

Gunther von Hagens

On Gruesome Corpses, Gestalt Plastinates* and Mandatory Interment

Grim and Gruesome Corpses in Anatomy

“A dissection hall full of cadavers is no Garden of Eden [...] From time immemorial, it has been the cause of revulsion for delicate nerves, and with few exceptions the brief duration of such anatomists can be easily understood when spent in such rooms. That they become desensitized after a certain period of time can not offset the harmfulness involved and will show that people can learn to live with nearly anything when the spirit of research guides them even to such sources of truth.”

Anatomist Anton Hyrtl wrote this in 1860 at a time when he and his colleagues had to fetch their cadavers from the gallows and to dissect them publicly.¹ Because decomposition proceeded very fast during the summer, public dissections could only be performed during the cold months. The discovery of formaldehyde at the end of the 19th century proved to be a major breakthrough in mitigating the unpleasantness of anatomical training. Since then, it has been used to preserve cadavers. It stops decomposition. It also permits anatomical cadavers to be dissected regardless of the season and over several months. Nevertheless, anatomical cadavers have retained a certain bloodcurdling aura, and thus give rise to an emotional revulsion. Their psychological impact on students is critical. Hence, in 1984, Herbert Lippert, an anatomist in Hanover, described anatomical cadavers as “dehumanizing” in the *Deutsches Ärzteblatt*.² As they monopolize anatomical instruction, they are “too little oriented to the living.” Cadavers “accustom students not to expect any expression of feelings from patients.” They “are gradually viewed not as human beings but only as problems. [...] Despite all of the officially professed respect due to body donors, most students could not imagine that a member of their families could donate his or her body for anatomical study.”

What makes anatomical cadavers so unpalatable? The fact that they are dead cannot be the reason. Gestalt plastinates are just as dead as anatomical cadavers, and yet every day about five people who attend the BODY WORLDS exhibition sign up as body donors for plastination. Conversely, in my 20 years as a university anatomist, I have never once experienced that a student or colleague became a body donor for anatomical study. Consequently, there must be a fundamental difference in the way both anatomical cadavers and gestalt plastinates in the Körperwelten exhibition are perceived.

*Gestalt Plastinate: Aesthetic, instructive whole-body specimen positioned in a life-like pose.

The reason for this is not difficult to understand. Observers cannot identify with the “grim and gruesome corpses” in dissection halls. Bloated, discolored and surrounded by the caustic odor of formaldehyde, they are the unpleasant but necessary evil of practical anatomy. Students, many of whom are holding a scalpel in their hands for the first time, are totally out of their element in a dissection class. In the brief time available to them, a “massacred specimen” is all too often the result. These student deprecations on corpses together with increasing desiccation as well as the accompanying brown or black discoloration all contribute to making anatomical cadavers generally “grim and gruesome.” The reason that they are nevertheless of vital importance for anatomical training is to be found in their authenticity. Even the best pictures or models cannot replace the original just as viewing a picture of a landscape or a computer animation cannot give a realistic idea of a forest. Authentic anatomical specimens make bodily interiors ‘graspable’ in both senses of the word.

New Possibilities for Specimens through Plastination

Plastinates are authentic anatomical specimens. They are permanently preserved because the fluids and soluble fats in their tissue have been replaced initially with ice-cold acetone and subsequently with plastic in a vacuum. The reactive plastics used in this process, such as silicone rubber or epoxy resin, harden after infusion. As a consequence, plastinates remain dry, odorless and accurate in detail down to the microscopic level. They can be pliable, rigid or even transparent.³ This has made them the most natural and best-preserved specimens since the beginning of anatomy.

By hardening the plastic in such specimens, the tissue becomes thoroughly solidified so that not only the bones, but also the muscles and other soft tissue can take over supporting functions. In this way, anatomically preserved bodies cannot just be positioned upright, as has only been possible with skeletons, but in a whole variety of new and innovative forms for presenting dissected specimens as well. Hence, through plastination, it has first become possible, for example, to present the muscular system in an upright pose, completely independent of its own skeleton; without the hardened plastic, the muscles would simply collapse.

As such bodies are placed in a particular pose, I call them gestalt plastinates. The nature of the pose must be strategically planned; here the theme determines the pose as

form follows function. In planning such poses, I distinguish between anatomically correct positioning, motion posing and fragmentation of a body.

Poses

Whole-body plastinates that have been infused with silicone but have not yet been hardened are still pliable and are a kind of ‘pre-specimen,’ which will become a durable specimen only after the silicone hardens. However, hardening cannot take place immediately after the specimen has been removed from the silicone tank because at that point it is initially a crumpled heap of matter. In this situation, we are virtually compelled to shape it in some way, even if this is only an upright pose. Moreover, all of the dissected structures, every organ, every nerve and every vessel must be correctly positioned anatomically before the plastic hardens, thereby permanently ‘freezing’ the respective pose. One wrong angle of even one of the eight vessels emanating directly from the heart and this one mistake could overshadow the plastinator and his work well beyond his lifetime. A whole-body plastinate requires ap-

proximately 1000 pins, foam pads and supporting wires until each structure has been fixed and hardened in an anatomically correct position. This is painstaking, demanding work.

With the first whole-body plastinates, I oriented the respective poses according to the anatomical structures to be displayed, without regard for the overall appeal of the total design. As a result, the specimens either appeared rigid as lifeless manikins or they looked unnaturally distorted or even grotesque when, for example, the lower leg was twisted for a better view of the sole of the foot or the head was tilted back to afford a better look at the lower jaw and throat regions. It was obvious that the instructional value of anatomical exhibits would be significantly enhanced by the overall aesthetic impact of gestalt plastinates. Just as the appeal of a picture is determined by its frame and vice versa, poses and instructiveness interact with each other in gestalt plastinates. For special anatomical themes, some bodily poses are more suitable than others are. Each pose, each bodily posture, possesses its own specific instructional potential. Hence, exhibits of artificial shoulder, elbow, hip and knee joints concretely call for the respective joints to be appropriately bent. As shown

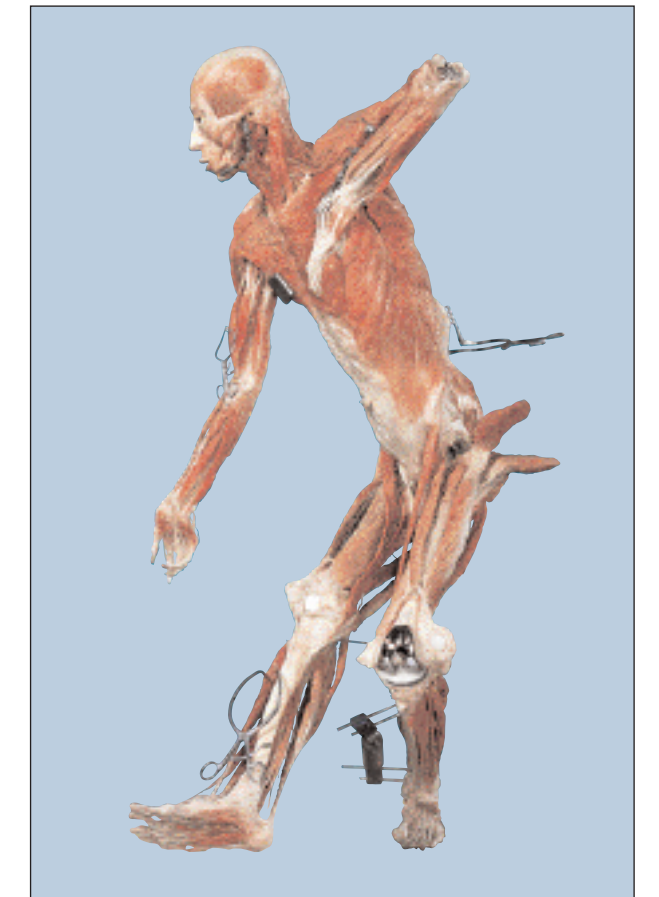
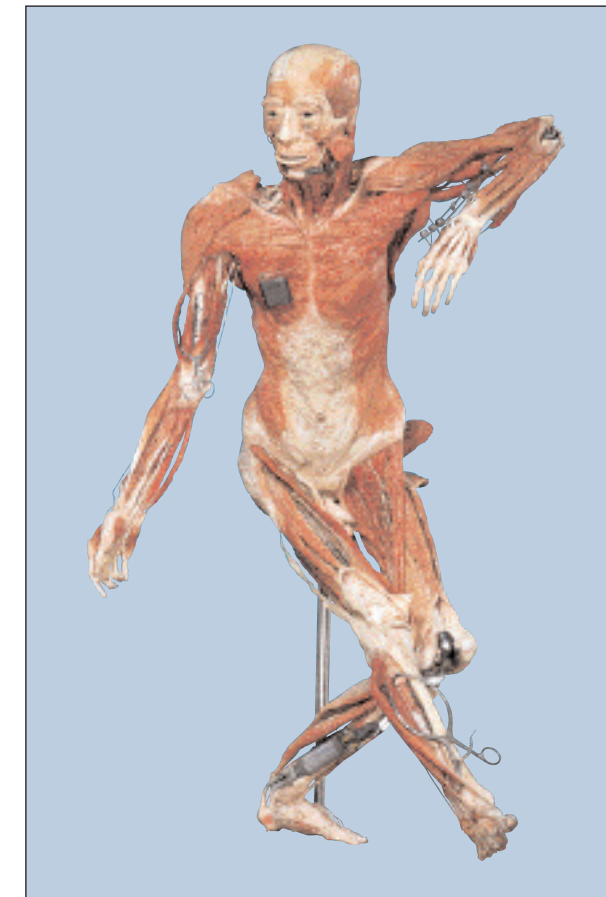


Fig. 1: *The Orthopedic Body*, 1997

in Figure 1, these bent joints can be harmoniously displayed in the pose of a dancer.

It was the anatomical artists of the Renaissance who were the first to reduce the distance between anatomized cadavers and the living, by imparting poses of motion to whole-body specimens. This can be seen in many depictions; there are also several dry specimens from a later period, unfortunately largely in pitiful condition.⁴ The lifelike poses of these musclemen have endowed these specimens with the illusion of life, which tends to suppress any thoughts of corpses and mourning or even to neutralize these ideas. The illusion of movement suggested when viewing specimens positioned in lifelike poses is based on unconscious memories of visual images of motion. Such specimens are animated by poses of motion in the imagination of viewers. This succeeds especially when typical aspects of movements are magnified or even exaggerated. With *The Runner*, this means concretely that the length of the stride has to be exaggerated to a fantastic degree. Generally speaking, this is the same technique as that used by sculptors to bring life to a kinetic sculpture hewn out of a block of marble. The lifelike poses of gestalt plastinates are so similar to the living that viewers can actually recognize and even feel their own corporeality and can identify with it.

Gestalt plastinates are not objects of mourning; they are instructional specimens. Mourning would interfere with learning; our thoughts would digress. Consequently, I have attempted to make gestalt plastinates appear as lifelike as possible. Freed of the stigma of revulsion, such vital, holistic anatomy thus becomes feasible, with which viewers can be fascinated by its authenticity.

It is just this holistic, lifelike presentation that does not let viewers forget that each gestalt plastinate represents a unique and individual life. Each gestalt plastinate is an anatomical treasure, unique down to the microscopic, indeed down to the genetic and thus the molecular levels. Hence, the design efforts of a plastinator actually affirm his intention to upgrade the value of the human body. The ethical reservation that with gestalt plastinates “the human corpse [...] is degraded to an object” is thus refuted.⁵

The illusion of bringing life to a body can be reinforced through a striking facial dissection, an emotional pose, typical lifelike details such as accessories, clothing, tools or by creating spaces familiar to viewers, like workplaces or the natural environment. The idea of functionality in the imagination serves the illusion of motion. When a gestalt plastinate ‘is playing chess’ or ‘is riding,’ death is brought closer to life in a kind of humorous fashion. “It would be hard to imagine whole-body plastinates without that special humor (the pose, as one of the few hate-filled visitors to the exhibition claimed as the main reason for his rejection of it), with which von Hagens has quite obviously succeeded in transforming the energy of the threat emanating from repression into zestfulness, without letting either desire or inhibition penetrate the consciousness [...]”⁶

Fragmented Gestalt Plastinates

Traditional anatomical dissection is based on removal. The insides of the body are successively laid bare, layer by layer, ‘dissecting by removal’ as it is typically called. First the skin is removed, then the muscles, followed by the organs, until only the bones and ligaments are left. Therein lies the weakness of this method of dissection, as by the end of the course, students have often forgotten which parts were removed at the beginning. Such ‘leftover’ dissections are even more incomprehensible for laypersons.

Conversely, in architectural and engineering studies, it is common to present complex, three-dimensional situations in so-called ‘exploded views’ that leave nothing out but instead show the structures separately by displacing the individual components spatially while retaining their proper relationships to the whole. By means of their displacement, an insight into the structure is made possible, which aids in understanding the compact three-dimensionality.

When I opened an anatomical atlas for the first time, I was surprised that I was led picture by picture into the depths of the body in large strides, but the intermediate structures that could have given me a three-dimensional understanding were nowhere to be seen. As a student, I learned that the missing pieces consisted mainly of fat and connective tissue that had landed on the dissection-room floor. The so-called ‘exploded skull,’ which permits a view into the complex bone structure of the cranium by means of a spatial displacement of the individual bones, has been the only exploded specimen in anatomy departments until now. This is understandable as a certain hardness is needed for fragmentation that was not possible with soft tissue prior to the discovery of plastination. Fragmented whole-body specimens can be folded open, expanded horizontally and longitudinally, turned into ‘drawer bodies,’ and of course ‘exploded’ to show their inner workings. For this purpose, bodily fragments are expanded, are opened as bodily ‘doors’ or are pulled out like drawers. Insights are gained by spatially moving certain components without removing any organs or body parts. In this way, views of the inside of the body can be gained that have remained unseen until now. Fragmented gestalt plastinates succeed when the arrangement virtually prompts viewers perforce to reconstruct the exploded bodily fragments in their original positions, in other words to close the body in the mind’s eye. It thus brings about a mental animation of the fragmented gestalt plastinate in the eye of the beholder, which can even serve to enhance its impressiveness.

Mental, spatially opened dissections are the parents of practical fragmentation and expansion. They are the forms of creative thinking that challenges my imagination most intensively, which I first began to master after 15 years of dissection work. For the first few years, I taught anatomy with pictures, just as I had got to know them in anatomy atlases and in dissection courses. When I was teaching anatomy, these pictures helpfully came to mind. In my imagination

then, the human body resembled more a stick figure than the genuine, densely structured insides of the body. My knowledge of anatomy gained more depth after the invention of slice plastinates and the daily anatomical occupation with plastinate body slices. My idea of the body’s insides became more compact because 1/8-inch-thick slices permitted me continually to observe how structures spread throughout the body, which ones are above and below them, which ones are to the right and to the left, which ones are in front and behind. A contributing factor to solidifying my anatomical conception was the fact that I called upon students in seminars over a number of years to think themselves randomly into the various bodily structures, to shoot imaginary arrows in all directions within these spaces and to describe exactly the anatomical paths that were followed. In establishing new views of bodily interiors, it is usually more helpful not to look at anatomical pictures to see what they show, but to analyze what they do not show. Why, for example, is the eustachian tube never shown from below? Why is the gluteal musculature never shown from above? In the meantime, I have been aided in such considerations by a database comprising 20,000 anatomical pictures ranging over five centuries, which I am constantly expanding.

When the approximately 5,000 definable structures of the body’s interior had become so familiar to me as people’s own bodily surfaces are to them, I no longer needed any pictures to know where exactly these structures were to be found deep below the exterior. Just as anyone can walk through his or her own apartment in the mind’s eye, I thus began to ‘wander’ through the human body mentally. Unlike apartments, in bodies everything is tightly packed, structure to structure, without any spaces in between. As a consequence, I do not mentally move between anatomical structures, but inside of them. I wend my way through organs, bones and muscles and slide down nerves, as if I were moving around in a basement storeroom crammed with sacks of potatoes and peas and the electric wiring in between. The burlap used to enclose such foodstuffs corresponds to the connective tissue covering the organs, muscles and nerve tracts in the body. Now I only have to observe the surrounding area carefully and to blot out the adjoining organs in my mind in order to permit completely new bodily landscapes to evolve. These are then mentally exposed by removing, displacing or separating the structures located in front of them. The pancreas can thus be made visible either by removing the stomach that blocks it or by shifting the stomach upwards or by cutting it in two and moving it laterally to both sides. When exposing structures with such invasive thinking, I always have the choice of dividing them either geometrically by cutting or functionally in accordance with their natural surface relief.

However, there are not only instructional interfaces inside the body itself; they can also be imagined from the outside towards the inside. These can be mentally expanded into fissures. Structures that are of interest can, if necessary, be

imagined from their more instructive sides and finally these fissures are displayed as aesthetically appealing showrooms of bodily interiors. Gestalt plastinates conceived in this way must be considered and reconsidered again and again, like a chess game in which one or both players has his or her back to the board so that the moves have to be announced while the constellations of pieces formed in the mind’s eye are constantly changing with each move. The moves also get better and better the more often they can be reconsidered and, if necessary, can be altered mentally. In doing so, the position of the pieces can be optimized through isolated movements in front of the mind’s eye. The faster I can successively perform these movements in all three directions in front of my mind’s eye, the easier it is to choose alternatives and to make decisions about which one of the bodily images thus imagined comes closest to my objective.

I call fragmented gestalt plastinates of the whole body ‘exploded specimens.’ To a particular degree, they aid the understanding of laypersons looking into such specimens, who need the totality of the body in order to comprehend it. The unusual body forms resulting from fragmentation are in fact a necessary consequence, but are not the object of my artistic efforts. Creative impulses are foreign to today’s macroscopic anatomy, which is entirely devoted to students’ instruction and research. However, it is just not possible at all to get a cadaver soaked in formaldehyde to stand up straight and to remain in a given position. It is thus understandable that when professional anatomists occasionally criticize certain bodily specimens in the BODY WORLDS exhibition “that are not to be justified by a single didactic principle,” they are breaking with visual anatomical patterns that have obtained for decades.⁷ The reactions of visitors to the BODY WORLDS exhibition have shown that the type of representation that creates interspaces without removing organs or other bodily parts is superior to traditional dissections in imparting holistic anatomical knowledge.

Examples of Specimens

The Runner

The *Runner* is the first and only anatomical whole-body specimen worldwide, in which both the skeleton and the muscles are all visible at the same time. For this purpose, the muscles were detached at their fleshy origins on the respective bones largely located near the torso, and were then either folded back or laterally shifted in groups. For an unobstructed all-around view, it was necessary to lead the extremities away from the torso, e.g., either towards the front or back. This inevitably resulted in the positioning of the *Runner*.

If certain “associations with Baron Frankenstein” are awakened here,⁸ for me this is an indication of the realization suggested to me by Bazon Brock that varying ways of thinking can all lead to the same creative results.⁹ Consequently, the *Runner* has been evaluated in varying ways. Opinions on this

specimen range from a “unique synergistic view of the locomotive system, especially for physiotherapists”¹⁰; “a specter right out of a chamber of horrors: [...] It is naked and what’s more: [...] Pieces of flesh are hanging downwards [...]”¹¹; to “Mercury, the messenger of the gods, on a swing.”¹²

Reclining Pregnant Woman (Fig. 2)

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. In this connection, this pose, in which the body is lying upright on its side, has aided in providing the desired lifelikeness as well as the necessary tension. 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 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. Two opinions that show very different ways of seeing things should be quoted at this point: “I cannot get the image of the pregnant woman out of my head. I am the mother of four children. However, I have first truly understood the miracle of pregnancy while in front of this woman’s body.”¹³ Conversely: “A plastinated pregnant woman in a pin-up pose strikes Kerstin as not being in very good taste.”¹⁴

Examples of Expansion

The ‘exploded skull’ is the only example of an expanded dissection known to traditional anatomy. In producing this specimen, all of the individual skull bones that have been previously separated are shown as a kind of anatomical ‘big bang’ as if they were about to scatter in all directions. This principle, when applied to the entire body, led to *The Exploded Body (Fig. 3)*. The next consideration was not to expand the bodily fragments in all directions at the same time, but selectively in one of the possible directions. With bodies expanded longitudinally, expansion was upwards (*Fig. 4*), with the *Organ Man* it was lateral (*Fig. 5*) and with the *Swordsman* it was towards the front and rear.

The Swordsman (Fig. 6)

Of the three gestalt plastinates expanded in a particular direction, the *Swordsman* has been made the most lifelike with its typical positioning. In order to facilitate the viewers’ ability to return the fragments to their original positions in the mind’s eye, the right knee and elbow joints serve as pivots to open the front and back halves of the body. Dissection of a third layer of organs including the spinal column, kidneys, heart and the insides of the head was dictated by the

didactic attempt to display the organs as separately as possible, while at the same time showing the spinal cord from the front with the peripheral nerves emerging from it, especially those of the arms and legs.

The Lassoer (Fig. 7)

With the *Lassoer*, several expansion techniques were combined with one another. To turn the head left, it was not simply rotated, but was opened to offer a view inside of it. For this purpose, the head was opened with two cuts running parallel to the nose. The resulting fragments were then fanned out like an accordion. The view into the torso was made possible by swinging out the three segments of the torso. To make it easier for viewers to close it up again in the mind’s eye, a strip of tissue from the chest and abdominal walls was left in place, as was a lower left-hand section of the torso. In order to show the large number of finger and foot muscles with their marionette-like tendons, the tendons of both forearms and of the right lower leg were separated from their attachments and then together with the venters of the muscles were twisted laterally in such a way that the elbow joints and the one knee joint could serve as pivots. The superficial and deeper muscles of the right thigh have been made simultaneously visible by separating the former from their origins at the hip. This integrated superficial and deep dissection has been combined with a lateral shift of the left leg so that both the head of the femur that has been removed from the hip socket and the hipbone (acetabulum) itself can be viewed.

The Drawer Body (Fig. 8)

Traditional anatomical representations have given a false impression of the compactness of bodily interiors and close spatial relationships of the individual structures to one another. The interior of the body is a tightly packed, functional system of adjacent organs without fissures and interspaces. *The Drawer Body* presents just this compactness in the human body. In order not to be reminded of figures created by Dali, I have refrained from dissecting too many drawers, namely for the chest organs, the upper and lower abdomen as well as the small pelvic cavity with the reproductive



Fig. 2: Reclining Pregnant Woman, 1999

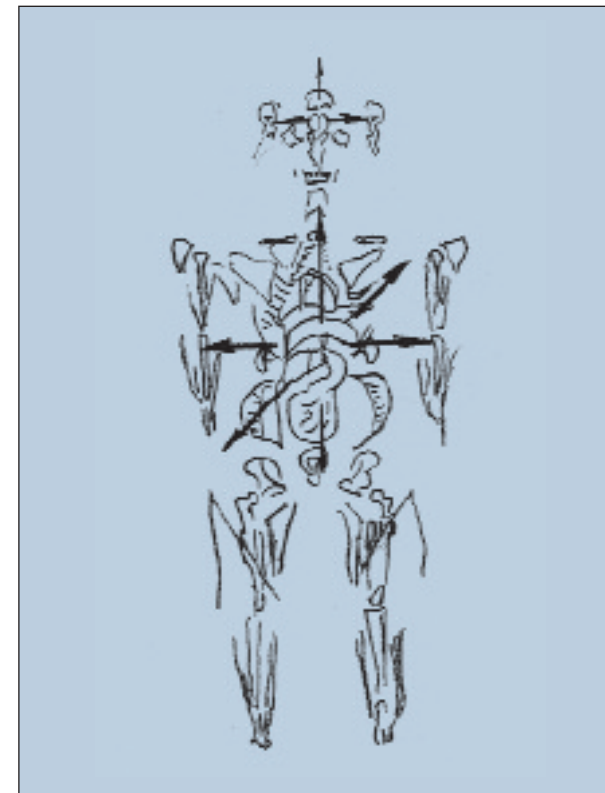


Fig. 3: The Exploded Body, 1997

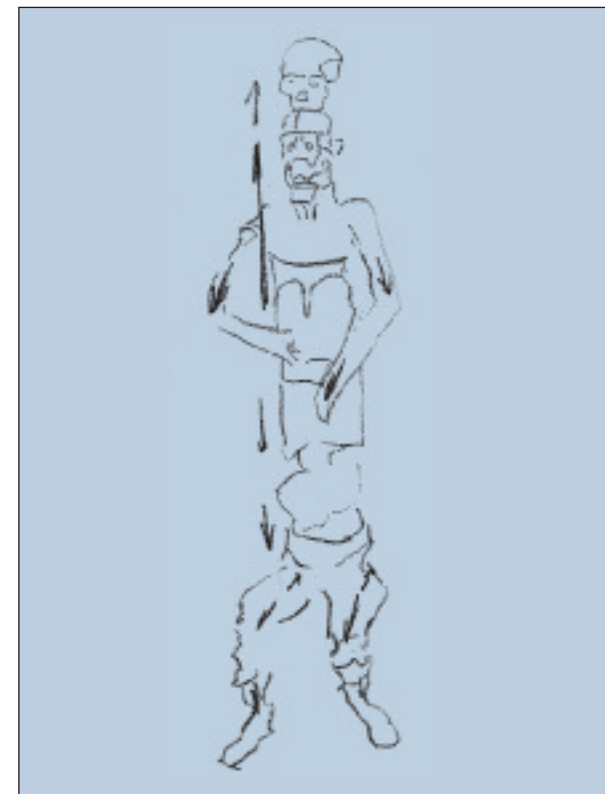


Fig. 4: The Longitudinally Expanded Body, 1996





Fig. 5: *The Organ Man*, 2000



Fig. 7: *The Lassoer*, 1999

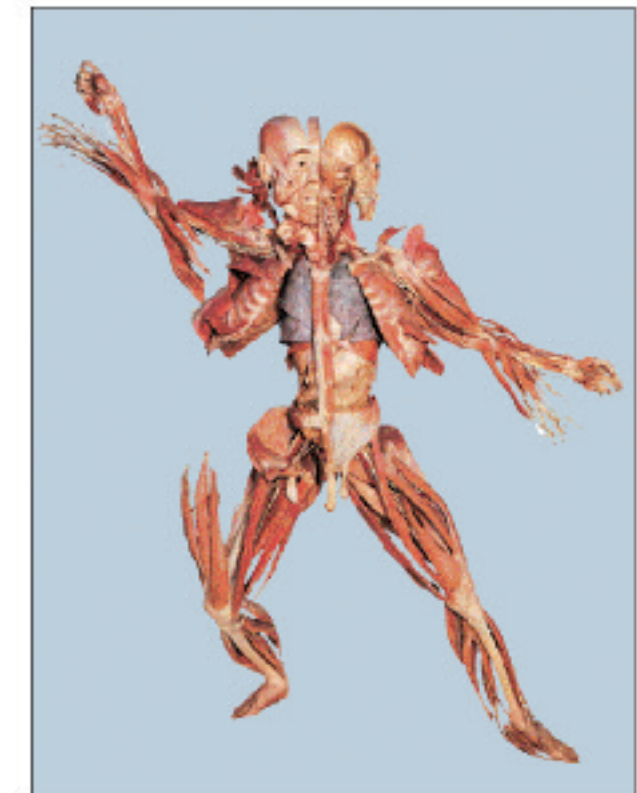


Fig. 6: *The Swordsman*, 1999

organs, although in my opinion this would be the most understandable way of presenting them. Instead, I have concentrated on one large window that contains two bodily doors to permit a more detailed view: one for the heart and another one for the glandular cavity, which I have combined with an opening in the stomach.

Lifelike Ambience

One of the essential design principles of the BODY WORLDS exhibition has been based on the conviction that a lifelike and attractive setting, e.g., one enlivened with plants and objects from daily life, would facilitate dealing with human specimens. As it is the anatomy of living human beings that interests us, it should be imparted in an environment which is familiar to visitors and in which they can feel comfortable. Just as the artists of the Renaissance placed their anatomical figures in lively landscapes adorned with plants and animals, I like to put the gestalt plastinates back into the living world from which they came. The gestalt plastinate posed as a *Chess Player* has been given a chess board, while the *Swordsman* wields a foil. Other gestalt plastinates have been placed in a garden setting complete with a brook. Lippert referred to the negative effects and atmosphere in the dissecting halls common at most universities. He wrote that ca-

davers used for anatomical study were presented to students in an environment “that caused fear to arise instead of confidence.” Students would thus become so accustomed to working in such an uninviting, sterile environment “that they would no longer be able to understand the shock of patients reacting to hospital facilities” (Lippert, cf. Ref. 2).

Creative and Aesthetic Anatomy

Anatomical artists of the Renaissance drew the human body just as they perceived it. In order to make clear the candid presentation of reality—an autopsy, i.e. seeing for oneself—they included light and shadow in their studies of dissections. They even painted a fly shown sitting on the cadaver in order to indicate the moment of viewing. Viewers were supposed to be able to rely on these pictures; nothing was generalized. The schematization of anatomical drawings developed later. The anatomical artists preferred to draw musclemen in aesthetic and lively poses, frozen, so to speak, between life and decomposition. They were more interested in dissected bodies as form and relief than in the details of their insides. As the anatomical artists began to die off, dissection lost its creative and aesthetic components. Today creative anatomy is only practiced in such clinical areas as reconstructive surgery (e.g., of the face) and aesthetic surgery (also known as plastic surgery).

In the criticism quoted here that “dissections are not just carried out—as alleged—according to objective criteria [...], but in light of the effects,”¹⁵ I see scant regard for the surroundings in which knowledge is imparted. An aesthetic anatomy atlas, endowed with an emotionally positive ambience, instead of an abhorrently disgusting book, a richly colored gestalt plastinate instead of a grisly cadaver, will all help to make anatomy an emotionally positive experience. Why have schoolbooks and museums become so much better today than they were 20 years ago? Because they concentrate on presenting effects, colorful pictures and small stories that are easy to remember. Pedagogical research has proven that that which is presented in an emotionally positive way can be learned faster and is easier to remember. I gladly make use of effects when they facilitate learning. The church recognized this much earlier than pedagogical science. Whatever was supposed to stick in people’s minds was gold-plated, optically refined in every imaginable way as well as put in monstrance’s and publicly displayed, e.g., canonized relics of skeletons that were carried through Cologne during Corpus Christi processions. What is the ethical-moral difference between the glass eye of a gestalt plastinate and the glass eye used in a reconstructive facial operation or between a gesture of movement in a gestalt plastinate and a breast enlargement in a living person. There is no reason not to let gestalt plastinates have the same things that we as the living take for granted. How-



Fig. 8: *The Drawer Body*, 1999

ever, a plastination laboratory is not a beauty salon for bodily interiors as the plastination process when professionally applied only prevents cadavers from being turned into the usual gruesome anatomical apparitions. This becomes readily apparent on the one hand when we view aesthetic, transparent body slices that do not require any type of coloration,¹⁶ while on the other hand when we see deformed fetuses that in no way have any aesthetic appeal on which to feast the eyes.

Design parameters rooted in us cannot be abandoned in reconstructing or positioning specimens if a gestalt plastinate is to be perceived as a whole. Apparently the design potential of our bodies is limited—beyond the given anatomical structure—by deeply rooted constraints about ourselves. Although I can create interspaces to facilitate viewing at will, nevertheless my imagination is subject to very limited tolerances should the body be regarded as a whole. It seems important for the symmetry of the design to be unblemished. An improperly positioned eye, a shoulder that has been removed, a missing extremity can degrade the design and make the body appear chopped up.

Gestalt and fragmented plastinates, made possible by solidifying soft tissue and organs, are capable of imparting the feeling that they are authentic representatives of very individual human lives better than the traditional, partial dissections or individual specimens preserved in formaldehyde or supine cadavers could ever do. This complies with my ob-

jective of making the physical body accessible without the gruesome aspects, which has never been seen in this way by human eyes before and which will positively amaze viewers acquiring knowledge in such an aesthetic-instructive manner that they will find the design compelling just because it is convincingly aesthetic and instructive but not morally offensive.

The Beauty of Bodily Interiors

Is the human body generally attractive? To answer this question, let us first turn to depictions of bodily exteriors in art history: Without doubt, the depictions and sculptures of the Renaissance in the 15th century only showed the beauty of the body. In contrast, the Expressionists of the 20th century also presented suffering and fragile, emaciated, sickly bodies. Neither group, neither the artists of the Renaissance nor the Expressionists, depicted the untruth. Both sides of the body, the attractive and the less attractive, are real—here a perfect, strapping body, there an old and feeble body or even a mutilated one. Both sides are also shown in the BODY WORLDS exhibition—here aesthetically posed plastinates, there severely deformed fetuses.

Sensitivity to the beauty of bodily exteriors has been acquired evolutionarily. In doing so, only those bodily attributes were able to gain acceptance as criteria for beauty that

signaled health and vitality (bodily symmetry, muscle volume, smooth, soft skin, etc.) and that showed promise of being successfully passed on to the coming generations as each person's own genes. Conversely, evolution has not developed any visual preferences for non-visible bodily interiors; they can only be experienced indirectly (for example, exhalation, perspiration or excrement). Consequently, viewers do not find a diseased heart or a cirrhotic liver any less attractive than healthy organs. Pathologists can even rave about 'groovy' cancerous metastases in the liver. However, unpleasant visual appearances and indirect attributes of bodily exteriors can be so revolting that all we can do is flee.

In light of varying aesthetic assessments of bodily exteriors and interiors, aesthetic presentation of gestalt plastinates can be achieved by avoiding physical revulsion (no missing teeth, no empty eye sockets, no excrement, no offensive odors, etc.) and by taking general aesthetic principles into consideration, which are subject to our perceptions:

Designing aesthetic gestalt plastinates aids in overcoming taboos that are hostile to the body. It permits us to satisfy our deep curiosity about our own persons and to open our hearts to ourselves. Our bodies can thus undergo a change in meaning: from a grisly unknown quantity to an intimate main attraction of creation.

Culture and Bodies

The Aristotelian philosophy on the dualism of body and soul found its way into Christianity via the Roman Catholic world. As a consequence, the Christian religion at the same time became the most amicable of all towards anatomy. Modern anatomy was thus able to become established in Italy, the land of anatomy-friendly popes. Scholars of the Enlightenment learned to devote themselves to the body in a selectively anatomical way, free of any mystique or grief.

At the beginning of the 3rd millennium, technical progress has made it possible for us to gain new ways of viewing the human body thanks to internal imaging processes developed for medical purposes, such as computerized axial tomography (CAT), magnetic resonance processes or 3D ultrasound used with living human bodies. Whether the interiors of our bodies are made visible by means of the density distribution of our bodily fluids or body temperatures, we can experience our bodies in a new and visually different way each time.

With the aid of computerized image processing, it has become possible to manipulate such body-related data artificially. High-performance, three-dimensional computer-graphics software now allows us to create new bodily images in cyberspace that are capable of evoking emotional responses from viewers. In addition to this ability to be experienced graphically, plastination also permits us to make bodily interiors authentically perceptible in 3D. There are

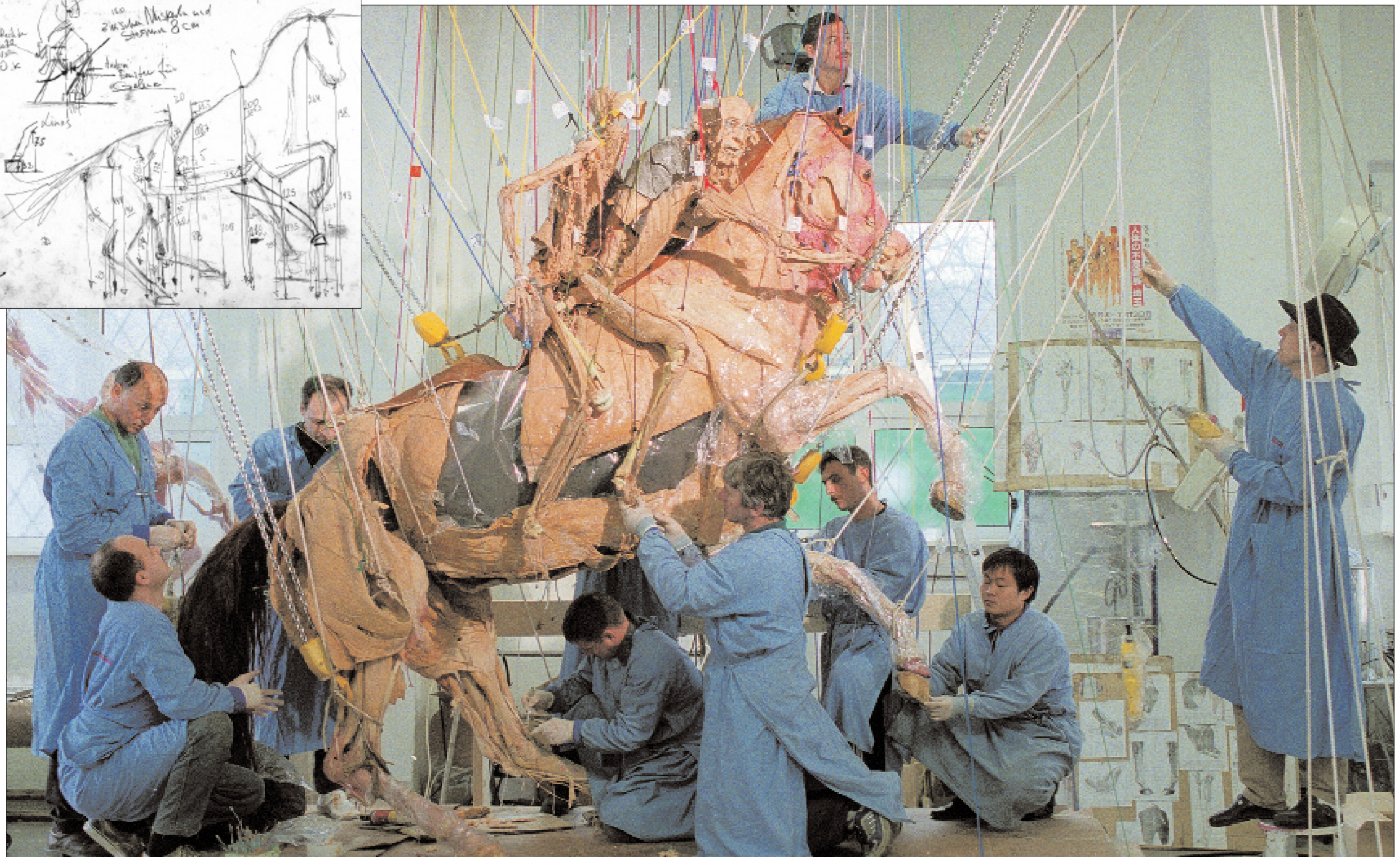
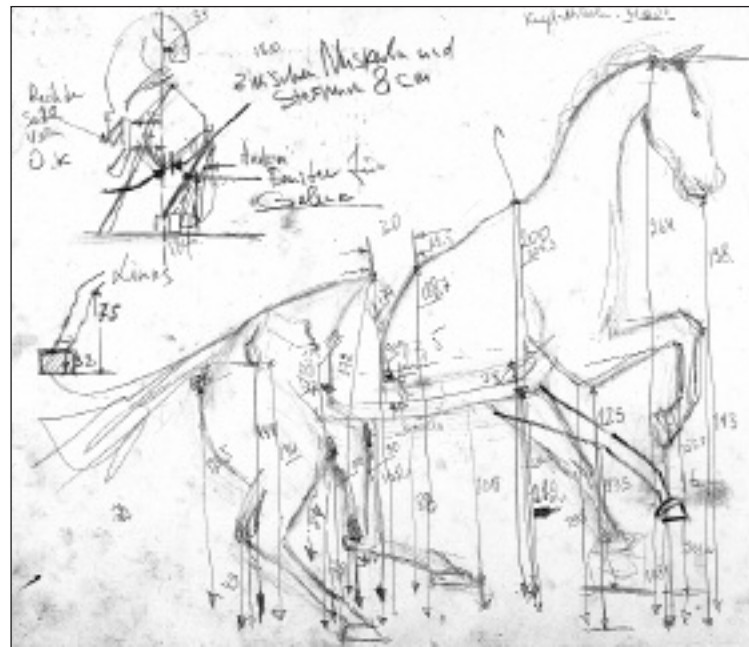
no new possibilities for depicting the body that are truly fascinating; it is only the body itself that is fascinating. Skeletons and mummies have now been joined by a new representative of post-mortem physical existence, namely gestalt plastinates. Body donors have bequeathed these bodies to future generations of their own free will as a kind of 'anatomical cultural heritage.' In this connection, a plastinator has assumed the role of a designer.

The debate surrounding the BODY WORLDS exhibition, and especially the gestalt plastinates shown therein, has been conducted very emotionally; nevertheless, it affects the culturally acquired appreciation of our physical being. The way in which we deal with our bodies has been culturally shaped by our traditions. How much nudity and how many bodily interiors can be shown publicly have been regulated and placed under taboo. It affects our cultural identity based on group acceptance. From totally veiled women in strict Islamic countries to uninhibited nudity during Carnival in Rio de Janeiro, we can find all of the nuances involved in dealing with naked skin. In Sudan a disputed nudity border in fact separates the veiled Islamic North from the more liberal, naked black-African South. Naturally, dealing with naked skin and with bodily interiors also differs accordingly. Because gestalt plastinates serve educational purposes, they may be more nude than naked skin, since in most cultures nudity is only acceptable in art and in medicine.

Whether nudity is placed under taboo is not only dependent on the location, but also on the purpose in mind. The public will generally be more apt to concede a nudity show to artists of nude paintings than to someone attending a striptease show. It is no different when physically showing bodily interiors. Medical students may look at bodily interiors. Artists may not necessarily be given this right, while laypersons will have to justify why they should not be considered voyeurs: "It is probably that weird, creepy feeling, a kind of voyeurism, that drives people in droves to the BODY WORLDS exhibition, this sensationalism, when a corpse stares into space."¹⁷

The cultural significance of plastination is threefold:

1. For the first time, people have been dispensing with traditional burials for the sake of educating the public about anatomy.
2. Showing attractive bodily interiors has made it possible to emancipate the body. Bodily interiors are no longer repressed by the immediate effects on our consciousness of the body. We can thus develop anatomical pride in our bodies. Numerous comments made by visitors to the exhibition have documented this: "I now understand myself better and am full of admiration for my body." "I am the mother of five children. Today I have better understood the life that I was able to give my children." "I stand in awe of the Creator, intend to stop smoking and to do more for and with my wonderful body. What a pity that I hadn't seen this much earlier."¹⁸



Gunther von Hagens and his plastination team positioning the mega plastinate „The Rearing Horse with Rider“, 2000

Clarity	Clear, precise dissections	Offensive, imprecise dissections
Dynamics and functions	Lifelike poses, flexed muscles	Deathlike poses, motionlessness
Human forms	Preserved, perfect forms, sustained symmetry	Fragmentation of the body, mutilation, deformation
Harmonious distribution	Harmonious windows in the body	Disharmonious bodily openings
Dimensions and forms	Proportional structures	Disproportional structures
Frequency of presentation	Rare and surprising	Frequent, conventional, commonplace
Colours	Colourful	Grey and monotone
Odours	Odourless	Stinking, pungent
Blood	Solid or removed	Dripping

Tab. 1: Perceptions of the human body

3. With gestalt plastinates, death takes on a new dimension. It gains a certain proximity to reality, which imbues the image of death with a particular reconciliation. Comment of a body donor: “Since seeing the BODY WORLDS exhibition, I can await my death with absolute calmness.”

A surprisingly large number of visitors to the BODY WORLDS exhibition—i.e., surprising for commentators from our society at large, the media, church representatives, anatomical professionals and politicians—has shown through high acceptance ratings that laypersons do not always fulfill prognostications about their anticipated interests.¹⁹ It is just this fact that means democratization for anatomy.

Five hundred years ago, anatomical artists bolted a skeleton together for the first time and made it a permanent part of society. Now at the turn of a new millennium, we are again experiencing the resurrection of excoriated bodies as gestalt plastinates. Plastination is thus able to satisfy the desire for immortality, which until now has been monopolized by the church, in a way that is commensurate with our times. Christian burial is quasi a tacit, accepted body donation for Christian funeral services. However, these rites emphasize the spirit and disregard the body. Although donating bodies for plastination will return meaning to the body, we still fear the death of the body, but do not fear the death of the soul.

We experience and exercise the daily death of the soul every time we go to sleep; we tend to repress the death of the body. However, the valuable and unique body that we groom and care for each day does not suddenly have to become some-

thing useless after death. Speaking from the standpoint of depth psychology, Susanne Sarial commented that “by walking a tightrope along the abyss of projections, von Hagens has succeeded in relaxing the repression mechanisms through the unexpected humor and the aesthetics of his specimens to such an extent that a small connecting tunnel is created to our primal sexual curiosity and to the closely-related, general cognitive interest and narcissism involved, which is uniquely our own.”²⁰ This narcissism acts in two ways: On the one hand, in the narcissistic satisfaction that we will not someday simply disappear into thin air, but instead will achieve a certain immortality through plastination. On the other hand, this narcissistic satisfaction acts in a way that grants the body every imaginable form of attention and implies the thought of aesthetically designing the body according to our own values [...] the body is not just a ‘container of disgusting fluids,’ not the Devil’s playground for sins of the flesh, as propagated by Christianity, but a ‘stylized cultural happening.’”²¹ Redesigning the body through plastination strengthens this narcissism, which is diametrically opposed to the “memento mori” of the Church and its teaching on “dust to dust.”²² In a period of redefining the value of the body, which is bound up with greater esteem, donating bodies for plastination seems to be a response to Christian negation of the body, which is no longer in tune with the times—a response that considers the body less as a “sack of maggots” (Luther) than as a marvel of creation.

Gestalt Plastinates between Art and Science

The public debate on the artful character of gestalt plastinates has demonstrated their communicative function, which has turned them into a cultural happening. These gestalt plastinates do not serve any artistic purpose; however, they can certainly comply with artistic criteria. Like works of art, well-executed gestalt plastinates possess aesthetic appeal and emotional worth. This is expressed, inter alia, in that half of all visitors have also come to the exhibition because of its aesthetic appeal. Nearly one-third of the visitors have assessed the exhibition as an art show.²³

Here I personally accept the aspect of *Könnenskunst* (skilled art)²⁴ everywhere and have coined the term BODY WORLDS to preclude any misunderstandings. I define this as the aesthetic-instructive presentation of bodily interiors. Presentation is meant both in the sense of exhibiting art and of demonstrating artistic craftsmanship. The aesthetic-dynamic designs made possible for the body by plastination for anatomical purposes permits an emotionally experiential and visual anatomy instead of conventional academic and textbook anatomy. In addition to BODY WORLDS the term ‘designing anatomy’ suggests itself here; its results are gestalt plastinates. The aesthetic value of specimens is enhanced by the design of the respective plastinate and its ambience, just as a monstrosity enhances the religious impact of a relic. The objective of designing anatomy is to impart anatomical-functional insights and thus does not transform anatomical specimens into objects of art. Hence, I do not produce chandeliers out of human bones²⁵ or make an arrangement of brains and testicles in order to designate it as a “masculine medallion.”²⁶ I do not carve cauliflower out of brains and do not transform a penis with testicles into a revolver. As art and beauty are in the eyes of the beholders, gestalt plastinates are not turned into objects of art by my supposed “disposition as an artist.” I am an inventor; for me the creativity of an artist is even more disciplined than the more objective thinking of a scientist. My model is an inventor like Edison, who realized his inventions during his lifetime and achieved financial success with them.

Gestalt plastinates are also not turned into art by my supposed outward appearance as an artist, which is often assumed because of my hat.²⁷ Like artists, inventors are individualists. And so were the anatomists of the Renaissance, when they wore hats while lecturing or dissecting within the circle of their colleagues. After I had familiarized myself with the works of Josef Beuys, I could say that we had much in common and neither of us was ‘old hat.’ The reason is that he is a model for me both because of his unconventional thinking and his efforts to conduct a regular discourse with laypersons about his work and theses. The difference between us lies in the fact that he sought the favor of laypersons but won the approval of intellectuals, while I have courted the favor of professional colleagues but have actually only gained the approval of laypersons.

What Is a Corpse

Given that the debate about when life begins and ends, and thus when a body begins and stops living, has been largely concluded, the definition of a living human being would not appear to be controversial. Yet as recently as 200 years ago, the beginning and end of a human life could only be established by observing a person’s first and last breath. More precise definitions did not become available until our understanding of medicine began to grow. With the invention of the microscope, for instance, we could pinpoint the beginning of human life as the point at which an ovum is fertilized, and with the discovery of the circulatory system came the conviction that life ended when the heart stopped beating. Still more insight was provided by the inventions of electrocardiography (EKG) and electroencephalography (EEG), which can be used to detect electricity in the heart and brain and display this information in graphic form. Since then, a lack of any electrical activity in the heart and brain have marked the dividing line between life and death. From this time onward, a dead human body has been referred to as a corpse in casual speech. Developments in artificial respiration and in heart-lung machines have renewed the debate surrounding the end of life because these technologies have allowed the heart to continue beating even after brain death and have kept the rest of the organism ‘alive’ through artificial means. Brain death is now considered the critical factor in determining the ‘true’ time of death and is also used as a basis for organ transplants.

Conversely, in light of the recent controversy surrounding the legality of the BODY WORLDS exhibition, the question “What is a corpse?” would appear to be in need of further clarification. The *Kulturkampf* in the media has really been quite dramatic, revolving around the questions “morbid or educational?”, “anatomical exhibition or illegal cemetery?”, “bloodcurdling corpses or plastination?” The controversy surrounding the BODY WORLDS exhibition in Cologne came to a head when representatives of the Lutheran Church of Cologne demanded that municipal authorities prohibit the exhibition.²⁸ At the root of this public dispute are widely disparate views of what a corpse really is. The passions unleashed by this controversy have been further inflamed by the lack of uniformity in the use of various terms. The words ‘corpse,’ ‘cadaver,’ ‘the deceased’ and ‘body,’ for instance, are used as synonyms, although their distinctions should really be clearly defined (see below).

General encyclopedias, such as *Brockhaus* and *Meyer*, define a corpse as “the body of a human being after death” and “the human body after death.”²⁹ A corpse is thus defined by the point at which its existence begins as such, i.e., at the moment of death. The *Deutsche Rechtslexikon* attempts a definition based on human form: “A corpse is body, recognizable in its entirety, of a human being who has died or was born dead (not miscarried). Its legal classification is disputed.”³⁰ Both approaches, however, fail to answer the

question “When does a corpse cease to be a corpse?” Until now this has not been a relevant question because the transformation from corpse to dust or ashes, whether in the grave or in the crematorium, has not been a visible process.

Jürgen Gaedke provides the most extensive definition of a corpse, describing it in terms of the end of its existence: “A cadaver is a lifeless human body until such time as the relationship between its individual components is eliminated either by the natural process of decomposition or by another equivalent method of destruction (such as cremation). This also includes human bodies that have been dissected for scientific purposes, provided there exists the intent of interring individual parts together in the traditional manner.”³¹

What is striking about this definition is that Gaedke uses the term ‘cadaver’ and limits the definition by emphasizing ‘decomposition’ and the ‘intent’ to inter. According to this, *gestalt* plastinates should not be viewed as corpses subject to burial because they neither decompose nor [must they be] are they buried. Nevertheless, this definition and its application to plastinates are not clear enough to distinguish satisfactorily between bodies that decompose and the various forms of non-decomposing corpses. What is needed is a system for comparing and contrasting the various forms of a corpse's existence.

In the following I have attempted to organize the terms generally used in this context, emphasize their unique qualities and summarize the results in a diagram (see Figure 1).

All Corpses Are Bodies, But not All Bodies Are Corpses

When using the term ‘bodies,’ it is important to draw an existential difference between a ‘corpse,’ which exists in reality, and the ‘deceased,’ which does not. How else, as Wetz astutely observes, could we refer to the “corpse of the deceased?”³² The term ‘corpse’ describes the dead, lifeless body; conversely, the term ‘deceased’ conjures up an image of the formerly living individual, who continues to exist in the memory of the survivors. A special category of bodies is represented by brain-dead organ donors, whose corpses are used for transplants and are by definition dead due to the irreversible loss of brain function (brain death). The remaining organs, however, are artificially kept ‘alive’ until they are extracted for transplants.

For the purpose of creating a system for categorizing the various forms of post-mortem corporeal existence, I shall use the term ‘corpse’ exclusively, for the sake of clarity. I have classified corpses according to their relative permanence, which reflects their material composition, or, to be more precise, the amounts of water and preservatives that they contain. This results in three major classifications of corpses, namely the corpse itself (a corpse in a state of decomposition), wet cadavers and dry cadavers.

1. A corpse is a dead human body that will decompose

and/or dry out and shrink when exposed to the air. A corpse is generally buried and is a dead body in a legal sense. When used colloquially, the term ‘dead body’ generally refers to a corpse as defined here. Corpses are necessarily of interest to the authorities, as decomposition makes corpses a potential source of disease. For this reason, lawmakers have required that corpses be buried within 36 to 96 hours.³³ Because the identity of a corpse is generally known, and there are usually friends and family, they are typically designated as corpses to be mourned, i.e., as objects of individual grief and individual human pathos. An unclaimed body is an anonymous corpse whose identity is not known. This category also includes waterlogged corpses. Corpses not only serve as objects of mourning: pathological and/or medical dissection of corpses is also useful for determining the legal cause of death of the individual.

2. Wet cadavers have been preserved in fluid and consequently do not decompose, although they will dry out when exposed to air, shrinking significantly and turning brown or black. In order to preserve these cadavers, they must be protected from drying out and shrinking, either by keeping them wet (i.e. in liquid or in an atmosphere of at least 100% humidity) or preserved using a process that dries them without shrinkage. Because preservation renders them non-infectious, they do not generally represent a health problem to the authorities. Wet cadavers include those used for anatomical study and what are known as ‘bog bodies.’ Because they are exposed to the air when dissected by students, cadavers used for anatomical study tend to exhibit significant signs of drying out and shrinkage within three to four months, even if kept meticulously moist. After use in the dissection lab, these cadavers are generally buried. To supplement their museums, anatomical institutes typically transform entire cadavers or parts of cadavers into permanent specimens or skeletons. Bog bodies are preserved by the tannic acid found in bogs and must likewise be stored under moist conditions to prevent massive shrinkage. The identity of these corpses is not generally known because they usually are already hundreds of years old by the time they are found. A special class of wet cadavers is glacier bodies (such as ‘Ötzi’). Decomposition of these corpses has been arrested not by chemical processes, but rather by permafrost. A frozen body is subject to a continuous, albeit slow drying process (whereby moisture is lost due to sublimation), and as a result will either be a wet or a dry cadaver, depending on the amount of time it remains frozen. If a frozen body thaws prematurely, those parts of it that have not been dried out will be subject to decomposition.

3. Finally we have what are known as ‘dry cadavers,’ which, due to continuous dehydration, neither decompose nor shrink significantly. Artificial dry cadavers are filled with preservatives or other materials such as natural resins

that prevent moisture from entering the body and introducing bacteria. Mummies are typical examples of dry cadavers. The mortal remains of the pharaohs were worshipped as visible, physical manifestations of the hereafter. Today, as relics from a former time, mummies remind us of our own mortality.

For a better overview see Table 2, which summarizes the most important criteria described above.

The above classification scheme organizes corpses according to the degree to which they decompose, which, in turn, is dictated by their physical state and/or the manner in which they are preserved. In this light, plastinates and skeletons would have to be classified as dry cadavers. Both retain the recognizable form of the human body; both are preserved in a dry state and do not decompose. The dehydration process leaves no visible signs of shrinkage in either one. All three representatives of this category are incomplete: mummies lack internal organs, plastinates generally lack skin and skeletons lack muscles, organs and skin. Skeletons can, accordingly, be viewed as bone skeletons, mummies as combined skin and bone skeletons (without organs) and plastinates as combined organ, muscle and bone skeletons (without skin).

Figure 2 classifies human body parts, organs and tissue remains as fresh, dead and preserved specimens. This chart provides an overview of the wide variety of permanent anatomical specimens.

Should Plastinates Be Buried?

Church leaders were not the only ones calling for mandatory burial of plastinates—lawyers were as well. According to Thiele, “state burial regulations expressly require across-the-board, mandatory burial,” especially if both “corpses used for anatomical study” as well as “severed body parts” are subject to mandatory burial.³⁴ Such legal requirements are “based on considerations of custom and the ethical treatment of deceased individuals as dictated by local culture.” The “exempt status accorded to corpses used for anatomical study ... merely postpones obligatory burial.”

In the *Rheinische Merkur*, von Campenhausen argues, “that Germany legally mandates the burial of all corpses without exception is an expression of human custom and of respect for the dignity of the deceased even after death.” In the case of corpses used for anatomy, “burial is merely postponed. The same is true for organ transplants, where the donated organ is later buried with the recipient of that organ. There are no exceptions to the legal requirement of dignified burial.”³⁵

Ernst Benda makes three arguments against the BODY WORLDS exhibition: 1) by invoking mandatory burial, 2) by citing the provision stated in article 13 of the Burial Reg-

ulations of Baden-Württemberg (“Corpses may not be put on public display”) and 3) by summarizing as follows: “Transforming a corpse into a permanent exhibition piece is prohibited by law...” The responsibility for the error, he feels, lies “where the transformation process took place,” i.e., at the Institute of Plastination.³⁶

Plastination has now existed for 23 years, and this is the first time that anyone has demanded that plastinates be buried. This demand would presumably never have arisen were it not for the fact that the BODY WORLDS exhibition shows entire bodies that have been dissected and plastinated. Mandatory burial, however, makes very little sense given that burial has never been demanded for the permanent anatomical specimens on display in countless museums. Permanent displays of human specimens have been shown in public anatomical collections throughout Europe ever since the Renaissance; such exhibits are regularly expanded with new specimens. In Germany, for instance, we have the Museum of Pathology and Anatomy in the Charité (the Virchow Museum) in Berlin; Austria has the Federal Museum of Pathology and Anatomy in the Vienna *Narrenturm*; and Switzerland has the Anatomical Museum of Basel.

Most of Europe's anatomical museums are located in Italy, where public anatomy was established during the Renaissance at the anatomical theatres of Padua and Bologna. These include the Museum of Veterinary Medicine, Pathology and Teratology in Ozzano (Emilia), the *Museo di Antropologia Criminale* in Turin, the *Museo di Anatomia Patologica* in Rome, the *Museo di Anatomia e Istologia Patologica* in Bologna, the *Museo del Istituto di Anatomia Umana e Patologia* in Pavia, the *Museo Anatomico* in Modena and the *Museo Anatomico* in Naples. Some of these museums also include entire dissected bodies in their anatomical collections. Have the critics overlooked these? Or should these specimens be judged differently due to their age and historical significance?

It is also striking that it is not anatomists who are demanding that plastinates be buried, but rather a handful of lawyers and theologians who are unfamiliar with both the complex reality of anatomical dissection (*Figure 2*) as well as anatomical practices around the world. If the demand for burial is psychologically rooted in the use of entire bodies for exhibits, then the following questions would be justified and are not meant at all cynically: How large may an anatomical specimen be before it is no longer considered a corpse and thus subject to mandatory burial? If the corpse were perhaps quartered or cut into sections, its components physically separated and, for instance, shipped in separate crates, would it no longer be considered a corpse? How many body parts would have to be separated? How many tissue groups (skin, muscles, organs or entire extremities) would have to be dissected and removed? The example of a dismembered corpse has taught us that a corpse does not necessarily have to be contiguous. A murderer cannot argue that there is no corpse, and thus no victim, because he dismembered it. This means

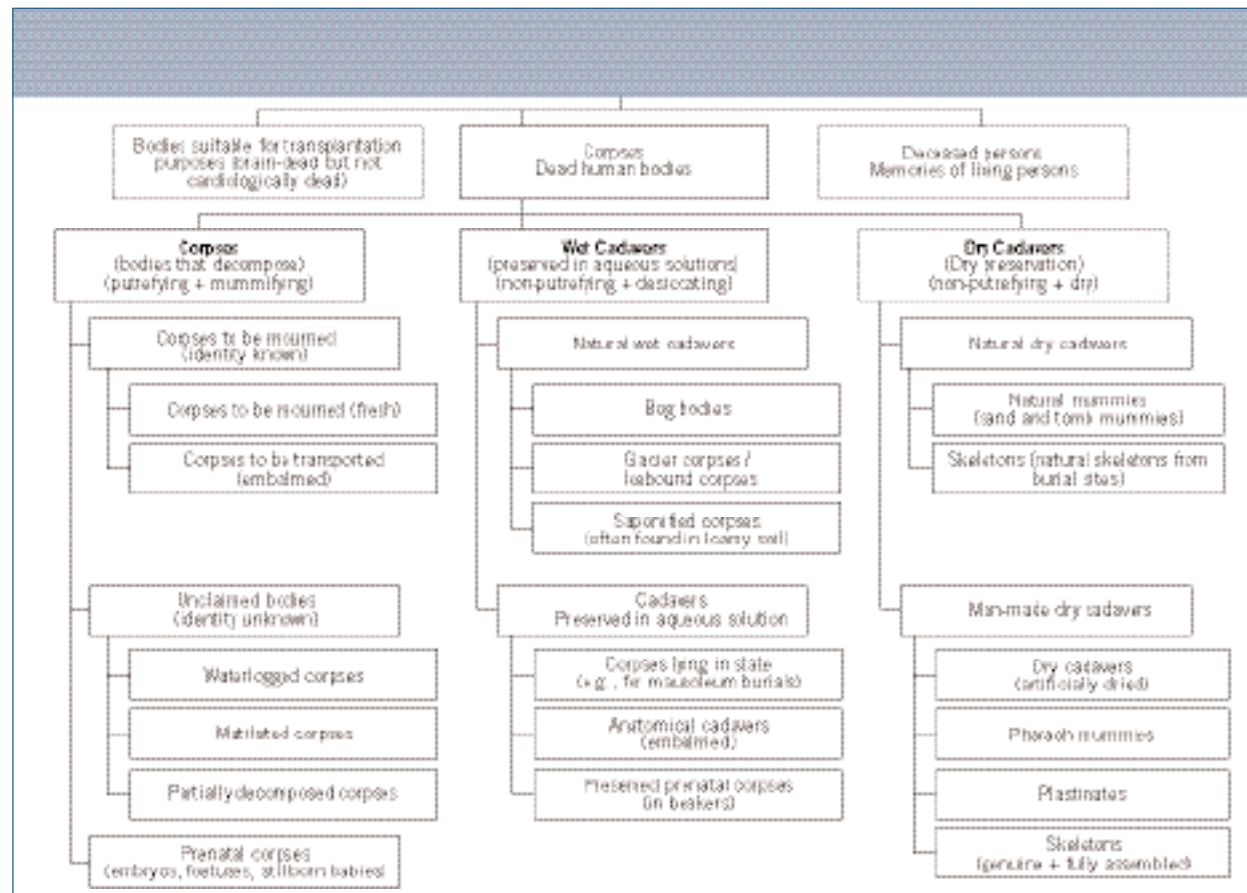


Fig. 1: The deceased, cadavers and corpses (© Gunther von Hagens)

that the criterion that a body be complete cannot be an appropriate one for evaluating plastinates. More important is the distinction between corpses or body parts that can decompose and permanently preserved specimens that cannot, regardless of the degree of completeness. This places the focus of the dispute not on the issue of whether plastinates are corpses, but rather on the question of how to handle corpses and body parts.

Characteristics of Plastinates

The intention of the following discussion is to elaborate on the characteristic qualities of plastinates as compared to other corpses. To aid in this discussion, I will classify these qualities into the following categories: the purpose for which the plastinate is intended, how it is administered and the qualitative changes that have taken place. The purpose of a plastinate can be deduced from the reasons for which a corpse has been donated: to further research, instruction and public education. The administrative act consists of accepting the corpse for plastination, which includes both receipt of the signed donation form as well as ensuring anonymity. The qualitative change involved be-

gins with the first step in the plastination process, i.e., in transforming the corpse into a pre-plastinate. This is done by injecting the necessary chemicals into the vascular system, followed (in the case of cross-sectional plastination) by freezing and impregnating the specimen with polymer. The transformation from pre-plastination to plastination (both for whole-body and partial specimens) is accomplished by curing the polymer in each cell within the specimen. Creating anonymity is important for disassociating the corpse from the specimen because this is the only way of ensuring that the plastinate will not be an object of reverence. In other words, anonymity ends the feeling of individual, emotional attachment to the deceased. The anonymity of plastinates also makes sense because it is in line with anatomical traditions and distinguishes plastinates from corpses to be mourned as well as from mummies and relics of known individuals. For this reason, non-anonymous plastinates must be exceptions to the rule and must be thoroughly justified. It goes without saying that each human specimen continues to have human qualities. That also means that plastinates may only be used in accordance with the last will and testament of the donor, i.e., exclusively for the purposes of research, instruction and public education. Plastinates that can no longer be used

Decomposing	+	-	-
Desiccating	+	+	-
Water content	+	+	-
Preservatives	-	+	+
Whole-body specimens	Corpses to be mourned Unclaimed bodies	Bog bodies, Glacier corpses, Anatomical cadavers	Mummies, Skeletons, Gestalt plastinates
Partial-body specimens	Decomposing body parts	Dissections preserved in aqueous solution	Relics Plastinated organs

Tab. 2: Criteria for distinguishing corpses

are disposed of appropriately, i.e., they are cremated separately and not included with household waste—just as any other human remains would be.

Intended Purposes

Because of the purpose intended for a plastinate, we can perform procedures on it that would not be possible on a corpse intended for mourning. Dismemberment, for instance, is only possible because a plastinate is intended for anatomical study. In his definition of a corpse, Gaedke addresses the subject of intended purpose as follows: “A cadaver is a lifeless human body ..., provided there exists the intent of interring individual parts together in the traditional manner.”³⁷ Regarding those individuals who determine how to dispose of a body, he writes, “The survivors of the deceased are generally those who exercise the right of disposition... This right of disposition may also carry with it the authority to photograph or even dissect the corpse.”³⁸ Whole-body religious artifacts such as the mummies of Capuchin monks and the ornaments fashioned from bones that adorn certain churches serve a ritualistic purpose that precludes burial. The state's respect for this purpose is what has allowed these relics to survive in crypts and churches to this day, whereas the purpose of mummies and relics used to serve ritualistic purposes today largely revolves around tourism. A publicly displayed plastinate serves the purpose of public education. As recently as one hundred years ago, processions of relics drew hundreds of thousands of people to Cologne; plastinates are now doing the same thing. They are a modern way of combining curiosity with a thirst for knowledge and the desire for a deeper understanding of the shocks to which the flesh is heir.

Consent of the Individual Donors and the Survivors

Acquiring the consent of individuals to use their corpses for the purposes of research, instruction and public education is a development that did not arise until the past few decades. In the late Middle Ages, when the science of anatomy was in its infancy, anatomical studies were preferably performed on the corpses of executed criminals. Unclaimed corpses were later used for anatomical instruction. This practice was codified in the Prussian directives of 1889, which stated that unclaimed corpses were to be taken to institutes of anatomy. Most institutes of anatomy in Germany were still operating according to this regulation as recently as the 1980s. The moral standard underlying this regulation is the conviction that anatomical study was no less honorable than burial. In addition, this legislation was also based on the conviction that the state was obliged to offset the shortage of corpses that could be used for the purposes of research, education and training. In the early years of scientific anatomical study, this shortage had led to grave robbing and even murder.³⁹ After 1945, an additional regulation went into effect in Germany, allowing individuals to establish in their wills whether their bodies could be used for anatomical study after their deaths. This made it possible for institutes of anatomy to meet their needs for corpses largely through voluntary donations. Contrary to the conviction of many laymen, no one has ever been paid to donate their bodies to anatomical science. When death benefits in Germany sank from DM 7,500 to DM 2,100 today, the number of “testamentary donors” rose so sharply and so suddenly that donations specified in last wills and testaments became the sole source of corpses for anatomical institutes. Since that time, in fact, these institutes have generally been covering their annual demand for donated corpses within the first few months of each year and do not accept donations for the remainder of the year. As a result of this development, the consent of the individual for using his or her corpse for anatomical study is often required in

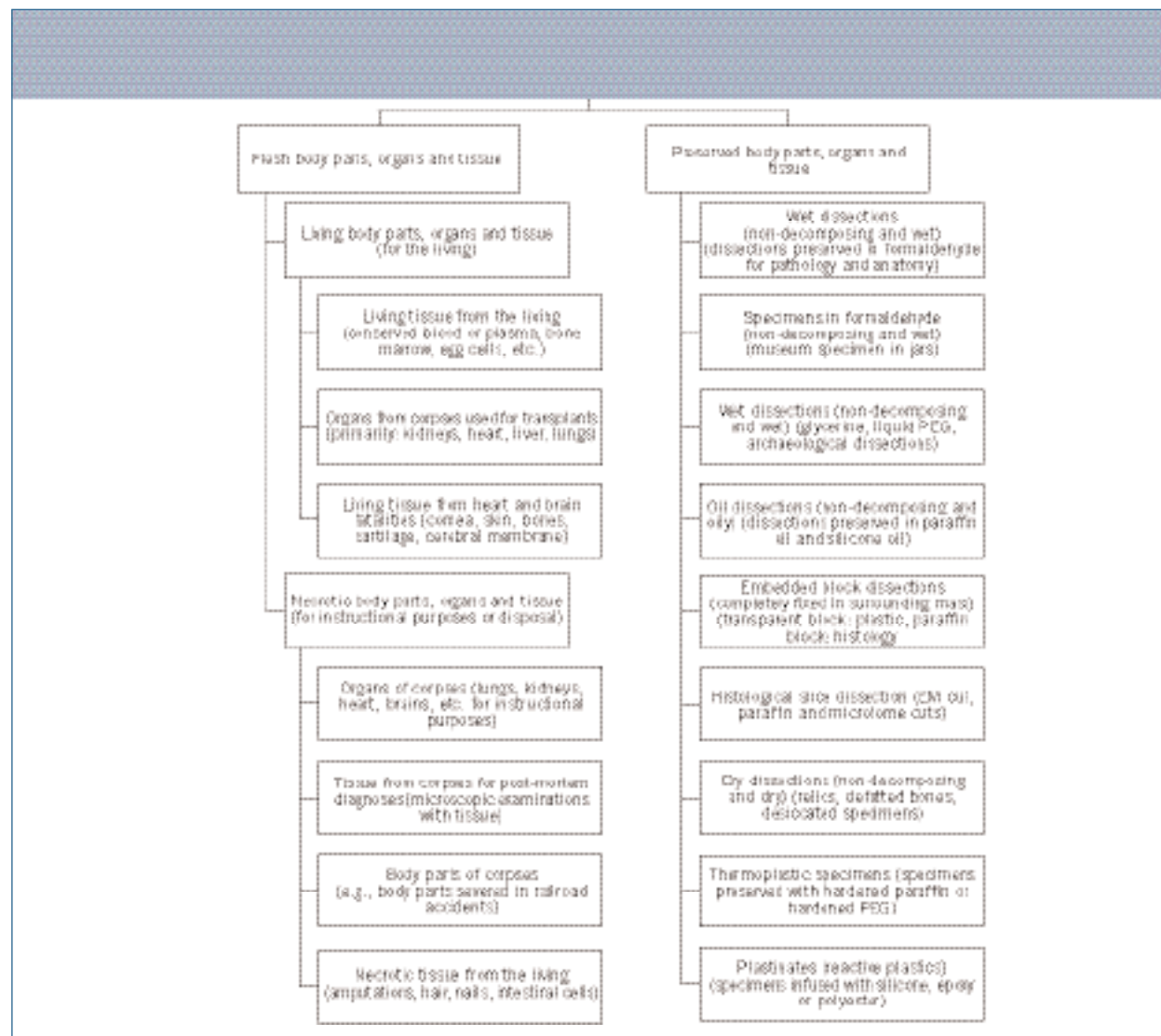


Fig. 2: Taxonomy of human body parts, organs and tissue

Germany, even though it is not legally mandated. Introducing a formal donation policy for plastination reflects the conviction that the values of a democratic society, i.e., that individuals have as much discretion over the use of their bodies as possible, dictate that a public exhibition can only be based on a conscious decision on the part of donors. In practice, the general requirement that the use of a corpse be determined by a conscious decision on the part of the individual has not been applied uniformly. Unlike dissections carried out for the purpose of anatomical study, autopsies, for instance, do not require any consent from either the deceased or his or her survivors; in fact, objections raised by these individuals have no effect whatsoever. After nearly every fatal traffic accident, for instance, the district attorney's office orders an autopsy to determine who was at fault in the accident. No one takes offence to this practice. The permanent specimens on display at anatomical museums stem almost exclusively from individuals who were never

asked for their consent.

On the other hand, both the right to a burial as well as morally or legally mandated burials do, in fact, apply to mummies, skeletons, bone fragments and even the smallest anatomical specimens if they have inherent moral or religious meaning. In cultures where burial is dictated by religion, all that is required to create unifying, collective mourning among members of that society is a shared sense of connectedness to the discovered mortal remains (mostly bones) of their ancestors.

An example of this is the enforceable right of burial claimed by the native inhabitants of the United States and Australia. The US Congress passed two laws in 1989/90 (the "National Museum of the American Indian Act" and the "Native American Grave Protection and Repatriation Act") stipulating that the anonymous remains of Native American ancestors must be turned over to Indian groups for burial upon reasonable application. The "Aboriginal and Torres Strait Islander Her-

itage Protection Law" was passed in 1987 in the Australian state of Victoria, granting aboriginal peoples the right to have the bones discovered at archaeological sites repatriated—a right that led to the reburial of fossilized skeletal remains that were up to ten thousand years old.⁴⁰ There is also an example of this in Germany: In 1989, German television's Channel 3 (SWF) showed a short film about the National Socialist origins of histological specimens at German universities.⁴¹ The administration at the University of Heidelberg disposed of the problem "in a manner suitable to corpses": The glass slides were crushed and buried in the Heidelberg cemetery. This example demonstrates that the size of the tissue sample and the manner of preservation does not necessarily have any effect on burial decisions, even if the amount of tissue involved is only one-fiftieth the size of a drop of blood and 70% of it consists of the plastic with which it is saturated between the two slides. Conversely, there is no burial requirement for the hundreds of thousands of anonymous skeletons found in secondary schools, theatres, crypts and private collections around the world. The same is true of the mummies of pharaohs and of corpses preserved in glaciers ('Ötzi').

Anonymity

Because students are expected to be interested in anatomical structures and not in the fate of the deceased, anonymity has had a long tradition in the study of anatomy. Anonymity neutralizes the individual, emotional bonds to the deceased and underscores the change in meaning of a corpse from an object of mourning to one of study. Lippert questions this practice when he writes, "The corpse is a tool for training students in all aspects of dehumanization because the patient is just a number with no name or feelings. ... Its only need is for a little moisture ... Early on in the course, the students bombard the instructor with questions about the corpse's origins, his or her occupation and medical history. This personal interest fades away over the course of the semester. The corpse becomes an object that students can use to earn academic credit."⁴² When evaluating the pros and cons, I would be in favor of providing anatomy students with information relevant to the physical state of the corpse, such as the age and cause of death. For plastinates, however, there are serious reasons for consistency when it comes to maintaining anonymity. On the one hand, anonymity provides an additional means of disassociating the plastinate from the corpse. On the other hand, it eliminates any legal problems that might result from the survivors' permanent rights of disposition. Experience has shown, unfortunately, that wills stipulating an individual's desire to donate his or her body for anatomical study often unleash family conflicts, some of which have occasionally even made it to court. As a result, revealing the identity of a plastinate will always remain an exception to the rule.

Tradition and Dignity

Religious sentiments and concepts of morality, tradition and dignity have played a crucial role in shaping the way in which we handle corpses, and have given rise to a wide variety of burial rites in individual societies. In Tibet, for instance, religious conviction mandates that corpses be fed to vultures, and in India the ashes of the deceased are scattered in the Ganges. Gaedke considers this issue as follows: "All rights of disposition of the deceased are subject to the limitations stipulated in article 138 of the German Civil Code (BGB), in which neither the views of the deceased nor those of the survivors are sufficient in their own right for settling issues of human rights and human dignity, i.e., for determining whether the use of a corpse violates standards of reverence or moral codes. Disposal of a corpse must instead represent an objective violation of moral codes or standards of reverence."⁴³ In other words, applying traditional moral concepts requires a majority consensus within society.

What this means for the BODY WORLDS exhibition is that the debate about human dignity and displaying plastinates in public cannot be separated from the traditions and moral convictions of the general populace. Particularly in a democracy, citizens should indeed have the right to contribute to a decision regarding what is and what is not considered dignified, and what can and cannot be displayed—especially when these considerations do not limit the rights of others. For me, the dignity of the deceased, which has been debated again and again in the context of the BODY WORLDS exhibition, is a sense of traditional values that resides in the mind of the mourner. It is not an inherent aspect of the decaying corpse, the urn full of ashes or a plastinate. As such, the visible corpse is, sociologically speaking, a 'souvenir of mourning' that keeps the memory alive but that gradually loses meaning as the corpse decomposes; if embalmed it becomes an 'icon of mourning' (as in the cases of Lenin's and Mao's tombs). Benda also indicates that the corpse itself has nothing to do with dignity when he argues that "even a dead human being retains his or her dignity. It is not, however, the body that deserves respect, but rather that which, depending upon one's religious convictions, is not mortal and has been released from the body."⁴⁴ Benda thus denies the dignity of the body, conferring dignity instead upon the soul of the deceased, which is certainly an alternative for those who believe in the existence of the soul.

Legal Recognition of Mandatory Burial

The right to burial is not a Federal issue in Germany; this means that the Institute for Plastination in Heidelberg is subject to the burial laws of the state of Baden-Württemberg.⁴⁵ All of the paragraphs in which the word 'corpse' is used, however, make it very clear that the law is referring only to corpses that decompose, i.e. 'cadavers' to be either buried

or used for anatomical study. A 'corpse in a legal sense' is therefore a cadaver.

Article 27 of the Burial Regulations of Baden-Württemberg states that "all corpses must be taken to a public morgue, if available, within 36 hours of death, but not before a death certificate has been issued," and article 37 states that "every corpse must be buried." As discussed above, the unclear definition of a corpse makes it impossible to classify a plastinate as a corpse. This is also reflected in the practices associated with human corpses around the world, which require mandatory burial only for those corpses that fit the above definition of 'cadaver' and not for all corpses. If this were not the case, there would be no publicly accessible mausoleums and museums would not be able to display mummies, skeletal remains, corpses that have been preserved in moors or corpses that have been artificially preserved. The argument that corpses used for anatomical study are subject to mandatory, albeit delayed, burial⁴⁶ is irrelevant in this context, because the length of the delay has not been defined and has been applied arbitrarily depending on a given corpse's usefulness; in other words, the amount of time that plastinates may be exhibited does not have to be limited. Burial laws do not regulate wet cadavers, such as those found in moors and glaciers, any more than they do dry cadavers, i.e., mummies, skeletons and plastinates. If dry cadavers were corpses as defined by law, then skeletons and mummies would be subject to the same regulations as cadavers (corpses slated for burial), i.e., they would need proper documentation when transported across international borders and would have to be sealed in zinc coffins. Similarly, burial laws have no provisions for pathological and medical dissections; these are regulated by individual state laws. Small corpses (such as embryos and fetuses) and partial specimens of the human body are subject only to laws governing perishable specimens. Accordingly, article 30.2 of the Burial Regulations of Baden-Württemberg states as follows: "Severed body parts and miscarried fetuses not intended for burial are to be disposed of in a hygienic manner and in accordance with traditional sensitivities." Violations of the law are addressed in article 49 of the Burial Regulations, but this does not apply to permanent specimens. Here the law states that "Anyone who intentionally or negligently disposes of or denies burial to a corpse shall be held in violation of the law." Yet just as burial laws do not regulate the disposal of permanent specimens, they likewise do not prohibit the process of converting corpses or body parts that would otherwise decompose into permanently preserved specimens. There are therefore no governmental regulations prohibiting the process of converting a corpse into a wet or dry cadaver. This has made it possible to convert corpses into skeletons for the past four hundred years. Just as corpses converted into skeletons are not subject to burial requirements, mandatory burial likewise does not apply to corpses made into plastinates.

Transformation from a Corpse to a Plastinate

In summary, a donated body is converted from a corpse to a dry cadaver following the death of the donor. By the time that a corpse must be buried by law, it has already been transformed into a pre-plastinate by eliminating the risk of decomposition, by establishing the intended purpose of the plastinate and by ensuring the anonymity of the donor. At this point the corpse has lost all of those properties that would ordinarily make it subject to mandatory burial. The specimen can no longer decompose once it has been preserved by the plastination process. Initial preservation is complete within 8 to 24 hours of receiving the corpse. Dissection and the subsequent plastination process take between two weeks and a year; they are complete, i.e., the pre-plastinate is transformed into a plastinate, after the polymer within the specimen (roughly 70% polymer) has cured. For mandatory burial to be waived, it is critical that the dead human body no longer be capable of decomposing and thus of spreading disease, that the intended purpose of the specimen be anatomical study and public education (as is the case for whole-body specimens displayed in museums) and that the donor remain anonymous.

Customs Regulations

In conclusion, I would like to say a few words about applicable customs regulations for shipping human anatomical specimens, including plastinates, across international borders. Contrary to claims in a few sensationalist reports in the media⁴⁷ such shipments are subject to clear and unmistakable regulations. Plastinates are "items in anatomical collections," and as such are shipped under Customs Classification Code 97050000.⁴⁸ This customs code encompasses "zoological, botanical, mineralogical or anatomical collections or items in such collections." Because customs law has not yet been thoroughly internationalized, a case may well arise in that a plastinate may be shipped in Germany as an item in an anatomical collection, and in Mexico as a 'medical specimen' (used for organs intended for transplantation). Shipping plastinated specimens abroad has also at times meant providing explanations, describing "items in an anatomical collection," for instance, as "human and animal specimens in the broadest sense; not intended for human consumption." Customs technicalities in other countries have also at times required that plastinates be described as 'human by-products' (used to describe human ashes), and 'medications' in the broadest sense (used for stored blood, even though plastinates have been preserved as solid, permanent specimens). Some argue that preserved, whole-body specimens must be declared as corpses so that they can be regulated with appropriate documentation, thereby ensuring that the specimens do not become the victims of foul play.⁴⁹ This argu-

ment would appear out of touch with reality. The state never checks to make sure that corpses have really been buried, nor is there any need for this. Murderers, after all, are concerned with getting rid of corpses, not with keeping them, and preserving the bodies would certainly not serve this end. There are no known cases where bodies have been disposed of by preserving them for the purpose of anatomical study.

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