At the turn of the twenty-first century, there is hardly a corner of the globe that has not been marked by the hand of man, at first done in search of natural products for survival and then later textured with synthetic materials that now define environments around the world.¹ Recently this tendency to enhance our natural world with technology has taken a new direction in the search for self-similar reproduction, both in plant and animal husbandry.² Yet, it seems to me that genetic engineering is only an intensified version of artificial insemination, sperm banks, fertilization clinics, and generally of planned parenthood. Indeed, even cloning genes is merely a dream-come-true for the alchemist long in search for the perfect body drawn from sperm mixed with all sorts of substances. Also, it seems, as designer reproduction has became more exact, so have the social rules for controlling it, and tomorrow we can be sure that medicinal milk will require FDA approval, just as does a side of beef on the market today.³


³ For a period study on health issues, see Mary Lindemann, Health and Healing in Eighteenth-Century Germany (Baltimore: Johns Hopkins University Press, 1996).
With this pattern of social control over the evils of technology, we move forward with MRI and CAT scans, getting ever better pictures of the "fingerprints of mythology." And as we look inwardly into the center of the body, we also turn life itself into a lab, watching our children in nurseries through two-way mirrors, patrolling crime with video cameras, and taping sex stories about our president on miniature recorders. Indeed, with satellite pictures and space ships we can say the whole world has become a laboratory, and so we can ask in this context: where is the evil, where is the void, and what do historical texts have to tell us about such spiritual sensations?

Galen's medicine, Vasalius' anatomy, and Harvey's circulation system from other centuries, all demonstrated some level of understanding the human body as a machine driven by some vitalistic force. So what happened in the eighteenth century that was so different. I would argue that theology lost its hold on the human body and that, around mid-century, the body fell under the spell of science and only then was it brought into the laboratory, where it was noticed for the first time by authors and artists of the human condition. This scientific turn was not simply the use of live bodies over discarded cadavers, it was gradual state-sanctioned permission to experiment on the human body, perhaps nowhere better illustrated than in Johann G. Krüger's (1715-59) demonstration of the medical use of electricity in 1743 at the University of Halle.

In 1730 Stephen Gray (1666-1736) had electrified the human body in the famous "suspended boy" experiment, two years later sending a discharge from a static generator through

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4 Michio Kaku, *Hyperspace* (New York: Doubleday, 1994), examines the movement among theoretical physicists in search of "higher dimensions," p. 9, where the various laws of nature are unified and the description of the world is simpler and more elegant.

5 Recent attempts to examine the new focus on human biology in the second half of the eighteenth-century include, James L. Larson, *Interpreting Nature. The Science of Living Form from Linnaeus to Kant* (Johns Hopkins University Press, 1994); Thomas H. Broman, *The Transformation of German Academic Medicine, 1750-1829* (Cambridge: CUP, 1996); and Helmut Müller-Sievers, *Self-Generation: Biology, Philosophy, and Literature around...*
a circle of boys holding hands. And so by 1742, it is not surprising that the students of Halle asked concerning electricity, as custom and law permitted them, "cui bono, for whom to what good?" Professor Krüger responded with a seminar on the uses of electricity in medicine the following year, examining the nature of electricity, inventing the practice of "electrotherapy," and recording experiments on the effect of electricity on pulse rates, blood flow, the senses, toothaches and other common ailments. Forty years after Krüger's discovery of "electrotherapy," Friedrich Schiller (1759-1805), one of the first modern authors on the freedom of the body, would record in notes from his medical studies (1781), that as we learn to control electrical matter (elektrische Materie, NA.22:72), we also learn about "one of the greatest blessings to mankind" (eine von den größten Wohltaten vor die Menschheit, 72).

By the turn of the century, Alexander von Humboldt (1769-1859) systematically explored Luigi Galvani's (1737-98) accidental discovery of a twitch in frog leg muscles from an electrical discharge (1780). And at the same time, Johann Ritter (1776-1818) examined Galvani's discovery that certain metals can cause the same effect on the tongue, a taste perfected later in the century by Heinrich R. Hertz (1857-94), whose gourmet version still measures the Hertz frequency unit (Hz) at 1 oscillation per second. The step from the twitch of a frog leg, to the touch of the tongue, on to Georg Büchner's (1813-37) identification of nine nerves in the fish brain is not great. Thus, in the extended eighteenth century, we see the origins of our present understanding of the brain as a mass of nerves electronically linked and chemically stimulated,

1800 (Stanford: Stanford University Press, 1997),


7 Georg Büchner, Memoire sur le Systeme Nerveux du Barbeau, in: Sämtliche Werke und Briefe, 2 vols. (Leipzig: Insel, 1962), vol. 2, pp. 181-250. See also his inaugural address at the University of Zürich in 1836, "Über Schädelnerven," vol. 2, pp. 353-67, particularly the introduction in which he distinguishes the various research approaches to the body before examining the nine nerves that he was able to identify in the skull.
together processing thought and conditioning behavior. Not only is "the fifth element" an external force used to medicate the body, it also supplies the power to study the brain that controls the body. And while it drives the computer that serves as an analogue to the brain, we do not know if it has any role in the "replication of DNA" or in the "regulation of genes."  

When science eclipsed religion, it also began to stage the body in more secular terms. Following the parade of foreigners of color brought back to Europe from global expeditions, Peter Camper (1722-89) published a "Lecture on the origin and the color of blacks, held in Groeningen on the anatomical stage (Schaubühne) on November 14, 1764." Staging experiments for the public was a common practice, none done more dramatically than by one of Germany's first itinerant electricians, Christian F. Ludolff (1707-63), who on January 23, 1744, succeeded in igniting ether with an electrical discharge before the Prussian King, Frederick the Great, and hundreds of spectators, on the occasion of the founding of the Royal Academy of Sciences in Berlin. But staging the human body is a more serious matter than staging electricity, or for that matter, than showing the medicinal value of electricity on the body. It is more complicated, because it strikes close to home, is personal, and is monitored by social and

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8 Jörg Meya and Heinz Otto Sibum, *Das fünfte Element* (Hamburg: Rowohlt, 1987) explain how early electricians viewed electricity as a substance equal to the four elements of antiquity, fire, water, air, and earth, p. 9.


religious institutions and regulated by state agencies.

Staging the human being in the lab is simply more about anthropology than physics, which is why Camper's career is instructive. As Europe's leading comparative anatomist he was at the cutting edge of taking control of the body from the grasp of the church. Particularly his lectures at the "Academy for Drawing in Amsterdam" (Amsterdamer Zeichen Akademie), given in the 1770s and published in German in 1782, are instructive, because here he examines the issue of racial prejudice from a scientific and aesthetic point of view. In his third lecture from 1782 "On the Beauty of Form" (Über die Schönheit der Formen), he argues that it runs against our "habits" (Gewohnheiten, 77) to see beauty in the forms of other races. Beauty is not shaped by rules, rather is "rooted" (eingewurzelt, 77) in the habits of youth which cannot be expunged with age. Secondly, Camper argues, beauty is grounded in "authority" (Autorität, 78), and thirdly, it is in the "customs and tastes of a country" (Sitte und Mode eines Landes, 78). He explains how the Europeans paint their gods white, just as every other culture reproduces its gods in a sense of beauty that is grounded in forms familiar to the self-same people. Beauty, and perfection, is the reproduction of images comfortable to the habits of the senses.

In his "Natural History of the Orang-Utang" from 1791, Camper engages more directly the question of putting the human being in the lab, in this essay reviewing the history of literature on human dissection for medical and scientific purposes. By comparing rib counts in

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12 Peter Camper, Vorlesungen, gehalten in der Amsterdammer Zeichen Akademie. Über den Ausdruck der verschiedenen Leidenschaften durch die Gesichtszüge; Über die Bewundernsürdige Ähnlichkeit im Bau des Menschen, der Vierfüßigen Thiere, der Vögel und Fische; und Über die Schönheit der Formen, Trans. G. Schaz (Berlin: Voss, 1793), including lectures from 1774, 1778, and 1782 and plates with drawings showing how human body parts overlay those of animals, including the rump of man and horse and the structure of a fish compared with man sitting in a rowboat.

Utang to the human body, he concluded that since antiquity the body parts of various animals had been used to determine those of humans, and that the error in the difference gave evidence that human bodies until recently had not been dissected in the lab. Indeed, Camper's entire discussion of Galen's human body shows that it was analogized from comparative animal bodies. This essay is at the same time a lecture on the deconstruction of race, in which peoples around the globe are linked and distinguished from animals. In Camper's own words, he was putting the human body into the "lecture room" (Lehrsaal, 11), onto "his own dissection stage" (seine eigene Zergliederungsbühne, 123) for scientific purposes. And while Camper sought separation and distinction for the human body, Goethe took more pleasure in discovery of the intermaxillary bone "in man as well as animal" (dem Menschen wie den Tieren, LA,I,9:154-66). From another generation, Goethe argued linkage in this last bone of contention that would set mankind free of religion and prepare him for an orgy of experimentation.  

Camper staged the human body to disconnect animal-human analogies, to deconstruct race, and to take a moral lesson from the roots of our sense of beauty. Schiller went farther in an essay from 1784, asking in his title "What impact can a good permanent stage have?" (Was kann eine gute stehende Schaubühne eigentlich wirken?, NA, 20:87-100). The point that Schiller makes is that the stage can bring moral instruction to a nation, because it is freed from religion and the law, and yet mediates both by displaying the human being in all its visceral faults and aesthetic potential. The impact of the stage is powerful because it elevates human beings from the "trials of physical life" (Dauer des physischen Lebens, 88): "the need of the animal-human is

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older and more pressing--while the need of the spirit is more preferable and inexhaustible"
(Bedürfniß des Thiermenschen ist älter und drängender--Bedürfniß des Geistes vorzüglicher und
unerschöpflicher, 88). Written between his dissertation on the physiology of mind and body and
his inaugural lecture on academic freedom at the University of Jena, Schiller saw the stage as a
means to display the visceral side of life for the moral development of a culture. For him the
stage was a means to dissect life as Camper's was a means to dissect the body.

So where is the evil and the void in staging the body? I think Büchner saw that better
than any writer of the period. Goethe's Homunculus is a friendly being artificially reproduced in
a flask and destined to a search for bodily completion. And Mary Shelly's electronically
synthesized body, while strong in empathy, remains too fantastic to be taken seriously. But
Büchner's Woyzeck is real and in this story lays the evil and the void of the body in the lab. In
Goethe's story the human body in the lab becomes the "black box" of molecular biology today, 15
and in that of Shelly it becomes the electronic wizardry of science fiction. 16 In Büchner's story
we see the real dangers of the human being used as a guinea pig for the advancement of science
and medicine. In this military experiment on the effects of a diet of peas on human metabolism,
we see how an individual under study begins to pace, becomes irrational, is made stupid, and
eventually commits murder in a fit of jealousy. There are rules about marketing natural products
produced in the lab, but where there is no market, technology roams freely and marks our life
with the evil side of the Faustian equation, as we have learned with nuclear tests in Nevada, with

15 Michael J. Behe, Darwin's Black Box, The biochemical Challenge to Evolution (New York: Simon & Schuster, 1996) describes the mysteries of "the chemistry of life," pp. 11-13, as a way of exposing the inadequacy of Darwin's mechanics of the survival of the fittest for evolutionary change, yet leaving us with little more than data banks of molecular forms written in visual and mathematical languages.
agent orange in Vietnam, and with noxious bacteria in Iraq. It would seem, as far as the body in the lab goes, one can best find the evil and the void in Büchner's military industrial complex.