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Bertrand PULMAN

The Issues Involved in Cloning:
Sociology and Bioethics

“Discussions about the future of the family that deal only with the pill overlook the biological witches’ brew now seething in the laboratories. The moral and emotional choices that will confront us in the coming decades are mind-staggering.”

ABSTRACT

The law on bioethics passed by the French parliament in 2004 qualifies reproductive cloning as a “crime against the human species”, a clear indication of how threatened the social world feels by certain aspects of genetic engineering. This article analyses the many social issues involved in cloning. The field of bioethics constitutes a kind of open-air laboratory for anyone interested in studying norm formation processes in pluralist societies. Among other things it brings to light the intertwining of axiological or value-focused controversies and economic logic. After specifying what cloning is, the article reviews the stages through which the prospect of reproductive cloning as both reality and fantasy has become a focus of public debate. It then examines the main arguments for and against reproductive cloning, paying particular attention to arguments that refer to the danger cloning represents for the social tie (a blow to the principles of filiation, the resurgence of eugenics, etc.). Lastly, the article looks at the difficulties encountered when attempts are made to formulate a prohibition at the national and international levels. The conclusion seeks to demonstrate how certain biologists’ discourse on cloning represents a strong invitation for greater dialogue between the life sciences and sociology.

The bioethics laws adopted by the French Parliament in 1994 made no direct mention of cloning. Ten years later, a new law intended to update this first set banned reproductive cloning in firm, extensive terms. To provide a structure for the law, a new category of crime was introduced into the French Penal Code: “crimes against the human species”. Simultaneously, it was decreed that anyone practicing “an operation aimed at bringing about the birth of a child who is genetically identical to another person, either living or

deceased” is punishable by a 30-year prison sentence. This extremely rapid development illustrates the race now on between scientific progress, ethical understanding and thinking, and the development of legal norms—a race that in my opinion calls for sociological analysis.

This investigation is located at the intersection between sociology of sciences and sociology of ethics. In a premonitory article entitled “Pour une sociologie de l’éthique”, François-A. Isambert, Paul Ladrière and Jean-Paul Terrenoire (1978) stressed the fact that developments in science were enlarging the ethics sphere: “The ethics field is obviously going to be extended given that the field of human action is being extended. New techniques bring forward new deontologies. Above all, science is eliciting hitherto unknown situations for which available criteria are inadequate.” (p. 335). Isambert sensed that the most crucial questions would arise in the biomedical area, where life and death are inexorably intertwined; he was quick to focus his thinking on such subjects as prenatal diagnosis and “voluntary pregnancy interruption” [official French term for prenatal diagnosis and “voluntary pregnancy interruption” [official French term for abortion, legal in France since 1974] (Isambert, 1980, 1982). Today bioethics has made itself felt as a social issue and reality and a focus of reflection for sociologists: “Bioethics and more broadly speaking controversial medical practices such as contraception and abortion, organ transplant and donation, assisted reproduction and euthanasia, are highly promising objects of study for a sociological approach aimed at bringing to the fore the social dimensions of ‘the moral phenomenon’” (Bateman Novaes, 1998, p. 7). In this domain, certain sociological studies have proven particularly fruitful, one example among many being Anne Paillet’s study (2002) of the decisions that doctors in neonatal intensive care services have to make, which brings to light the ethics dimension underlying medical practices in precisely those situations where classic deontological schemata are inoperative.

Medical bioethics represents a genuine open-air laboratory for anyone wishing to observe and study norm development in process in a pluralist society. And we can be certain that bioethics will assume even greater importance in the years to come, since moral dilemmas generated by advances in the biosciences will most surely multiply. The most recent United States presidential election campaign showed how strong the impact of these divisive themes has become on the political scene. Under these conditions, it is important to identify and “investigate the problematic situations that give rise to controversies” (Bateman Novaes, 1998, p. 8). The cloning theme lends itself particularly well to such investigation. It is a well-known fact that in 2002 the Raelian sect caused considerable uproar when it announced the birth of human babies by means of cloning operations. Since then, thankfully, the factual reality of that news has not been confirmed. Nonetheless, the announcement evoked a disturbing landscape in which we could glimpse what phenomena and how they relate to the main dimensions of social life (Merlié, 2004).

(2) Ever since Durkheim (1893) and Lévy-Bruhl (1903), French sociology has been continuously attentive to the status of moral phenomena and how they relate to the main dimensions of social life (Merlié, 2004).
genetic advances might become in the hands of a group of visionary fanatics with no scruples about exploiting situations of public helplessness and confusion. The announcement immediately elicited a great many indignant reactions. Fears and fantasies got mixed into arguments of all sorts. The matter is too serious to be treated at the level of emotion. Thinking can only be based on proven facts. The priorities should be to provide information on the real state of knowledge, assess experiments that have already been conducted, facilitate understanding of the research under way, anticipate future breakthroughs and above all, in my opinion, take the measure of the multiple social issues involved.

The inflated reactions and heavy sanctions that have been instituted in France attest to the society’s sense that cloning represents a threat to several essential dimensions of the social field. Still, it is remarkable how difficult it is to identify the nature of this threat with any precision. While nearly everyone agrees that reproductive cloning should be condemned, the various arguments are often difficult to specify, prove heterogeneous when assembled, and in some cases seem themselves open to contradictory interpretations. Attempts to formulate the issue in sociological terms—such as Jürgen Habermas’ in The Future of Human Nature (2003)—are rare and precious. (3) I obviously do not intend to come down categorically on any side in such a delicate debate; the purpose here is rather to help state and clarify the substance of that debate. To this end, and with no claim to be exhaustive, this study is focused on a few themes that seem to me essential.

– Defining cloning. What are the different meanings of the term? What mediation exists between scientific research and the perception of cloning in popular culture? How, through what stages, did cloning become a focus of public debate?

– Arguments advanced. Who has spoken out on cloning? What have the main arguments been in favor of human cloning and above all against it? How are the different levels of argumentation situated in relation to each other?

– Formulating a prohibition. How has a social norm that developed on a foundation of strong emotion been translated into legal terms? What problems arise from the heterogeneity of current formulations of the problem, namely at the international level?

Deliberations on cloning are a particularly valuable example in that they enable us to bring to light the close intertwining of axiological or value-focused debates and the various strata of social life.

(3) It should be noted, however, that Habermas’ book is primarily concerned with the problems posed by pre-implantation diagnosis and only mentions cloning in passing: “This situation, by the way, is not unlike that of a clone who, by being modeled on the person and the life history of a ‘twin’ chronologically out of phase, is deprived of an unobstructed future of its own.” (2003, pp. 62-63).
From horticulture to biology

The terms “clone” and “cloning” admit of various meanings, including in scientific milieus. Moreover, they are abundantly used in the media, which increases usage dispersion and imprecision. It is important first of all, therefore, to get a perspective on the many meanings those terms have accumulated over time.

Etymology points in the direction of the plant world: “Young and tender shoots, twigs, small branches that are still pliable and flexible –this is what the Ancient Greek word klôn first designated. It is common in the works of Euripides, Thucydides and Plato.” (Atlan et al., 1999, p. 9). The horticultural dimension was quite present when the term resurfaced in the modern period on the initiative of an American botanist, Herbert Webber, who in 1903 published an article in Science in which he proposed using the term “clon, plural clons” to designate the “groups of plants that are propagated by the use of any form of plant parts such as bulbs, tubers, cuttings, grafts, buds, etc., and which are simply parts of the same individual seedling” (Webber, 1903, p. 502). It is useful to recall that plants can reproduce either sexually or asexually. In the first case, the male gamete fertilizes the female one and the genome of the seed is the result of this combination. In vegetative reproduction, by contrast, detached fragments of plant matter can form whole individual plants, and the genome of the descendants is the same as that of the single parent plant: a green hazelnut branch that has developed out of a lateral bud can grow along the soil, then take root to produce new plants. This possibility, strongly present in nature, has long been used by farmers concerned to produce uniform flowers, fruits or vegetables; the shoots obtained from geranium or potato cuttings, for example, are identical to the parent plant. The term “clone” was thus associated from the outset with ideas that have come to weigh heavily in its current connotations: asexual reproduction in which descendants are exactly identical to the being that produced them, the possibility of human intervention in nature.

Webber’s text pertains exclusively to the plant kingdom; it does not allude to the fact that asexual reproduction also exists in the animal kingdom. And it was in the horticultural world that the term was first diffused. Gradually, however, it came to acquire new meanings.

Biologists took up the term in the 1950s, using it in reference to their experiments on cell multiplication mechanisms. The medical import of these studies was considerable; they led to a better understanding of how cancerous tumors proliferate, for example. In this context the term “clone” designated a set of identical cells cultured in vitro from an ancestor cell. This usage is

(4) This was shown in a remarkable study by a British geneticist: “The multiple meanings of clone are not due to popular usage, but to the desire of scientists, unhampered by any regulatory body, to extend the term to a variety of newly discovered phenomena whose characteristics only partially overlap.” (Mittwoch, 2002, p. 401).
reflected in the title of a celebrated work by the Australian immunologist Frank Macfarlane Burnet, *The Clonal Selection Theory of Acquired Immunity* (1959). Biologists thus introduced a new dimension: the term clone became linked to the idea of intervention at the level of the cell.

At approximately the same period a biologist in Philadelphia, Robert Briggs, developed a new experimental technique that opened the way for what is today called cloning. He conducted a series of experiments aimed at obtaining a frog that would be identical to another frog. He used the procedure called nuclear transfer, which consists of enucleating an egg cell. He then extracted the nucleus of a somatic cell from the organism he wished to duplicate. This nucleus was introduced into the cytoplasm of the enucleated oocyte. Embryogenesis was then induced by means of an electrochemical impulse, and the renucleated oocyte began dividing as a fertilized egg does. After a period of *in vitro* growth, the embryo is implanted in the uterus of a surrogate mother. If all goes according to plan, a creature comes into being with exactly the same nuclear genome as the one from which the initial nucleus was transferred. In contrast to classic egg fertilization, there is no gamete fusion and thus no combination of maternal and paternal genes.\(^5\)

In his first experiments, Briggs only attained partial success. The nuclei extracted for injection came not from a grown frog but a blastocyst; *i.e.*, an embryo at an extremely early stage, consisting of only a few hundred undifferentiated cells. At the time it did not seem possible to use adult tissues. But Briggs pushed the experiment quite far: several nuclei from the blastocyst were transferred into different oocytes, and the process was repeated with the blastocysts thereby obtained. Briggs called the set of embryos derived from the same blastocyst a “nuclear clone”. The adjective “nuclear” was gradually omitted from publications. When the British biologist John Gurdon reproduced and amplified these experiments, he reported on them in the following terms: “The effect is the same as in the vegetative propagation of plants, namely the production of a clone: a population consisting of many individuals all having an identical set of genes in their nuclei.” (Gurdon, 1968).

Cloning became a focus of public debate in the 1960s. Some researchers began speculating on the possibility of using the nuclear transfer technique to produce humans. The most important stages in the development of the debate were the following.

In 1963 the Indian biologist John Haldane gave a talk entitled “Biological Possibilities for the Human Species of the Next Ten Thousand Years”.\(^6\) Raising the question of what discoveries would make it possible to bring into being “a greater number of superior people”, he underscored the prospects offered by cloning: “The production of a clone from cells of persons of attested ability might raise the possibilities of human achievement dramatically […] They would be made from people who were held to have excelled

\(^5\) Quite spectacular images of this operation may be viewed on the website of the Advanced Cell Technology company: http://www.advancedcell.com/scnt.htm.

in a socially acceptable accomplishment.” In 1966, the American biologist Joshua Lederberg published an article in *The American Naturalist* entitled “Experimental Genetics and Human Evolution”(7) that mentions the experiments on frogs and predicts they will be extended to humans: “There is nothing to suggest any particular difficulty about accomplishing this in mammals or man […] If a superior individual (and presumably then genotype) is identified, why not copy it directly, rather than suffer all the risks of recombinational disruption.” What is most striking is that both Haldane and Lederberg openly used eugenics-type arguments, envisioning cloning as one means among others to improve the human species. Biology at the time elicited few fears. In 1967 Lederberg continued in the same vein in the *Washington Post*, underlining the medical potential of cloning. Leon Kass responded with a letter to the *Post* denouncing the “insouciance” with which the questions were being handled. He suggested that “programmed reproduction of man will in fact dehumanize him”.(8)

What really brought the theme of cloning out of specialist circles and into the public eye was Alvin Toffler’s *Future Shock*. Toffler predicted that scientific discoveries would be the source of “implausible conflicts and wildly novel dilemmas” (1970, p. 187). Specifically, the human body would no longer be an immutable boundary: “Man will be able, within a reasonably short period, to redesign not merely individual bodies but the entire human race. [...] One of the more fantastic possibilities is that man will be able to make biological carbon copies of himself. Through a process known as ‘cloning’ it will be possible to grow from the nucleus of an adult cell a new organism that has the same genetic characteristics of the person contributing the cell nucleus [...] There is a certain charm to the idea of Albert Einstein bequeathing copies of himself to posterity. But what of Adolf Hitler?”(1970, pp. 197-198). Toffler’s book was very much at the origin of the popular perception of cloning and its dangers. The clone concept became a common rhetorical figure at that time for designating people who resemble each other. Simultaneously, Toffler provided the matrix that the anxiety elicited by the notion of cloning came to be expressed in. One of the more striking examples was Ira Levin’s international best seller, *The Boys from Brazil* (1976), where conspirators nostalgic for the Nazi regime clone hundreds of Hitlers.

**Ethics debate and economic rationality**

Futurologists and novelists were somewhat premature in their predictions. All the previously cited texts imagine the cloning of a human adult. There are in fact still a number of safety locks that would have to be broken before that could happen.

First, it seems extremely difficult to clone mammals. After several failed attempts, the biologist Davor Solter published an article in 1984 in *Science* that closes with these words: “The cloning of mammals by simple nuclear transfer is biologically impossible.” (p. 1319). Solter’s conclusion was widely accepted, and the effect of this was to marginalize cloning experimentation. The few teams that continued to work in this area belonged to the world of agronomics research. They were supported by private companies attracted by the commercial prospects that cloning seemed to offer. In fact, it was a scientist working for a British agronomics laboratory, Steen Willadsen, who dealt the first blow to the Solter dogma, announcing in March 1986 the birth of a lamb reproduced by nuclear transfer.

The next stage was cloning an adult animal. Scientists believed that the cells of the adult were too specialized to be used in a nuclear transfer operation. A few researchers wanted to tackle the problem, particularly Ian Wilmut, who was conducting experiments at the Roslin Animal Breeding Research Station in Scotland. In 1990 his efforts brought about the birth of a genetically modified female lamb that produced a protein in its milk that is used for treating cystic fibrosis. The ability to multiply such transgenic animals obviously represented major commercial possibilities. Wilmut and his collaborators developed a set of experiments to determine the maximum growth stage at which a cell could provide a nucleus for transfer purposes. After much trial and error, they managed to produce Dolly, the celebrated female lamb, on July 5, 1996. Dolly was cloned from the nucleus of a cell taken from the mammary gland of a six-year-old ewe, *i.e.*, a differentiated cell from an adult animal.

On February 27, 1997, Wilmut announced the birth of Dolly in an article in *Nature*. The title on the cover read “A Flock of Clones”, and the news immediately created a considerable media stir. In addition to the technical feat thereby accomplished, the event suggested the stupefying possibility of telescoping the generations. The anthropologist Philippe Descola has given an incisive account of the implications of this: “What captured much more attention than the treasures of ingenuity required to perform embryogenesis in an already differentiated cell was the fact that an adult mammal could be replicated. Whereas embryonic cloning could still be viewed as a rather complicated means of fabricating twin animals, cloning an adult subject meant it was possible to start up an entire line of copies. It is highly likely that the paradoxical combination of genetic identity and generational difference was what stimulated speculation on human cloning. Though all cultures have been confronted with the question of twinship, none has ever had to invent a social framework (elsewhere than in tales and myths) in which the idea of clones derived from other clones is conceivable.” (Descola, 2000, p. 333).

The prospect of reproductive cloning technique being extended to the human species elicited a combination of fascination and repulsion. The media grabbed hold of the theme, and the strong emotion that stirred public opinion forced the highest authorities at both the national and international levels to react. In this regard, the situation was similar to the one described by
Sébastien Dalgalarrondo and Philippe Urfalino (2000 and 2002) on deliberations in connection with AIDS treatment: in a context where interactions among the protagonists in a controversy are receiving heavy media coverage, public authorities need to make policy decisions quickly.

In France the President of the Republic Jacques Chirac submitted the question to the Comité Consultatif National d’Éthique (national ethics advisory committee), which delivered its opinion on April 22, 1997. It first acknowledged the strong likelihood that human reproductive cloning would become a social demand: “We cannot rule out the idea that a social current exists that is likely to legitimate recourse to these techniques, at least for couples where one member does not possess the gamete required for fertilization.” This prospect was categorically condemned by the Comité: “In contrast to Dolly, human clones would know that they are clones. They would also know that others know they are. We cannot fail to see the intolerable reification of the human being implied in such a situation [...] The organism of the individual thus produced would serve in fact as a means of expression for a genome chosen by a third party. Such a project can only be deemed an attack on the human condition.”

In March 1997, US President Clinton prohibited the use of federal funds for human cloning experiments. Three months later, the National Bioethics Advisory Commission concluded in a report that given the current state of affairs it would be morally unacceptable to create a human being through cloning. This did not, of course, have any effect on private funding, which is very powerful in the United States.

Several initiatives were taken at the international scale. On April 4, 1997, at Oviedo, the Council of Europe adopted the Convention on Human Rights and Biomedicine, which prohibited producing human embryos for research purposes; the Additional Protocol to that convention, “Prohibition of Cloning Human Beings”, adopted in Paris on January 12, 1998, declared that “any intervention [...] seeking to create a human being genetically identical to another human being, whether living or dead, is prohibited”. At approximately the same time –November 11, 1997– UNESCO drafted a Universal Declaration on the Human Genome and Human Rights, specifying that “practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted”. The United Nations General Assembly adopted the UNESCO declaration on December 9, 1998.

These texts of course did not prevent scientists from pursuing and making advances in animal cloning. In the summer of 1997, Ian Wilmut announced the post-cloning birth of a female lamb, Polly, whose milk contained the blood coagulating factor used to treat hemophilia. Curiously, even though this event was an important new success because it represented the first cloning of

(10) On the specificity of the cloning debate in the United States see Volker Lehmann’s excellent review (2002).
a large transgenic mammal, it elicited little reaction. In this connection it is worthy noting the astounding contrast between the near absence of public protest against experiments done on animals and the strong mobilization of a major segment of public opinion against genetically modified plant organisms. This is especially striking given that, as the biologist Pierre Jouannet has so aptly pointed out, few people seem to know that the work done on animals is very directly preparing the technical ground for a move to humans: “It seems important to realize that despite the great incantatory declarations against cloning, in reality everything is being done to develop it scientifically. We claim to want to prohibit therapeutic cloning, among other types, because it would facilitate reproductive cloning. But this is a very misleading argument. The research that most effectively facilitates reproductive cloning of human beings is that being done on other mammals.” (Atlan et al., 2003, p. 15).

In the last few years, a dozen new animal species have been cloned by nuclear transfer. It is important here to grasp the huge economic stakes of this research, and the intense pressure this creates in favor of innovation. A few examples:

– In 1997, the American company Infigen obtained the first cow to be cloned from an adult cell. It is easy to imagine the importance of this capacity to reproduce animals identical to others that have performed exceptionally (the quality of such features as meat or fleece) in the world of animal breeding. A famous stud bull, Starbuck, who had sired more than 200,000 descendants through artificial insemination, was cloned after his death to produce Starbuck 2.

– In 2001, the American company Genetic Savings and Clone produced the first cloned kitten. Three years later, for $50,000 and a great deal of publicity, it delivered a cloned cat to a rich Texan woman who had lost the original pet. There is in fact strong demand for pet cloning from private individuals who have trouble accepting the idea of their animal dying. Several private firms are already very active in this sector. They currently offer to cryopreserve a sample of the animal’s tissue for $1,000 until such time as cloning technology is made available to the public at large. To understand how commonplace cloning has come to seem, one need only visit the internet sites of these firms.(11) The biologist Bertrand Jordan notes: “Applying cloning in this ways helps people get used to the idea and accept it. What could be less offensive than seeking to recreate a beloved cat or dog? It also creates solvent demand that then finances the practice and improvement of cloning methods, thereby increasing the technical feasibility of human reproductive cloning.” (2003, p. 85).

– In 2002 a French team headed by Jean-Paul Renard of the Institut National de la Recherche Agronomique announced that they had cloned rats. Because of certain physiological similarities between humans and rats, these animals are of course widely used to study human pathologies. This opens up

considerable prospects for better understanding certain diseases and developing new medical treatments.

The most important issue in animal cloning is combining it with transgenesis. Mention has already been made of the possibility of duplicating genetically modified animals that produce a therapeutic protein in their milk. Another particularly promising sector is xenotransplantation. The chronic lack of human organs means that many patients do not receive the transplants they need. Some animals, particularly pigs, could constitute an alternative source of organs for humans (heart, pancreas, etc.). Many researchers are currently working on transgenically modifying and cloning pigs to obtain an animal whose organs might be transplanted without triggering immediate rejection. These studies are in their preliminary stages, but are receiving investment commensurate with the commercial prospects and medical hopes they create (see Claeys and Huriet, 2000).

Philippe Steiner’s research on blood and organ donation has shown that organizational and industrial considerations are likely to filter into an ethics debate and shift its terms. Cloning is a new example of a situation where commercial logic causes “axiological demands [to] collide with economic rationality” (Steiner, 2003, p. 155).

From animals to humans

What is the situation for human beings? Clearly it is crucial to distinguish between unfounded, unreliable announcements and experiments that have produced incontrovertible results.

In the first category, there is Richard Seed’s announcement in 1998 that he intended to clone humans by nuclear transfer in a private clinic in Chicago as a service to sterile couples.(12) This affair elicited some emotional reaction, though Seed does not seem to have had the means to realize this plan. The Italian gynecologist Severino Antinori, who had already drawn attention to himself when he assisted a woman of 63 in becoming pregnant and delivered her baby, caused a much greater stir with his 2001 announcement that he had created an international network that was developing reproductive cloning in the human species as a remedy to certain types of sterility. He then made a series of spectacular and often self-contradictory statements in which his own participation in the events seemed questionable and provided no proof of his allegations. Today Antinori must watch what he says: on February 19, 2004, Italy passed a law on medically assisted reproduction that strictly prohibits cloning, with prison sentences of up to 20 years and a € 1 million fine.

(12) It is necessary to measure the huge market represented by the struggle against sterility, particularly in the United States. In this connection see www.zavos.org.
The most intense public discussion of cloning in France has been in reaction to the Raelians’ announcements. This movement, founded by a Frenchman in 1973 on the belief that humanity had been created in a laboratory by extraterrestrials, claims 60,000 members throughout the world. In France it is on the list of “sects” established by a parliamentary commission in 1996. In North America the Raelians are covered by the traditional denominational pluralism; in Quebec the sect has even been promoted for tax purposes to the rank of a recognized church. Cloning is central in Raelian discourse. According to Rael, the “supreme guide”, it will “enable humanity to attain eternal life”. As early as 1997, Rael founded the company Clonaid to promote cloning. Five years later, the president of Clonaid announced the birth of the first cloned human baby, Eve, a little girl supposedly born December 26, 2002, in an undisclosed location, the clone of an 31-year-old American woman who furnished both the nucleus from a skin cell and the oocyte, then carried the implanted embryo to term. Eve was thus said to be the complete genetic copy of her mother: the cloning was done in the first place because of the “father’s” sterility and could obviously require no external contribution from him. The announcement was on the front page of all the major daily newspapers and provoked amazement because scientists were in fact reluctant to denounce in clear terms what nonetheless appears with hindsight to have been a total hoax. Given the reaction they had provoked there was no reason for the Raelians to stop there, and in January 2003 Clonaid announced the birth of another little girl whose parents were said to be two Dutch lesbians. The Clonaid internet site currently claims that “13 cloned children [...] are alive today” and that “23 pregnancies are under way”.

“In any case”, wrote the biologist Bertrand Jordan in 2003, “it’s only a matter of time. The Raelians conned us, but other protagonists in this incredible race to clone a human being are already probably close to the goal” (p. 129). In fact, serious research was already offering a glimpse of the field of possibilities. In November 2001, an American company called Advanced Cell Technology made public the results of an experiment on human cells: three human embryos had been created by nuclear transfer, one had reached the size of six cells in the laboratory. However, the company website makes the following affirmation: “Our intention is not to create cloned human beings, but rather to make lifesaving therapies for a wide range of human disease conditions.”

Great hopes are currently set on the use of what are called embryonic stem cells, cells present in the human embryo at the blastocyst stage, which can both reproduce identical copies of themselves and engender new cells that later differentiate into the 300 types of specialized cells that make up the human organism. In 1998, using a surplus embryo produced by *in vitro* fertilization, American researchers managed for the first time to isolate stem cells able to survive in culture. Since then, scientists have been working to control cell differentiation so as to grow cell populations which, when implanted in a

patient, will be able to regenerate damaged organs and tissues. This kind of treatment is at its very early stages, but offers a glimpse of promising clinical prospects for fighting diseases that are today incurable or hard to treat. The major drawback to stem cells obtained from *in vitro* embryos is that they are immunologically different from patient stem cells; there is a risk of transplants being rejected. This suggests the potential value of growing stem cells from an embryo with the same immunological profile as the patient. “The aim of this variant of cloning is to obtain totipotent cells genetically identical to those of the donor, then have them develop before transplantation in such a way as to obtain neurones for treating Parkinson’s disease, cardiomyocytes for repairing heart tissue after a heart attack, or pancreatic cells for treating diabetes.” (Jordan, 2003, p. 161). This is what is called “therapeutic” or “scientific” cloning; it is of course not a reproduction technique because no embryo is implanted in a uterus.

Therapeutic cloning and the use of embryo stem cells raise many controversial questions, primarily because embryos are created only to be destroyed through production of therapeutic material. (15) Still, research is advancing speedily in countries where it is not prohibited. In this respect the new French legislation, according to which producing human embryos through cloning for therapeutic purposes is punishable by seven years’ imprisonment, may be considered repressive. Other western countries, such as Great Britain, Sweden and Israel, allow controlled practice of cloning for therapeutic purposes. But it is in Asia where the relative freedom is greatest: a certain number of Asian countries are betting on the rise of biotechnology, and their cultural and religious traditions are such as not to hinder development of research and experimentation in this area. (16) The most recent advances seemed to have been in South Korea, where a team of biologists from the University of Seoul claimed to have produced thirty embryos cloned by nuclear transfer and developed to the blastocyst stage and to have managed to culture a line of stem cells from one of them. (17) The results of these experiments were published in the journal *Science* (Hwang *et al.*, 2004). Despite the fact that the Korean team’s investigations pertained to therapeutic cloning, they made the possibility of reproductive cloning seem more tangible. Reacting to the event, Axel Kahn declared: “My prognosis is that we will be announcing the birth of a cloned child before anyone has been cured by therapeutic cloning.” (*Libération*, Feb. 13, 2004). It is therefore crucial to take the measure of the various arguments advanced for and against reproductive cloning. The following review does not claim to be exhaustive, but rather to analyse arguments that have been made recurrently in recent debates.


(16) In the words of Francis Fukuyama, “If ever there is a region in the world that is very likely to keep its distance from the emerging consensus on regulating biotechnology, it’s Asia.” (2002, p. 285).

(17) Author’s note: This article was written in December 2004 and published in September 2004, well before Hwang’s research proved to be a hoax.
Struggle against sterility or attack on human dignity?

The arguments most often cited by partisans of reproductive cloning have been somewhat drowned out by the highly publicized elucubrations of the Raelians. Those arguments have a certain weight both at the intellectual level and as related to real social demand, demand which is likely to grow in the coming years.(18) In fact, there is a fairly wide spectrum of positions, ranging from pro-cloning activists to scientists in favor of a less than hostile attitude to research intensification. Four ideas are usually put forward.

The most frequently cited reason for approving reproductive cloning is sterility. Some couples have a problem of incurable infertility. Others do not wish to use medically assisted reproduction techniques that would require an external donor. They understand reproductive cloning as first and foremost a means of having biologically related descendants. In this connection some analysts think of cloning as one stage in a long-term development in which the battle against sterility is consistent with an overall dissociation between sexuality and reproduction. The psychoanalyst Geneviève Delaisi de Parseval writes: “Reproductive cloning would bring us into the era of asexual reproduction. However, it should be noted –and this fact is well-integrated into our society’s representations and laws– that if that era were to exist it would be directly related to the preceding one: the era of non-sexual reproduction. The possibility of dissociating sexuality and procreation dates from the contraceptive age. Then came the split between procreation and filiation due to medically assisted reproduction techniques that use gamete and embryo donors (sterile parents were now able to have children thanks to gametes from other individuals). And when it became possible to freeze gametes and embryos, procreation was emancipated from time –an immense epistemological leap yet one that, paradoxically, has not received much comment. For it then became possible for twins to come into the world at different times, brothers and sisters conceived the same day by in vitro fertilization but reimplanted into their mother’s uterus at a few years’ distance from one another.” (Libération, Jan. 2, 2003). The geneticist Michel Revel has commented in somewhat similar terms: “Sexual reproduction ensures human diversity, and there can be no question of replacing it with cloning. But it is the essence of medicine to try to palliate the insufficiencies of nature –by circumventing it if necessary. For a sterile couple that rejects the notion of extramarital sperm or eggs, cloning-assisted reproduction (if the method were safe and effective) would be a new medical possibility. [...] This does not mean ‘clones for tomorrow’ but rather that we should not exclude a priori a new technology that might be of help in the struggle against human afflictions.” (Libération, Feb. 27, 2003).

(18) “Independently of all these fantasies, there is real demand for reproductive cloning. As early as ten years ago I found myself having to deal with an astonishing letter sent to my laboratory […] a couple whose son had just succumbed to cancer and who were looking to ressuscitate him somehow.” (Jordan, 2003, p. 113).
In similar tones but a somewhat different connection, reproductive cloning is sometimes spoken of favorably because it would offer homosexual couples the possibility of having a genetically related child. Lesbian associations have even made the right to cloning one of their demands, in the aim of breaking the heterosexual monopoly on reproduction. Cloning would of course entirely free a female couple from any and all obligation to involve a man, though the reverse is not true; a male couple would still need to involve a woman since an egg and pregnancy are required. In any case, this prospect is not likely to be realized any time soon, at least not in France. The new bioethics law reaffirms in terms identical to those used in 1994 that medically assisted reproduction techniques are reserved to couples made up of a man and a woman (they must either be married or able to show they have been living together for at least two years).

Another idea often put forward is that cloning would make it possible to reproduce loved ones who either have died or are extremely likely to die soon. The most frequently cited case here is that of parents wishing to replace a child who died at a young age, the idea being that the physical resemblance would allow them to see the clone as a sort of reincarnation of the deceased child, who might then be able to take up that person’s existence where it was left off. In a narcissistic variant of this fantasy-fueled quest for immortality, individuals have also volunteered to have themselves cloned. They persist in these representations despite biologists’ explaining that they proceed from an entirely mythic vision of genetics: first, nuclear transfer never produces perfect genetic identity because oocyte cytoplasm influences the way the genes develop the organism; second, having the same genes obviously does not lead to identical personalities. These facts are of course not likely to modify representations that develop on a non-rational level. A mother wanting to realize the possibility of having her deceased daughter live again declared: “I know that this new child will not be Carrie, but perhaps God will decide to give her my daughter’s soul.” (Eudes, 2002, p. 10).\(^{(19)}\)

Lastly, there is the extreme argument that consists in affirming that every citizen has an unalienable right to decide when and how he or she will reproduce. According to this understanding, every individual may legitimately choose the means of ensuring that he or she has descendants, and any interference from the state in this area would be immoral and anti-constitutional. This line of argument has occasionally been used in the United States. In March 2001 at Congressional hearings on cloning, Randolphe Wicker, the founder of

\(^{(19)}\) The Comité Consultatif National d’Éthique stressed from the outset that the only possible response to irrational beliefs was prohibition: “If the fact that people identify dead persons with their clones were to lead to bringing beings into the world that way, we would no longer be dealing with a belief that should be respected but clear instrumentalization of the person, and it is ethically imperative to prevent that from happening. Clones would be wanted for themselves for completely superficial reasons; the clone would be a sort of prosthesis for a fantasy-fueled desire in which the clone would have no place. Biomedical technique could not be used in the service of such madness without becoming scientifically and ethically perverted.” (1997, p. 21).
Clone Rights United Front, made the following declaration: “Cloning is part of every citizen’s reproductive right. [...] Cloning is part of every American’s right to religious liberty. [...] Politicians in Washington and politicians in state capitols have no business deciding for American citizens who can bear children and how they can have them.” This is an extreme assertion in that no society has ever granted its members perfect freedom in reproductive matters, but it does force us to reflect on how to justify prohibition effectively.

Why prohibit? In the name of what?

In a kind of rhetorical escalation, reproductive cloning has been condemned repeatedly by the various moral and public authorities (Lecourt, 2003, p. 30). But it has never been a simple matter to justify prohibition, as several authors have acknowledged: “As I see it, the major difficulty involved in thinking about human cloning today is that we are immediately against any and all authorization of it but without knowing exactly why, and we are in a tight spot when it comes to arguing the point and determining which arguments justify prohibition.” (Augé in Atlan et al., 1999, p. 53). (20) The arguments put forward against cloning center around five often interlinked themes, distinguished from each other here for analytic purposes.

1) Health risks for mother and child

The spectacular successes in animal cloning should not obscure the considerable failure rate: the proportion of nuclear transfers that become clones is around 1%; fetal and perinatal mortality rates are extremely high. Moreover, cloned animals often display serious pathologies: malformed organs, immune deficiency, obesity, etc. These facts suggest that at our present level of knowledge, attempting to clone humans would involve extremely serious risks for the health of the mothers and children involved; under the present circumstances experimentation, could only be abusive. The biologist Henri Atlan has insisted on this point: “Leaving aside all matters of moral or religious opinion and the legal or illegal status of cloning, at our current level of technological know-how with regard to animals, delivering a human child conceived by nuclear transfer would be a transgression of all our laws on experiments involving humans. This technique has in no way been perfected in connection with animals; and for the women concerned and the children who would be born this way, it would involve numerous abortions and developmental anomalies. Under the current conditions, no ethics committee in the world would

(20) “What was quite striking in the international debate that immediately developed around the cloning of the Scottish ewe was the combination of nearly unanimous refusal to extend this reproductive process to humans and the weakness of the arguments used to justify prohibition.” (Descola, 2000, p. 330).
permit the move from experimentation on animals to experimentation on humans.” (Le Monde, Dec. 28, 2002).

This argument should in theory suffice to block the process. Still, it does not close the debate. Animal cloning research is advancing fast—as is therapeutic cloning research in countries that allow it. Moreover, as we all know, there is no dearth of unscrupulous sorcerer’s apprentices ready to take advantage of the lack of homogeneous international regulations and make the move to experimenting on humans. Lastly, no one can say with any certainty what tomorrow’s scientific advances will be; there is no reason to assume that better cloning techniques will not appear one day. It is therefore worthwhile exploring in some detail the other reasons given for prohibiting cloning.

2) The inviolability of sexual reproduction, an argument presented from several perspectives

The theological perspective: sexual reproduction is understood as both a natural and transcendental structure whose inviolability must be defended because it is sacred. In this view, cloning is a violation, even an abolition of familial, i.e., filial relations—relations understood to be of divine origin. Lopez Trujillo, President of the Pontifical Counsel for the Family, writes: “Cloning of human embryos is contrary to the dignity of the family […] In human beings, the sexual and procreative dynamic takes place naturally in a context in which sexuality and procreation are harmoniously integrated in the reality of conjugal love, which fills with meaning human sexuality open to life […] Human cloning ruptures this whole dynamic.” (Lopez Trujillo, 2003).

The biological: the understanding here is that duplicating humans through cloning would ultimately reduce genetic diversity, thereby weakening the species. The random mixing of chromosomes that results from sexual reproduction has diversified humanity’s genetic inheritance, and that diversity represents a selective advantage because it favors human adaptation to variable environments. “If sexual reproduction became the exception rather than the rule, the percentage of genetically identical individuals would rise fast and the degree of genetic diversity in the species would fall dangerously. Genetic diversity is a factor of evolutionary adaptation to changes in the environment.” (Atlan et al., 1999, p. 48). This threat would only be operative if cloning became generalized, however: “By ensuring genome mix, sexual reproduction ensures the genetic diversity required to sustain the human species’ capacity to adapt. Sexual reproduction is therefore absolutely essential at the species level.

(21) Bertrand Jordan insightfully notes that if this should happen, the current near-unanimous opposition to cloning would very likely crumble away: “Demand and market logic would become decisive and human reproductive cloning would quickly become a reality […] The current consensus is strongly linked to the health risks involved for children born this way. It remains to be seen what that consensus would become if, thanks to a sudden technical breakthrough, that danger became comparable to what we know for classic in vitro fertilization.” (Jordan, 2003, p. 159, p. 176).
But if this rule, which seems to me fundamental, were only violated occasionally, the consequences would probably be very slight.” (Jouannet in Atlan et al., 2003, p. 15).

The philosophical-juridical perspective: the right to a singular genetic identity as guaranteed by sexual reproduction is understood to be the very foundation of human dignity. This principle has often been invoked in official institutional texts; for example, in a resolution passed on March 12, 1997 by the European Parliament: “each individual has a right to his or her own genetic identity and human cloning is and must continue to be prohibited”. Descola has very clearly pointed up the limitations of this understanding: “Are we supposed to think that the absolute singularity of the genome, the natural consequence of our mode of reproduction, is a fundamental right that defines the dignity of the person? Monozygotic twins readily do without that type of dignity. Moreover, this position tends to convert a biological law into a moral rule, an observation of fact into a value judgment. Doesn’t this open up the risk of having other genetic information serve as a justification for normative principles? [...] Condemning human cloning by invoking everyone’s right to a singular genetic identity also works to perpetuate an unfortunate tendency to confuse the individual with the genome.” (2000, p. 331).

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(22) In Fukuyama’s thinking, for example, the temptation to found bioethics regulations on nature is quite strong: “Certain things should be outlawed. One of them is reproductive cloning [...] Cloning is a totally artificial means of reproduction that will create equally artificial, unnatural relations between parents and clones.” (2002, p. 304).

3) Violating the principles of filiation

As some see it, cloning would disorganize filiation markers and even cause them to disappear because it would allow for producing genetically identical beings at different moments in time. This upset of the generations could
deprive individuals of the references that found their identity and in so doing undermine the symbolic foundations of the social order.

It is true that human cloning could lead to enormously confused situations. How would we understand the relation between the clone and the individual who contributed the nucleus used to make him or her? “Even though a clone is not technically engendered by the individual of whom he or she is a genetic copy, it is in fact difficult not to think that he or she is derived from that person, owes his or her life to him or her, is his or her descendant. […] The possibility of being my ‘father’s’ or ‘mother’s’ genetic twin gives rise to a cognitive paradox.” (Descola, 2000, p. 334). Situations would arise that are difficult to conceive of today. A woman who cloned her deceased spouse before having that embryo implanted in her own womb would then give birth to whom? We do not have a very clear idea of the answer. Thinking along these lines makes the frightening break in filiation principles repeatedly noted by anthropologists seem perfectly possible. The anthropologist Marc Augé writes: “The opposition between the sexes may be considered the origin and model of all the oppositions we use to conceive identity, otherness and relations. Our twofold reference to sex and filiation is, in the last analysis, constitutive of how we think about social life and the individual. If the use of cloning techniques led to denying the importance of this twofold reference, this could only have strong, deep repercussions on man as a symbolic animal. It could lead to the making of an individual whose filial line would be truncated, a nearly isolated individual, without forebears.” (in Atlan et al., 1999, p. 61). (23)

However, it is once again the work of anthropologists that suggests the limitations of this interpretation, in that they have presented us with descriptions of kinship systems that function extremely differently from ours (see Héritier, 1985). We may cite the example of a generation mix which, while shocking to our sensibilities, showed itself perfectly viable in a time and place other than our own: “The Chukchee of eastern Siberia do not view as unsuitable a marriage between a girl of about twenty years old and a baby boy of two or three years. The young woman, often already a mother if she has lovers, raises her child and her little husband together. In North America, the Mohave observe the opposite practice: an adult man marries a baby girl and cares for her until she is old enough to fulfill her marital duties. Such marriages are considered very sound: the memory of the paternal attention lavished by the husband on his little wife reinforces, it is believed, the natural affection between the spouses.” (Lévi-Strauss, 1992, p. 50). Asexual reproduction does not exist in the human species, of course. Still, certain ethnic groups have developed views on the embryo that are largely free of the imperatives of sexual reproduction. Atlan writes on this point: “While it is true that anthropologists describe multiple filiation systems, systems very different

(23) “Like the Greek gods, human clones would be free of kinship and its rules, thereby contravening the most elementary principles governing the composition of ties between persons, those that define how we conceive of our identity.” (Descola, 2000, p. 339).
from the one traditionally operative in our societies, no system of filiation can purely and simply dispense with one of the two biological parents because all systems are founded on the universal experience of sexual reproduction.” (1999, p. 28). Here I do not entirely agree. In fact, there are or have been peoples who seem quite ignorant of physiological paternity and who thus constructed their kinship systems on bases other than that of sexual reproduction.(24) This points in the direction of a fact that Atlan himself underlined: “Social disorder can be contained by legislation” (1999, p. 64). Even in an utterly unknown situation, it is always possible to imagine laying down rules and constructing new symbolic markers or reference points. To return to the question raised earlier of what tie would exist between clone and nucleus provider, the law might determine that if the age difference were less than eighteen years the two would be siblings, whereas if it were greater they would be child and mother or father. As Augé points out: “Social fathers and mothers are not necessarily biological ones; all kinship systems acknowledge this point. We can therefore imagine new modes of kinship –and new modes of filiation– developing out of the realities of cloning.” (in Atlan et al., 1999, p. 60).

4) Instrumentalization(25)

In recent years, the reference to Kant has proved dominant in the bioethics domain. The following principle, posited by the philosopher in The Groundwork for the Metaphysic of Morals ([1785] 1964), is constantly evoked: “Act in such a way that you always treat humanity, whether in your own person or in the person of any other, never simply as a means but always at the same time as an end” (p. 96). In this understanding, to fabricate an individual through cloning is to negate autonomy. Because a clone’s identity would be determined by an alienating external will, clones would necessarily be enslaved and reified; “Their existence would tend to be instrumentalized and could be reduced to a new form of slavery where clones would serve as means of expressing the assumed qualities of their genomes, selected for that reason.” (Atlan et al., 1999, p. 30). Marc Augé has pointed out where this idea runs into trouble: “Human beings can already be produced for explicit ends external to them –without cloning. This is where, as I see it, the argument becomes difficult to construct, the idea that there can be both ‘natural’ fabrication full of good intentions and another kind” (in Atlan et al., 1999, p. 58).(26)

(25) The term “instrumentalization” is repeatedly used in official texts and discourse on cloning. For example, the Additional Protocol adopted by the Council of Europe in 1998 states: “The instrumentalisation of human beings through the deliberate creation of genetically identical human beings is contrary to human dignity and thus constitutes a misuse of biology and medicine.”
(26) The same critique has been developed in more radical terms by Hottois: “It is quite ordinary for parents or one parent to impose a selfish fantasy function on the child, turning to
In a similar strain, other thinkers have gone so far as to speak of “eugenics”, a word often used in the media to denounce the dehumanizing potential of genetic engineering. To better circumscribe what he sees as the specific danger for the future of humanity, Habermas refers to “liberal eugenics”: not the violence exercised by a coercive state but rather the violence resulting from a situation where operations would be decided on the basis of individual whims and left up to the marketization of human life: “What we need to do is to come to a clear distinction between the authoritarian and liberal varieties of eugenics. [...] In liberal societies, eugenic decisions would be transferred, via markets governed by profit orientation and preferential demand, to the individual choice of parents and, on the whole, to the anarchic whims of consumers and clients” (Habermas, 2003, p. 48).

5) Stigmatization

The understanding here is that clones are in danger of being perceived as mere copies and therefore as sub-human. The identity of an individual cannot of course be reduced to his or her genome. Still, the uniqueness of bodily appearance, particularly the face, is de facto, for most people, the property by means of which the unique character and autonomy of the human being is experienced. Under these conditions, we may indeed fear that pronounced visible resemblance could lead to disparaging treatment, even ostracism. Atlan has insisted repeatedly on this danger: “Having some familiarity with the state of moral degeneracy that characterizes men and women who stigmatize all difference, we can imagine that people who have been made in an extremely different way from all others would be immediately stigmatized” (1999, p. 55); “Individuals born by this technique are in great danger of being discriminated against. Anti-clone racism would of course be based on pseudobiological fantasies for which there is no possible moral justification, but as is the case for ordinary racism, that fact would hardly prevent it from existing.” (Atlan et al., 2003, p. 16).

Clearly the arguments for prohibiting human reproductive cloning are both numerous and relatively heterogeneous, or in any case do not readily fit together. Given this state of affairs, it is hardly surprising that public
authorities at both the national and international levels have found it difficult to formulate their prohibitions.

The first difficulty that the legislative power ran into in France was how to characterize the act being prohibited. When the government of Socialist prime minister Lionel Jospin sent its bioethics bill to parliament in 2001, the initial prohibition of cloning was worded thus: “Any and all interventions aimed at delivering a child or developing a human embryo not directly derived from the gametes of a man and woman are prohibited.” This wording was rightfully criticized in the parliamentary commission because it would have led to incriminating not only the biologist who had created the embryo through nuclear transfer and implanted it, but also the obstetrician or mid-wife who assisted in the delivery. Once a woman is pregnant, it is obviously incumbent on the medical team, who would not necessarily know how the pregnancy originated, to ensure the health and safety of mother and child, even if that child were a clone. The parliamentary commission thus proposed new wording: “Any and all interventions whose aim or effect is to conceive or implant a human embryo not directly derived from the gametes of a man and a woman are prohibited.” This amendment was rejected by the government, and ultimately an entirely different formulation was chosen: “Any and all interventions aimed at delivering a child genetically identical to another person, living or dead, is prohibited.” (Article 21 of the Law of August 6, 2004). In these terms cloning is not essentially characterized by asexual reproduction but rather the presumed result of such reproduction: a person “genetically identical” to another. To justify this change, the public authorities invoked the need to stick as closely as possible to the wording used in international agreements already in effect, namely the Council of Europe’s 1998 Additional Protocol. But for the reasons already mentioned above, wording that insists on genetic identity is scientifically objectionable because there can be no absolute genetic copy. This point was underlined repeatedly by scientists participating in the parliamentary hearings, among them Jean-Paul Renard, who declared: “In biology there is no such thing as a ‘photocopy’. Even monozygotic twins, called ‘identical’, are different.”

The hedging with regard to how to characterize the crime was even more striking. The government bill initially indicated a 20-year prison sentence. In her preamble for the bill, the employment and solidarity minister of the time, Élisabeth Guigou, deemed cloning “a model of reproduction that would constitute a degrading offense against the rights and dignity of the human

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(28) “Ultimately the only conclusion that I have reached is that there is no single argument that suffices in itself. Each of the arguments taken in isolation may be contested. But there is a bundle of convergent elements, and this bundle is such that with things as they are now it is preferable to prohibit cloning” (Atlan et al., 1999, p. 65).

(29) “This objection would have been decisive if the prohibition were focused on the result; i.e., bringing into the world a child that would indeed be genetically identical to another person. But this is not the case. Here what is prohibited is first and foremost the intention of pursuing such an aim.” (opinion expressed on March 19, 2003 by Mme Valérie Pécresse on behalf of the Commission des Lois of the French National Assembly).
being”. It had not been considered necessary to create a new crime category, however. The situation escalated during the parliamentary debates, particularly after the Raelians’ announcement, which caused a great stir in public opinion. In January 2002 then-member of parliament Jean-François Mattei [representing the UMP, France’s main center-right party], presented an amendment that would establish a “crime against the humanity of man” not covered by the statute of limitations and punishable by life in prison. The amendment was rejected. But when Mattei became health minister in December 2002, he announced his intention to define a new “crime against the dignity of the human person”, to be inscribed in the French Penal Code. Ultimately the notion of a “crime against the human species” was chosen, with a 30-year sentence and possible life imprisonment if the crime were committed by an organized group (Article 28 of the Law of August 6, 2004).

In this intensely emotional situation, the political authorities understandably wished to give great solemnity to their condemnation of reproductive cloning; understandable too that the existing model of “crime against humanity” worked as a pole of attraction.(30) Still, the notion of a “crime against the human species” incurred widespread criticism. It may seem rather unusual, even baroque, to criminalize so harshly a technique that leads to giving life when the worst crime in criminal law has always been murder. Moreover, in the eyes of some observers the notion of human species had the drawback of “biologizing” law, thereby ostracizing before-the-fact any and all children that might be born through cloning.(31)

At the international level the situation is extremely confused. Approximately 40 countries, including Germany, Australia and South Africa, have passed laws prohibiting reproductive cloning. To this day, however, there is no binding international agreement, and it seems extremely difficult to reach a common position. In 2001 France and Germany asked the United Nations to draft a “universal convention prohibiting human cloning for reproductive ends”. Despite support from a great number of countries, this initiative produced no such convention. The United States, supported by the Vatican and an alliance of countries with strong Christian traditions (Italy, Spain, Ireland, Austria, etc.), played the intransigence card, demanding categorical prohibition of all cloning practices of whatever sort for reproductive and therapeutic purposes alike. This hard-line approach blocked discussion, since many countries in favor of prohibiting reproductive cloning wished to leave the door open for therapeutic cloning. Ultimately a non-binding statement was adopted by the UN General Assembly on March 8, 2005, inviting member states to prohibit all forms of cloning “incompatible with human dignity”. Thirty-four countries (including France) voted against the statement;

(30) “As I see it, reproductive cloning is the equivalent at the level of the individual person of a crime against humanity at the collective level.” (Jean-François Mattei speaking to the Commission des Affaires Sociales of the French Senate on December 12, 2002).

37 abstained. Consequently, researchers who want to move forward can move their experiments—and breakthrough declarations—to countries with more permissive regulations. As is often the case in such situations, there are grounds for concern that accelerated scientific and technical developments will overtake public authorities’ attempts at regulation.

Sociology, bioethics and the status of the embryo

The biologist Henri Atlan is among those who have thought the most thoroughly about the questions and issues raised by cloning. As I see it, the main value of his positions lies in a constant concern to show that his arguments are relevant here and now. In other words, the arguments presented and exchanged do not necessarily have absolute value; they necessarily pertain to a society organized in a certain way. And while it is appropriate to prohibit reproductive cloning given the current state of knowledge and know-how, the debate is likely to evolve over time. This approach is very clear in Atlan’s arguments on stigmatization: “Today, rightly or wrongly, the idea of making a child through cloning too radically offends social representations of human procreation—still centered fundamentally around sexuality and genes—for us to neglect the dangers of racism or potential cloning misuse. But the day may come when there will no longer be any connection in our representations between sexuality and reproduction. This prospect is not in itself shocking to me. It all depends on the social, cultural, and moral context in which the event occurs.” (Atlan et al., 2003, p. 16). We may be more or less convinced by this statement, depending on our individual convictions. It does, however, point in the direction of an idea that is of great sociological relevance: representations of conception and birth vary geographically and by period. Obviously the way of perceiving, and therefore of posing, problems linked to procreation changes over time, sometimes quite quickly: “In the 1950s, artificial insemination using donor sperm elicited categoric condemnations in terms that strongly recall those being used today in connection with cloning. As did the test-tube conception and birth of Louise Brown in 1978. In surveys done in the late 1970s, 85% of respondents said they were against making ‘test-tube babies’. Who is against it today? This has not become a massive means of procreating, but it is at the origin of nearly 1% of births in France, [the country known as the] ‘first-born daughter of the Catholic Church’.” (Jordan, 2003, p. 148).

In the end, by adopting an attitude like this which does not insult the future, biologists such as Atlan and Jordan are following Max Weber’s

(32) “As I see it, prohibition is above all a social precaution. It is not eternal, but relative to the current state of humanity’s moral development. [...] If I say ‘no to human reproductive cloning’ in the present state of society, it is because the social dangers seem greater to me than the therapeutic benefits a few persons might derive from it. But these social dangers are not necessarily immutable” (Atlan et al., 1999, pp. 55-56).
teaching: the future of science is more science. “In the sciences of human culture, concept construction depends on how problems are posed, and varies in turn with the very content of civilization.”(33) (Weber 1965, p. 204). Constructions are thus doomed to remain unfinished, and it would be mad to claim we can announce inviolable certainties. For this very reason, it seems crucial to develop a sociological approach to these issues. It is particularly important to take into account the fact that the status of the embryo varies by social space: there are several ways of “conceiving” the embryo by period and place.(34)

The fact that views of the embryo are not the same for all societies goes a long way to explaining the difficulties encountered in attempts to construct an international consensus on cloning. British legislation, for example, is based on a distinction between the embryo up to 14 days after fertilization and the embryo after that limit. Research on sterility and genetic diseases that uses “pre-embryos” (less than 14 days old) has been permitted in the UK since 1990, but no research of any kind may be done using embryos more than 14 days old, nor may such embryos be preserved in vitro. The British authorities recently used this distinction to determine its official position: it has strictly but straightforwardly prohibited human reproductive cloning; on the other hand, controlled experimental research in therapeutic cloning has been permitted since 2002. In other words, research teams in Britain can obtain permission to create embryos through nuclear transfer and make stem-cell lines. These embryos may in no case be implanted and must be destroyed after two-weeks’ time. This legislation, which gambles on cloning’s beneficial medical repercussions, was passed in a spirit of overt, assertive pragmatism.(35) Still, as Jordan explains, the 14-day limit has not received unanimous approval: “The oft-mentioned 14-day limit, before which we are said to be dealing with a ‘pre-embryo’, corresponds to the very beginning of nervous system development. In the British legislation permitting therapeutic cloning it serves as the limit. It can be argued that before that date no distinction has been established between the embryo and the placenta, and that the absence of a nervous system ensures the absence of all sensation. It should be noted also that at this stage the embryo measures approximately one millimeter. These distinctions are of course of no interest to anyone claiming that life is sacred from the instant of conception.” (2003, p. 167).(36)
It is hardly surprising that controversies in the bioethics field should converge on the issue of the status of the embryo. On this point I am in agreement with Luc Boltanski’s observation in his most recent work, *La condition fœtale. Une sociologie de l’engendrement et de l’avortement* (2004), that among the upsets that have affected reproduction conditions, one deserves particular attention: “the fetus’ rise to power and accession to the social world” (Boltanski, 2004, p. 207). First of all it should be noted that the fetus entered the field of the visible via medical imaging. Ultrasound and fetoscopy conferred a presence and reality on these beings that they had never had before: “The American magazine *Life*’s 1965 cover photo of a 18-week old fetus in the amniotic sac inside the uterus, taken by the Swedish photographer Lennart Nilsson, stood out as a groundbreaking event not only because of the technological feat accomplished but because it marked the accession to the order of graphic representation of a being that until then had largely escaped such representation.” (Boltanski, p. 203). In this respect it seems that we have just lived through one of those moments in which, as Michel Foucault underlined in connection with the “birth of the clinic”, “the relation between the visible and invisible –which is necessary to all concrete knowledge–changed its structure, revealing through gaze and language what had previously been below and beyond their domain.” (Foucault, 1989, p. xiii).

Simultaneously, medical techniques for assisting reproduction brought new beings into existence whose existence, status and future pose entirely new problems. These creatures, which Boltanski calls “techno-fetuses”, the typical example being “surplus” embryos created through *in vitro* fertilization, have become an object of public debate and controversy. “These debates, bearing on category definitions and on moral and legal issues and conducted to a large degree in the public space, have had the important effect of bringing the fetus into social space, making it a full-fledged social being, which it does not seem to have been in the history of the west or in any known society.” (Boltanski, 2004, p. 185).

Given these conditions, there seems to me to be a necessity for greater collaboration between the social and life sciences on bioethics questions. This is especially urgent because our questions and the areas those questions fall into will be multiplying: “Disciplines such as genomics, proteomics, genetic engineering and regenerative medicine are going to lead humanity beyond

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(36) The doctrine holding that the soul appears from the instant of conception was introduced into the Catholic Church by Pius IX in 1869. There had already been much disagreement among the Church fathers on the matter (Caspar, 1992). In the thirteenth century, Thomas Aquinas was still supporting the thesis of differential acquisition which held that the male embryo acquired a soul at 40 days, the female at 84 days.

(37) “The last 30 years have been marked by the fetus’ entry into society. This movement, which continues to develop before our eyes today and is surely far from over, represents a radical innovation.” (Boltanski, 2004, p. 204).

(38) It is hardly by chance that the public authorities are concerned today to count surplus embryos. In France the number of frozen embryos at the end of 2000 was approximately 120,000. In 2004, after observing that there had been no recent reliable count, the health ministry called for systematic counting in all centers for medically assisted reproduction.
what can be imagined today.” (Stock, 2004, p. 70). Controversies around
eugenics in particular are likely to come to the fore and may have unsuspected
impact. To give only one example, there will soon be prenatal tests that can
determine child’s sex in a way that is non-intrusive for the mother (by simple
analysis of fetal cells in mother’s bloodstream) as early as the sixth week of
gestation (i.e., before the French legal time limit for abortion). The result
could be a sharp increase in convenience abortions consistent with couple’s
preference for a boy or a girl. Fierce public debate will necessarily develop to
determine whether such practices are acceptable or not. On subjects as deli-
cate as this one, the point is not of course to reach hasty conclusions about
what good and evil or right and wrong might be, but on the contrary to facili-
tate constructive dialogue between the various points of view and encourage
discussion among the various disciplines involved. Given the strong original
links between biology and sociology (we need only think of Auguste Comte),
it would ultimately not be surprising if the upsets that are so deeply affecting
the conditions in which living beings arrive in the world were to stimulate
sociological thinking on the matter.

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