

Experiencing *Body Worlds*: Voyeurism, Education, or Enlightenment?

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Abstract Until the advent of plastinated cadavers, few outside the medical professions have had firsthand experience with human corpses. Such opportunities are now available at the *Body Worlds* exhibits of Gunther von Hagens. After an overview of these exhibits, we explore visitor responses as revealed in comment books available upon exiting the exhibit. Cultural, philosophical, and religious issues raised in the comments serve as a microcosm of society at large. The conclusion considers the challenge of such exhibits in introducing the public to science education, notes the image of the body as machine—so prevalent in the West—reflected in visitor comments, and finds hope that the exhibits promote, for many visitors, a sense of community among all humankind.

Keywords Anatomy art · Body Worlds · Evolution and design · Gunther von Hagens · Plastination · Science education · Science exhibitions

Introduction

In modern societies, the experience of seeing a cadaver at close hand for the first time, especially a dissected one, can be extremely overpowering. This is as true for medical students as it is for the general population, as Leonardo da Vinci warned centuries ago: “And if you should have a love for such things you might be prevented by loathing, and if that did not prevent you, you might be deterred by the fear of living in the night hours in the company of those corpses, quartered and flayed and horrible to see.”¹ Yet over the past ten years, the exhibits of Gunther von Hagens’ *Body Worlds* using real human cadavers in various stages of dissection and posed in life-like postures have now been viewed by over twenty million visitors on three continents, presenting anatomy to more individuals worldwide than any other exhibit in the history of medicine. To be introduced to the study

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of the human body by observing dissected cadavers rather than models or textbook illustrations has proven to be a powerful draw to the lay public as well as the health care community. The success of *Body Worlds* has predictably inspired similar exhibits such as “The Amazing Human Body,” “Body Exploration,” and “The Universe Within.”

Such exhibits have been made possible through the invention of plastination, the replacement of body fat and water with polymers, by Gunther von Hagens, a German anatomist, entrepreneur, and founder in 1993 of the Institute for Plastination (IfP). Most visitors would feel uneasy viewing a cadaver on a dissecting or morgue table, but by eliminating the smell, wetness, and other gruesome aspects traditionally associated with human dissection that often inspire revulsion, plastination provides an opportunity for the lay public to experience something that only health professionals and morticians have experienced in the past. The visitor to *Body Worlds* no longer need concern herself with Leonardo da Vinci’s admonition. The animated and familiar poses of the plastinates allow the majority of visitors to overcome fairly quickly any intense sense of unease, disgust, and even fear of seeing a dead body and also to appreciate the living form and function of the human body. The poses are designed in part to show the mechanical capacities of the human body in performing various everyday acts as well as athletic feats, displaying the complex of muscles, nerves, vessels and organs involved in those actions.

While the focus of this paper will be on visitor experiences and responses to *Body Worlds*, a few brief, preliminary remarks regarding the notoriety that the exhibits have achieved are in order, as the controversies have provided some of the background context tempering visitor expectations and thus their reactions. The subject matter of the exhibits inevitably has raised a number of much-discussed ethical questions regarding the respectful disposal of human cadavers, the relationship between science (specifically anatomical science) and art, the possible financial motivations of von Hagens himself, and the sources of the cadavers. Concerning the matter of respectful disposal, the press is decidedly ambivalent. Early reports in Europe often referred to the *Body Worlds* exhibits using such negative characterizations as “shock art” and “Dr. Frankenstein’s exhibition.”² Now, media reports are generally more positive although ambivalence remains. For instance, Penny Herschovitch in a 2003 review in *Science* was generally impressed with the educational aspects of *Body Worlds* but also stated that the exhibit “speaks to an unsatiated, voyeuristic public fascination with body, immortality, and death.”³ And a December 2006 article in *The Dallas Morning News* includes two differing points of view about the Dallas *Body Worlds* exhibit, one from Daniel Foster, M.D., a Professor of Internal Medicine at the University of Texas Southwestern Medical Center, and the other from Thomas Hibbs, Ph.D., a Professor of Ethics and Culture at Baylor University in Waco.⁴ Dr. Foster has a very positive point of view which praises the educational aspects of the exhibit, while Dr. Hibbs feels the education is gained through shock value, presenting “a pornography of the dead human body.”

As for financial motivations, a question often asked is why a non-profit university or museum could not sponsor the plastination program rather than von Hagens’ for-profit private institution. Young college students, among others, noting the “high” price of admission, frequently raise such concerns, while many others claim that it was well worth the price. One survey of the visitors to the Munich *Body Worlds* in 2003 indicates that a quarter of the visitors thought the exhibition was primarily for the financial benefit of the organizers but nearly three quarters did not.⁵ In any case, it is doubtful that any museum or university could support a facility to prepare the vast number of displays that von Hagens has produced. The work involved in preparing the

dissections is exacting, time consuming, and very expensive, as is the transportation and setting up of the exhibits. Von Hagens himself claims that most of the money earned is used to support the further work of the IfP.⁶

Regarding the issue of body procurement, the authors have satisfied themselves that the cadavers on display in the exhibits have been legally obtained. According to the *Body Worlds* website, over seven thousand individuals have filed body donation forms.⁷ The body donation program has been studied carefully. Dr. Hans-Martin Sass, a bioethicist at the Kennedy Institute of Ethics at Georgetown University in Washington D.C. was retained by the California Science Center (CSC) to review the documentation for the IfP body donation program prior to bringing the first *Body Worlds* exhibition to the USA. In early 2004, Dr. Sass traveled to the IfP headquarters in Heidelberg and reviewed all the deceased body donation consent forms and matched them with the death certificates, verifying that each donor had given consent to use her/his body for public display. Dr. Sass has stated that the "IfP donation form is more detailed than most forms for body donation..." and that the "IfP Declaration of Intent to Donate is easy to understand..."⁸ We also had a telephone conversation with Dr. Sass in October 2006 when he again confirmed that he was satisfied with the *Body Worlds* body donation program documentation and that with over six thousand body donation forms on file, he saw no incentive, in fact, a strong disincentive considering the scrutiny Dr. von Hagens and *Body Worlds* is under, for the IfP to engage in the illegal procurement of bodies. In addition, the Science Museum of Minnesota, according to its website, reviewed the ethics report from CSC and also had its attorneys conduct an independent review of the body donor consent forms.⁹

Many lay visitors, like the press, have expressed ambivalence with regard to the displays. A few have even expressed extreme repugnance at what they see as a desecration of life, condemning both the exhibitors and those who volunteer their bodies for plastination. Many similar comments can be found on web sites like "Stop Body Worlds."¹⁰ The vast majority of visitors to the exhibits, however, including lay persons as well as medical professionals, religious conservatives as well as liberal humanists, have given the exhibits high praise. In this article, we are not particularly concerned with the expectations and motivations of visitors, even if their motivations are the result of morbid curiosity in freak shows and gore. Other studies have thoroughly documented that voyeuristic motivations are minimal and that desire to learn more about the body, on the part of both lay persons and professionals, is dominant.¹¹ Lay visitors in particular often desire to know more about their own physical problems or those of a loved one suffering from disease. Rather, we are primarily interested in the post-visit responses to the exhibits, regardless of initial anticipations, as spontaneously revealed in the guest books available for visitor comments immediately upon exiting the exhibits. Such comments frequently provide windows into what the visitors experienced and reflected upon as they walked among the dead. All of the ethical issues discussed above appear in these responses.

Important elements contributing to the visitor experience are the venues of the exhibits themselves, how they are promoted, and how they are organized and structured. Following a brief discussion of these contextual aspects, we shall move directly to the various scientific, philosophical, and religious reflections revealed in the comments in the guest books. We have examined over 2,500 comments from the exhibits in London, Toronto, Singapore, Cleveland, Houston, and Denver. We are not the first to be interested in visitor responses, and note here the excellent studies of Peter Leiberich et al. (2006), and of Tony Walter (2004). Our results generally confirm theirs and provide complementary analyses and insights.

Venues, promotion, and organization of *Body Worlds*

The *Body Worlds* exhibitions were first shown in Japan in 1996 and due to their unanticipated and overwhelming success with the public were brought to Germany the following year and later to other European countries, including Vienna, Switzerland, Belgium and Great Britain, and to Asian venues including Korea, Taiwan, and Singapore. Beginning in 2004, the exhibits have been shown in North American (Canada and the USA) with a significant change in the venues and promotional styles. In Europe, the venues were large exhibition halls unrelated to museums or medical institutions. In the United States and Canada, well-respected science museums have co-sponsored the exhibits with health care organizations such as the Harvard Pilgrim Health Clinic in Boston, with medically related charities such as the American Red Cross and the American Lung Association of Minnesota, and with a medical school, the Baylor College of Medicine in Houston. Many of the North American museums have established advisory/ethical review boards consisting of local community leaders in medical, religious, ethical and educational fields to review the way the exhibits are presented to the community and to address any local concerns.

The advertising methods have also changed greatly in the North American venues. In Europe, sensationalistic promotions have included futuristic aliens, Halloween posters and costume parties. Recently, *Body Worlds* was portrayed in a new movie, *Casino Royale*, bringing additional advertising for the exhibits. In North America, museum promotions have emphasized the educational nature of the exhibits including testimonials from the medical and religious communities. The educational aspects of the *Body Worlds* exhibits in the USA and Canada have been enhanced by ancillary lectures from members of the medical community, docents in the exhibits with hands-on activities, and audio tours that were begun in the European exhibitions.

The layout of the exhibits has been carefully planned to acclimate the audience gradually to the dissections. Following the sequence used successfully in Europe and Asia, ethics review panels in the USA such as the one at the California Science Center agreed that the exhibits should begin with basic skeletons, with which most individuals are familiar and comfortable. Thus, exhibits generally begin with the musculo-skeletal system and then move into other systems, including the nervous, respiratory, cardiovascular, and digestive systems, and also begin to intersperse whole body plastinates into the areas with glass cases of organ systems. Despite this precaution, it is not always effective, especially for those who attempt to draw a stark dichotomy between the scientific and artistic elements of the exhibits. For instance, a visitor at the Chicago exhibition noted that the first room was acceptable for its “scientific/medical/educational aspects....However,...I feel the line was crossed in posing humans in an ‘artistic’ manner. The ‘Family’ with child on the shoulders of the ‘dad’ with a thumbs-up looking position and the hat on the head, I feel were in poor taste. As well as the reclining woman with child—” We shall give further consideration to the issue of art and science later.

The pregnant “reclining woman with child” referred to above is decidedly one of the more controversial figures in the exhibits. In Europe and Asia, exhibits of the reproductive system, pregnancy, and normal and abnormal fetuses had been integrated into the main hall. In the USA, due to concerned comments, the plastinates of the fetuses and pregnant women have been placed in a separate room or sectioned off from the main viewing area by curtains in order to allow visitors the choice of viewing these exhibits. Inevitably, this “isolation” has drawn criticism from some who see this as a denigration of women’s reproductive role. As an example, one female visitor to the Chicago exhibit noted that the reproduction section of the exhibit “was relegated to a sectioned-off dark corner in back of the last room as though it were somehow shameful or freakish.” Equally predictable, others

have felt that more isolation and cautionary signs were needed or even some means of excluding children. We shall return to the matter of gender representation later but here shall simply note that the exhibition as a whole, and particularly the reproductive section, is often greatly appreciated by children and young adolescents. As one young visitor in Denver noted, “I liked the embryo center because my mom is 4 months pregnant!” Other positive comments from (or about) children included:

“I came here very hesitant. Didn’t feel well along the way...until my Dad pointed out just how wonderful God is to be able to create such a wonder” (Denver).

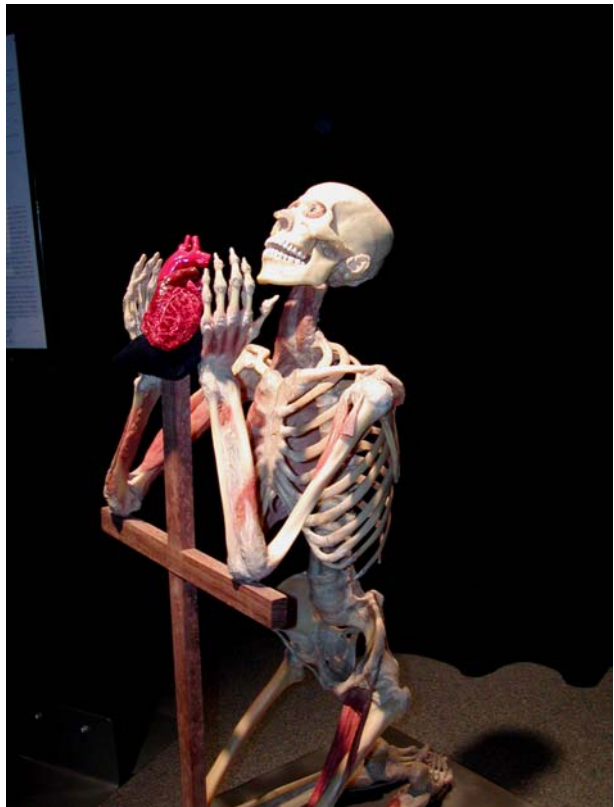
[A mother’s report:] “My 5 year old liked the ballerina best and even the fetus exhibit” (Toronto).

“I really liked the fetus exhibition. It showed how concerned you are” (London, from a 12 year old girl).

“The bodyworks were ‘beautiful!’ It shows everything. It is a work of art! Fantastic and wonderful!” (Singapore, from an 11 year old female).

First impressions are indeed critical, and thus we found one introductory room especially thought-provoking. In Houston, the *Body Worlds 3* visitor encountered, after just a few steps into the exhibit, a skeleton with a few attached muscles, kneeling at a cross and holding a heart (Fig. 1). The explanation behind the praying plastinate gave thanks to the

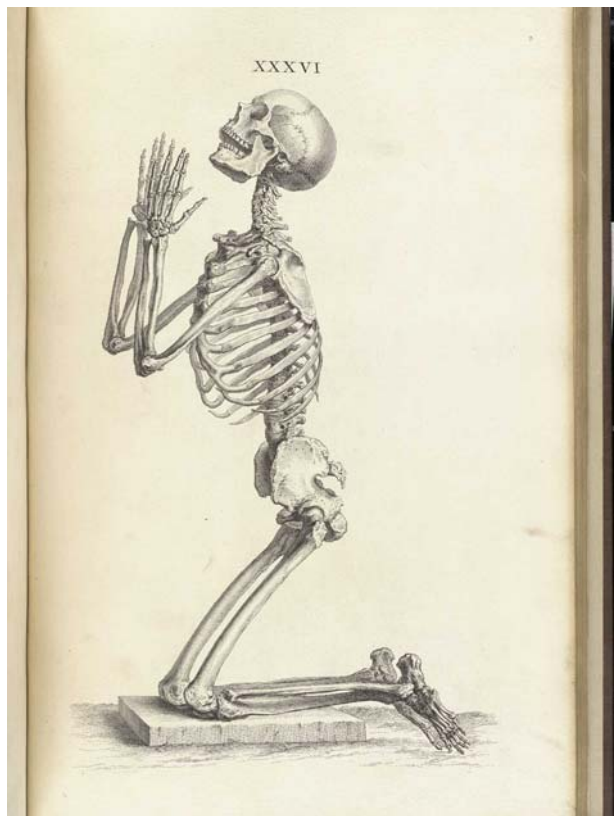
Fig. 1 Entry room exhibit at *Body Worlds 3* in Houston. “The Praying Skeleton.” Photographed with permission from the IfP at *BODY WORLDS 3*, Houston



individuals who donated their bodies and obliquely addressed the almost inevitable religious concerns regarding body donation: the visitor is informed that most of the donating individuals were Christians. The pose itself strongly evokes the idea that life is a sacred gift, whose beauty can be celebrated even in death. Although we assume it is not apparent to the average attendee, the pose of this figure is reminiscent of an anatomical drawing in the important 18th century text *Osteographia, or The anatomy of the bones* by William Cheselden (1688–1752), an English surgeon (Fig. 2).

At the outset and through the exhibit, many of the poses emulate drawings by famous anatomists from the Renaissance through the nineteenth century, bringing an historical context to the presentation. In many cases, the acts of imitation are made explicit to visitors by the large, anatomical drawings, often accompanied by quotations and explanations hung on the walls throughout the displays. Both the historical poses—even when not always recognized as such, for example, “The Reclining Pregnant Woman” who recalls various “anatomical Venuses”—and the newly created posturings like “The Skateboarder,” “The Caller” with a cell phone, “The Yoga Lady,” and the “The Mythical Plastinate” have generated a fair amount of controversy regarding the issue of art versus science. The controversy of art versus science—so much discussed in the press and in scholarly articles—is just one of the recurring themes we found in the visitor comments.

Fig. 2 William Cheselden, *Osteographia, or The anatomy of the bones* (London, 1733). Courtesy of the National Library of Medicine. This image is available on line at: http://www.nlm.nih.gov/exhibition/historicalanatomies/Images/1200_pixels/cheselden_t36.jpg (last visited Feb 28, 2007)



Reaction of visitors to *Body Worlds*

As we entered each exhibit, we were immediately impressed with the attitude of the visitors both in Europe (visited only by CMM) and North America. The Houston and especially the Denver exhibits had long lines in which the visitors were talking loudly and discussing many different topics while they waited. However, when they entered the exhibit, there was suddenly a hushed tone of voice, and conversations immediately turned to the plastinated bodies and organs, with the inevitable comparison to their own bodies and illnesses. The responses to the whole body plastinates that we observed have predominantly been respectful and solemn and the experience regarded as a learning opportunity. Although we read many immature comments from children or adolescents in the guest comment books, we never personally witnessed any disrespect in the exhibits. Other visitors' experiences have been different. One visitor in Cleveland remarked: "It was offensive and distracting to hear rude comments about the plastinates, realizing they gave a great sacrifice for science and art." Others complained about unsupervised children.

The vast majority of comments were overall quite positive in tone, congratulating von Hagens for a fantastic experience and for his superb dissections that informed visitors about human anatomy and often thanking him, his co-workers, the sponsoring institutions, the body donors and their families, and even God, for making the exhibit possible. This general finding is in accord with many other analyses of visitor responses and of visitor surveys. Carefully crafted surveys easily lend themselves to statistical analysis, while the same cannot be said for the comment books. We did not attempt to do any statistical analysis of different types of comments, since it was difficult to decide what should count as a "comment." There were many non-verbal entries—drawn pictures or cartoons—a fair number, regrettably, of one- or two-word obscenities and insults (directed either at von Hagens or previous comment writers), and numerous "dittoes." A number of writers signed their names, but relatively few gave personal details such as their age, profession or religious affiliation.

As Tony Walter has noted, a dominant theme of visitor comments has been "an elementary scientific gaze in which obvious interest is shown in anatomical details."¹² But then he immediately notes that *Body Worlds* "is less a popularized anatomy lab than a shrine to the human body, a shrine in which medically untrained people can look at the body in new ways." We would add that for many visitors, both lay persons and the medically trained, it is also very much a kind of meditation hall where they are compelled to ponder deep assumptions about their own personal and social identity, their relationship to the universe and/or to God, and to the meaning and purpose of life. As a result, the comment books frequently mirror the social, political and ideological issues in contemporary society. Given the opportunity for guest book writers to view previous comments, we often find what amounts to running debates on especially controversial issues, serving as a microcosm of the culture wars currently fought in society at large. On some issues, however, there seems to be remarkable agreement.

We have arranged the major, recurring issues according to the following four questions. (1) What is life in its relation to death? (2) What do these bodies reveal about our relations with others and our place in the universe? (3) Are these plastinates freak displays or sacred relics? and (4) What is the origin of these complex machines we know as our bodies? We shall frequently rely on the words of the visitors themselves, as they often speak quite eloquently (comments have been minimally edited to correct spelling and basic punctuation).

1. *What is life in its relation to death?* The debate over whether *Body Worlds* is more art than science, more science than art, or equally science and art, reflects in many ways the general blurring of boundaries that pervades the exhibitions. Among those boundaries is that of life and death, which interacts with the equally nebulous line between reverence for the dead and dehumanization of life. The artistic representation of bodies was seen by many as highly respectful: “I was amazed by the wonderfully respectful and artistic way these one-time humans were presented” (Denver).

Nudity as well as art was an issue for some, both in relation to male and female cadavers. But as the comment below indicates, strong religious convictions of a certain kind could easily override any concerns about nakedness:

“...I saw way too many penises...there are some things people weren’t meant to see and this was clearly one of them” (Chicago).

“...I do not understand why the artistic portion was necessary. I really do appreciate the tactfulness of the exhibit... I personally was not offended by the nudity because that is the way God created us. Adam and Eve didn’t know what clothing was before they sinned” (Chicago).

As already indicated, “The Reclining Pregnant Woman” was one of the most controversial figures, juxtaposing in dramatic and traumatic fashion birth and death (Fig. 3). Especially disturbing to some was the allegedly lascivious pose of the woman. Von Hagens gives his reasons for placing the cadaver in this position in the *Body Worlds* catalog:

It was difficult to position this gestalt plastinate: The body should not be made to appear lifeless and should permit an optimum view of the fetus in the uterus, while at the same time showing proper respect for this double tragedy. The physical discomfort of an advanced state of pregnancy made the reclining pose obvious....The head has been tilted to the side with the eyes closed, i.e., consciously away from the viewer, and the hand of the free arm has been laid on the back of the head, as with a headache. In



Fig. 3 “The Reclining Pregnant Woman.” Gunther von Hagens’ *BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>

this way, the body language of this pose fundamentally differs from a lascivious provocation, in which the head would be coquettishly thrown back and the eyes would be enticingly trained on the viewer.¹³

A second pregnant cadaver in a standing position provoked far fewer comments (Fig. 4). While some saw only a perverse Playboy-like pose, others had a very different response, from both “clinical” and “maternal” perspectives:

“I just took gross anatomy and have seen many of these before so of course the only thing we did not see was a pregnant woman with a fetus. That, for me, was my favorite” (Chicago, from a female dental student).

“As a mother the ‘infant/female’ section was extremely interesting and sad” (London).

Many of the whole-body plastinates are posed in rather bizarre positions, such as “The Mythical Plastinate” (Fig. 5) or accompanied by odd accessories such as a jaunty hat (Fig. 6). What some visitors found to be grotesque, others found to be humorous, and the opposite of desecrating:

“*Thank you* for your scientific brilliance, artistic commitment, vision, humor and edginess” (Chicago).

“Fascinating and informative and even *artistic* exhibit. I thought the humorous touches were refreshing and humanizing, not at all disrespectful of those who gave their bodies for this project” (Chicago).

“Thanks for the sense of humor in poses—keeping the humanity of the subject in mind” (Cleveland, from a thirty-five year old female ophthalmologist).

The realism and authenticity of the bodies greatly enhanced the public’s reflections on life and death. While academic observers have questioned how “real” the bodies are, for most visitors this is not an issue. However, it is still not clear to all visitors exactly what the specimens are made of—whether they are only plastic—or what a plastinated body will look like despite all the pictorial promotions. For instance, one of the most perplexing comments we came upon was the following: “...I thought or expected there were going to be human bodies suspended in glass containers w/ a liquid substance so we could get the full human effect” (Chicago). Perhaps this writer meant that the plastinates were less fully human or that the plastinates obscured the full effect of the reality of death. In any case, for the overwhelming majority of visitors, it was precisely not having the body suspended in glass that created the sense of full, living human beings. As a Denver visitor exclaimed: “Everything although preserved—resonates with life.”

The “realism” also brought home to many the thin line between the living and the dead:

“All these details make up our bodies and we’re so delicate we can’t even realize” (Chicago).

“It reminds me of how perfect, imperfect, strong and fragile bones and muscles and company can be” (Chicago).

Of special interest were the ways in which visitors of all ages wanted to interact physically with the plastinates, and in some cases apparently did, judging from the following comment: “I was surprised to see how many people were touching the displays.... I think the displays should be behind glass to protect them from ignorant people like this” (London). This comment prompted a pointed rejoinder: “Can you not understand why anyone would be so fascinated as to want to touch them?” One child, age four, according to the comment of her mother, also wanted to touch one of the plastinates: “The angel was her

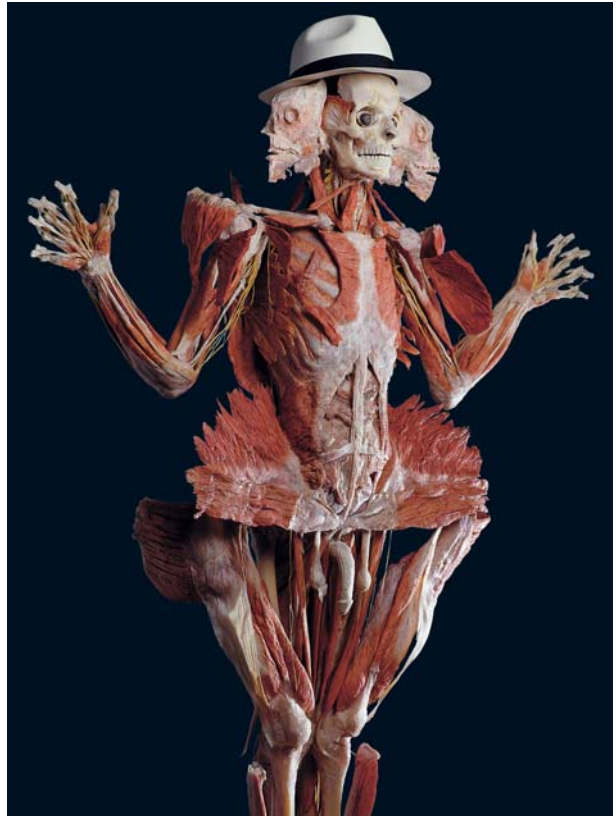
Fig. 4 “The Woman Bearing Life.” *Gunther von Hagens’ BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>



Fig. 5 “The Mythical Plastinate.” *Gunther von Hagens’ BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>



Fig. 6 “The Winged Man.” *Gunther von Hagens’ BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>



favorite—she was glad she finally got to touch one—the liver and the brain” (Cleveland). The emotional feelings attending such impulses reveal a further blurring of the life–death boundary: “At times I found myself wanting to caress the figures! At other times I felt like I was being viewed by the exhibited pieces” (Toronto).

In one significant sense, the plastinates in the exhibit create a huge dichotomy between life and death: the radical depersonalization of the donors. For some, this depersonalization represented a gross dehumanization: “The only thing I found to be uniquely profound was the graphic dehumanization that the staff has conducted. It’s almost as if you beg the question, ‘What would Hitler do?’” (Denver). For others, the clinical, impersonal aspects were partly compensated by particular elements of the overall presentation: “By adding the philosophical quotes, you have diminished the clinical and added the dimension of human immortality” (Chicago, from a female funeral organist). Many observers simply expressed their desire to know more about the personal lives of the donors:

“It is very fascinating how the human body works. But where did these people come from? What kinds of lives did they lead? What did they look like before plastination? It would be interesting to know more about them individually” (Denver).

“Perhaps you can include small little articles/section on the person’s particulars, e.g. name, how they died, etc.” (Singapore).

“Makes me appreciate how fantastic a machine the human body is. At the end, I began to wonder who these people were in life” (Denver).

“...the sense of spirit, of sacredness, could have been addressed by letting us in on the identity of the folk who donated themselves” (Toronto).

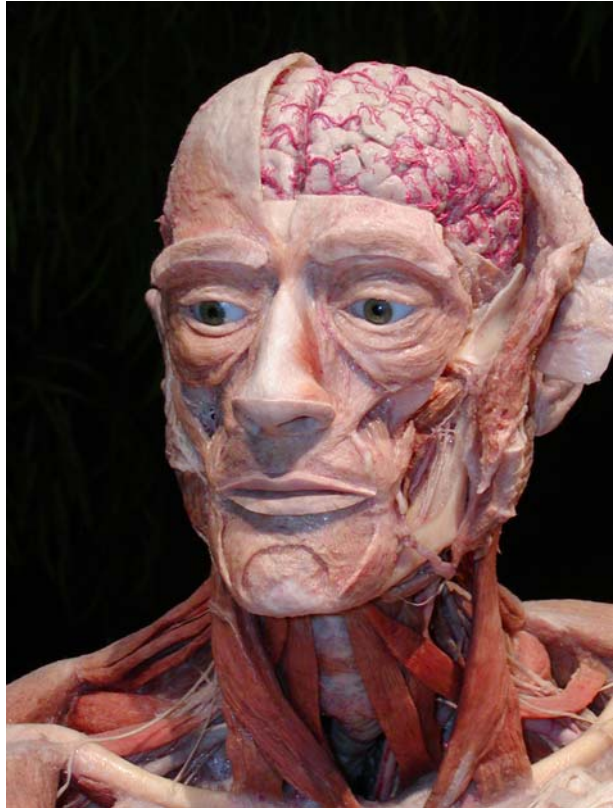
This sense of wanting to know about the personal life of the donors affected professional anatomists as well. The following comment comes from the personal journal of one of the authors (CMM) after visiting the Denver *Body Worlds*: “As I looked into this cadaver’s face (‘The Yoga Lady,’ Fig. 7), I suddenly imagined the woman who once inhabited this body and felt a strong connection to her. I wondered about her life and felt sad that she had died so young. I have the same sense of connectedness when I look into ‘The Ponderer’s’ face, (Fig. 8) with its contemplative expression.”

Of course there are compelling reasons for protecting the anonymity of the donors and their families. Moreover, no information is provided about the medical history of the donors, causes of death, or the actual person. However, Leiberich et al. have suggested that the exhibit could improve its potential for enhancing public awareness of health issues and our mortality by including relevant medical information: “Too sparse information about anatomy, physiology and pathophysiology, the lack of a life context for the cadavers on



Fig. 7 “The Yoga Lady.” Gunther von Hagens’ *BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>

Fig. 8 “The Ponderer.” Photographed with permission from the IfP at *Body Worlds 2*, Denver



display (this could be presented without violating the anonymity)...[are among] the underlying weaknesses of the exhibition, as a few visitors point out in detailed critique.”¹⁴

Two aspects of this depersonalization were especially troubling to some. First, while the actual personal life, or social identity, of the person was hidden, a fictive and imaginary identity was imposed on her body, and second, while the donors remained anonymous, von Hagens’ signature was attached to the plastinates like an artist’s signature. Similar to a piece of art work in a museum, each whole body plastinate bears a metal display tag with the name of the plastinate based on the pose (e.g., “The Ponderer,” “The Chess Player”), year of preparation, and the engraved autograph of Gunther von Hagens. Von Hagens states that he is following in the tradition of the Renaissance anatomists who created poses as anatomical art as well as educational material.¹⁵

At times, both issues above are mentioned in the same grievance:

“I found it strange that von Hagens’ signature would be there and little reference to the ‘person’ behind his work. Was the ‘yoga lady’ or the ‘skateboarder’ really a practitioner of these skills?” (Toronto).

“I had no idea who donated their bodies but instead this von Hagens fellow’s name is everywhere and nowhere is there any mention of the donors who made the exhibit possible” (Toronto).

“The people who donated their bodies to Science did not agree to have their bodies sliced up, rearranged and named and then signed as if it is a sculpture made by an artist.... I find

the presentation disgusting. After an anatomy class is over a priest or minister comes in and blesses the bodies and allows them to be buried in holy ground. When will these people be allowed to rest in peace—instead of forever being forever displayed in pieces?” (Toronto).

While inaccurate in terms of its description of the post-dissection disposal of cadavers in most medical schools today (a common practice is for the cadavers to be cremated and the ashes buried in a secular memorial service), the last comment draws attention to the question of the post-mortem destiny of the person. The issue of the relation of life to death often comes into focus, however, not just at the end of life, but also at the beginning.

For the beginning of life, the obvious and highly controversial question is when life, or rather human life, commences. Needless to say, *Body Worlds*, especially its exhibits relating to reproduction, brings this question to the forefront for many visitors. A fair number of comment writers seems surprised about how large the fetus is at early stages of pregnancy, prompting them to reconsider the abortion question. Others simply find confirmation of their prior views:

“Every woman who is pregnant or considering abortion should see that section of the exhibit regarding the fetus’ development. As a 6-month baby, my mother cared enough to let me survive to see this 41 years later. Thank you for a marvelous glimpse into God’s intelligent handiwork and marvelous design” (Chicago). (We shall consider the idea of an intelligent creator and design in our fourth question.)

“I hope that every woman in the world that has had an abortion will come here and see what they have done...Killed an innocent baby. Thanks for opening my eyes” (Cleveland, from a 17-year old female high school student).

“You can’t deny that there was an intelligent creator. *Abortion is murder!*” (Cleveland).

“I can’t explain how people could discount life after such a display of life. This event impressed upon me the wonderous way Jehovah God created us” (Cleveland).

“Proof that life begins at conception—way to go Jesus!” (Denver).

There were other visitors who did not appreciate such religious “propaganda” for the pro-life position. In response to one such proponent, one commentator wrote: “Please do not use this forum to impose your religious views!” (Chicago).

Turning to the opposite end of life, we find that the relation of life to death for many visitors naturally relates to their view of post-mortem existence: “But in the end all of us return to where we come from—the maker. Professor, I hope you spend more in reaching people who do not know the creator. Well, a job well done anyway. Jesus Loves You” (Singapore). Common in these reflections about our post-mortem destiny was the question as to whether or not humans possess an immortal soul. These views were refracted by *Body Worlds* in numerous and conflicting ways. Those who are convinced that there is an immortal soul sometimes expressed concern that the exhibit is conducive to disbelief: “I noted several quotes from noted atheists—and only one from the bible. It was a wonderful exhibit of the wonder of creation—but the illusion that life ends at death was disturbing” (Denver). A more extreme view rejecting the exhibit as a whole for celebrating mere physicality was provided by the following:

“A celebration of prurience pandering to those with an unhealthy obsession with physicality. We are more than the sum of our parts!” (Chicago).

“A gross violation of human dignity. We are more than flesh & bones and no science or art justifies demeaning human dignity in this manner” (Toronto).

Other visitors simply called for a comparable exhibit of the soul—one assumes such requests were made without expectation of actual realization: “We await the anatomy of the spirit—the *animating* force” (Denver). And “Gunther, could you find a way to ‘do’ Spirit and ‘heart’ too?” (London). There were others who were convinced that the exhibit actually did represent body and spirit, indirectly or directly, the latter based apparently on the life-like poses of the whole-body plastinates:

“It shows we need our souls to give that personality, individuality and a transcendence of our bodies” (London).

“As Americans we are losing respect and reverence for the human body in our lifestyle. This exhibit is a reawakening of our mortality and a reminder of our immortality” (Chicago, from a female funeral organist).

“Just an excellent duplication of the human body and soul” (Cleveland).

Of course, there were the skeptics, convinced that the exhibit demonstrated a non-vitalistic view of life:

“I really do not understand why, if ever, anyone would protest this exhibit, because the only difference really is that we still have vital fluids” (Chicago).

“I hope we can continue to push ethical boundaries in order to further our knowledge and capabilities. I especially hope everyone considers the religious and philosophical implications. There wasn’t a single soul or spirit discovered” (Houston).

“I’m grateful for the experience of being able to see myself in our truest form” (Toronto).

“Amazing...hard to believe we truly are just walking and talking meat parcels” (Denver).

And, finally, there were those who just wondered about our real identity, perhaps most succinctly expressed by a visitor at the Singapore exhibit: “I have this thought in me: Who am I?”

Belief in a soul unique to humankind prompted the following comment: “The body and all its wonderment is not what makes us humans. It is what makes us animals” (Cleveland). Such a view, of course would not be shared by most Hindu or Buddhist viewers of the exhibit who see all animals endowed with spirit as well. As always, there are the non-believers: “A reminder that we are all animals after all...” (London). In the next section, we will take up the topic of the relation of humans to non-human animals.

We conclude this section with one of the more memorable comments regarding life and death: “On the philosophical side, this is *laughing at Death*, as saying: ‘nevertheless, despite your cruel grasp, we [humans] defeated you by being of some good use to others by looking alive and teaching’” (London).

2. *What do these bodies reveal about our relations with others and our place in the universe?* We shall deal with the question of human identity as it relates to the following three aspects: gender, race, and species. Regarding gender, one of the most common complaints about the exhibits was the relative absence of female bodies. In the earliest exhibits, according to von Hagens, female plastinates were few because (1) he did not wish to be accused of pandering to voyeuristic interests; (2) he was following the tradition of Renaissance anatomists who focused more on male bodies; and (3) female bodies, in general, do not exhibit as clearly the muscular features present in male cadavers, and except for the reproductive systems, male and female bodies are essentially the same.¹⁶ In later exhibits, there have been and will continue to be more female plastinates. The increase in female displays, however, has not silenced

feminist critiques, as the poses often used for males and females seem to reinforce gender stereotypes:

“Why are all the women in strange acrobatic positions but the men are all standing in a natural state? Does the pervertedness of the male species have to cross over even into science involving Dead women? Would they appreciate that?” (Houston).

“I enjoyed it a lot. I did find it curious that it was mostly females that were in weird poses” (Houston).

“The female figures are often more contorted than the male figures. The female figures could be shown more similarly to the males—thinking, standing, etc. The mother and child, however, are beautifully done” (Denver).

“Look at the gender roles beyond death....there’s the risk of naturalizing gender roles. These are entirely socially constructed. How come there’s not a male ballet dancer? Or a female soccer player?” (Toronto).

Some complaints got right down to the nitty-gritty: “Why was the clitoris not shown/ labeled...that’s one of the most important parts!!” (Chicago, from a female attendee).

Issues of gender often blend into those of race. As one exasperated female visitor protested, “...there appeared to be no black females. As a black female, it upsets me that this exhibit only depicted a vast majority of white men. That was the most racist display I have ever seen” (Cleveland). And in a complaint reminiscent of that lodged against the posing of female bodies, one commentator wrote: “... the only black cadavers were at the very end. The one that died from obesity. I think they should have been throughout the exhibit in other manners” (Cleveland). Still another visitor simply presented the following petition: “Dr. Hagens, I would like to see all peoples of color be on exhibit. Perhaps it would send a message that color is truly only skin deep” (Denver). Others saw racism in the alleged (but false) assertion that most plastinates were of non-white ancestry: “It was disturbing to sense that most of the donated bodies were of indigenous people (size)” (Denver). But the vast majority of people who commented on race were in general agreement that race is only skin deep and found both an interracial bonding with all humankind and between healthy and the sick:

“This exhibit has shown me about me & my brothers and sisters. I understand more and appreciate more. I also learned from the beautiful and profound words surrounding the exhibits...” (Denver).

“This is the most bonding experience I have had with the human race which I love being a part of” (Denver).

“I look at us like *this* and wonder why we abuse our bodies, treat others with malice and the price we pay for hurt and violence” (Chicago).

“A truly amazing and wonderous display of how we have been designed by our creator. Truly we are all created equally” (Denver).

“I was walking through the exhibit in close proximity to someone in a wheelchair with some mechanism to clear (vacuum) his lungs from time to time. At some point in the exhibit, I was moved by the realization that he and I have more in common than our apparent differences” (Denver).

We mentioned above the problem that many visitors experienced with the clinical separation of the cadaver from the personal identity of the donor. However, there is a positive aspect to this depersonalization that is deeply humanizing, as the above quotations implicitly reveal and Y. Michael Barilan makes explicit: “The separation of the skin from the body marked the removal of personal and social status and also the opening of a seal covering the mysteries of the human body. The flayed corpse stands for the non-personal

example of human nature, either ‘normal’ or ‘pathological’. By shedding the skin, the body steps away from its particular life and stands for human nature as such.”¹⁷ It is this shared human nature that is often made dramatically manifest for visitors.

The sense of community extended to include all species for some. The plastinate primarily evoking this response was “The Rearing Horse with Rider,” juxtaposing the similar anatomical features of human and horse [see, for example, the “sweatbands” on the ankle and hock (Fig. 9)]:

“I was surprised to see as well the horse.... It was a different look at not just our own musculo-skeletal system, but that of any being. That in all forms of life [it] is the same” (Chicago).

“Placing the rider on the horse was a great juxtaposition and a demonstration that human beings are *part* of nature, life and death, not the ‘greatest,’ or the ‘best,’ or ‘most sacred.’ If there is a God he or she created *all* nature...” (Chicago).

“The flesh of a human looks exactly the same as the flesh of a horse...We don’t eat one, we eat the other. Why is that?” (London)

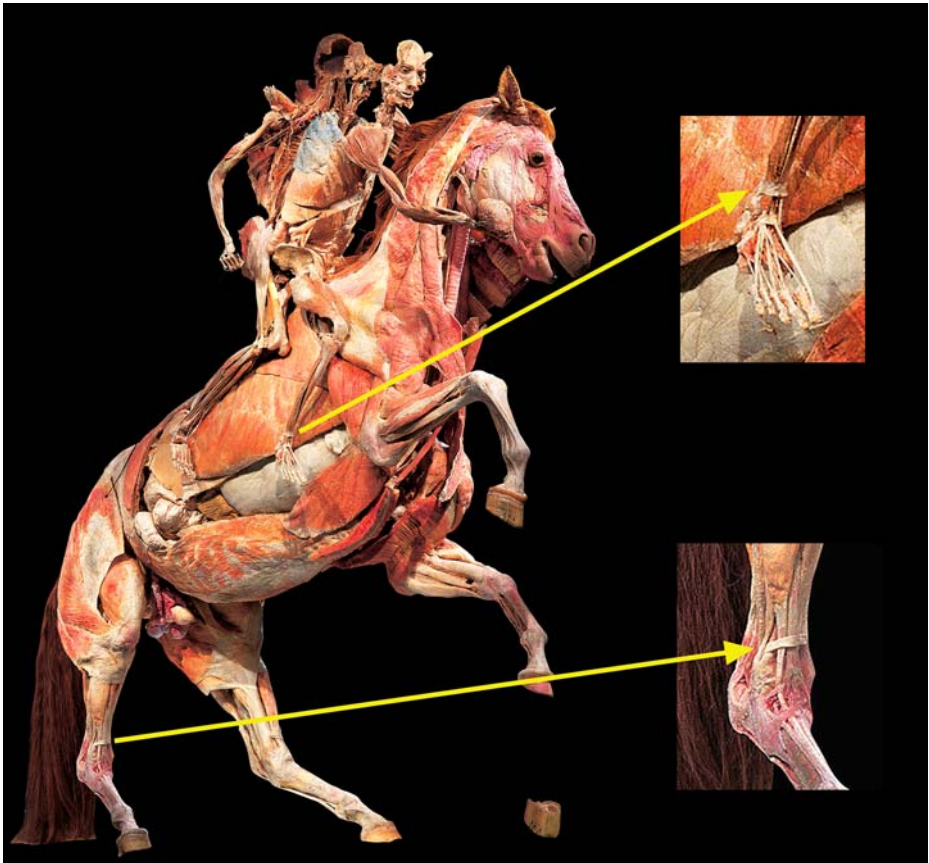


Fig. 9 “The Rearing Horse with Rider.” Note the similar appearance of the human ankle and equine hock “sweatbands” (extensor retinaculum). *Gunther von Hagens’ BODY WORLDS* and the Institute for Plastination, <http://www.bodyworlds.com>

“...are we going to see ourselves as a master race of beings, or part of a greater perfect web of interdependent life?” (Toronto).

3. *Are these plastinates freak displays or sacred relics?* Barilan argues that the fascination with real or authentic dead bodies “seems rooted in the tradition of the reliquaries in which (allegedly) authentic body parts of saints were preserved in special receptacles for visual veneration.”¹⁸ He contrasts the “freak” with the saint: “The person of the freak is determined by his or her body; the body of the saint is stigmatized by the person and soul. The relic exemplifies the ideal of the mastery of the spirit over the flesh; the pathological exhibit suggests the opposite.”¹⁹ *Body Worlds* represents elements of both with its pathological displays of abnormal fetuses, on the one hand, and its celebration of the wonders of the healthy and athletic human body, on the other. As Tony Walter rightly observes, *Body Worlds* “may be read...as a shrine to the worship of the body.”²⁰ The visitor comments make clear this ambivalence.

For some viewers, the exhibit suggested the curio cabinets of the late Renaissance. One visitor seemed to be relatively neutral about this historical indebtedness: “This exhibit owes much to cabinets of curios from the sixteenth and seventeenth centuries—why not acknowledge that?” (Chicago). The writer goes on to give some credit to the historical information in the banners but still thinks this aspect is not highlighted enough. Others, however, found the curio cabinet idea extremely offensive: “If this were in an art museum, this exhibit would have been shut down immediately as sacrilegious, an abomination...This is a high tech freak show and a cabinet of curios—not science. Most obscene was the whore house posing of the pregnant woman’s body” (Chicago). Going beyond mere freak shows, some visitors likened *Body Worlds* to the gory spectacles of ancient Rome: “Some centuries past today humans will consider this sort of exhibition barbaric just as we consider Roman stadium with man and lion fights barbaric today! However, human progress needs a lot of barbaric expositions!” (Houston). More simply, a Denver visitor protested: “A crime against nature. God is angry.”

The vast majority of visitors, as we have already indicated, had no such problems, but some noted the controversy, attributing remonstrations like the above to religious benightedness: “Exceptional! It is difficult to imagine such imagery originating in the US with our climate of religious zealotry—thankfully there are enlightened individuals and nations to fill our void” (Houston). Much more commonly, religious sentiments and assumptions were used in arguments justifying the exhibits:

“As a devout Roman Catholic I find this exhibition as important as the very first dissection without which medical science would still be in the dark ages. They too were questioned morally” (London).

“God gave us these bodies to lead a spiritual life. He also gave mankind the wherewithal to do this for an incredible educational learning. Thank you” (Denver).

Many religious justifications invoked biblical authority, referring to Psalm 139:14 in particular, which is undoubtedly the most frequently cited quotation in the comment books. Thus, a Houston visitor remarked: “The Bible says/declares that we are beautifully and wonderfully made. Only God can make such a treasure. We can dissect it and study it, only God can create it. God bless the people who found a way to prove God’s power through this exhibition.” The final question relates directly to the idea of God’s wonderful design of the human body, but we would simply note the strong religious validation given for the exhibit by many visitors.

Such rationales frequently become expressions of a religious or near-religious experience. For those who respond to the exhibits as a kind of reliquary display or shrine to the body, *Body Worlds* often seems to inspire deep religious reflections and even spiritual experiences of some sort. At times, the comment writers indicate only implicitly the religious nature of their experiences, but at other times, they become quite explicit when fascination turns into astonishment and awe:

“It’s hard to think of myself as being like that inside. At first I felt a little uncomfortable but it was soon taken over with curiosity and amazement” (London).

“Thanks to the medical scientists and docs for their care and dedication and expertise. Thanks to the polymer scientists for the technology to preserve who we are so graphically. Thanks to the Museum for bringing the exhibit to Chicago. Thanks be to our Creator for his infinite wisdom and glory. Astounding—how fragile we are” (Chicago).

“Most awesome thing I’ve ever seen....I wish everyone could see this to appreciate the miracle of life and the certainty that God exists!” (Chicago).

“Searching experiences, like prayer, were had here. Whose eyes am I looking into?” (Toronto).

“It is like frozen worship to ‘The Creator’” (Houston).

“Our god is awesome! Praise God, Jesus and Holy Spirit! Thank you!” (Denver).

“At times it can humble you to your knees” (Chicago).

“My eyes were filled with tears over and over as I looked and was awe-inspired by the design God has assembled us to be...but my eyes were filled with tears too knowing that these were daughters and sons—once alive and now forever captured—frozen in a moment” (Chicago).

Tony Walter notes similar reactions in his study, but also adds that while Renaissance anatomists were not doing science in our sense of the term but demonstrating God’s handiwork: “Von Hagens is doing the secular equivalent, helping the visitor worship not God, but Man.”²¹

On the topic of religious experience, one finds that it is not just Christian sentiments that are inspired by the exhibit although these clearly predominate in western countries. In Singapore, for instance, we found references not just to other gods or god-like beings but also to reincarnation:

“Before I came, I thought it would be ghoulish but I enjoyed it tremendously. Well-done. May all beings who have contributed to this exhibition have a good rebirth! Amitabha [Buddha of Infinite Light]!”

“I was caught by surprise how the human body could be ‘reincarnated’ with plastination.”

“It’s a rare opportunity. We didn’t bring it [the body with us] when we were born, and we will not take it with us when we die” (translated from Chinese).

Even in western venues, given contemporary pluralistic societies, it was not surprising to come across comments like the following:

“Why are all the smart quotes from Europeans? Buddha had a lot to say about death as well!” (Toronto).

“Literally a surprise find and I’m *encouraged*...to Meditate! and dance and love other living things with compassion. Om Namah Shivaya [“Obeisance to Lord Shiva”] (London, from a Hindu female).

We will now turn to the last question, and one of the most contentious.

4. *What is the origin of these complex machines we know as our bodies?* This particular topic elicited, as might be expected, a large number of earnest and emphatic responses from religious conservatives, insisting that the exhibit demonstrated or proved beyond doubt that the body was designed and engineered by God. References to Intelligent Design were not infrequent. Here are some responses typical from this perspective:

“What an amazing masterpiece! This great exhibit shows off God’s wonderful design and educates us all as to the intricacy and complexity of its design. Awesome! TX (Houston, from a 24-year old teacher).

“Admiro el cuerpo humano y siempre pensé que Dios es el ingeniero y arquitecto del mundo de la ciencia (ciencia) y del Saber” (“I admire the human body and always think that God is the engineer and architect of the world, of science, and of knowledge,” authors’ translation; Houston).

“We are wonderfully and beautifully made by God. He is the awesome, great, creator of all mankind and everything else on Earth. Believe in your creator through Jesus Christ” (Houston).

“Displays how fearfully and wonderfully we are made” (Singapore).

“What a great mechanism is made by God” (Singapore).

“Absolutely unbelievable...undeniably Intelligent Design” (Houston).

“Your exhibit *proves* that only ‘God’ can make a body. God is Real” (Houston).

“It is hard to imagine anyone not believing in God after seeing this” (Denver).

“Thank you for your proof that there is a creator” (Denver).

“I have to admire the wonder of the creation!” (Singapore, translated from Chinese).

“This is the creation of the God!” (Singapore, translated from Chinese).

“I am so grateful to realize ‘something/somebody’ created me” (Cleveland).

“If one doesn’t believe in God!!! He will now” (Denver).

Interestingly, some religiously conservative visitors were concerned that the exhibit, far from proving God’s existence, could serve the opposite purpose and lead visitors *not* to appreciate that life “was gifted upon us through God....And to have such displays sometimes makes others doubt in what we really are” (Chicago).

Implicit in most of the above comments is the rejection of Darwinian evolution. Such rejection is commonly made explicit:

“How can anyone see this and still believe all life has the same origin or in ‘evolution’?” (Houston).

“Now we know it is by design, not evolution” (Cleveland).

Such confessions at times provoked protests although they were relatively infrequent. Nonetheless, they are quite interesting. The following are the initial, anti-evolutionary statements, and then the dissenting response:

“How can you see this and even doubt *there is a God!*” (Houston).

[Response:] “Because Religion is for the weak minded! How can you refute the evidence of evolution?”

“We are fearfully and wonderfully made” (Houston).

[Response:] “Evolution is truly awesome.”

“This gives us all proof that we did not come from apes!” (Denver).

[Response:] “An ape exhibit would look remarkably similar. In fact, I would recommend a comparison display.”

“This was an awesome display of how God created such a complex machine in man, when *He created* us in *His image*! Creation! Not evolution” (Houston).

[Response:] “This is an awesome display of the power of natural selection.”

In only one instance did we find an initial pro-evolutionist statement eliciting a creationist response:

“I hope this exhibit helps people realize that they are animals. We are meat. We are mammals and chimpanzees are our cousins. Mike” (Houston).

[Response:] “Mike, maybe your kin are chimpanzees. As for me, I’m human.”

One creationist objected to the time-frame that the explanations on occasion set forth but still found the exhibit exhilarating: “Very awesome—educational. I am a creationist, so I didn’t agree with the ‘millions of years’ concept. Nevertheless, this was fabulous” (Denver).

As any observer of the Intelligent Design controversy knows, one of the primary “logical” reasons used by defenders of this point of view is the implausibility of random chance producing such marvelous machines as our bodies from the makeup of cells to the organization and cooperation of the body as a whole. Underlying this concern is undoubtedly a sense that random creation would undermine any sense of meaning and purpose in life. A number of comment writers make these concerns clear:

“Needed is more biblical information as this exhibit clearly points to a Creator. None of this happened by chance but was clearly designed and planned by God” (Cleveland).

“We are no accident” (Houston).

“How anyone can imagine that random chance caused all this is pretty unbelievable. This is all obviously the work of some great mastermind. Intelligent Design not neo-Darwinian Evolution of even the more laughable punctuated Equilibrium. Big Bang cosmology has put to rest the issue of the need for a first cause. We need a first cause. The question now is whose God is He?” (London, from a visitor from San Jose, California).

[The above comment provoked the following laconic response:] “Yeah ok mate! Whatever.”

“I loved the part with the babies. It really shows that life starts right away. Bravo for giving us this wonderful insight into our amazing bodies. I really don’t think we just came here by mistake we are so wonderfully and perfectly made” (Denver).

There were others, of course, who had a different sense of the meaning of the reproduction section: “My favorite was the reproduction exhibit. The human body has evolved in an extraordinary way and I’m glad you could provide the public with a way to view it” (Denver).

A pointed rejection of Intelligent Design, with a feminist twist, came from a visitor in Cleveland: “...a complete refutation of ‘intelligent design,’ rather millions of years of trial and error...Goddess Bless!” (Cleveland).

Often both sides saw their position as bolstered by “science”:

“Thank you for showing us what *science* is all about! And to counter the claims of the flat earth creationists” (Chicago).

“What better proof of ‘intelligent design’—that there is a ‘God.’ ...Thank you for a wonderful scientific display...” (Chicago).

Then there were the compromisers or those who simply realized an exhibit like this is not really designed to settle such controversies:

“An incredible insight to how our bodies evolved into the complex systems that they are. It gives us a profound respect for life and the processes that developed—whether you call that miraculous force ‘God’ or ‘Nature’” (Denver).

“I suppose one can see what they wish to see! The handiwork of God or the intricate workings of evolution...” (Cleveland).

Other comments tied together the abortion and creationist/evolution issues:

“The exhibit is wonderful. However, some antiabortionists will claim it supports their views while others will claim the same parts show a pro-abortion bias. Also the quotation from Seneca will be considered by some a support for atheism while the quote from Psalm 8 will be used to support creationism and blast evolution. Nevertheless, it’s a great exhibit” (Chicago).

As has often been noted, one of the results of the exhibit for many visitors is a resolve to quit smoking, reduce alcohol consumption, lose weight, or become more active, inspired in part by the displays of the smoke-blackened lungs, cirrhotic livers, and layers of excess body fat. To be sure, relatively few visitors may come to such resolutions, but the numbers of those who do are not insignificant. At the Munich *Body Worlds*, for instance, nearly 5% resolved to stop smoking, 8% to reduce drinking, 33% to eat better, and 28% to involve themselves in more sports—these results coming from a population that to some extent is more health-conscious than the average.²²

The religiously conservative often tied such resolutions to their creationist perspectives:

“Helps one realize how important it is to take care of our bodies of God’s wonderful creation in His image” (Denver).

“*Praise God...we are fearfully and wonderfully made!!!* Thank you very much Denver Museum, for allowing this exhibit here. It is a wake up call for me. I am over weight... I’m glad that the 300 to 120 lb difference was on display toward the end” (Denver).

“Thank you for more than you can know. I began this exhibit with a feeling of awe that led to tears: I realized early on that I was not taking care of the body that God entrusted me to care for. For years I have embraced my physical appearance—in spite of societies’ view—and I still do. Yet there are so many things I must do to maintain it. I am so appreciative of the opportunity God gifted me to be on Earth and I have to use it wisely. Part of that involves doing what I can to *be here*” (Denver).

“We really need to take care of ourselves more because our bodies are truly perfect specimens of God’s creation!” (Chicago).

Conclusions

A number of reflections occurred to the authors after their visits to exhibits and after writing this essay. First, while the exhibits clearly provide a marvelous opportunity for the lay person to learn about the body and to see an amazing integration of science with art, they do little in the area of critical science education—a task probably beyond the scope of a museum exhibit. This was obvious in the evolution–creationist discussions where conclusions were largely stated as self-evident from the displays themselves, whereas in

science, few things are self-evident or a matter of common sense. The lay person tends to identify science with a body of knowledge, rather than with a painstaking method of teasing out understanding from “the facts,” a tendency quite apparent in the comment books.

Second, much of the contemporary and perhaps largely western understanding of the body as a machine with or without a “ghost” operating the machine. Such an understanding has been dominant in the West since the Renaissance, with roots going back much earlier to ancient Greece. Different conceptions of the body, of a more organic nature, have been prevalent in other, especially Asian, cultures. It is unfortunate that we were not able to obtain comments from Japan or Korea that might have expressed very different metaphorical notions of what our bodies are like, notions that would tend to see life and death as part of a cyclical, organic process of growth and decay, rather than as the construction of a mechanism that eventually breaks down.

Third, we find hope in the fact that so many visitors commented on the sense of human community and unity of races after seeing beneath the skin. Barilan nicely summarizes this optimistic point in commenting on the “traditions of the authentic relic.” He notes: “The power of authenticity will be sublimated from veneration of saints to respect for every person.”²³

Finally, we were amused by one commentator in Toronto who asked, “I wonder who reads this stuff?” Well, now you know. Actually, at least some visitors, in addition to these two academics, have found the comment books fascinating and worth perusing. As a London visitor concluded: “Always find ‘comments books’ interesting—I enjoy the diversity of opinion, even if, often, the comments within are inane and ugly, rather than true reflections of what the exhibits did to you.” So when you visit *Body Worlds*, you might want to save a few minutes at the end to read what your fellow museum-goers thought of the experience.

Endnotes

- 1 Leonardo da Vinci, *The Notebooks of Leonardo da Vinci*, 108.
- 2 See, for instance, <http://observer.guardian.co.uk/international/story/0,,668874,00.html> (last visited Feb 28, 2007).
- 3 P. Herschovitch, “Rest in Plastic,” 828.
- 4 D. Foster and T. Hibbs, “Inside Out,” 1P, 4P, 5P.
- 5 P. Leiberich et al., “Body Worlds exhibition—Visitor attitudes and emotions,” 570–71.
- 6 From a public lecture entitled *Meet Dr. Gunther von Hagens: Inventor of Plastination and an Innovative Exhibit*, given on June 1, 2006 in conjunction with the Denver *Body Worlds* Exhibit and placed on the Denver Museum of Nature and Science web site. This lecture is no longer available on line.
- 7 G. von Hagens’ *Body Worlds*, “The Body Donation,” http://www.bodyworlds.com/en/bodydonation/body_donation_program.html (last visited Feb 28, 2007).
- 8 Hans-Martin Sass’s report is available at http://www.koerperwelten.de/Downloads/ethics_summary.pdf (last visited Feb 28, 2007).
- 9 The Science Museum of Minnesota statement on their review of the CSI report is no longer available on their web site.
- 10 See <http://dignityinboston.googlepages.com/?gclid=CK67j4PqnIoCFR8iIgoddFMahg> (last visited Feb 28, 2007).
- 11 For example, see the study by P. Leiberich et al., 570.
- 12 T. Walter, “Body Worlds: clinical detachment and anatomical awe,” 464.
- 13 *Gunther von Hagens’ Body Worlds: The Anatomical Exhibition of Real Human Bodies; Catalog on the Exhibition*, ed. G. von Hagens and A. Whalley, 264.
- 14 Leiberich et al., 572.
- 15 G. von Hagens and A. Whalley, 266–67.

- 16 G. von Hagens' *Body Worlds*, "Questions and Answers," http://www.bodyworlds.com/en/exhibitions/questions_answers.html (last visited Feb 28, 2007).
- 17 Y. M. Barilan, "The story of the body and the story of the person: Towards an ethics of representing human bodies and body-parts," 194.
- 18 Ibid.
- 19 Ibid, 196.
- 20 Walter, 479.
- 21 Ibid, 479.
- 22 Leiberich et al., 570.
- 23 Barilan, 202.

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