Below are samples of analytical essays that incorporate literature reviews. They were composed by students in the Fall 2005 Dean's Book Course. Essays incorporating literature reviews partially fulfill the requirement for Assignment Two in Honors 291.

The samples provide different approaches to incorporating literature reviews into longer essays.

- Sample I, written for Honors 291, explicitly sets off the literature review under its own heading, following the essay's introduction and preceding its discussion of the issue.
- Sample II, also composed for Honors 291, weaves a review of the literature seamlessly into the overall discussion.

Sample I

Cloning: An Option for Endangered Species Conservation

Emily Follett

Includes research question in introduction.

Review is composed in the style of an expository essay with an introduction, discussion, and conclusion.

Introduction:

Geneticists know that the technology of cloning lies in the palm of their hands, and its use domestic animals and now endangered species has already proven successful. The question I ask is this: Will cloning be used in the conservation of endangered species? This very question has arked debate between the scientific community and many conservationists. Contrary to the value forth by many conservationist groups, my research suggests that the cloning of endangered ecies is, in fact, a viable option in their preservation and repopulation.

view of the Literature:

Cites all sources that agree with this assertion and separates entries with semicolons.

Most available sources support the idea of using cloning to rebuild animal populations or least obtain viable DNA from endangered animals ("Endangered Species"; Fields-Meyer and Seaman; Holt *et al.*; Lanza *et al.*; Ryder; Trivedi). The prominent scientists Betsy Dresser, Robert Lanza, and Philip Damiani of the Advanced Cell Technology laboratories in Worcester, Massachusetts, expressed their optimism about cloning endangered species in the article "Cloning Noah's Ark." Dresser and Lanza were also quoted in several online news sources as well ("Endangered species cloned"; "Endangered Species: Kittens") . They conclude that "Biotechnology might offer the best way to keep some endangered species from disappearing from the planet" (Lanza *et al.*). As my research suggests, cloning endangered species will surely have its benefits in keeping these populations alive, an option which conservationists cannot deny.

Concludes opening paragraph with thesis statement.

The scientists mentioned do not ignore opposition to their scientific claims from conservationists skeptical of the uses of cloning and leery that it usage will deter humans from restoring natural habitats. Instead, the scientific researchers have taken each of these criticisms and, in a sense, knocked them down, providing economic and scientific evidence to back up their claims. The Advanced Cell Technology's article "Cloning Noah's Ark" along with William Holt and colleagues' article on cloning endangered species both do an excellent job of presenting the negative aspects associated with this new technology which concerns many conservationists, but assure their audience that the benefits emerging from cloning endangered species certainly outweigh the costs. As Betsy Dresser stated in a National Geographic article discussing the first successfully cloned endangered species, "Saving habitat may not be enough, any tool for saving endangered species is important...Cloning is just another reproductive tool, like in-vitro fertilization" (Trivedi). Placed in this context, Dresser never claims that conserving habitats wi

Most often summarizes or paraphrases; occasionally quotes directly.

Cites individuals making unique claims or prominent claims

not work or should be abandoned, but simply suggests that saving an animal's environment may not be enough. Increasing the numbers in a given population is just as important and cloning may be one of the only options some species have left to survive.

Each article definitely displays its own biases toward the research conducted on cloning endangered species. However, the scientists writing about their research often display both sides of the argument, allowing the reader to understand why this new technology is so controversial within the different scientific and conservationist communities. Lanza, Dresser, and Damiani conclude:

> Although we agree that every effort should be made to preserve wild spaces for the incredible diversity of life that inhabits this planet, in some cases either the battle has already been lost or its outcome looks dire. Cloning technology is not a panacea, but it offers the opportunity to save some of the species that contribute to that diversity. (Lanza *et al.*)

Concludes lit review with a summary statement and moves on to own discussion.

Despite the biases found in my research, the information has been presented in a way that informs me of the criticisms revolving around the science and technology of cloning endangered species and has provided numerous reasons for its acceptance in the scientific community as well as in the realm of conservation. The following discussion delves into my research on cloning endangered species, promoting its benefits, while also acknowledging its shortfalls.

Now uses sources to support own claims rather than focusing on sources themselves.

Discussion:

The mere presence of humans has played a drastic role in the decline of species around the globe. Industrial expansion, waste, pollution, over-hunting and fishing, scientific experimentation, and the destruction of habitats are all humanly driven actions that have increasingly endangered various animals and plants, some to the point of near extinction (Holt). Many people are now concerned with reversing this cycle that humans have played such a part in creating, leaving wildlife conservationists and other concerned individuals to grapple with possible solutions. Through raising awareness and setting aside safe sanctuaries, small gains have been made in protecting these species. However, with new scientific technology being created and perfected every day, multiple options have been made available to conservationists across the globe. Since the first successful cloning of Dolly the sheep, scientists have considered this particular technology an option in repopulating endangered animals.

The small populations of endangered animals that remain today lack genetic variation and diversity, greatly reducing their chances of a successful rebound in the wild. One potential method proposed by biological scientists and geneticists that could help solve this diversity dilemma revolves around the technology of cloning. It has been suggested that if scientists were to clone each member of a small population of a given endangered species, the resulting clones, along with the original species members, could breed naturally, presumably creating multiple offspring and increasing the diversity within the group (Holt). Scientists are also exploring the idea of collecting various cells from multiple endangered creatures and saving the genetic material from the original gene pools. If the numbers of a given species were to drastically decrease to near extinction, the genes already saved could be cloned, making it possible for scientists to rekindle the population. These genes on hand would offer enough genetic variation that natural breeding could successfully take place once enough clones were created from the original gene pool ("Endangered Species: Kittens..."). According to Betsy Dresser, a researcher of endangered species for the Audubon Center in New Orleans, cloning "may allow us to bring back genetic material from infertile animals, dead animals and even very young animals that were too immature to breed" ("Endangered Species:

Kittens..."). This idea of cloning has opened up new doors in the realm of conservation and with time and perfection may prove to be one of the most valuable techniques in saving rare species all over the world.

The new technology has already been put to the test with the successful cloning of both wild animals and those held in captivity. However, the first attempts in this field of work were not as successful as scientists had hoped. In Worcester, Massachusetts, at the Advanced Cell Technology laboratories, a gaur, more commonly known as an endangered Asian Ox, was cloned from the DNA of a dead male gaur placed into the egg of a domestic cow ("Endangered species cloned"). Scientists used a total of 692 eggs, which resulted in only thirty-two cloned embryos that were then placed into surrogate domestic cows. Only one resulted in a successful pregnancy that was carried to term, and the result was the baby gaur, Noah, the first cloned endangered animal. Unfortunately, the young gaur survived for only two days and died of dysentery, which scientists have not attributed to the cloning procedure ("Endangered species cloned"). With such a large number of eggs and embryos to work with, only one clone was actually produced and its life was cut drastically short. After this event, scientists around the globe attempted to produce more feasible results.

Unlike the endangered Gaur, the mouflon lamb was the first endangered animal to be successfully cloned and survive over an extended period of time. This type of lamb was originally from the Mediterranean islands and was brought over to Europe as well. The species nearly died out over a century ago, and the small population left has been raised in captivity. Interestingly enough, this lamb was cloned from the cells of a mouflon ewe that had died a day earlier, and the DNA from the collected cells was inserted into the nucleus of an unfertilized egg from a domestic sheep who in turn served as the mouflon lamb's surrogate mother ("Endangered Species: Kittens…"). After the first successful birth of an endangered species, more were sure to come.

Recently in the past year, the world saw the first successful cloning of a wild endangered species. Eight healthy kittens were cloned and born from several adult African wildcats. This opened a new window for geneticists, biologists, and conservationists alike. Instead of working with the more familiar domesticated animals such as the mouflon lamb, the technology of cloning was now proving successful with animals that were not raised in captivity (Trivedi). For those seeking to revive the dwindling populations of endangered wild animals, the success of the African wildcats may serve as a stepping stone in this genetic process and the cloning of other rare, perhaps less familiar creatures may be within arms' reach after all.

Still, many conservationists are skeptical of the actual practice of cloning to revive endangered species. Successful cloning of an organism requires a deep knowledge and understanding of its make-up and physiological background, and unfortunately scientists know the least about those animals on the endangered list (Holt). Due to their scarcity in the wild, as well as in sanctuaries, research on these "at-risk" animals is often limited for fear of harming the few that remain. Jeopardizing small populations of endangered animals for research that may prove invalid is enough reason for many conservationists to turn away from this scientific technology altogether (Holt). Other conservationists also feel that cloning an endangered species is not enough. It is one thing to create more of a particular species, but if you do not get to the root of the problem causing their decline, the species will still be unable to thrive in the wild. According to Susan Lieberman of the World Wildlife Foundation, "Cloning does nothing to reduce the most pressing threats to endangered species and their habitats; conservation requires work on entire populations and their habitats" (Trivedi). Perhaps a joint effort in improving wildlife habitats in combination with the actual cloning of endangered species may prove to be the most successful method.

Aside from the drawbacks discussed, scientists at Worcester's Advanced Cell Technology (ACT) claim that cloning may play a key role in maintaining and managing already endangered species, along with those whose declining populations are pushing them toward endangerment (Lanza *et al.*). ACT staff promote the idea of creating world banks to hold the frozen tissues of vast numbers of endangered species in a given population. With this tissue store, scientists will have access to the DNA of as many endangered animals as of a given species as possible, allowing diversity and genetic variation of a creature to be saved over several decades, while also making specimens readily accessible to the scientific community (Lanza *et al.*). While critics argue that cloning endangered species would take away from the importance of and focus on habitat preservation, ACT and other scientists have raised the claim that several nations around the globe are either too poor or to unstable to support a well-maintained preservation site for endangered animals (Lanza *et al.*). With this in mind, countries that may have the funding to establish preservation lands might not be situated in a climate or environment that suits the endangered animals, or they simply may not have enough land to put aside for conservation because of an increasing population of people. For these reasons, it may be of great value to set aside genetic tissues holding the DNA of endangered species. The costs of freezing and keeping this genetic material is relatively inexpensive when compared to the money, time, and effort accompanying habitat conservation and zoo maintenance for large endangered species (Lanza *et al.*). With the frozen tissues on hand, scientists have the option to clone at the time that they feel is most opportune. This "waiting period" could allow funding to be distributed to habitat restoration and preservation, providing newly cloned animals with a safer environment to breed, live, and reclaim their populations.

Despite the challenges arising from the use of cloning as an effort to save endangered species, the field seems fairly optimistic. With great strides having already been seen through the first successful clones of both wild and domestic endangered species, the future will surely hold much more. Not only is the possibility there to rekindle scarce populations of species still in existence, but this idea of cloning may even hold the key to reviving species already considered extinct.

Works Cited

"Are cloned animals better than no animals?" Ecologist 34.7 (Sep. 2004): 10-10. Academic Search Premier. EBSCO. DuBois Library, Amherst, MA. 26 October 2005 <http://silk.library.umass.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=14263979&site=ehost-live>.

"Endangered species cloned." *BBC News*. 8 October 2000. 22 October 2005 <http://news. bbc.co.uk/l /hi/sci/techl262 1 59 .stm>.

"Endangered Species: Kittens born from cloned wildcats offer hope for conservationists." *Greenwire* 10 (2005). *Lexis Nexis*. 14 Oct. 2005 <http://http:llweb.lexis-nexis.com.silk. library.umass.edu:2048/universe/document?>.

Fields-Meyer, Thomas, and Debbie Seaman. "Send in the Clones." People 60.10 (08 Sep. 2003): 89-90. Academic Search Premier. EBSCO. DuBois Library, Amherst, MA. 22 October 2005 <http://silk.library.umass.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=10706772&site=ehost-live>.

Holt, William V., Amanda R. Pickard, and Randall S. Prather. "Wildlife Conservation and Reproductive Cloning." *Reproduction* 127 (2004): 317-324. *Zoological Record*. 14 Oct. 2005 <http://www.reproduction-online.org.silk.library.umass.edu:2048/cgiLcQntent/ full/127/3/317>.

Lanza, Robert P., Betsy L. Dresser, and Philip Damiani. "Cloning Noah's Ark." *Scientific American*

283 (2000). *Academic Search Premier*. 22 Oct. 2005 <http://search.epnet.com.silk.library.umass.edu:2048/login.aspx?direct=true &db=aph&an=3664004>.

Ryder, Oliver A. "Cloning advances and challenges for conservation." Trends in Biotechnology 20.6 (June 2002): 231. Academic Search Premier. EBSCO. DuBois Library, Amherst, MA. 22 October 2005 <http://silk.library.umass.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=7799659&site=ehost-live>.

Trivedi, Bijal P. "Scientists Clone First Endangered Species: A Wild Sheep." *National Geographic News*. 29 Oct. 2001.14 Oct. 2005 <http/news.nationalgeographic.com /news/2001/10/1025 TV sheepclone.htm>.

Sample II

The Psychological Impact of Reprogenetics and Cloning

Sheila Pennell

In *Remaking Eden,* Lee M. Silver explores the social, political, and scientific aspects of the advancing fields of reprogenetics and cloning. He does not, however, examine in detail the personal psychological implications that these technologies have on the children they produce. I suspect that at the time he was writing the text not much data was available on the subject, and yet he makes no indication that negative or positive consequences could be associated with new methods of reproduction. In the chapter entitled "Human 'Cuttings'" he states:

> Children born through standard IVF do not seem to be psychologically harmed when they find out they were conceived in a laboratory dish, and if cloning is incorporated as an acceptable practice in the future reprogenetic toolbox, it will be no stranger than IVF once was. (135)

I find this brief examination of the children created by IVF to be insufficient and incomplete in the context of Silver's research. Granted, the earliest article that I found examining the long-term repercussions of IVF and other reprogenetic technologies dated from summer 1998; *Remaking Eden* was published in 1997. I found one abstract from an article published in 1995 that showed no negative effects from IVF, and possibly even that the quality of parenting was superior to children conceived in this way (McMahon *et al*). In the "notes" section at the back *of Remaking Eden* no article was mentioned at all, and it appears that Silver may have assumed for himself that reprogenetic technology had no negative effect on children.

In the course of my research I found that for the most part Silver's unsubstantiated assumption was in fact correct. Children conceived via IVF have no glaring or obvious defects, physical or psychological. There are, however, some subtle developmental differences associated with the use of the technology. In 2003 the *Journal of Child Psychology and Psychiatry,* Golombok and MacCallum reported: "There is no evidence of cognitive impairment in singleton children born at full term as a result of assisted reproduction procedures," and "although existing knowledge about the impact of assisted reproduction for parenting and child development does not give undue cause for concern, there remain a number of unanswered questions in relation to children born this way" (Golombok *et al*). In short, currently the use of IVF is not seen as unnecessarily dangerous but the repercussions of its use do need further examination. Some other interesting findings from this article were focused on the impact that infertility and the use of IVF have on

parents and their style of relating to their children. Fathers of IVF babies at 12 months of age report lower marital satisfaction, perhaps because their wives are so preoccupied with their long awaited newborn. Mothers also perceive their IVF babies as more vulnerable and themselves as less competent parents. In compensation perhaps, FVF mothers also report more positive feelings toward their baby and as the child grows up both parents appear to be more involved and report less stress in their parenting (Golombok *et al*).

Some slightly newer information from 2004 listed in the *Journal of Genetic Psychology* reviewed the currently available literature on this subject in their introduction. The review found that research about family functioning in those families that have used reprogenetic technologies is conclusive and positive, and IVF families function at least as well as other families. Data on the socioemotional outcomes is more variable; while most studies have found no significant differences some have reported a higher incidence of behavioral and social problems with children conceived by IVF. The data available on the physical well being of IVF children is the most inconsistent. Some studies indicated that singleton children conceived by IVF tend to have lower birth weight and gestational age. This difference, however, does not seem to apply to twins conceived by IVF versus naturally conceived twins. The article then went on to describe the research that they themselves conducted. They focused significantly on the physical aspects of IVF versus naturally conceived babies at 2 years of age. They reported no differences in the children at 24 months despite the differences at birth. They did suggest, however, that more subtle aspects of development could be negatively affected that were not measurable by the criteria used in their study. More data would be needed to conclude this. The significance of all these findings is mainly that children with low birth weight are more prone to learning problems, cerebral palsy and vision and hearing problems. Therefore if the use of IVF does in fact correlate with low birth weight and gestational age, it would also correlate with all these impairments (Kelly-Vance *et al*).

Silver makes another unsubstantiated point when he states that the children conceived by IVF won't be affected "when they find out" (135) that they were conceived in a laboratory dish. The statistics from IVF clinics that I found indicated that only 11% of clinicians believe children have a right to know their reproductive origins, and while most clinics offer counseling services clinicians do not take a stand on one side or the other on the disclosure issue, but the statistics indicate that nearly half of the clinicians surveyed agree that children should be informed (Gross *et al*). In reality, I could have been conceived by IVF and in this case I feel that it would almost be worse to tell me now than to never tell me at all. It is no secret that secrets create stress within a family, and I believe that parents attempting to hide their child's origins from them could negatively affect the family dynamic and cause unneeded turmoil within an otherwise loving family. This stress can be avoided by disclosing with the child from the beginning that they were conceived hi a special way. Even so, do familial stress or even physical problems make the use of reprogenetics unfair to the children they produce?

Silver poses a question about the emotions of a cloned child that could also be extended to one conceived by IVF: "How will she feel when she grows up to find out that she has the same genetic material as her older sister? Will she feel *so* bad that it would have been better for her not to have been born at all? I doubt it" (135). This can be extended to ask of an IVF child: How will she feel when she grows up to find she was conceived in a laboratory dish? Here, Silver seems to be alluding to an interesting medical ethics argument: can an unborn individual have an interest hi existing? John Robertson, a medical ethicist to whom Silver refers elsewhere in the book states that "preventing harm would mean preventing the birth of the child whose interests one is trying to protect" (Munson 687). And if we assume that it is better to exist than to not exist, then it seems certain that "even if children born of the new reproductive technologies were to suffer serious impairments as a result of their origin, this would not necessarily render it wrong to use these techniques" (Munson 687).

An interesting point of view to consider is that of Louise Brown, the first child to be conceived in a laboratory dish. Despite the media blitz surrounding her conception, birth, and even many of her subsequent birthday parties Louise lives a normal, trauma-free life. She is not grossly abnormal or psychologically scarred; as a matter of fact, in 1998, at age twenty, Louise was studying to be a nurse and working part time at a fast food

restaurant. She is quoted as saying, "I want to have my own children whatever it takes... I would use the In-Vitro method if I couldn't have a baby" (Munson 651). *Time* magazine ran an article in their feature entitled "80 Days that Changed the World" that calls Louise a "Brave New Baby." In this article it is revealed that in 2004 Louise, at 24 years of age, has been joined by 1 million other babies conceived by IVF. (Gibbs)

So I ask you, would you rather have never been born at all? What if your genetic makeup was identical to that of your mother? What if you were a member of Silver's "genrich" class? And if so, should we have prevented your parents from reproducing? It seems that I have returned to Silver's original assertion: perhaps the use of reprogenetic technology by its very nature cannot be harmful to the children it produces because without it they would not exist at all.

Works Cited

Gibbs, Nancy. "Brave New Baby." *Time* 16(13) (3/31/2003) 58. *Academic Search Premiere.* Dubois Library, Umass Amherst. 9 Oct. 2004. <http://www.library.umass.edu/cgi-bin/aka/databases.cgi>.

Golombok, Susan and MacCallum, Fiona. "Practitioner Review: Outcomes for parents and children following non-traditional conception: what do clinicians need to know?" *Journal of Child Psychology and Psychiatry* 44:3 (2003) 303-315. *PsychInfo.* Dubois Library, Umass Amherst. 9 Oct. 2005 <http://www.library.umass.edu/cgi-bin/aka/databases.cgi>.

Gross, Jami N, Clay, Daniel L, *et al.* "Assisted Reproductive Technology: Counseling and Disclosure With Children." *Children's Health Care* 33 (2004) 123-131. *Google.* 9 Oct. 2005 <www.Google.com>.

Kelly-Vance, Lisa, Anthis, Kristine S. *et al.* "Assisted Reproduction Versus Spontaneous Conception: A Comparison of the Developmental Outcomes in Twins. *Journal of*

Genetic Psychology 165(2) (2004) 157-167. *PsychInfo.* Dubois Library, Umass Amherst. 9 Oct. 2005 <http://www.library.umass.edu/cgi-bin/aka/databases.cgi>.

McMahon, Catherine A, Ungerer, Judy A, *et al.* "Psychosocial outcomes for parents and children after in vitro fertilization: A review." *Journal of Reproductive and Infant Psychology* 13(1995): 1-16. *PsychInfo.* Dubois Library, Umass Amherst. 9 Oct. 2005 <http://www.library.umass.edu/cgi-bin/aka/databases.cgi>.

Munson, Ronald. *Intervention and Reflection: Basic Issues in Medical Ethics.* Belmont, CA: Wadsworth/Thompson Learning, 2000.

Sandel, Michael J. "The Case Against Perfection" Atlantic Monthly (1072-7825) 293.3 (Apr. 2004): 50-62. Academic Search Premier. EBSCO. Dubois Library, UMass Amherst 12 Oct 2005. <http://silk.library.umass.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=12445627&site=ehost-live>.