NEW BIOLOGICAL BOOKS

The aim of this section is to give brief indications of the character, content and cost of new books in the various fields of biology. More books are received by The Quarterly *than can be reviewed critically. All submitted books, however, are carefully considered for originality, timeliness, and reader interest, and we make every effort to find a competent and conscientious reviewer for each book selected for review.*

Of those books that are selected for consideration, some are merely listed, others are given brief notice, most receive critical reviews, and a few are featured in lead reviews. Listings, *without comments, are mainly to inform the reader that the books have appeared; examples are books whose titles are self-explanatory, such as dictionaries and taxonomic revisions, or that are reprints of earlier publications, or are new editions of well-established works.* Unsigned brief notices, *written by one of the editors, may be given to such works as anthologies or symposium volumes that are organized in a fashion that makes it possible to comment meaningfully on them.* Regular reviews *are more extensive evaluations and are signed by the reviewers. The longer* lead reviews *consider books of special significance. Each volume reviewed becomes the property of the reviewer. Most books not reviewed are donated to libraries at SUNY Stony Brook or other appropriate recipient.*

The price in each case represents the publisher's suggested list price at the time the book is received for review, and is for purchase directly from the publisher.

Authors and publishers of biological books should bear in mind that The Quarterly *can consider for notice only those books that are sent to The Editors,* The Quarterly Review of Biology, *C-2615 Frank Melville, Jr. Memorial Library, State University of New York, Stony Brook, NY 11794-3349 USA. We welcome prepublication copies as an aid to early preparation of reviews.*

HUMAN BY DESIGN

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A review of

WAR AGAINST THE WEAK: EUGENICS AND AMERICA'S CAMPAIGN TO CREATE A MASTER RACE.

By Edwin Black. New York: Four Wall Eight Windows. $27.00. xxviii + 550 p + 14 pl; ill.; index. ISBN: 1–56858–258–7. 2003.

REDESIGNING HUMANS: OUR INEVITABLE GENETIC FUTURE.

By Gregory Stock. Boston (Massachusetts): Houghton Mifflin. $24.00. x + 277 p; index. ISBN: 0–618–06026–X. 2002.

The dispassionate light of science illuminates our world, placing the mysticism and folklore that have always tainted humanity's perception of the world and our place in it, back into the dark shadows from which they came. The light of science also reveals new and unexplored pathways for understanding, modifying, improving and, yes, even destroying the world in which we live. Although the prescribed discipline and practices upon which science is based are straightforward to understand, its application can be, and often has been, corrupted by the presence of uniquely human idiosyncrasies such as prejudice, racism, ambition, avarice, greed, bigotry, class warfare, xenophobia, anti-Semitism, and even good intentions.

In spite of our uniquely human idiosyncrasies, the development of science and the sci-

entific method are the fertile ground from which great ideas are born and nurtured and failed ideas discarded. Among the many scientists who have illuminated the pathway to understanding the true biological origins of life and death, we are fortunate to have had surface such luminaries as Francis Bacon, Charles Darwin, Gregor Mendel, James Watson, George Williams, and Stephen Jay Gould. From this same fertile ground have also sprung weeds, and so we have some who intentionally or unintentionally misuse, misinterpret, distort, or exaggerate the products of science. Perhaps the most glaring example came during a time of what should have been great enlightenment following the publication of Darwin's theory of evolution. It was humanity's gross misunderstanding and corruption of science that was brought forth by the development and applied principles of social Darwinism.

In recent years, science has once again illuminated a new pathway that may lead humanity toward a golden age of healthier and longer lives, free from many of the diseases and disorders that have plagued our species from its origin. The same path also has the potential to place humanity on the identical moral precipice it faced more than a century ago. Which road will we take? This has yet to be determined, but what is fascinating for the moment is both the journey itself and the fact that we are living in the very time when the decision will be made about which pathway to choose.

Readers today are fortunate to have two new books that take us on this journey by crystallizing the profound differences, and revealing the frightening similarities, between contemporary efforts to enhance humanity through the biomedical sciences and historical efforts to enhance humanity through selective breeding and negative eugenics. Ironically, in both cases the stated goals are nearly identical—to enhance the "quality" of the human species and improve the public health of current and future generations.

In *War Against The Weak,* investigative reporter Edwin Black begins by clubbing readers with the main punchline of the book: the 20th century practice of hunting down and exterminating people with undesirable traits did not begin with the well-documented brutal practices of Nazi Germany under Adolf Hitler but, rather, with the "good intentions" of wealthy industrialists in the United States who used "science" to support the idea that the time had come to save the human species from itself. Before we discuss this method of enhancing humanity, let us step back for a moment, as did Edwin Black in his second chapter, and examine the social and scientific underpinnings that led many to believe we were on the verge of exterminating ourselves.

As important as differential fertility is to Darwin's evolution theory, poverty and the havoc it brings is central to the origin of eugenics. There are always a small number of people in every society in whom resources are concentrated—everyone else represents the underclass or have nots. The fundamental differences between these groups of people, which is often delineated by such characteristics as education, language, income, and occupation, among others, have not only fueled class warfare, but also represent a barrier that segregates groups of people about as effectively as continents separated by oceans. According to Black, when the underclass turns to crime and violence in order to scratch out a meager existence, those from whom they take have had a consistent response—control or eliminate the underclass.

The gross disparity in the distribution of resources initially led the wealthy to label the have nots as the undeserving poor and vagrants. Later, as Black so poignantly makes clear, the labels rapidly changed to defectives, feebleminded, delinquents, unfit, morally unsuitable, shiftless, and moral degenerates. Under the imprimatur of science, the labels became far more insidious, spreading beyond the poor to entire subgroups of the population that the wealthy deemed undesirable. More biologically meaningful labels followed, such as defective classes, savage races, biological menace, maritally unworthy, and human waste (a phrase attributable to Margaret Sanger).

What is most astonishing about these views, according to Black, is that they grew directly out of "science" and an explicitly stated desire to improve or enhance humanity. It began

with Herbert Spencer's laws of nature in which it was expected that society could be improved by the inevitable elimination of the "unfit" classes. A combination of Malthusian constraints on population growth, Darwin's theory of evolution, and Mendel's discovery of heredity, provided both the theory and mechanism needed to support Spencer's laws of nature. The person who first put some of the pieces together was England's Francis Galton, who believed that "[w]hat Nature does blindly, slowly and ruthlessly, man may do providently, quickly and kindly" (Galton 1904:82). This was Galton's way of saying that through judicious marriage choices among only the finest families, a more highly gifted race of men could be bred. This method of enhancement became known as positive eugenics. The known problems of inbreeding appeared not to matter to Galton and his followers.

Black goes on to describe how some scientists and wealthy industrialists took one giant leap beyond Galton's positive eugenics, suggesting that the enhancement of humanity could be hastened by taking a more active role in eliminating the genetically unfit and racially undesirable. Such groups of undesirable people were defined largely by class in England, but in the United States, they were also defined by racial and ethnic characteristics. Here is where Black makes his major point in the book. It is in the United States that the "unfit" were first deemed to be subhuman, much like an infection that needed to be quarantined and then eliminated.

According to Black, it was in the United States that the science of criminology provided formal labels of the criminal type. The president of the Anthropological Society of Washington, Robert Fletcher, argued in 1891 that the evil classes should be quarantined like the plague (Morse 1892); George Bernard Shaw declared that a eugenic religion was required to save civilization (Shaw 1904); Madison Grant from the American Museum of Natural History stated that the mixing of races was racial suicide (Grant 1916); Theodore Roosevelt stated that "society has no business to permit degenerates to reproduce their kind" (Roosevelt 1913); H G Wells noted that "we cannot make the social life and the world peace we are determined to make, with the ill-bred, ill-trained swarms of inferior citizens that you inflict upon us" (Wells 1922:xvi); and perhaps most insidious of all because it involved legislation that had a subsequent rippling effect on many aspects of science and medicine, Supreme Court Justice Oliver Wendell Holmes declared in a majority opinion that it is "better for all the world, if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind" (*Buck v. Bell* 1927).

It was from this scientific, legal, and socially acceptable view of eugenics that the "science" behind improving humanity took root. Fueling the American eugenics movement was a large infusion of cash from The Carnegie Institution, The Rockefeller Foundation, and the E H Harriman fortune, strong support from the American Breeders Association, and the eventual creation of a Eugenics Record Office (ERO) at Cold Spring Harbor Laboratory. Eugenics and "race science" were taught at major universities throughout the country, according to Black more than 60,000 Americans were actually sterilized, and efforts were underway through the ERO to severely restrict migration based on racial and religious attributes. The idea of quarantining the undesirable classes and races in order to reduce their fertility and, ultimately, for their extermination, sprang forth from this complex mix of money, "science," and legal developments. Black's startling point here is that although the idea for improving humanity through eugenics may have originated in England, the practical plans for doing so—a global solution if you will—were hatched in the United States and ultimately imported and put into practical application by Adolf Hitler in Nazi Germany.

The remainder of Black's book is devoted largely to the gruesome and sad details behind the rise of eugenics and its implementation in Germany. I suspect much of this story is known by anyone who has read the dozens of similar accounts already published, but Black will definitely keep readers riveted to their chair. The chapter on "scientific"

experiments conducted by Josef Mengele at concentration camps was particularly frightening, especially since Mengele viewed himself as a premier scientist. What caught my attention at the end of Black's book is the chapter entitled Newgenics. Although Black carefully avoids referring to geneticists today as panderers of race science like that of 20th century scientists, he does make it clear that similar phrases about improving or enhancing humanity are surfacing once again among many scientists today—many of whom are suggesting that humanity is on the verge of taking control of our own biological destiny as never before. That is about to sound hauntingly familiar.

In *Redesigning Humans,* readers are taken on a journey into what Gregory Stock describes as our "inevitable" future—a time when humanity seizes control of our biological and evolutionary destiny. The mantra of the book becomes glaringly self evident because of the frequency with which it occurs, and it is intended to be as much of a club as Black's message, as if hitting readers over the head repeatedly will make them believe it to be true. According to Stock, humanity is about to embark on an extraordinary adventure that we cannot avoid, because whether we like it or not, advances in the biomedical sciences will force current and future generations to biologically enhance and redesign themselves. We are told that this will occur through embryo selection, germ line engineering, cloning, and transgenic technologies. Stock believes this is our destiny because the technologies will be developed whether we want them or not, so we need to embrace our inevitable genetic future and let the visionaries essentially spawn a new and better species. Stock's case is both powerful and convincing.

The chapters in Stock's book are nicely arranged to give readers a sampling of the various technologies being developed and the technical and ethical difficulties each will face. His enthusiasm is often appropriately tempered, although it is crystal clear that he not only believes these technologies to be inevitable, but he also sees them as desirable mechanisms for transforming humanity into the far more advanced species he believes we are destined to become.

Stock relies heavily on the equivalent of what I see as a religious dogma among futurists, and that is if we make a mistake along the way in furthering science, the speed of technology's advance will forever stay ahead of the problems caused by our mistakes. Ironically, this line of reasoning does not even hold true with the one force of mortality that has claimed more human lives throughout history than all others combined—infectious diseases. Although humanity is certainly better off today by comparison to previous generations that faced heavy losses from infectious diseases, the microbes are making a comeback, and they are doing so with a vengeance.

Stock appropriately includes caveats in his discussion of every technology, recognizing that lethal errors are inevitable. Indeed, as Stock accurately acknowledges, negative tradeoffs are a known and accepted risk when it comes to such technological advances as surgical procedures, the use of pharmaceuticals, and vaccinations for communicable diseases. Risking the lives of the few to enhance the health and well-being of the many is the principle upon which much of medicine and biomedical technology is built—why should germ line modification, embryo selection, and other enhancement technologies be any different?

The image I kept forming as I read Stock's book was utopia. It is not that he was always presenting a Pollyannaish view of technology. To the contrary, the book is filled with appropriately placed caution, and the second chapter is devoted to a much needed quelling of the technoexuberance. What caught my attention was the persistent imagery of humanity taking the reigns of our own biological destiny as if we know the direction we were headed, and that the enhancement technologies upon which we eventually settle will transcend humanity as we know it. Stock believes that enhancement technologies are about to make our species become more than human, moving humanity out of its gawky childhood as a species, as if science will fast-forward human evolution on its destined path toward greater complexity and new intellectual and physical heights. Such imagery of the birth of a new species is a com-

mon theme throughout the book, and Stock is not just reporting on the process—he is also championing both the technologies and the idea of self-directed rapid biological evolution. Not so fast if you please.

What Stock completely ignores in his book is exactly what Edwin Black reminds us of so poignantly—the uniquely human idiosyncrasies of prejudice, racism, ambition, avarice, greed, bigotry, class warfare, xenophobia, anti-Semitism, and even good intentions still exist in full force today, and will no doubt continue to cloud our judgment. Scientists and the enhancement consuming public are not immune from these idiosyncrasies, and therein lies the problem. Although enhancement technologies are presented by Stock as methods of fast-forwarding human evolution (as if it is known in advance that this is a good thing), improving public health, eliminating germ line diseases, and equalizing the injustices wrought by assortative mating, the exact same ideals were held up by scientists in the early 20th century as the rationale supporting both positive and negative eugenics. I do not believe it is possible for enhancement technologies and the scientists who develop and use them to operate independent of such human intolerance.

The irony is that the birth of eugenics in the late 19th century also began with pure motives, often held by well-meaning scientists who championed the technologies that would protect and enhance everything that humanity deemed desirable. The problem is that someone has to make a decision on what is and is not desirable when it comes to human enhancement; what society does and does not value; and perhaps most importantly, who among us has undesirable traits. It is not enough to say that the market for enhancement technology will play itself out in an open and even playing field with individuals making choices for themselves and their offspring. The market for enhancement technologies will surely be unequally distributed, and the very people Stock says will benefit the most are the least likely to be able to access it. Furthermore, individuals making choices for themselves is one thing—decisions made about future generations occur without their knowledge or consent; they are permanent unless they in turn choose to reverse them; such technologies will fundamentally change the human gene pool if they become as widespread as Stock anticipates; and it will achieve in an instant what positive and negative eugenics combined could never even hope to have achieved with selective breeding and the extermination of the "unfit" and "undesirable." Finally, we must eventually face what I view as the likelihood that enhancement technologies will eventually be used as a tool for discrimination against both individuals and entire subgroups of the population who possess traits that others deem undesirable.

The most disturbing link between *War Against the Weak* and *Redesigning Humans* comes in the language associated with the term enhancement, and the labels given to subgroups of the population with undesirable traits. The defectives, feebleminded, delinquents, unfit, and moral degenerates of the early eugenics movement are now, in Stock's world of enhancement technology, people "without the special talents and attributes that our society values—those who are clumsy, inarticulate, unattractive, slow-witted; those who would find it wonderful just to be average" (p 187). To be fair to Stock, this unfortunate use of terms was intended to portray a set of characteristics that some people might like to change about themselves; he did not present them as a first cut at defining undesirable traits that we should eliminate. The problem is not with Stock, but those who would use and extend this line of reasoning. To further complicate things, he also reminds us that people today are already choosing available enhancement technologies (such as plastic surgery) to improve their "subnormal attributes." So why not accelerate the process with enhancement technologies? This language used by Stock is hauntingly familiar, and I probably would not have paid much attention to it had I not read Black's book first.

Please do not get me wrong here—I am not calling Stock a racist or bigot or anti-Semite, nor do I believe he has anything but the purest motives in opening up the notion of enhancement technology for discussion. To the contrary, Stock refers repeatedly to the

eugenics movement of the early 20th century as an event from which we must learn and distance ourselves. We should not shoot the messenger—Stock has appropriately outlined for readers the technologies now being developed to modify our underlying biology, and he appropriately raises a red flag of caution repeatedly. Although Stock is clearly an advocate for these technologies, it is others who will almost certainly try to use this science to begin the process of cleansing the human genome. That should sound familiar.

What I fear most is not the technology, which I agree with Stock will be developed regardless of whether we want it or not. It is the application of enhancement technology where my concerns rest. The good intentions of treating more effectively lethal and disabling diseases and improving public health is a laudable goal, but such intentions already have a history of advancing to the point where proactive measures are taken to prevent their expression in people currently alive. The next step is to prevent them in future generations through reproductive selection, which is then followed by enhancements to existing generations (gene therapies), and then permanent enhancements to future generations (germ line engineering). In the process, enhancement technologies must eventually be translated into identifying individuals currently alive who possess undesirable traits. The choice to enhance oneself or your own children may at first be made by those who willingly choose to do so, but how long will it be before the choices are made for us. It is at this juncture that such technologies can generate the exact same divisions in humanity that was spawned by the eugenics movement of the 20th century.

It is not enough to just learn from the past as Stock suggests. If that were the case, why are infectious diseases making a comeback throughout the world? Why do poverty and inequality persist? Why do so many people go hungry when there is enough food to feed everyone? Why have we continued to pollute the planet to the point where global climate change is a certainty? Although humanity has somehow advanced itself in spite of our mistakes, I remain unconvinced that we know even remotely enough about genetics to wield the power that Stock believes will soon be in our hands, and I am troubled with the prospect that our human idiosyncrasies will once again get in the way of our good intentions.

By now it should be evident why I chose to review these books together. They are both compelling accounts that are extremely well written; they involve science and technology and the promise of a future with less disease; and they remind us that the very human intellect that gave us Darwin and Mozart, also gave us social Darwinism and Josef Mengele. To get the full impact of the importance of these books, I recommend reading *War Against the Weak* first, then *Redesigning Humans*. Each book independently tells a fascinating story and is certainly worth the read, but when scrutinized back-to-back, I think readers will be shocked and perhaps even frightened (as I was) at the similarity in the message.

Having read Stock's book and after speaking with him personally, I share his enthusiasm for the potential that enhancement technology brings, and I agree with his mantra—such technology is going to be developed and used. I remain unconvinced, however, that humanity knows enough to direct its own evolution, especially when we cannot even control the amount of food we put into our bodies, pollution into the air, or destructive and uniquely human idiosyncrasies. I see in Black's book a reminder that the very human characteristics that contributed to the eugenics movements of the 20th century are not only still with us, but will most certainly have the potential to resurface in a scientific climate that can achieve the same goals, and much more, in a fraction of the time. Think for a moment how Hitler and the early eugenicists would have made use of the enhancement technologies being developed today.

For now, the important thing to remember is that racial bigotry, ethnic hatred, and class warfare still exist, and the engines of science have conjured up a new cauldron within which the seeds of a new kind of eugenics have already been planted—technologies that have all of the same trappings of the promise of an improved humanity that was present in the late 19th and early 20th century. Improved public health may very well be

the admirable goal of enhancement science, but as Edwin Black reminds us, well-known and internationally respected scientists of 100 years ago had the exact same ideals.

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