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FOOLING MOTHER NATURE

An Ethical Analysis of and Recommendations for Oversight of Human-Performance Enhancements in the Armed Forces

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HOW WOULD the armed forces use a drug that allowed a soldier to remain awake and alert for 72 consecutive hours? What if there were an implantable device that improved the eyesight and short-term memory of pilots? Would techniques allowing fatigued or wounded military personnel to produce naturally occurring substances, such as endorphins, be useful to the armed forces? What if biotechnology could help the armed forces of the next century develop ways to disperse forces without feelings of loneliness and isolation affecting these soldiers—a situation that could virtually create an empty battlefield? Like the advances in physics that yielded the ability to split the atom, advances in biotechnology may soon yield these or many other capabilities. One possible characteristic of the revolution in military affairs could well be a revolution in human performance by the judicious use of new technologies. But "can" and "should" are often poles apart. One can fool Mother Nature, but should one?

So far, the answer seems to be "no." The reaction throughout the literature on the enhancement of human-performance has been consistently negative.[1] This was also the reaction of members of the Biotechnology Workshop 2020, held May 1996 at the US Army War College, during discussions of the possibility of using human-performance enhancements in military settings.[2] The generalized resistance among the workshop participants centered, as elsewhere, on ethical considerations of risk of harm and concerns regarding justice.[3] Then, as now, the authors, who were participants, disagree with the majority's perspective. We maintain that, since human-performance enhancements are already a part of our daily lives, futuristic ones such as enhanced neural network functions or biosensors are different only in degree and not in kind. Thus, rather than stick our heads in the sand and pretend that human-performance enhancement is forbidden, we need to be intellectually honest with ourselves and acknowledge that some use is already well established and that the prospect for the development and utilization of more sophisticated techniques is well on its way.

The existence of such use is not the same as advocating that this use ought to be perpetuated or expanded. Nor are we calling for such. Instead, we take the pragmatic view that as technological capabilities in this arena advance—both in our own country and in other nations—a continued, heedless resistance will prevent the establishment of an oversight system that we will need to sort through what may be appropriate, and then decide which specific advances to utilize as they come on-line. A blanket opposition to using human-performance enhancements is both theoretically and ethically insupportable as well as practically indefensible. Further, there are conditions under which the application of human-performance enhancements is ethically permissible. The utilization of such technologies must be considered systematically within the context of an organized review structure.

This article analyzes several philosophical arguments against the use of human-performance enhancements and then applies analogies to the military setting. We conclude by advocating the establishment of procedures in the armed forces for ethical oversight of the development and utilization of these technologies. The implementation of this recommendation is imperative because the commercial inducements for performance enhancers, as well as the increasing scientific sophistication of other nations, make their emergence inescapable. Since the capabilities will become available, the systems necessary to analyze their implications and plan their appropriate implementation must be created before their use is upon us. We need to relearn the lesson of Hiroshima—don't develop deadly, world-altering technologies in a moral and ethical vacuum.

Everyday Use of Human-Performance Enhancements

Pacemakers, portable oxygen tanks, and artificial limbs are all examples of performance-enhancing technologies. We do not spurn such technologies because they bring people who would otherwise function at a deficit up to normal levels. We are not considering those agents or devices used to correct human physiologic or psychological deficits. Here, the focus is on those human-performance enhancements designed to improve the performance of healthy, normal adult humans. The only kinds of performance-enhancing technologies this article addresses are those designed to augment normal or peak performance. And, although we are directing the readers' attention to the expected advent of what now may be viewed as exotic human-performance enhancers, we must remember that the use of performance enhancements to extend normal, healthy function is already part and parcel of our daily lives.

For example, caffeine is a human-performance enhancer. To illustrate, in 1991 Michael H. Shapiro opened a talk on the ethics of human-performance enhancement by telling the following story: "I saw a colleague walking toward me in the hallway. He carried two paper cups filled with brown liquid. 'Two cups of coffee?' I said. 'Gotta be sharp,' he replied."[4] Drinking caffeine to keep alert and awake is nearly ubiquitous and, therefore, is easily overlooked in deliberations about more high-tech human-performance enhancements. Nevertheless, caffeine's performance-enhancing properties are sufficiently well recognized to have come under scientific scrutiny. There has already been discussion about adding caffeine to the list of substances banned in sports—a clear recognition of its stimulant properties.[5]

Another example is contact lenses worn to intensify or alter eye color. Such lenses, perhaps as well as any commonly used performance-enhancing item, exemplify the confused and confusing concerns elicited in discussions of more esoteric enhancements. But contact lenses are unnatural and artificial. They can alter our God-given identities. They may damage our eyes. They may give some people an appearance advantage over others. This may lead to advantages in opportunity and resources. Merit evaluations may be differentially affected by such advantages. These same arguments are used to prove the moral unacceptability of other kinds of human-performance enhancements. Why do we cling to these kinds of arguments for some human-performance enhancements but barely acknowledge their applicability to others? It would seem that we are making intuitive distinctions. Although it is quite possible that these intuitive distinctions do indeed represent morally relevant differences, such differences will not be sorted out if the structures necessary for thorough debate go uncreated. What are the arguments for and against the use of performance enhancers?

For and Against

The ethics literature on human-performance enhancements is concentrated in the fields of sports and genetics. In both, ethical arguments for and against their use fall into four separable, but sometimes overlapping, categories: (1) harm and coercion, (2) moral boundaries, (3) coherence, and (4) normative systems.

One possible characteristic of the revolution in military affairs could well be a revolution in human-performance by the judicious use of new technologies.

The harm and coercion arguments are straightforward. Grounded in consequentialist theories, they posit that human-performance enhancements create the potential for unacceptable risks of harm. Tolerance of their use is coercive because it may force others to undertake risks they otherwise would not, merely to assure their competitive capabilities. In the military context,

this line of thinking is analogous to the worry that individual soldiers might agree to use human-performance enhancements because of an anxiety that, if they did not, they would receive less favorable performance evaluations.

The moral-boundary argument focuses on establishing frameworks or setting limits for appropriate conduct. Considerations focus on the boundaries of internal versus external change and natural versus unnatural properties. Thus, this argument suggests that caffeine may be allowable but that amphetamines are not. Amphetamines or opiates may be allowable under some conditions, but hallucinogens are never allowed under any circumstance.

Coherence arguments address issues of whether or not an action is consistent with our idea or understanding of the essence of an endeavor or phenomenon. Thus, can a performance-enhanced soldier be a good soldier? Can we enhance the performance of combatants and still adhere to war rules that are just? Does genetic alteration of human traits or characteristics alter our understanding of what it means to be human? Is a soldier still a soldier if his/her heart rate is mechanically altered to increase brain oxygenation in order to sharpen thinking?

Normative-systemic arguments point to the moral rules which exist in a society and ask if the action or phenomenon under consideration strengthens or weakens faithfulness to these moral beliefs. For example, a norm or rule our society upholds is that it is important to protect the safety of our nation's citizens. Here, a relevant question might be whether or not the use of human-performance enhancements in a military setting can be expected to maximize aggregated good outcomes for citizen safety. Or, for example, if soldiers can go without sleep with no loss of function or if pilots can see better than they have ever seen before, will the course and outcome of fighting be better for our side—or worse? What of the notion of military honor? Can honor, so integral to our understanding of what it means to be part of the armed forces, be just as honorable if it is fortified pharmacologically? If sense of commitment, honor, and loyalty could be fortified through biology, is its quality or importance lessened or devalued in some way?

Considerations of justice suggest that we ask if performance enhancements undercut our notions of fairness and equity. For example, how might the use of performance enhancements reduce gender inequities? If the practice of excluding women from certain military activities is truly based on concerns about disparities between men and women in terms of characteristics such as strength, size, and aggressiveness, then human-performance enhancers could bring greater gender equity to military practices. More broadly, concerns about justice require thoughtful and thorough discussion about how implementation of human-performance enhancements might impact procedures for, say, promotion and advancement. But what of the arguments against the use of human-performance enhancements in military settings? Can they ever be ethically permissible?

Harm and Coercion

The most common arguments against the use of human-performance enhancements are that they pose too great a risk of harm and that they create an environment which coerces others into taking on similarly excessive risks. The literature of the philosophy of sport, Wellington's "playing fields of Eaton," has thoughtfully explored this concern.[6] Yet, after almost 20 years of abundant debate, there seems to be no consensus. Why?

In sports, the primary focus has been on anabolic steroids, taken to increase strength and, to a lesser degree, aggression. The opposition to their use has been based on concerns about harm to the individual and to others. Because it is likely that athletes are taking steroids at doses far beyond medically acceptable levels, presumptions about potentially high risks of physical harm seem prudent.[7] Prohibition of abuse is necessary.

It does not follow, however, that the use of performance-enhancing drugs administered under controlled conditions poses any greater risk of harm than do other methods of high-intensity training. Nor is it clear why pharmacologically manufactured substances such as steroids might pose potential harms that are qualitatively or morally different from those produced by other substances, such as excessive consumption of vitamins and minerals or special diets.

Medical practice on a basketball court, however, is not the same thing as battlefield medicine.

Many instances of human-performance enhancement are considered safe and effective in other contexts—for example, blood doping versus apheresis. Blood doping is used to provide extra energy by removing, storing, and then reinfusing one's own red blood cells. A similar procedure, apheresis, is performed routinely and safely in hospitals and medical research centers to obtain plasma for banking and transfusion. This brings into doubt the premise that blood doping ought to be prohibited on the grounds that it presents undue risk of physical harm.

The use of analgesics presents another kind of concern about harm and another example of confused thinking. The question of analgesics often comes up in sports literature in discussions of the conceptual distinction between restorative and additive enhancements.[8] Although the following story demonstrates the difficulties in drawing restorative versus additive distinctions, it also clearly illustrates what may be a crucial distinction in considering how the risk of harm in military settings may be morally different from the risk of harm in sports: "Bill Walton, formerly a star for the Portland Trailblazers, sued the team on the ground that its doctor concealed the hazards of playing on a fractured foot. The doctor, evidently complying with management's preference, prescribed analgesics. Walton's foot was further damaged."[9] To subject a player to the risk of increased physical harm simply because doing so allows the fans greater viewing pleasure may be morally questionable, if not ethically impermissible.

Medical practice on a basketball court, however, is not the same thing as battlefield medicine. Dosing Bill Walton to allow him to go back and play another quarter or two is very different in purpose from patching up soldiers so they can return to their battlefield positions. In the military setting, the equation may be calculated quite differently, arriving at a different risk/benefit ratio. What is an acceptable risk for the military may thus be at a much higher level than what would be considered morally acceptable in a civilian setting. In his article "The Military Ethic in an Age of Nihilism," Dr. James Toner asked, "What values or morals govern or are distinctive of a professional military group?" After citing several that he felt the military professional has in common with other public servants—such as a sense of honor and duty, willingness to be self-sacrificing, and showing loyalty to superiors and subordinates—he offered one set of values specific only to the military: "I venture to say, with Gen Sir John Hackett, that what finally segregates you from so many others with whom, in many other ways, you might share high values is precisely this: you guard our country and our way of life, you are also prepared, either directly or indirectly, to kill in our defense. Yours is a contract conceivably involving death—either yours or our country's enemies."[10] This is a distinction that raises the stakes for the kinds of risks one might be willing to take—indeed, must be willing to take and to order in a combat setting.

Being willing and being coerced, however, are two different things. In sports, the concern about coercion follows the line of thinking that athletes do not function in isolation. Competition, by its very nature, is a social endeavor. If one athlete uses perform-

ance enhancements, others will be coerced into doing so, simply to retain their competitive edge. Track coach Fred Dwyer summed up the problem this way: "The result is that athletes—none of whom understandingly, are willing to settle for second place—feel that 'if my opponent is going to get for himself that little extra, then I'm a fool not to.'"[11] But here, perhaps more than anywhere else, the analogy to sports falls short. Unlike athletic competition, military activities do not pit one soldier against the other, but nation against nation. Thus, in the military context, competition is qualitatively different than in sports because the stakes are not only "higher" but they are inherently and absolutely incomparable. In sports, competitors want to win for personal fame, wealth, and personal satisfaction. In military competition, winning is necessary to reduce or avoid loss of life, assure the freedom of citizen populations, and protect national interests.

Can honor, so integral to our understanding of what it means to be part of the armed forces, be just as honorable if it is fortified pharmacologically?

The military's purpose of protecting the nation's interests—human, economic, political, and territorial—results in the requirement that it endeavor to keep the nation superior to those nations that pose a threat. Military preparedness has always utilized appropriate modern technologies to do so. It is this need, rather than something inherently coercive about the technologies themselves, that creates the pressure to push their development and utilization—whether it be human-performance enhancements or missile- detection systems.

Nevertheless, since war and military preparedness are inherently competitive, the issue of voluntariness presents thorny ethical concerns. The coercion may not emanate from a choice to compete, but from superior officers. While there are coaches who turn a blind eye to drug use and there are physicians who knowingly give athletes easily abused prescriptions, this is not the moral equivalent of being in a closed system where a person might be ordered to use performance enhancements. Although it is true that the freedoms of the competent, consenting civilian often do not apply in the military, some choice remains. For example, participation in the Army Rangers, Marine Force Recon, Navy SEALs, and other special-forces units is voluntary. Indeed, in an "all volunteer force" it can be argued that the freedom either to volunteer or not is also the choice between fewer or greater individual freedoms. Volunteers choose to relinquish many more freedoms than do nonvolunteers. Although this may not seem to be coercive on its face, the expanding potential of a wide array of biotechnology-driven human-performance enhancers presents marked complexities for our understanding of just what is coercion, and demands open as well as systematic discussion of when voluntariness needs to be protected and assured.

Moral Boundaries

Moral-boundary arguments seek to create frameworks or set limits for ethically justifiable behavior. Two such boundaries that regularly surface in discussions of the moral aspects of human-performance enhancements are internal versus external methods for increasing performance and natural versus unnatural properties. These boundaries, however, are often difficult to draw with precision and even more difficult to maintain in practice.

For example, it is fairly easy to categorize steroid use to increase aggressiveness in athletic training as an external enhancement. But what of psychological interventions such as psychotherapy or imaging techniques? In substantive ways, the pharmacological intervention is no different than the

psychological one, but the drug use is commonly thought of as external in a way that use of psychological techniques is not.

Two military studies conducted more than a decade ago specifically demonstrate this conceptual confusion. Both examined the effects of incentives on performance under conditions of sleep deprivation.[12] One, conducted by J. A. Horne and A. N. Pettitt, explored the theory that the provision of a monetary incentive could improve performance.[13] The other, conducted by Diana R. Haslam, also tested for improved performance but used the knowledge that the sleep-deprived subject would soon be allowed to nap as the incentive.[14] In the first, the experimental human-performance enhancer was the incentive to obtain money, an easily identified external instrumental incentive. In the second, the enhancer was the incentive provided by the knowledge of future relief. Both interventions were externally obtained—one was instrumental, the other psychological. Although the monetary incentive is more clearly external than the information that a nap is forthcoming, both had effects only because of the way in which the incentive was processed cognitively (i.e., internally) by the subjects.

The most common arguments against the use of human-performance enhancements are that they pose too great a risk of harm and that they create an environment which coerces others into taking on similarly excessive risks.

It is necessary here to acknowledge the morally relevant distinction between human-performance enhancements, such as the administration of substances or the implantation of devices, and those performance-enhancing interventions, such as incentives, that act on cognitive processes without other additives. But as we think about future possibilities, such as those contemplated during discussions at the Biotechnology Workshop 2020, the lines separating enhancements from incentives become less morally relevant.[15] The intent of the incentive studies just cited was to manipulate cognitive pro-cesses. That they did so without resorting to invasive experimental procedures may be more a function of the state of the art than any consideration of the ethics associated with research on human subjects. For example, the goals of expanding our understanding of neural networks is the same—that is, we are seeking ways to improve performance, mediated by cognitive function. This natural/unnatural distinction is equally difficult to draw and sustain. This discussion has been most vigorous in the field of genetics.[16] Inherent in the question "What does it mean to be human?" are our deepest yearnings to understand our humanity. Overlapping considerations about coherence and the setting of moral boundaries on what is natural and unnatural human behavior pose unanswerable questions. On first blush, we think we can make these distinctions. But a closer examination only serves to illuminate the complexities.

We prize what we view as natural—vigor, courage, native intelligence, and so forth. We loathe what we see as unnatural—steroids to increase strength, brainwashing to produce automatic behaviors, or Hollywood's image of robotic police officers. But we see through a glass darkly, and our discrimination between what is natural and unnatural is subject to change. "What other tribe on the planet," one of the Biotechnology Workshop attendees asked in debate, "surgically implants sand in the human chest in the belief that sand makes one more attractive to others in the tribe?"[17] For example, consider how we have changed our views on the "naturalness" of alcoholism. Today's thinking emphasizes a genetic (i.e., natural) basis for alcoholism as the most reasonable explanation. Thus, instead of viewing alcoholism as simply a matter of weak will and as an unnatural and perverse psychological problem, we now give credence to a more nu-

anced understanding of the genetic components of the disorder. Another example is today's treatment response to neurologically disturbed children. Instead of beating them for misbehavior, they are often successfully treated pharmacologically. Although a repetition of the Salem witch trials is unthinkable, it is worth keeping in mind how easy it is to make mistakes as we muddle through the difficult problem of figuring out what humanity is all about. In short, as we learn more about who we are and how our bodies and minds work, we are constantly recreating and redrawing our boundaries between natural and unnatural and perfecting our understanding of what it means to be human.

Coherence

Coherence arguments analyze whether or not some action or behavior is consistent with our idea or understanding of the essence of an endeavor or phenomenon. The previous discussion focused on whether or not we can think of actions conducted by persons utilizing performance enhancements as actions performed by persons as we know them, instead of viewing them as movielike robotic hybrids. In sport, much writing articulates what is integral to our appreciation of what it means to play games and to be engaged in athletic competition.[18] Thus, a coherence analysis asks if drug-enhanced athletic performance is consistent with our notions of what it means to engage in sports. According to some observers, sports can be defined as a mutual search for excellence through competition that is designed to bring out the best in each competitor.[19] Given this definition, the argument follows that "drugs circumvent this ideal by showing only whose body responded best to performance enhancers."[20] But what if professional sports are more about entertainment than sport? In today's world of multimillion-dollar player contracts and basketball stars with orange hair, it is difficult to say with certainty that the essence of sport is only competition.

Therefore, coherence analysis would ask, in the military context, whether the utilization of human-performance enhancements is consistent with the essence of military service? If, for example, honor, loyalty, and willingness to give one's life for one's country are essential aspects of military service, how might biotechnologically derived means used to intensify these urges be morally different than the conventional training methods now employed by the military to accomplish the same end? If there are morally relevant distinctions to be made among various means for achieving the same ends, as there usually are, we must ask how new methods will be evaluated and compared to others that are presently considered ethically acceptable.

Normative Systems Arguments

Normative-systemic arguments focus on the moral rules that exist in a society and analyze whether or not a particular action or phenomenon strengthens or weakens adherence to these moral norms. In the case of human-performance enhancements in a military setting, the question is, Can their use be expected to strengthen or weaken adherence to military ideals? Is it the "three o'clock in the morning" kind of self-induced courage that fortifies a sentry, or is it the sentry's blood and brain responding to a drug taken at the beginning of the watch? Does the sentry serve the system by having drugless courage or by being an alert sentry?

What of human-performance enhancements and military justice? The norms of justice and fairness are central to military service. Amidst the cries of gender inequities which plague today's armed services, the prudent use of human-performance enhancements might well serve the ends of justice, if extrapolations from sports are at all applicable.[21] Rules of fair play and equity define modern warfare and, at least ostensibly, modern military service. If performance-enhancing interventions could be appropriately applied to actually reduce the inequities between men and women in our

armed forces, should not such a prospect be thoroughly and openly discussed and considered? Nor should the implementation of human-performance enhancements necessarily jeopardize equity in existing systems of evaluation and promotion for both genders. Rather, as with the advent of any new technology, adjustments to the existing ways of doing business are often required, and—although such adjustments may require marked effort—appropriate changes can be expected to strengthen an existing system.

Summary

On the basis of ethical considerations, blanket prohibition of human-performance enhancements in military settings cannot be sustained. While sound moral arguments can be advanced against the use of some kinds of human-performance enhancements in military settings, such arguments cannot be sustained across the full spectrum of conceivable performance-enhancing technologies. At the same time, convincing ethical arguments can be raised in support of their use under certain conditions. What is needed, however, is a nuanced approach to their consideration through a well-organized and coordinated system for review and oversight. Jonathan Glover's perceptive but more generalized concerns raised over 20 years ago in *What Sort of People Should There Be?* still applies to our society at large and specifically to the military setting:

> Many people, when thinking of such possibilities as genetic engineering or techniques for controlling behavior, have a reaction of rather inarticulate horror or revulsion. It is much easier to feel disturbed and repelled by these enterprises than it is to give a coherent account of precisely what the objections are. If we stay inarticulate, events will perhaps take one of two courses. The first is that the techniques will be adopted, in a piecemeal way, a little at a time. The advocates will at each stage be able to offer some specifiable gain . . . and each time this may seem more compelling than rather vaguely formulated objections on principle. By easy stages, we could move to a world which none of us would choose if we could see it as a whole from the start. Another possibility is that our resistance will prove too deeply rooted for all this, and that these techniques will fall under some general and undiscriminating ban. This will be a less disturbing outcome from our point of view, as the world will remain more as it is now. But the result may be that future generations will lose things they would have found of great value. Leaving the objections at the level of inarticulate opposition excludes the possibility of discriminating between desirable and undesirable applications of the new technologies.[22]

The Army's Biotechnology Workshop 2020 calls for renewed attention to Glover's predictions, the occurrence of which should be avoided.[23] With the establishment of an organized system for reviewing and providing oversight of the development and utilization of performance-enhancing technologies in military settings, an important and needed step towards averting either prediction's realization will be taken.

Recommendations for Review and Oversight

The design of a system to review and monitor the development and use of human-performance enhancements in the US armed forces should draw upon a prototype already well established in the medical-research community. A military system which adapts the models of that community's Institutional Review Board (IRB) system,[24] the Recombinant DNA Advisory Committee (RAC),[25] and the presidential bioethics commissions, could well serve the need to create the necessary mechanisms to protect military personnel as well as civilian populations, while also allowing the US military to develop and utilize these new technologies.[26]

Systematic, diversified, public oversight of biomedical investigation is a recent phenomenon. The IRB is a statutory innovation

resulting from the regulatory implementation of the work of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The need for independent, broadly multidisciplinary, and public oversight of human-subjects research has grown out of the history of atrocities in human-subjects research.[27] In brief, the international codification of research ethics, beginning in the Nuremberg Code of 1947, followed by the Declaration of Helsinki in 1964 and the 1993 guidelines of the Council for International Organizations of Medical Science (CIOMS), along with the US regulations,[28] governs human-subject research for most federally funded studies. These are a demonstration of the need for systematic review of the involvement of humans in scientific progress. Experience has taught us that those who create new technologies ought not be solely responsible for the testing and utilization of such technologies. The enthusiasm of the creator must be tempered and moderated by more objective minds.

How might the use of performance enhancements reduce gender inequities?

The IRB, the RAC, and the newest presidential commission—the National Bioethics Advisory Commission (NBAC)—all share the virtues of diversity and public membership in composition.[29] This diversity and public participation is clearly articulated in the regulatory language establishing IRBs—committees composed of a diversified group of persons and charged with the ethical review and ongoing monitoring of human-subjects research. It includes at least five members "with varying backgrounds to promote complete and adequate" consideration of the ethical appropriateness of a research study.[30] The regulations further provide the following:

> 46.107 (a): The IRB shall be sufficiently qualified through the experience and expertise of its members, and the diversity of the members, including considerations of race, gender, and cultural backgrounds and sensitivity to such issues as community attitudes. . . .
> (c) Each IRB shall include at least one member whose primary concerns are in scientific areas and at least one member whose primary concerns are in nonscientific areas.
>
> (d) Each IRB shall include at least one member who is not otherwise affiliated with the institution and who is not part of the immediate family of a person who is affiliated with the institution.[31]

These and other relevant regulations are designed to assure that research studies are reviewed objectively. Thus, the IRB system is a manifestation of the lesson learned at Nuremberg. Someone besides the fox needs to watch the chicken coop. The utilization of human-performance enhancements within the US armed forces presents the same kinds of challenge to protect humans as does biomedical research. Similarly, just as war is too important to be left to the generals, so are the ethical and moral considerations of human-performance enhancers for members of our armed forces just too serious to be left in the hands of military medicine and researchers.

As these technologies come on-line—especially if they are ready for human testing at a time when US military personnel are about to become involved in a conflict—the lure to maximize every possible advantage to the troops will become compelling. At such a time, the efforts of an IRB-like committee will be crucial. Such a committee, composed of military and nonmilitary members—people of diversified rank, occupation, and social perspective—will bring a strengthened objectivity to its deliberations. Further, as in the present IRB system, the local nature of the committee will serve to promote local values and will be well situated to appreciate the conditions spe-

cific to the *local* environment that may affect utilization of the particular performance enhancement under review. (In the medical setting, the term *local* refers to an IRB established at the university or research center where the research is being conducted.) By having such committees review research being performed in their environment, the committee's composition can be expected to reflect local cultural norms. Although this blueprint would require some adjustment to the particularities of the military setting, similarity of intent can be preserved.

But for military purposes, the oversight by local IRB-like committees will not be enough. Even in the medical-research community, strong voices have long questioned the ability of IRBs to provide all the protections necessary, and there is a growing body of evidence that this concern is warranted.[32] Congress, the president, and the public, as well as the military, would be best served if the creation of a web of IRB-like committees is augmented with a more centralized, national review body. Here, the models provided by both the RAC and such presidential bioethics commissions as the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research or the newly created NBAC are models of ways in which broader public input and concentrated ethical analysis can be obtained.[33]

We believe that such an integrated system is necessary to oversee what is surely going to occur. At some point, the science of human-performance enhancements will progress to a stage at which it will be too attractive not to use it. Congress and the secretary of defense need a system before time overtakes our ability to lucidly consider the ethical implications of using these technologies.

The explosive progress in biosciences will allow for dramatic discoveries in biology, chemistry, and medicine in the years ahead. Development of human-performance enhancers is just around the corner, yet the implications of their emergence on the armed forces are not discussed in any war-college curriculum, under either the heading of future technologies or of ethics. The military, always one step behind the truly novel, should put in place a system for analyzing the problems and prospects coming out of the biotechnology fields.

We hope we have stimulated and informed the debate. In the absence of public debate, it seems that human-performance enhancers will arrive and be employed by the armed forces—not necessarily our armed forces—with a thoughtless enthusiasm comparable to that which accompanied the atomic bomb. That would be a tragedy, and we hope to prevent it. If we intend to fool Mother Nature, then we certainly ought to consider the "hows and whys" in advance.

Notes

1. Marty Duda, "Do Anabolic Steroids Pose an Ethical Dilemma for US Physicians?" *The Physician and Sportsmedicine* 14, no. 11 (November 1986): 173–75; Jacques Ellul, *The Technological Society* (New York: Knopf, 1964); John Burdon Sanderson Haldane, *Daedalus; or, Science and the Future* (New York: E.P. Dutton, 1924); and Thomas H. Murray, "The Coercive Power of Drugs in Sports," *The Hastings Center Report* 13 (August 1983): 24–30.

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