

Meet your inside

endoscopic visualizations in contemporary culture

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Since American filmmaker Gregg Bordowitz, in the above quotation, described the feeling of alienation when viewing his own intestines displayed live on a television screen, visualizations of the body have increasingly become the primary interface between physicians and patients. CT, MRI, PET, ultrasound, scintigraphy, laparoscopy, the list is long of the imaging technologies utilized in hospitals and clinics today.¹ Despite great differences in what they depict and how they are employed, these techniques share a common feature: they draw the attention from the body as such towards what is presented on the display screen. In this manner, medicine is not unlike other social trends

"I am the witness to my body's history. I watch as it becomes ill, from some safe distance, like watching the news on television. I'm lying on my side with a long thin probe three feet snaked into my intestines and I'm watching it all on TV. The doctor's head is turned to watch the monitor as he pushes the wire further into me. The nurses stare at the screen" (Bordowitz, 1997: 105)

in network society that foreground screens and digital displays.

This article deals with the visualization technique described by Bordowitz, namely endoscopy. Compared to the more transparent-like technologies of CT, MRI and PET, endoscopy shows a coarse, fleshy and narrow image of the bodily interior. Whereas CT and MRI provide the untrained viewer with an external sense of overview, endoscopy probes deep into the bodily volume, where the distinction between cavities and tissues is difficult to tell. Since endoscopy is based on the visual examination of the body as such, the shift towards external mediation creates an emotional tension between our

embodied sense of corporeal interiority and the live images of soft tissues projected onto TV monitors and computer screens. Drawing on the work of visual cultural scholars such as José van Dijck and Tom Gunning (van Dijck, 2005; Gunning; 2003), I argue that the technological visualization of the inner flesh yields an estranged relation between what we see on the screen and our unseen insides. The effect of different endoscopic technologies on our perception of the inner body is illustrated with examples from clinical medicine and performance art.

Watching your guts on TV

Bordowitz' wry account of a routine colonoscopy as performed in the 1990s, points out several noteworthy things. Firstly, it gives a visceral picture of the invasive nature of endoscopy. Compared to X-rays, which permeate the body in a subtle manner, endoscopic visualizations hinge on the physical contact between instrument and body. Most of us are familiar with the meaning of a colonoscopy. We shiver at the thought of having long probes inserted through our rectum and tend to find examinations of the gastrointestinal tract awkward. Secondly, the passage provides a telling example of how medical visualizations gradually have redirected the attention of physicians from the body of the patient to monitors and screens. As the term indicates, endoscopy (from the Greek *endo* = inside and *scope* = look) is the medical practice of peering into the body for diagnostic purposes. Although attempts of inspecting the bodily cavities with the aid of mirrors and light reflectors can be traced back to antiquity, it was first during the late nineteenth-century that en-

doscopy developed into a clinical method with its own proper instruments (Reuter, Reuter & Engel, 1999: 163). Contrary to the examination described by Bordowitz, physicians during this period would use their instruments to look into the body itself, regardless of if it was the eyes, the larynx, the colon or the bladder that was the object of the examination. Bordowitz laconic description of the doctor and nurses staring at the screen, does not only illustrate a shift in diagnostic technology. It says something implicit about the relation between body and representation in contemporary medicine. Thirdly, by drawing a parallel between TV and live videoscopic images of the bodily interior, Bordowitz touches upon a crucial aspect of medical visualizations, their intrinsic relation to popular culture and the way in which media forms the gaze. The key words here are "safe distance". The gaze that watches the news from a safe distance in the living room safeguards the patient as his or her inner flesh appears distantly on the hospital screen. Moved into the clinic, the television set creates an effect of alienation vis-à-vis the body. Although literally wired to the monitor, the patient looks at the images as if they didn't refer to him or her: "I am not the image of my intestine", says Bordowitz (Bordowitz, 1997: 105).

Cable transmitted video colonoscopy is interesting because it marks the shift in endoscopic attention from inward peering to outward observation. What was once only accessible to the solo gaze of the physician is now turned inside out and rendered visible to the patient as well. It goes without saying that this kind of joint looking differs widely from the enclosed gaze of prior days. Advocates of videoendoscopy like to think that the images fur-

ther the patient's knowledge and understanding of what the doctors are doing (Koti, 1993: 6). Most of us would probably agree with Bordowitz that there is something disquieting about seeing one's intestines visualized on a television screen.

Despite striking differences between older look-through instruments and screen-based video endoscopy, these two modes of diagnostic examination require the bodily presence of the patient. Whether the looking is directed into the body or towards the screen, vision is here inseparable from the patient lying beside. In this sense, the corporeal presence of the patient conditions the act of looking and frames the images of illuminated tissue. Recent innovations in endoscopic technology have, however, disrupted this correlation between vision and body. By means of miniaturized cameras, wireless transmission and digital image processing, endoscopic examination is no longer restricted to the immediacy of the couch and the intimacy of the patient. It can take place in front of a computer screen, entirely detached from the body being examined (Cave, 2006: 159).

Not long after Bordowitz had put his experience of video colonoscopy into words, a new generation of endoscopic devices were introduced. Bearing in mind the three factors discussed above, invasiveness, redirection of gaze from body to screen, and relation to media culture, we will look at the introduction of these new devices and ask what kind of image of our bodily interior that they convey.

Reframing the endoscopic look

Launched on the verge of the new millennium, wireless capsule endoscopy, or the pill camera

as the technique soon came to be referred to as, quickly gained reputation for its unconventional design. A miniature camera meant for swallowing sounded almost too good to be true. The curiosity of the public was aroused even more when it was pointed out that the camera bore a striking resemblance to *Proteus*, the shrunken submarine which ventures into the human body in the old science fiction movie, *Fantastic Voyage* (1966).² The reference to the movie clearly helped promote the pill camera, stressing the miniaturized and non-invasive character of the new endoscopic device. Here was a diagnostic technology that could enter and examine the body as smoothly as the submarine in the movie. No more fibre optic wires through mouth or rectum. No more reason for the patient to feel uncomfortable.

Once swallowed, the pill camera traverses the digestive tract, taking up to 60.000 pictures along its way, pictures that are instantly transmitted via sensors to a portable recorder that the patient carries along the waist. Downloaded on a hospital computer, the data is then processed into an animated film that the gastroenterologist can study with the aid of special software. Technically speaking, the pill camera completes the move in visual attention from body to screen that played such a significant role in video endoscopy. But not only does it do this. Drawing on information technology, the pill camera has taken the visualization of the inner flesh into the digital age and transformed it into a multiple and interactive screen, a collage of moving images, stills, graphs, figures and icons. Advanced software aids the gastroenterologist in analyzing the images, colour indications mark out suspicious spots, an endoscopic atlas can be consulted and synoptic

maps make it possible to orientate oneself inside the video. This form of endoscopic viewing has less to do with vision in the classic optical manner than with running the patient data on an appropriate computer. Vivian Sobchack has pointed out that technology does not only enable us to see images in different ways but also to see technologically (Sobchack, 2004: 139). Viewing an endoscopic film on the computer screen after the patient has handed back the recorder implies a different approach to bodily representation than if the viewing takes place while the patient is being examined.

In her book *The Virtual Window. From Alberti to Microsoft* (2006), Anne Friedberg points out the great importance that the window has played for the formation of visual knowledge in Western culture. From Alberti's treatise on perspective to today's virtual computer environments, the window has served as a model to structure the relation between viewer and image. We have only to think of the metaphoric use of "windows" in the personal computer, to see just how firmly rooted in our pictorial consciousness the notion of looking at an image as if we saw it through a window is (Friedberg, 2006: 220). Even today's digital interface with its panoply of images still retains the idea of the window as an overall guiding principle for visual representation. Following Friedberg, we could describe the development of endoscopic visualization as a movement from the body as window to the window as body, from a form of looking that utilized the natural openings of the body to a form of looking for which the window has become a stand-in for the body. Displayed on the computer screen, the images of bodily cavities can be manipulated with

greater ease than clinical examinations where the endoscope must be moved carefully inside the body. This is a pivotal aspect of the shift from television screen to computer display. It underscores the difference between looking at the body as a broadcasted event and looking at the body as an interactive program.

Whereas Gregg Bordowitz in the above example saw his own video endoscopy through the lens of a natural born TV viewer, patients today are probably more inclined to compare digital images of their inner flesh to other manifestations of computer culture such as simulations, film clips in Quick Time, fly-through animations or even video games. Physicians have already adapted to the new media landscape. The term fly-through for instance, commonly used in architecture where computer generated 3D-models have been around for some time now, has found a growing application in medicine and biomolecular research (Turkle, 2009: 63). Physicians who work with virtual representations of the body, i.e. digital models derived from CT-scans, talk about fly-through examinations of the inner anatomy. The reference to flying appeared already 1994 in the title of an article on virtual endoscopy (Parkins, 1994: 1046). Two years later, the computer scientist Arie Kaufman, boosted the new technique in an interview, stating that it allowed physicians to "fly through" the images of the colon and "search for bumps and other abnormalities".³ Likewise, the biophysicist Richard A. Robb characterized virtual endoscopy as an "immersive" technique, which allows the "endoscopist to simultaneously visualize the anatomy and manipulate the viewing orientation in a realistic way" (Robb, 2000: 135). To the general public, anatomical fly-throughs are perhaps mostly

associated with the *Visible Human*, whose software atlas offers the non-medical expert fly-through tours of the whole body.⁴

To what extent the digitization of the endoscopic body will bring about a different perception of our inner flesh is difficult to say. If the pill camera promises a non-invasive mode of examination from the patient's point of view, it certainly provides physicians with an immersive technique for visual scrutiny, a method for reframing the two-dimensional view through the endoscope within the multimedia window of the computer. The question is what kind of visual landscape that is emerging from inside the various software applications, and what sort of gaze that is being normalized in front of the screen.

Gastrointestinal voyage

Although linked to the TV monitor via the long endoscopic wire, Gregg Bordowitz was reluctant to identifying himself with what he saw. As far as he was concerned, the images of pinkish intestines could be showing just about any distant body broadcasted on TV; "I've seen exploratory images of the insides of bodies on TV medical programs. I am prepared for this knowledge. Television prepares us" (Bordowitz, 1997: 105). In the case of the pill camera it is information technology, the Internet, downloadable data and wireless networks that is preparing us for new images of our insides, in fact an old motif, that has been reframed due to changes in media infrastructure. Compared to video endoscopy, the pill camera would seem to entail an even more alien sight of our bodily interior. Not only that the images in themselves are stark to see. The whole procedure of having

a small camera take pictures of our stomach and bowels while we go about our daily routines is pretty extreme. Like spying on oneself and handing the secret message over on the portable recorder. What is it that I don't know about my body that this automatic eye can reveal? And do these images really contribute to our understanding of our corporeal selves, as some physicians like to think, or do they rather make us feel estranged in relation to our embodied sensibility?

These questions are explicitly dealt with in the work of London based artist Phillip Warnell. Using himself as experimental source, Warnell explores the relation between the body as an unknown inside and the means by which we try to unravel it. *The Girl with X-ray Eyes* (2007) (title of film and book), for instance, deals with the phenomenon of extra-visual power. In the film, Warnell lets Natasha Demkin, a Russian medical student, claimed to have x-ray vision, scan his body with her bare eyes. Typical for Warnell's performances and artworks is the mixture of science and popular culture, rational conceptions and irrational beliefs, new media and old media.⁵ The different references are used to situate the performance and show how notions of the body are created in the intersection between high culture and popular culture.

The theme of the transparent body, which was central to *The Girl with X-ray Eyes*, is also addressed in the confluence event *Endo/Ecto*, performed at ICA in London and Medical Museion, Copenhagen.⁶ Contrary to Natasha Demkin's innate X-ray eyes, *Endo/Ecto* revolves around a capsule endoscopic visualization of Warnell's inside.⁷ It is medical technology and not supernatural abilities that renders the opaque body transparent here. The perform-

ance in short stages the swallowing of a pill camera, the transmission of the images to a computer and the projection of the endoscopic images on a large screen along with old SF-movies such as *Fantastic Voyage* and *The Man with the X-ray Eyes* (1963). In Copenhagen, the performance also featured a screening of James Williamsons hilarious trick-film *The Big Swallow* (1901), which shows how the cameraman, shooting from the same angle as the audience, is engulfed by the sole character in the film. The London performance on the other hand, included a demonstration of marine bioluminescence. By presenting innovative technology alongside old-fashioned movies and luminous marine organisms, Warnell draws our attention to the cultural construction of transparency. Compared to bioluminescent organisms whose green phosphoric radiation illuminates the deep sea, endoscopic transparency is achieved through a series of mediated images that derive from compact and solid technology such as the pill camera and the software that makes the gastrointestinal images visible on the computer screen. Only in converted form, disengaged from the inside it points back to, does the pill camera show us our transparent flesh.

Obviously, the different technological devices used to visualize the inner body, is not the only thing that differs Bordowitz' description from Warnell's performance. Set in a hospital context with illness as an unyielding factor, Bordowitz experience of endoscopic examination is as private as Warnell's gastrointestinal voyage is public. It's doubtful whether Warnell had been able to perform *Endo/Ecto* had it not been for the wireless and automatic application of capsule endoscopy. With José van Dijck

we could say that the pill camera takes the notion of a permeable body that can be viewed smoothly from within, even further than fibre optic video endoscopy (van Dijck, 2005: 66). In this respect, the endoscopic gaze that van Dijck traces through the shifting media landscape of the twentieth-century has converged with the scanning technologies of today. Both seem to offer an image of the body as a porous entity that we no longer have to cut open in order to see. As van Dijck rightly points out, medical visualizations and media technologies have always been inextricably interweaved with one another, which is to say that the public spectacle is an ingrained element of the medical gaze. Today's ubiquitous information networks have hardly made medical visualizations less spectacular. We have only to consider the spread of the *Visible Human Project* on the Internet, to recognize the persistence of this scopic quality in medicine. Whether increased visibility necessarily leads to a familiarization of the inner body, as van Dijck argues, is however disputable (van Dijck, 2005: 69). It may be that the proliferation of medical visualizations in information society has yielded an understanding of the body as perfectly transparent and accessible. Yet, since this transparency and porosity is intrinsically technological, the perception of the inner body is caught up in the ever-changing frame of the visual apparatus; lenses, scopes, fibre optics, video monitors, TV screens, computer windows etc.

According to Tom Gunning, technological innovations incite feelings of astonishment and wonder that tend to fade away shortly after the new technology becomes routine. Gunning also notes that this feeling of astonishment is not merely caused by a sense of unfamiliarity

vis-à-vis the new technological device, it has also to do with a utopian dimension in technology that envisions a future fundamentally transformed by the new device (Gunning, 2004: 56). Once embedded in our habits, technologies turn ordinary, and the utopian dimension sinks into oblivion. However, as briefly remarked by Gunning, when least expected, the forgotten future can suddenly reappear with uncanny effect amid the customs of everyday life (Gunning, 2004: 56). Applied to endoscopy, the view that technology passes from being something wondrous to being just another ordinary practice, can help us better describe the transition that the endoscopic image has undergone in the above examples.

If we take the case of Bordowitz, the picture given of endoscopy here is one of ennui. The fact that the visualization of the inner body, is carried out as a diagnostic examination, accounts for the gloomy tone. Medical images are not always easy to tell apart and digital media has certainly not made it easier to discern the difference between visualizations of illnesses and of health. Nevertheless, if we focus on the means by which the inside of Bordowitz is visualized, we notice how the whole experience of looking at the endoscopic images is associated with watching TV. It is television that charges endoscopy with psychological meaning. Endless evenings in front of the TV, had prepared Bordowitz for his endoscopic examination. A highly familiarized media form enables him to cope with his feelings of discomfort. On the other hand, it is precisely this familiar gaze that renders the images of Bordowitz inside estranged. Displaced from its domestic context, the television screen introduces a well-known element among the specialized equipment of

the clinic. But, because the images displayed on the screen show us what we normally only experience through visceral sensation, the body on TV is experienced as something utterly strange.

Strange encounter

If Bordowitz viewed his inside through the frame of a standardized medium, namely television, the technology that Phillip Warnell employed in his performance, is still in the process of rapid expansion. Wireless communication, miniaturized technology and portable devices may not have released us from the prison of the screen as Lev Manovich so aptly put it, but they definitely have made our screen habits less restricted to spatial confinement (Manovich, 2001: 114). These three factors are also at least as important in *Endo/Ecto* as the projection of the endoscopic images in themselves. Without the actual swallowing of the pill camera, which is emphasized in the performance, we wouldn't see the images of the bodily interior with the same feeling of amazement. Although we're surrounded daily by the latest products of information communication networks, the pill camera brings out the almost inconceivable nature of these technological systems. Undoubtedly, there's something uncanny about a high-tech object that is designed for such primordial functions as intake and ingestion. However, viewed from another perspective, an endoscopic camera that covers the same route that our daily food consumption takes can only make sense in a society saturated by surveillance cameras.

By positioning the endoscopic visualization in an art performance context, Warnell invites

us to reflect upon the inward body as a biologically introverted and culturally traversed space. The resemblances that take place between optical technology, Warnell's sensor strapped body, the gastrointestinal images taken by the immersed camera and the cinematic fascination with the corporeal inside, show that no matter how visualized, the body retains an enigmatic quality that evades rational explanation. The more we look at it, the stranger it appears. This can be said about the optical technology as well.⁸ Once inside the body, the pill camera is out of our control. We can only sense its occurrence in the flesh via the images it transmits to the computer, images that we see through its point of view so to speak. Before our very eyes, the pill camera disrupts our ordinary notion of photography as it is sucked deeper and deeper into the bodily cavities. Somewhere along its way, the automatic eye suddenly encounters the presence of something utterly strange inside the stomach, the letter "S" drifting between the abdominal walls. What is detected here is simply one of the paste letters, spelling the words, *Guest Host Ghost*, which Warnell swallowed minutes before the pill camera. The paste letters add yet another link to the various resemblances mentioned above. They underscore our understanding of the inner body as something that oscillates between visual representation – scientific, fictive or performative – and beyond representation. But the letters also bring to mind what Warnell wrote in an article about his own work, that one of the things he explores in his performances are aspects of bodily "intimacy and anonymity" and how these are played out in relation to the social configuration of bodies (Warnell, 2009: 35). This is also something that lingers on in the

mind after having seen *Endo/Ecto*. How the mediated inside, is projected anonymously on the screen meanwhile the person it refers to looks at the peculiar scene that is taking place in his stomach.

Conclusion

With the media technological innovations of the late twentieth century, the view through the endoscope, which previously was observable only to the physician's eye, has now been made visible to patients and even spread beyond the clinic to the public realm. This mediation of our inside flesh entails above all two things: a re-direction of the inward gaze outwards – from looking into the physical body to looking at its visual representations on screens of various kinds – and the fact that our palpable, unseen bodies, are displayed live in all their abhorrent appearance. Although the endoscopic images at first glance appear to be overall alike, regardless of if we see them on TV or on a computer screen, we view them differently depending on the visual apparatus through which they are conveyed. We might even say that the same corporeal spectacle tends to transform due to the technological apparatus that frames it and the situation in which we find ourselves when looking at it. As always with spectacles, what first strikes us as new and unfamiliar, eventually turns into something familiar when the initial attraction fades out leaving only a routine gaze behind. However, what we tend to find familiar can take on a strange appearance when we least expect it. In the case of our inner bodies, the fact that endoscopy makes them visible by means of technological mediation, to see what we normally only sense as embodied

interiority, is in itself an astonishing act. Seen through the shifting devices of visual mediation, this feeling of astonishment is nonetheless affected in various ways, from the strange feeling of looking at one's inside on something as regular as a television screen, to the weird sight of someone swallowing a miniature camera that transmits images to a computer. In this sense, technological visualizations do not only contribute to making the inner body known to the general public. They also present the body as something that we never quite completely are familiar with.

Notes

- 1 The literature on the cultural impact of medical imaging is immense. See here for instance Isabelle Dussauge, *Technomedical Visions: Magnetic Resonance Imaging in 1980's Sweden*, Stockholm; KTH (dissertation), 2008; Joseph Dumit, *Picturing Personhood. Brain Scans and the Biomedical Identity*, Princeton University Press, 2004 and Bettyanne Holtzmann Kevles, *Naked to the bone: medical imaging in the twentieth-century*, Rutgers University Press, 1997.
- 2 On the connection between the pill camera and the *Fantastic Voyage* see the chapter "Endoscopic Gaze" in José van Dijck's book *The Transparent Body. A Cultural Analysis of Medical Imaging*, Washington University Press: Seattle, 2005.
- 3 For the interview with Kaufman see the following link: <http://www.nytimes.com/1996/04/14/nyregion/from-stony-brook-a-new-way-to-examine-colons-externally.html?sec=&spon=&pagewanted=all>. 27-04-2010.
- 4 *The Visible Human Project* stands out as a landmark of medical and information technological amalgamation and a reminder that despite refined methods, medical knowledge still relies on the density of the human corpse. On the *Visible Human Project* see Catherine Waldby, *The Visible Human Project. Informatic bodies and post-human medicine*, Routledge, 2000.
- 5 On Phillip Warnell's work see Ric Allsopp's essay *Performing the Interior*, <http://www.freisprung.com/blog/2009/02/performing-the-interior-by-ric-allso/>
- 6 Phillip Warnell has performed *Endo/Ecto* twice. The first performance was at ICA, London, 10 February 2006 and the second one at Medical Museion, Copenhagen, 13 September 2009.
- 7 On other endoscopic artworks see Renée van de Vall's article, "Between Battlefield and Play: Art and Aesthetics in Visual Culture", *Contemporary Aesthetics*, Vol. 1, 2003, <http://www.contempaesthetics.org/newvolume/pages/article.php?articleID=215>, which revolves round Mona Hatoum's endoscopic installation *Corps Étranger* from 1994.
- 8 In a recent article, Tom Gunning speaks of the "optical uncanny" as a certain trope in fantastic tales and modernistic fiction. Warnell's use of the pill camera resembles the way that authors such as E.T.A. Hoffman, Edgar Allen Poe and Eduardo Mendoza, inscribed optical instruments in their fantastic and visionary fiction. See Tom Gunning "Uncanny Reflections, Modern Illusions: Sighting the Modern Optical Uncanny" in *Uncanny Modernity. Cultural Theories, Modern Anxieties*, Jo Collins & John Jervis (eds); Hampshire, Palgrave MacMillan, 2008, 29-60.

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