

eugenics was practiced in the twentieth century and offers many helpful suggestions for warding off the evils of eugenics in the future. This book and its website complement other powerful sources on eugenics, like the 1997 documentary “In the Shadow of the Reich: Nazi Medicine,” by Professor John Michalczyk of Boston College, which makes the point that the eugenics movement, with its programs for sterilizing and experimenting on prisoners and institutionalized patients, began in the United States and Europe in the mid 1800s, and not in the Nazi concentration camps.

The state of Indiana is blessed with the highly influential CANDLES (Children of Auschwitz Nazi Deadly Lab Experiments Survivors) Holocaust Museum and Education Center in Terre Haute, founded by Eva Mozes Kor. Mrs. Kor and her late sister, Miriam, were survivors of the studies on twins performed at Auschwitz by Josef Mengele,

whose barbaric experiments were not always so different from medical experiments carried out on prisoners, mental patients, and poor people elsewhere in the world.

Finally, in the 2008 Instruction *Dignitas personae*, On Certain Bioethical Questions, the Congregation for the Doctrine of the Faith warns of “an essentially eugenic perspective” behind much philosophical reflection and scientific momentum in the realm of biomedical technology (n. 2). A wider appreciation of the pervasive temptations behind the eugenic perspective should contribute to a restoration of a reverence for life and for the uniqueness of each human being, especially those who are most fragile and vulnerable.

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***Chimera’s Children:  
Ethical, Philosophical and Religious Perspectives  
on Human Experimentation***

**edited by Calum MacKellar and David Albert Jones**

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*Chimera’s Children* is a useful compendium of material on the legal regulation and ethical debates about experimentation involving various organisms that combine human and nonhuman contributions. Such experimentation may mean the formation of embryos that are animal in origin but have the addition of some human material, such as cells, whole chromosomes, nonnuclear material like the mitochondria or an enucleated cell, or human genes or gene sequences. Or it may mean the reverse: the formation of embryos that are human in origin but have added animal elements. The addition of material from another species may be made before fertilization, during cloning, or after fertilization.

The lack of international consensus on such experimentation, on whether it is

permissible to make and study “part-human admixed organisms,” is the reason for the book. The editors—Calum MacKellar is director of research for the Scottish Council on Human Bioethics, and David Albert Jones is director of the Anscombe Bioethics Centre in Oxford—provide a survey of global research in this area, noting that “the ethical considerations run very deep and are extremely complex.”<sup>1</sup> Their overall aim is “to seek some clarifications . . . relating to the scientific, philosophical, cultural and religious perspectives” (11).

The first part of the book provides background, including definitions and an overview of current legislation. The second part looks at current developments in human–nonhuman experimentation and names

ethical issues involved in each. The third and final part examines “cultural, worldview and ethical perspectives.” The authors hope that this information will act as “a starting point for deeper reflection” (xiii).

Human–nonhuman entities might be produced to perform a very restricted function, such as the production of a specific human protein in the cells of an animal. For example, human DNA may be inserted into *E. coli* host cells to make human insulin. Other entities, like mouse–human hybrids, may be created for the study of human disease processes in the animal models. There is thought to be a significant difference between inserting human DNA into something like a bacterium or a virus and inserting human DNA into an animal embryo to create a human–animal “hybrid.” The issues are quite different. In the latter case there may be confusion over the moral status of the entity, and since parts of the human genome, which is a vital part of the reproductive process, are used generatively in this, there are questions about whether the genome should be regarded as sacred in its generative capacity and not be used in this way. In the case of forming a virus or bacterium containing human DNA, there are questions of biosafety for the human and animal populations, because bacteria and viruses, in particular, may be capable of transmitting DNA changes to their populations.

Human contributions to an animal embryo may be of smaller or greater proportions. It is thought that with only a minimal human genetic addition an embryo will remain an animal embryo, but no one knows just how much human genetic material or which human genetic material might alter its status to make it something more than an animal. The issue of respect for the integrity of animal species also arises. In this connection, the Pontifical Academy for Life has expressed the view that “there should be a reaffirmation of the right and duty of man, according to the mandate from his Creator and never against the natural order established by him, to act within the created order and on the created order, making use as well of other creatures, in order to achieve the

final goal of all creation: the glory of God and the full and definitive bringing about of His Kingdom, through the promotion of man.”<sup>2</sup>

The Congregation for the Doctrine of the Faith has addressed issues of respect for the human genome that are raised when human organisms contain some animal contributions: “From the ethical standpoint, such procedures [the use of animal oocytes to reprogram the nuclei of human somatic cells] represent an offense against the dignity of human beings on account of *the admixture of human and animal genetic elements capable of disrupting the specific identity of man.*”<sup>3</sup>

A language has developed to describe the various human–animal entities. A *chimera*, from which the book derives its title, is an organism that carries genetically distinct cells derived from at least two zygotes. The cells could be from the same or different species. A *mosaic* carries genetically distinct cells derived from a single species, either sourced from a single zygote but with some cells expressing a mutation or genetic anomaly that occurred during embryonic development, or involving cells from two zygotes that arose as separate embryonic siblings from the same procedure but then fused to form one embryo. While chimeras and mosaics are rare in natural circumstances, in vitro fertilization sometimes results in the formation of an embryo from the fusion of two embryos when they are together in culture soon after fertilization. In the latter case, the child—if he or she survives to be born—has cells with different genomes in different parts of the body. This has led to higher-than-expected error rates for preimplantation genetic diagnosis in IVF embryos. It is also emerging as a source of false-positive results in the new procedure of maternal serum testing of free-floating fetal DNA during pregnancy, where the mother is a mosaic and the confounding DNA came from the less dominant zygote during her own embryonic development. This is becoming more common now that second-generation IVF children are being born to mothers or fathers who themselves were conceived by IVF.

The words “hybrid” and “cybrid” are also used in the context of chimeras, even though

initially a *hybrid* was an embryo formed from gametes from different species. Unlike a chimera or mosaic, the cells of a hybrid are genetically the same throughout the body, since each cell receives half its genes from one species and half from the other. However, the term “hybrid” has also been used for an embryo that contains a disproportionate admixture of genetic material from two species owing to *transgenesis*, a process by which genes or even whole chromosomes are removed and replaced by genes or chromosomes from another species. The proportions could be quite variable.

Attempts have been made to form a hybrid by replacing a minimal number of animal genes with human genes for the purpose of developing an adult pig, for instance, whose organs might be used for human transplantation. Theoretically, the immune system of the recipient would not react to the transplanted organs, because the genes that would trigger that response have been removed and genes that would cause the organ to be recognized as compatible have been added. If such experiments were successful, a human patient might receive a heart, kidney, or liver taken from an adult pig whose genome had thus been altered embryonically to overcome the likelihood of immune rejection. This has been proposed as a way of addressing the chronic shortage of transplantable organs. As far as the author is aware, results of such experiments have only been achieved *in vitro*, and no one yet has attempted to transplant an organ from a transgenic human–animal hybrid into a human being.

A *cybrid* is a cloned embryo formed by fusing the enucleated egg from one animal with an ordinary somatic cell from an animal of a different species. An enucleated ovum from a cow or pig might be fused with an ordinary human cell, for example, to produce an embryo that is genetically mostly human, with only a small proportion of genetic material from the cytoplasmic organelles of the animal. The precise effects of such a combination are unknown, and it is also unclear whether such a hybrid would develop to be recognizably human: such an outcome is thought to be likely, but cannot be deter-

mined until a cybrid has developed to a stage at which its phenotypic characteristics can be observed. The questions are mostly about the transmissibility of epigenetic changes that control gastrulation and organogenesis.

Chapter 2 of *Chimera's Children* usefully explains some of the attempts in various countries to legally regulate the creation of human–animal entities. One of the weaknesses of this chapter, however, is that it provides very little information about other forms of regulation, such as official codes of ethics adopted voluntarily by researchers or required by governments or private funders. In Australia, for instance, the ethical guidelines promulgated by the National Health and Medical Research Council are considered contractually binding even though they are not statutorily enforced. Contracts between a research institution and the government require the institute to ensure compliance with the 2007 National Statement on Ethical Conduct in Human Research.

The authors also give considerable emphasis to documents of the Council of Europe, but little to those of the United Nations. They mention briefly the Universal Declaration of Human Rights (1948), which sets forth in article 1 the concept of human dignity as the foundation for human rights: “All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act toward one another in a spirit of brotherhood.” But the authors fail to mention the two international covenants that implement that declaration—the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights—with their preambular affirmations of human dignity, which express the role of inherent dignity and equal and inalienable rights more directly. The authors also mention only in passing the Universal Declaration on the Human Genome and Human Rights (1997) and the protections it affords. The Declaration on the Human Genome states in particular,

*Article 10.* No research or research applications concerning the human genome, in particular in the fields of biology, genetics

and medicine, should prevail over respect for the human rights, fundamental freedoms and human dignity of individuals or, where applicable, of groups of people.

*Article 11.* Practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted. States and competent international organizations are invited to co-operate in identifying such practices and in taking, at national or international level, the measures necessary to ensure that the principles set out in this Declaration are respected.<sup>4</sup>

The discussion in *Chimera's Children* does not convey the vital historical role that the concept of human dignity played in establishing human rights in international instruments after the Second World War.<sup>5</sup> Rights such as the inherent right to life and security of person and the right not to be trafficked (for prostitution or slavery) were based on a concept of dignity that was not dependent on autonomy and consent. Dignity meant that inalienable rights were based on a concept of flourishing and what the human person needed to flourish: essential need rather than mere want. The international human rights instruments have tended not to be invoked in the euthanasia debates, for instance, because they have this meaning that is linked to a much richer notion of dignity related to flourishing and related need.

The language of rights also implied a three-term relation involving not only the possessor of the right and its object (e.g., a person's right to health care) but also the person (or government or institution) in duty bound to respect those rights. That meant that the concept of dignity was relational between the right-holder and those in duty bound. Respect for another's dignity implied something about both parties.

The contemporary use of the concept reflects instead the postmodern tendency to shy away from the view that there is a law above civil law that is founded on the inherent dignity of each member of the human family and thus his or her needs and relationships as a member of the human family. The postmodern view talks instead about what

might be called "Kantian autonomy" as the basis of dignity, rather than the inviolability of each member of the human family.

To some extent this shift reflects the contemporary movement away from the Hippocratic tradition and its basis in benevolence and respect for the worth of each member of the human family. *Chimera's Children* might have dealt more convincingly with the notion of dignity by appealing to the earlier idea of it that formed the basis of the human rights movement in the mid twentieth century and the important concept of a law above civil law.

*Chimera's Children* usefully contributes a discussion of cultural, social, and religious factors that are relevant to experimentation involving human–nonhuman combinations, and it does so in a reasonably comprehensive way. It also develops the discussion of what has come to be known as the "yuck factor," which leads people to find repugnant at least some of the suggestions for the formation of human–animal entities, without necessarily providing clear reasons why. Unfortunately, the history of reproductive technology over the past thirty-five years has shown that the yuck factor is in fact unreliable, because the tolerance of new proposals tends to grow with familiarity, making repugnance transient in its cautionary effect. Having worked in the ethics of this area for all this time, I have learned not to rely on what are often visceral rather than reasoned philosophical or theological reactions.

In its discussion of various ethical perspectives, *Chimera's Children* provides some ethical analysis of the issues, but timidly. The editors make no real attempt to provide a consistently well-argued critique of a liberal approach to new possibilities for forming entities that mix human and animal contributions. This may reflect the editors' admission of the lack of agreement between contributors on significant matters. Their chapter of conclusions is singularly lacking in its failure to develop a consistent approach to the ethical issues.

An unresolved issue is the question of human–animal transgenesis, in which parts of the human genome are used to alter the

genome of an animal embryo in order to develop an adult animal whose organs might be transplanted to a human being. *Chimera's Children* mentions the issue and the argument made by some that the human genome ought to be treated as sacred out of respect for human generative capacity. This argument is based on the fact that the formation of a new human genome by the union of the germ cells of the parents is the biological means by which offspring gain the inheritance of human status, at least at the biological level. That is the observable reality. Of course, as a matter of faith, the Catholic tradition refers to the creation of a human soul as that which forms and informs the matter that is the human body. The addition of parts of the human genome to an animal embryo raises questions not only about the status of the being thus generated, but also about whether this is an appropriate use of the genome as the means of human generation.

*Chimera's Children* is a useful contribution in that it sets forth the issues and outlines the range of concerns that need to be addressed in ethical analyses of human–nonhuman experimentation. It is a resource for learning about the issues and, at least in summary form, the various national, cultural, religious, social, and ethical responses. It also provides a historical perspective in its review of what mythological chimeras represented in classical literature and the sense of dread that they often evoked.

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<sup>1</sup> Dr. MacKellar and Prof. Jones are identified as editors. However, a note on authorship indicates that Dr. MacKellar is the main author of the book and major contributions were made by Prof. Jones. Damien Keown wrote a section on Buddhist perspectives, and Dr. Sibtain Panjwani and Imranali Panjwani wrote a section on Islamic perspectives.

<sup>2</sup> Pontifical Academy for Life, “Prospects for Xenotransplantation: Scientific Aspects and Ethical Considerations” (September 26, 2001), n. 7.

<sup>3</sup> Congregation for the Doctrine of the Faith, *Dignitas personae* (September 8, 2008), n. 33.

<sup>4</sup> UN General Assembly, resolution 217 A (III), “Universal Declaration of Human Rights,” December 10, 1948, <http://www.ohchr.org/en/udhr/pages/introduction.aspx>. The two international covenants are the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights (both, UN General Assembly, resolution 2200A [XXI], December 16, 1966, <http://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx> and <http://www.ohchr.org/EN/ProfessionalInterest/Pages/cescr.aspx>). UNESCO General Conference, “Universal Declaration on the Human Genome and Human Rights,” November 11, 1997, <http://www.unesco.org/new/en/social-and-human-sciences/themes/bioethics/human-genome-and-human-rights/>.

<sup>5</sup> In the period between 1948 and 1966 particularly, the principal philosophical influence on the UN Human Rights Committee appears to have been the neo-Aristotelian Jacques Maritain, who furnished, on behalf of the committee, short explanatory articles for governments on how the main concepts were applied, including concepts such as “dignity” and “rights,” but also about the relationship between them and why particular rights were included. I discovered many of his documents in the Australian government archives, sent as attachments by the Australian government’s representative at the UN Human Rights Committee, Frederick Whitlam (father of Prime Minister Gough Whitlam) to the then-Minister for External Affairs, Paul Hasluck, and the Prime Minister, Robert Menzies.