § 285 (West 1999).

258. *People v. Baker*, 442 P.2d 675, 676 (Cal. 1968).

259. *People v. Russell*, 22 Cal. App. 3d 330 (Cal. Ct. App. 1971).

260. Stacy Jolna, *A Love Story With, More Than Likely, an Unhappy Ending*, *Wash. Post*, June 21, 1979, at A3.

261. *N.Y. Times*, Aug. 2, 1979, at 12, available in LEXIS NEWS Library, ARCNWS File, or Barbara Graustark, *Newsmakers*, *Newsweek*, Aug. 13, 1979, at 4.

262. See *supra* note 256.

as extremely dysfunctional has a 20-year history with county social service agencies. . . . In addition to Monday's case, there is a history of incest within the rest of the biological family, including a half-brother and sister who had a child from an incestuous relationship, court records show. The brother and sister contested the paternity of their 7-month-old son in court Monday. The sister testified that she never had sexual intercourse with her brother during the time she would have conceived her son. Asked whether he had intercourse with his sister then, the brother replied, "I really couldn't say." Saying that was a "most bizarre response," Ettenheim countered that most people would be able to confirm or deny whether they had sex with a sibling. Debra Endean, a genetics specialist, said results of paternity and genetic testing showed that the brother was 99.99% more likely to be the father of the child than any other man: . . . The brother and sister have continued to repeat a pathological pattern of lies and sociopathic behavior that has dominated their family history. "It appears nobody has learned a lesson," Ettenheim said. The worst part is that the brother and sister continue to deny the onsequences of their incestuous behavior on their children²⁶³

VI. SOME UNANSWERED QUESTIONS

Law, of course, has not dealt with some of the more routine issues likely to arise if and when cloning or alternative means of reproduction become viable options. Most pressing will be the question of the legality of contracts through which individuals enter into cloning agreements with laboratories or researchers. If the government bans on cloning in many countries continue, these contracts will undoubtedly be private and secret agreements and will be regarded with the same suspicion that greeted the first surrogacy contracts.²⁶⁴ The cloning procedure will undoubtedly command a high price, at least at first, leading to questions about allocation of resources, availability of the service to others than wealthy potential clonees, and accusations that cloning, like other sophisticated technology, is available only to the wealthy, Western, educated and usually white population of the Earth.²⁶⁵ Neither science fiction nor law has yet dealt

263. Mary Beth Murphy, *Brother, Sister Lose Parental Rights to Son. Siblings Believed to be First Prosecuted Solely for Incest Under 1989 Law*, Milwaukee J.-Sentinel, Feb. 11, 1997, at 1.

264. On British reaction, see Emily Hohler, *Baby Love and Baby Law*, Sunday Telegraph, Mar. 16, 1997, at O4 (on the first woman to have a baby as a surrogate). On United States reaction see Mike Kelly, *Selling Baby M*, The Record, Dec. 14, 1993, at B01.

265. Yet Western countries are rapidly moving to ban cloning, even as they debate how much genetic information is too much. See Mark Schoofs, *How Genetics is Changing Our Lives*, Village Voice, Sept. 30, 1997, available in LEXIS NEWS Library, CURNWS File.

adequately, if at all, with problems of estate planning, inheritance, and individual rights with regard to cloning.

In his study of science fiction as an expression of myth, Albert Wendland points out that science fiction is necessarily limited by the possibilities of the human mind. "We have not yet experienced anything from outside our own solar system and do not yet know what the 'truly alien' would entail. . . . Science fiction covers events which 'have not happened,' not the experience of being on the moon but an experience, a postulated experience."²⁶⁶ Cloning of the type postulated in the science fiction we have examined is moving relatively quickly from the "has not happened" to the "will happen."²⁶⁷

VII. CONCLUSION

Like other rapid advancements in technology and science, the issues of cloning and genetic manipulation force us to confront the fact that law and ethics lag behind the very real possibilities that such advancements offer us. Science has made and likely will continue to make advances that outstrip the current scope of law. We need only look to the current arguments over the nature and power of the Internet to see that many activities are already taking place unregulated or inadequately regulated.²⁶⁸ Biology is even more prone to the development of technology that has particularly profound implications for ethics and everyday law.²⁶⁹ Similarly, scientific advancements have presented us with dilemmas that law has anticipated. For example, the ability to perform in vitro fertilization and surrogacy have given us various cases where parental rights, responsibilities, and other considerations have had to be addressed in court for new law to be written.²⁷⁰ Advances in both science and technology in the field of molecular biology over the last thirty years have allowed us to move far beyond what was legislatively anticipated. The ability to move and express genes from one organism to another has allowed us to produce useful proteins such as insulin and human growth factor in vast quantities from bacteria, but also has created a quagmire of legal issues regarding ownership of newly discovered genes and their protein products. In addition, ethical and legal considerations have resulted from claims by both individuals and groups that "their" genes, that is, a gene discovered by a scientist during the course of his or her research, should not be patentable solely by the discoverer, but also by the individual or

266. Wendland, *supra* note 1.

267. When it does, will we see bumper stickers that read, "When Cloning Is Outlawed, Only Outlaws Will Have Clones."

268. Cybertheft, cyberlibel, cyberfraud and copyright infringement are only a few of the crimes for which current law has no adequate remedy.

269. See Lori B. Andrews, *The Sperminator*, N.Y. Times Mag., Mar. 28, 1999, at 62.

270. Recently the California courts have had to address the question of paternity for a child with six adults involved in her creation and yet, no "real" parents. See Patti Waldmeir, *Reproduction in a Muddle*, Financial Times, Mar. 27, 1999, at 11.

group through whom the discovery was made. Similarly, there is argument regarding the discovery and patenting of genes from plants and animals in rare ecological zones, where there is perceived to be a need to return to the area some value for the possible commercialization of the discovery made. Lesser developed countries are not able to benefit from the scientific advances which they have indirectly sponsored.

Other forms of genetic manipulation of organisms have given rise to various legal and ethical complications, such as, genetic manipulation of embryos in or ex utero to correct defects, and genetic screening of adults or fetuses, and on a broader scale: cloning, manipulation and hybridization of non-human species of animals or plants that not only push the boundaries of scientific knowledge and technology, but also give rise to new forms of life, generate new commercial products (crops and drugs and so forth), and stimulate great controversy as to their legal and ethical status and safety.

Even though the successful cloning of an entire human being does not seem imminent, the very possibility gives rise to great concern and fear on multiple levels, and legal implications are just beginning to be considered. Humans could be created simply as reservoirs for useful tissues or used as experimental organisms, even though this option has been widely, if not universally, viewed as unethical and heinous. The production of human tissue alone, for specific prophylactic or rehabilitative purposes, is more open to ethical consideration as a potentially life-saving procedure for those individuals needing transplants or having some genetic or other serious disease. Certain procedures, even if many individuals object to them, may still be both necessary and permissible for the welfare of a few. If we put an end to scientific research because we distrust the persons who engage in it and limit the bounds of human curiosity because we fear we will open a Pandora's box, we will create a future for ourselves that has indeed been predicted by science fiction, a world like Gary Ross' *Pleasantville*²⁷¹ or George Orwell's *1984*.²⁷²

271. (New Line Cinema 1998).

272. George Orwell's classic novel *1984* was first published in 1944, far enough in advance of its purported time period to caution its readers. It has been frequently reissued. The 1990 mass market paperback carries the original American blue and red lettering. A film version was shot in 1956, the 1984 remake starred Richard Burton and John Hurt. Other futuristic tales with similar themes include: Ray Bradbury, *Fahrenheit 451* (Vinyard 1966) (with Julie Christie); Terry Gilliam, *Brazil* (Universal Pictures 1985) (which starred Robert De Niro and Jonathan Pryce); and Stanley Kubrick, *A Clockwork Orange* (Warner Brothers 1971) (starring Malcolm MacDowell, and based on Anthony Burgess's novel of the same name).

APPENDIX I

TV and Films About Cloning and Genetic Manipulation

Alien: Resurrection (Brandywine Productions Ltd. 1997). Ripley is brought back from the dead through cloning after scientists figure out a way to extract the Queen's DNA from her.

Blade Runner (The Ladd Company 1982). Not strictly a clone movie, but considers the implications of creating androids that are "more human than human," and the desirability of combining human and artificial body parts to make a more intellectual and powerful being.

Clone Master (Paramount Television 1978).

The Clonus Horror (Clonus Assoc. 1978). Politicians plot to clone themselves and take over the world. Also called: **Parts: The Clonus Horror**.

Deepwater Black (The Sci-Fi Channel, television broadcast, 1997). A space vessel carries clones to another world after a killer virus devastates human life on Earth.

Doppelganger (Digital Pictures 1997). A British soccer star is kidnapped and cloned.

The Island of Dr. Moreau (American International Pictures 1977). Based on the H.G. Wells novel, a mad scientist tries to create smarter animals that nevertheless obey him.

The Island of Dr. Moreau (New Line Cinema 1996).

Multiplicity (Boss Film Studios 1996). An obliging scientist clones a man to help him deal with the demands on his time.

Mr. Murder (Elephant Walk Entertainment 1998). Scientists try to create the perfect killing machine.

Starman (Columbia Pictures 1984). A nice alien takes over the body of a dead man and convinces his widow to help him in his earthly adventure. Later made into a short-lived television series: *Starman* (Columbia Pictures Television television broadcast, 1986-1987) (22 episodes).

Star Trek: The Next Generation: The Masterpiece Society (Paramount TV television broadcast, Feb. 10, 1992). The Enterprise tries to save a genetically engineered society from natural disaster.

Star Trek: The Next Generation: Rightful Heir (Paramount TV television broadcast, May 17, 1993). A clone of Kahless, the mythic Klingon hero, is created to bring about unity.

Star Trek: The Next Generation: Second Chances (Paramount TV television broadcast, May 24, 1993). The Enterprise discovers a transporter-created duplicate of Lieutenant Riker on a deserted planet.

Star Trek: The Next Generation: Unnatural Selection (Paramount TV television broadcast, Jan. 30, 1989). Genetically engineered "perfect" children are carriers of a disorder lethal to their adult caretakers.

Star Trek: The Next Generation: Up the Long Ladder (Paramount TV television broadcast, May 22, 1989). The Enterprise attempts to assist two colonies of humans, one a genetically deteriorating advanced civilization reproducing through cloning and the other a healthy but more primitive culture. The ladder clearly refers to the double helix as well as to the "ladder" toward civilization. *The X-Files* (Fox television broadcast, 1993-current).

APPENDIX 2

Cloning in Fiction

- BeauSeigneur, James, *In His Image: Book One of the Christ Clone Trilogy* (1997).
- BeauSeigneur, James, *Acts of God* (1998) (Christ Clone Trilogy; 3).
- Boucher, Chris, *Last Man Running* (1998) (Doctor Who).
- Brass, Perry, *The Harvest: A Novel* (1997).
- Bujold, Lois McMaster, *Mirror Dance* (1994) (A Vorkosigan Adventure).
- Burton, Robert Alan, *Cellmates* (1999).
- Cherryh, C. J., *Cyteen: The Betrayal* (1988).
- Clones* (1998). Contains stories by Ursula LeGuin, Damon Knight, Greg Egan, Charles Sheffield, John Varley, Joe Haldeman, Ian R. MacLeod, Pamela Sargent, Kate Wilhelm.
- Crichton, Michael, *Jurassic Park* (1990).
- Crichton, Michael, *The Lost World* (1995).
- Davies, I. R., *The Cloning of Richard Mattacks* (1980) (KEA New Fiction Series; 11).
- Efimov, Igor Markovich, *Arkhivy Strashnogo suda/The Judgement Day Archives* (1982).
- Efimov, Igor Markovich, *The Judgment Day Archives: A Novel* (1988). Translation of *Arkhivy Strashnogo Suda*.
- Freireich, Valerie J., *Becoming Human* (1995).
- Hewlett, Martin, *Divine Blood* (1998). Original title: *Sangre de Cristo*.
- Kerner, Charlotte, *Geboren 1999: Eine Zukunftsgeschichte* (1995) (Gulliver Taschenbuch; 737).
- McKeone, Lee, *The Clone Crisis* (1992) (Questar Science Fiction).
- Resnick, Michael D., *The Widowmaker* (1996).
- Resnick, Michael D., *The Widowmaker Reborn* (1997) (Widowmaker Trilogy; 2).
- Resnick, Michael D., *The Widowmaker Unleashed* (1998) (Widowmaker Trilogy; 3).
- Scott, Jefferson, *Fatal Defect: A Genetic Thriller* (1998).
- Shear, David, *Cloning* (1972) (Hale SF).

- Sherman, Jory, *The Phoenix Man* (1980).
Slote, Alfred, *Clone Catcher* (1982).
Smith, Michael Marshall, *Spare* (1996).
Steel, Danielle, *The Klone and I* (1998).
Steel, Danielle, *Wanderlust* (1986).
Weldon, Fay, *The Cloning of Joanna May* (1990).
Wilson, Charles, *Direct Descendant* (1995).
Wilson, Francis Paul, *Masque* (1998).
Wolf, Michael, *The Catchers of Heaven: A Trilogy* (1996).

APPENDIX 3

Cloning in Fiction: Young Adult Literature

- Ames, Mildred, *Anna to the Infinite Power* (1981).
Cooper, Margaret C., *Code Name, Clone* (1982) (Walker Science Fiction for Young Readers).
Cooper, Margaret C., *Solution, Escape* (1981) (Walker Science Fiction for Young Readers).
Gormley, Beatrice, *Best Friend Insurance* (1983).
Homzie, Hillary, *Two Heads Are Better Than One* (1999) (Clone of My Own; 1).
Lasky, Kathryn, *Star Split* (1999).
MacGregor, Ellen, *Miss Pickerell Takes the Bull by the Horns* (1976) (An Archway Paperback).
Merkley, Chad, *Too Many Me's* (1999).
Ryan, Mary C., *Me Two* (1991).

