

# The Bioethics of Germline Gene Editing: *Worth the Global Outcry?*

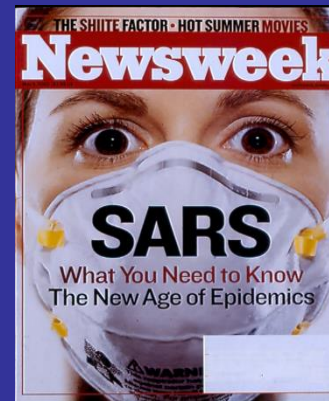
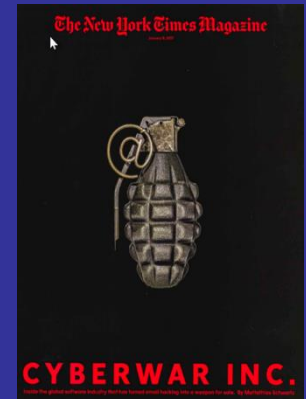
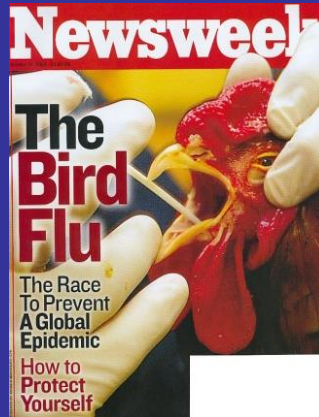
**George Annas**

ASGCT, Nov. 6, 2019  
Washington, DC


**BOSTON  
UNIVERSITY**



# Species-Wide Concern?



BY THE BEST SELLING AUTHOR



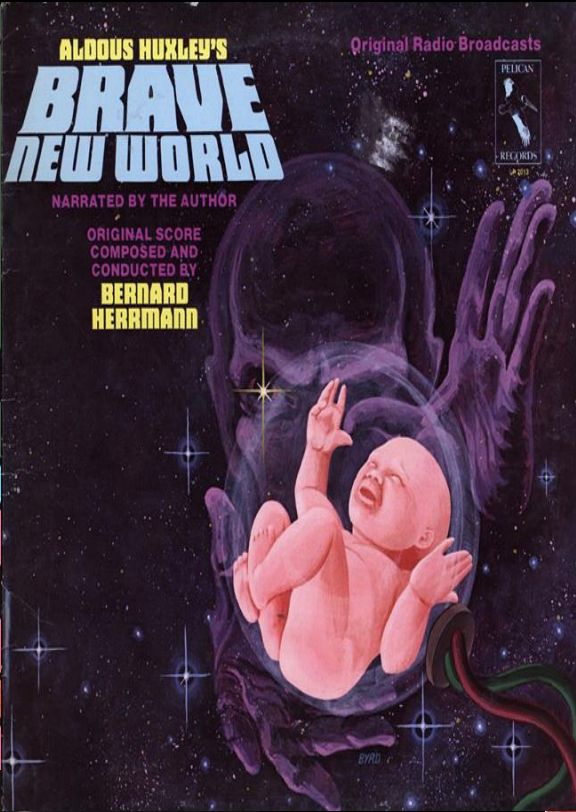
**KURT VONNEGUT CAT'S CRADLE**

A FREE-WHEEL UNFORGE  
-The Ne

ALDOUS HUXLEY'S  
**BRAVE NEW WORLD**  
Original Radio Broadcasts

NARRATED BY THE AUTHOR

ORIGINAL SCORE COMPOSED AND CONDUCTED BY  
**BERNARD HERRMANN**

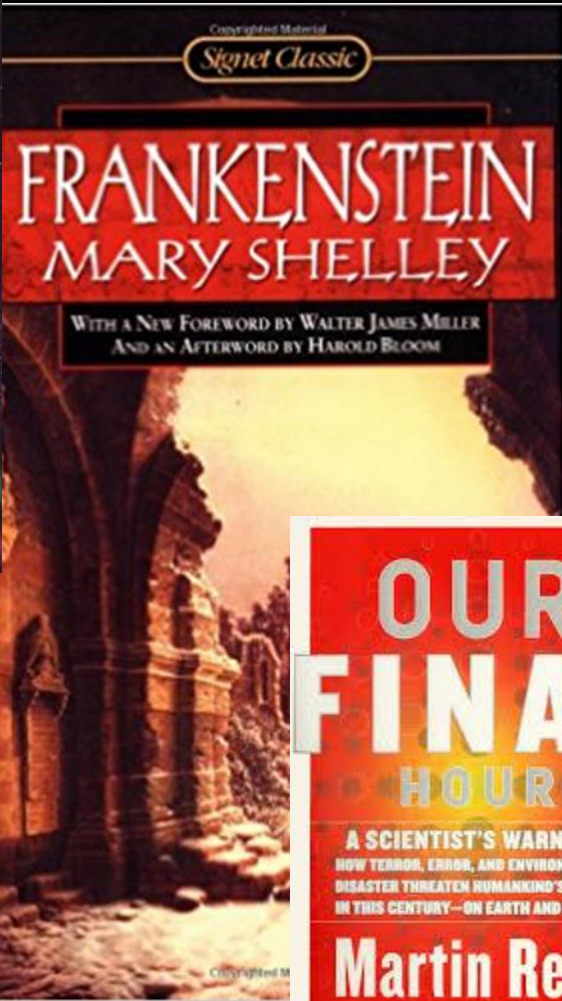


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MARY SHELLEY

WITH A NEW FOREWORD BY WALTER JAMES MILLER  
AND AN AFTERWORD BY HAROLD BLOOM



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**ICE 9**

**OUR FINAL HOUR**

A SCIENTIST'S WARNING:  
HOW TERROR, ERROR, AND ENVIRONMENTAL  
DISASTER THREATEN HUMANKIND'S FUTURE  
IN THIS CENTURY—ON EARTH AND BEYOND

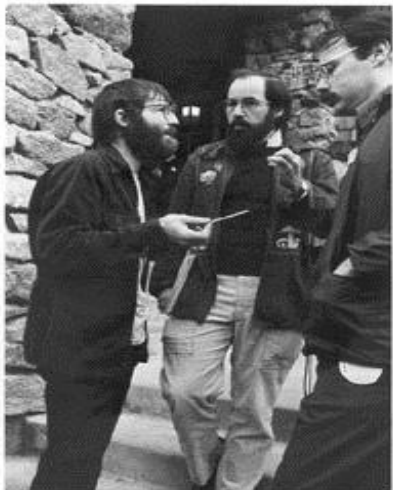
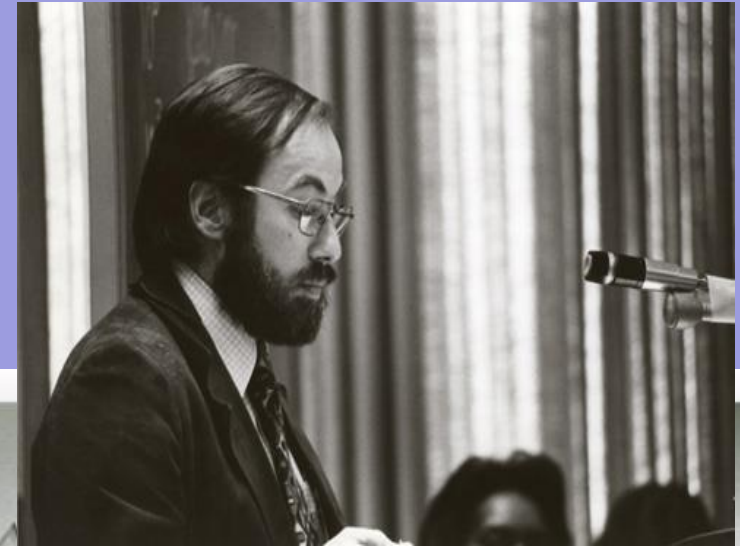
**Martin Rees**  
AUTHOR OF JUST SIX REMAINS



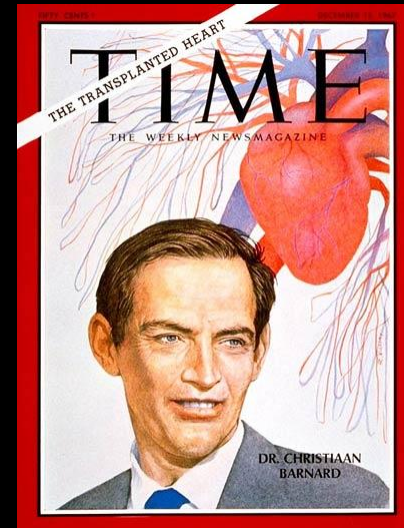
# Eugenics/Genetic Genocide



(Left to right) Maxine Singer, Norton Zinder, Sydney Brenner, and Paul Berg were among the Asilomar Conference.  
Copyright © National Academy of Sciences



# Can't Stop it?





# World's First Head Transplant



**HOW TO GET A HEAD**

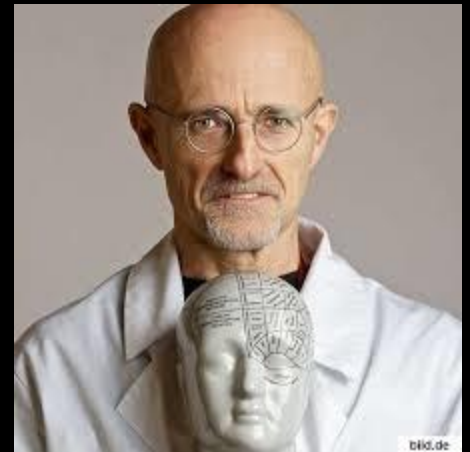
- 1 Head and body are cut to stop brain cells dying
- 2 Head is moved to the donor body and spinal cords fused with glue
- 3 Muscles, veins and organs are reconnected and skin attached together

4 Neck is cut and tubes connecting arteries and veins fixed

5 Hope for the best

**WARNING: DON'T TRY THIS AT HOME**

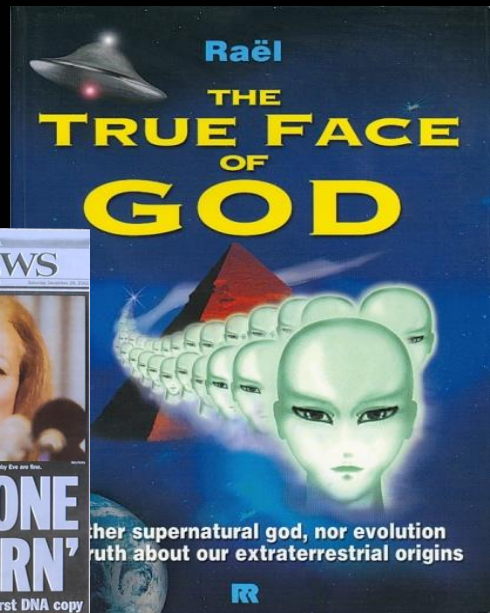
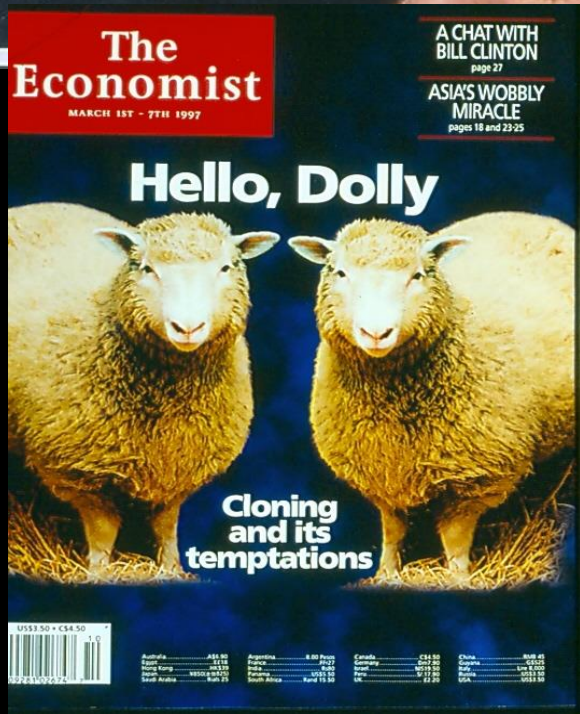
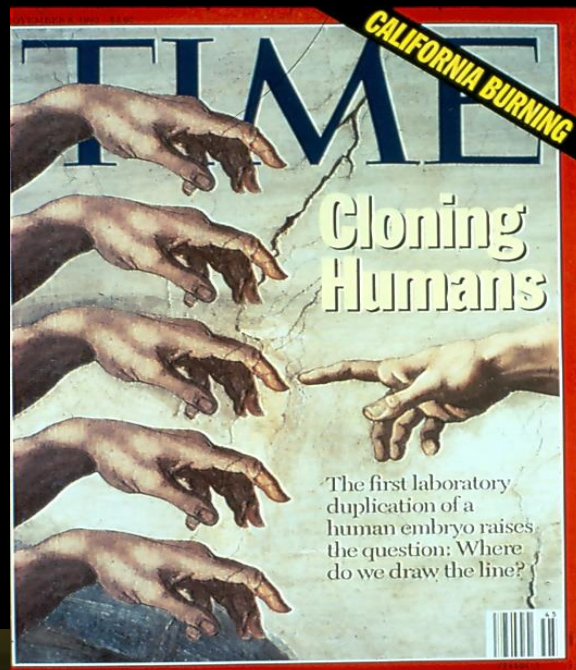
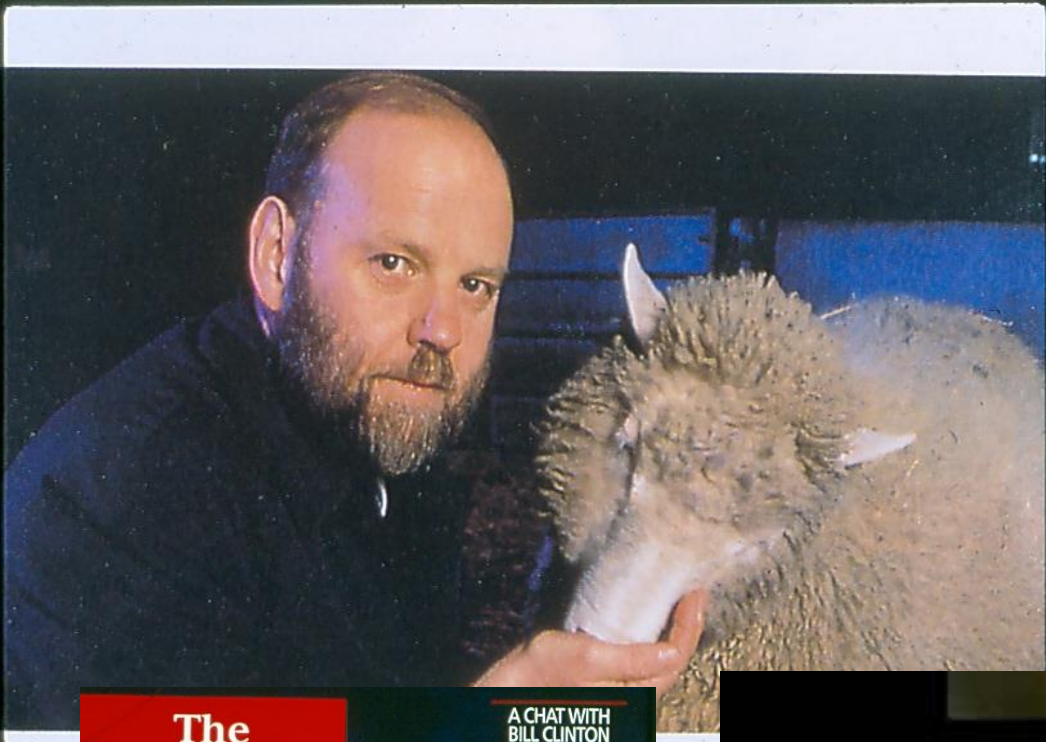
**NEXT UP?**















Three of a kind: Severino Antinori (left), Brigitte Boisselier and Panos Zavos .

NATURE | VOL 412 | 16 AUGUST 2001

National Academy of Sciences,  
August 2001

27 February 1997 International weekly journal of science  
**nature**



# A flock of clones

- Extrasolar planets** Fading from view
- Climate cycles** Eccentricity finds a role
- Archaeology** Hunting 400,000 years ago

Now on the market  
**Genetics**

# UN

## Declaration on Human Cloning

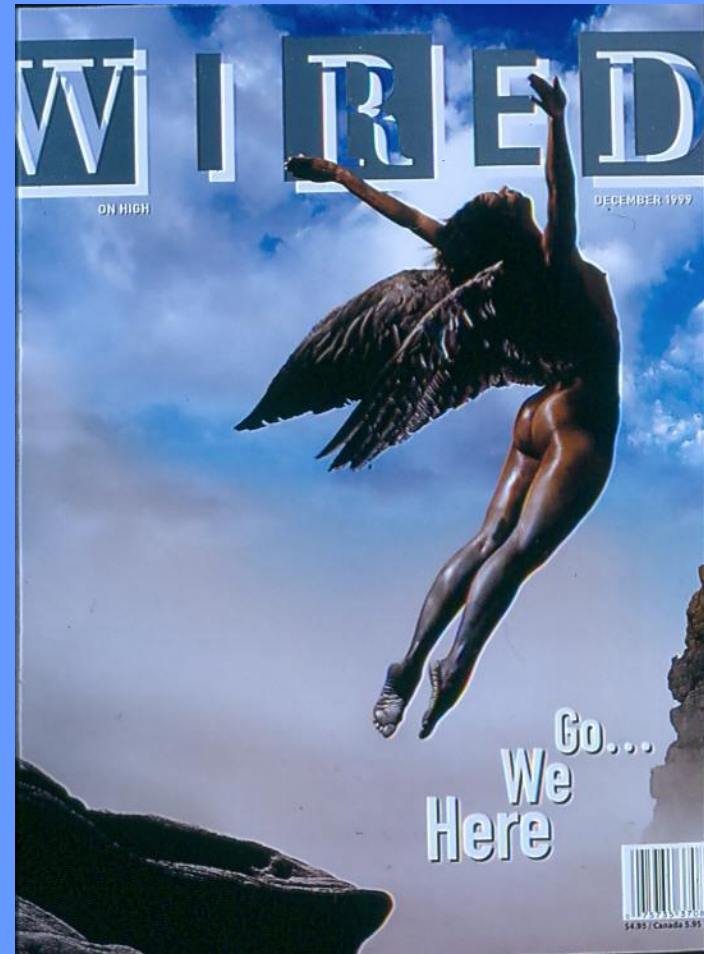
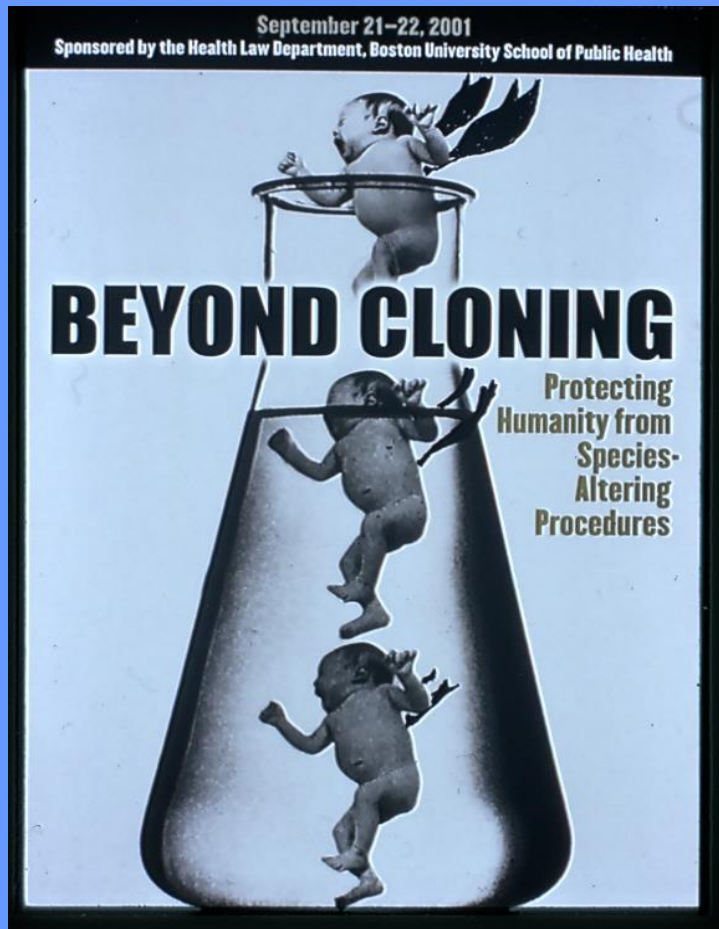
- Prohibit all forms of human cloning
- Prohibit genetic engineering



» March 8, 2005 (UN General Assembly, 84/34/37/36)



# Frames for Regulation





**'CATS' LEAPS  
ONTO BROADWAY**  
The hottest theater  
ticket in the country

**SAVING AFRICA'S  
BIG ANIMALS**  
A radical plan to  
butcher some of them  
and sell their meat

November 1982/\$2.00

# TEST- TUBE BABY BOOM

Elizabeth Carr,  
America's first  
in vitro baby,  
at the lab  
where she  
was conceived



TECHNOLOGY GUIDE  
GOING WIRELESS

**U.S. News** & WORLD REPORT  
SEPTEMBER 27, 2004  
www.usnews.com

# MIRACLE BABIES

How science  
is helping  
childless couples  
beat the odds





- 1. Assume new technology is ethical if it has any possible application to reproduction;**
- 2. Assume the new technology will work and produce benefit, and assume harms are speculative and controllable;**
- 3. Assume major values to be taken into account in infertility clinic are economic (efficiency, supply and cost), not ethical.**



**Implicit decision-making rules of the ethics committee of the American Society of Reproductive Medicine**

**ASSISTED REPRO FRAME**

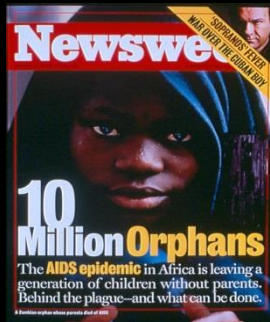
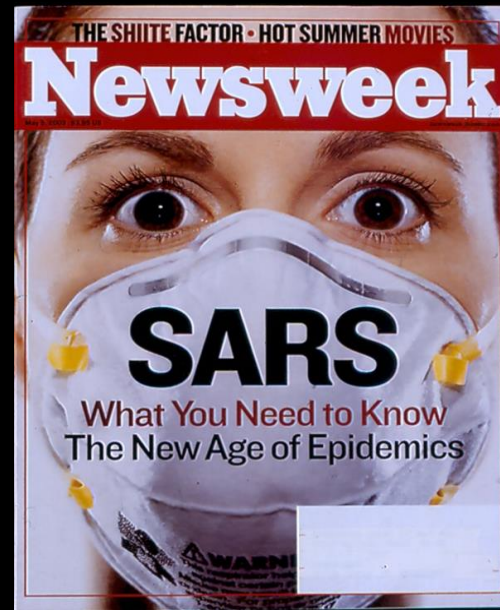
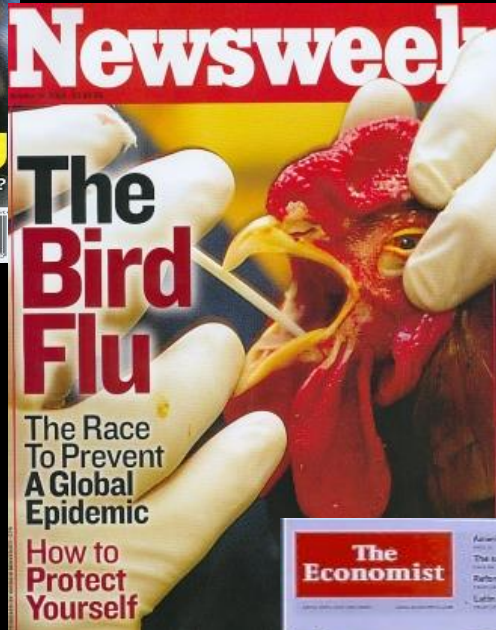


# Consumer Good or Human Experiment?

- “right” to a genetically-related child?
- genetic duplicate?
- Inherently unethically risky experiment?
- Species/Individual Consent (*necessary but not sufficient*)
- To experiment
- To monitoring







- H1N1
- Polio
- Ebola
- Zika
- Ebola



