

**Roving Scopes, Flickering Screens,  
and Abnormal Gastric Bodies:  
Digesting the Endoscopic Gaze**

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## Abstract

### **Roving Scopes, Flickering Screens, and Abnormal Gastric Bodies: Digesting the Endoscopic Gaze**

Robyn Fadden

The inner body is simultaneously familiar and foreign to most people – we experience its continuous workings every day, though are not always conscious of them. Medical technologies such as the endoscope have allowed physicians to extend their eye into this territory of the closed inner body, alive and in motion. More recent technological advances have been made in the production of high-quality digital images via a camera-like device integrated into the endoscope. This evolution in the technology moves it beyond medical exploration and technique and into being a technology of mediated representation, where images of the inner body represent not only a medical perspective, but the more complex world of the body as a system within broader, diverse cultural contexts. “The body,” and medically accepted representation of a common, homogenous physiology, becomes many bodies that present in many different ways. The digestive or gastroenterological system in particular is as an example of universality and bodily centrality while at the same time has qualities specific to each individual. It is a tangible way of bringing the world into our bodies and our bodies into the world. Much like the study of how information relates to knowledge and power, we can gather surface information (images), collate that with other known data, and come to conclusions. These images and their contexts connect to a continuum of knowledge and information about not only human biology and medical science, but to how specialized discourses are communicated within wider discourses, specifically within popular culture.

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## Chapter One

### **Under the Surface Is Another Surface: An Introduction to the Endoscope and the Gut's Great Diversity**

Endoscopy is a medical technique used for exploratory or surgical purposes, wherein a small camera-like device attached to the end of a probe is inserted into the body through a natural orifice or an incision if necessary. In the past, starting as early as the beginning of the 19<sup>th</sup> century, the endoscope was just that, a scope, and the physicians were the only ones who saw what it showed. However, in the past 20 years, a video or digital camera has been added to the scope, allowing surgeons to operate not only by looking directly into the scope but at a television-like monitor as well. Often the patient is able to view the exploration of his or her own body on this screen or might see a recording after surgery. With this evolution in the technology to include the creation of images or representations of the body, its impact transcended the medical field to become a form of media, a way of representing the world of the body and the body in the world.

José Van Dijck (2001) points out that further explorations of endoscopic technology increased when the media disseminated images of the inside of the body, sparking the interest of the general public: "Pictures of the living body's interior helped the audience imagine what it was like for a surgeon to look from the outside in.... The inner body became less exotic and more familiar with the mass distribution of endoscopic images, made possible by the introduction of video techniques in 1983" (222-223). This interest only grows as endoscopic technologies continue to advance and their sociocultural impacts continue to develop, directly reflecting Foucault's writings on the medical gaze in *The Birth of the Clinic*: "medical space can coincide with social space,

or, rather, traverse it and wholly penetrate it” (31). The endoscope as a medical technology is improved upon with new advances not only in medical techniques but in media technologies – the inside of the body becomes a visible, fluctuating multimedia site that can be interpreted in multiple ways.

The inside of the body has been homogenized by traditional medical discourse into a normative and universal interior, but a technology such as the endoscope, which is closely tied to image-based media technologies, exhibits an underlying unruly nature that undermines this dominant discourse. With such advances in medical technology that is so closely tied to media technology, questions of mediation and representation of bodies arise. By having access to images of the inside of the bodies of individual patients – which on the surface look little like the clean and clear illustrations in medical and anatomy textbooks – the idea of a normative or idealized interior anatomy becomes a thing of the past. This thesis works towards understanding that our insides are just as diverse as our outsides – we may all share similar form and structure, but the details are different and nothing holds still, our interiors don’t remain static as they do in an illustration or photograph. With all this movement and exploration, even the dichotomy of inside and outside breaks down under this increased access, as do the roles of subject and object. The perspective the endoscope gives us allows for new images to enter public consciousness, but it also shows us a rupture in the language of medicine and in how we talk about our bodies. How we view our bodies in medicine also changes: while the “medical gaze” still exists in this circumstance, its power dynamics need to be re-evaluated with regard to different and emerging understandings of normality and pathology.

The endoscope moves through the body: travels and sees and reports back. How and why does the endoscope rove? It roves both metaphorically and literally. Under the skilled hands of a surgeon, the endoscope has a specific purpose: the surgeon knows the terrain through years of studying its structure and purpose, from textbook to cadaver to computer simulation (provide reference) to live body. The endoscope is a medical technology created with the purpose of “non-invasively” exploring places inside the human body. With that kind of labeling of the technology, the images might seem to come to us benignly, from a sedated or anesthetized body that is being explored and worked upon, rather than a body with autonomy and authority. As this technology evolved to include the creation of images of the body, its impact transcended the medical field. It became a form of media, a way of representing the world of the body. While its technological use is still primarily medical, as a media technology its existence and meanings can be viewed on a much wider scale. The biological vision of the body is thought to be a fact, a mapped out anatomy meant to be observed for changes signaling illness. In the book *Wild Science*, Marchessault and Sawchuk focus on the importance of “actively and critically engaging with the public meanings of science, to assert the frictions and contradictions within popular renditions of what medicine can and should do” (2). Part of this is the exploration of new visual technologies of medicine that not only map bodies, but make “the human body into a virtual territory, inaugurating new forms of knowledge,” creating a “new subjectivity” via the medicalized subject whose body is viewed from the inside (3). The body itself is affected by socio-cultural context – this context changes our view of the body as well as the physical body itself. The

endoscope creates a body made up of images not seen before in textbooks, opening up ideas about the inside of the body as a world for exploration and discovery.

The idea for this thesis arises from my own fascination with the medical exploration of the human body. Or more accurately, my fascination with medicalized representations of the human body, by which I mean, I remember that from a young age, diagrams of the body's systems, its many layers, held my attention in ways that diagrams of houses or electric circuits or even of other animals did not. While I was already drawing parallels between these diagrammatic representations of things in the world – everything could be broken down and created out of parts, for instance – I had a hard time reconciling the precision of these images of the body with what I walked around in every day, the ever-changing body (and its functions) I actually felt and was.

So when my dad gave me a Visible Woman model to build when I was ten years old, the diagrams I knew and the information I already had were altered once more – this was three-dimensional, came with instructions, and was to be built by me. The illustration of the box looked nothing like the layers of off-white plastic bits that I would snap off, fit together and paint vivid colours over the coming months, yet they were a woman's body, weren't they? These bits and pieces that had been named by someone, I had no idea who, that fit together inside us all and made us, well, work. To me, even now that I know better, the uterus is still a bright yellow-green, the lungs a deep red, and the skin something that can be rendered invisible.

My knowledge of the human body is composed of layers, has a history that could be delved into and organized by year or topic or theme. Yet such a dissection is not so simple – and how do I go about dissecting it in the first place? One possibility is to look

at how knowledge is constructed out of so many sources of information. In this thesis, I will focus on one kind of information and how it fits into the greater body: images of the inside of the digestive system, as seen via the endoscope, a piece of medical equipment with its own sociocultural history and tied closely to popular media. To talk about the images taken by endoscopic video cameras, I will explore not only the history and genealogy of the technology but the overlapping discourses, medical and cultural, around the stomach and digestive system.

What makes images of the inside of the human body so compelling to most people? Why have x-rays, CT scans, endoscopic video, and filmed surgeries captured an audience, of sorts, outside medical and scientific fields? And what makes these places that are not just proximal to us but *are* actually us seem like uncharted territories in need of expert mapping? These questions that I will address all stem from the over-arching focus of my work: how medical and scientific information is communicated to the general public and its effects therein. How many layers of information, medical, biological or otherwise, have we gathered to get to where our ideas of the human body are today?

Deborah Lupton states that, increasingly, as we understand the body as part of social theory, “the body is not seen as universal biological realities but as a combination of discursive processes, practices and physical matter, which have a symbiotic and symbolic relationship within society” (49). While my research is inspired by the tangible endoscopic images of the digestive system, it is also inspired by the digestive system itself and our rhetorics of and relationships to these parts of the body. If bodies are understood as part of a flow of information within culture, they are at once “bodies of

knowledge,” holding certain facts and figures, and permeable creative makers of new or altered information. That is, what does one’s gut have to say and how do we come to listen to it? The circumstances surrounding that dialogue parallel the circumstances of any dialogue and deserve the same critical questioning as to who, what, where, why and how it is made possible.

José Van Dijck compares the “endoscopic gaze” that makes the invisible visible with Laura Mulvey’s “cinematic gaze,” writing that the “endoscopic gaze signifies the surgeon’s view from within the body, enabled by medical technology” (221). Due to the surgeon’s gaze and endoscopic images of the inside of the body, our perspective of the body now includes both the external and interior, both of which have been mediated to us through the images of media technologies. What do we then do with these images, which are a kind of knowledge or information, brought to us through a film-like medical media technology, interpreted for us by medical professionals entrenched in their discourse, but also just there to be viewed, as anything? We view them in many different contexts as well, to make things even more complex – each context, such as doctor’s office, television, the web, art, a soundtrack, an academic conference, among others, alters our interpretation. History and the sociocultural do not only surround technologies or create them but are also created through them.

My focus for the purpose of this thesis on the digestive or gastroenterological system is partly because of its universality and its bodily centrality – that is, everyone needs their digestive system in order to live, and it spans the length of the head and torso, running through the centre of our bodies. It is a tangible way of bringing the world into our bodies and breaking down the perceived barrier between ourselves and the outside

world. The food we put inside our bodies is processed in a documented, scientific way - we can track its progress, what it becomes, how it nourishes us, and what is discarded. Of course, the human body is not fully discovered territory. Nutrition is not an exact science, nor is gastroenterology (the science describing the stomach, *gaster*, and the bowel, *enter*). Meaning that what can be seen of the digestive system is not all there is to it. Much like the study of how information works, we can take surface readings, collate them with other known data, and come to conclusions.

The main purpose of my analysis of these images and their context is to connect them to a continuum of knowledge and information about not only human biology and medical science, but to how specialized discourses are communicated within wider discourses, specifically within popular culture. After much research, from phenomenology to identity politics, I've chosen to focus my inquiry and analysis using Foucault's theories of discourse. I am interested in how information and knowledge work within culture, and more specifically, how the communication of information affects knowledge. I will be working with theories from discourse analysis, visual culture, medical discourse and popular culture, and technology's place as a part of these intersecting discourses. Unpacking our layered knowledge of the body, including how the body is defined, will be informed by Foucault's theories of discourse and biopower/biopolitics as well as body cartography (the body in parts, not a whole). Because I am talking about the digestive system and fairly concrete images of it, I will address the multiple meanings of terms such as visibility, inside, outside, subject, object, gaze, perspective, and scope – that is, how these terms are defined depends on what they are being used to describe and on their context. The way these images “happen” is just as

important as the images themselves. Discourse analysis will help in understanding relationships between patient, doctor, endoscope technology, medical institution, television screen, computer screen, general audience, and on and on in the layered factors that make up how the digestive system, and the body, is understood.

Theories from visual culture overlap with theories of discourse as the text I am analyzing is a visual one, which is placed within a broader historical context of images of the insides and outsides of bodies brought to us not only through scientific inquiry but through the entertainment world, fashion, art and philosophy. The most obvious theory here, for this research, is that of the “gaze,” which comes from film studies and psychology, and which I am going to whittle down and call the “medical gaze” – a concept that is used in several different ways across several disciplines of research. I will talk about its origin and some of its contemporary uses in order to distinguish how I am using it here as a concept in cultural and media studies. Visual culture theories seek to understand the state of the image in the world, how the “spectator,” that is, us, understands that: “Visual cultures, then, are never simply about the image. An essential part of the whole process of images being produced, circulating, having currency and force, rests very much in the formation of the spectator” (Fuery and Fuery 126). To understand the cultural workings of images of the digestive system as brought to surgeons, patients and even an internet audience’s eyes via endoscopy, spectatorship and all its inherent power needs to be central to my investigation.

My corpus for understanding medical theories as they pertain culturally will be medical textbooks of surgical procedures, endoscope technology, and medical history. Anatomy of the gastrointestinal system is found in texts specific to that area of study

alongside pathology and treatment. Textbooks that are used are most often geared specifically to specialty practices, from surgery to nutrition. While there are classic anatomy texts such as Gray's Anatomy, once one gets down to studying the specifics of the digestive system, especially as they relate to endoscopic surgery, the monographs are organized to suit an already established high level of knowledge about gastroenterology. It is also interesting to note that any textbook or encyclopedia of gastroenterology published before 1975 has been moved to most libraries' storage areas, suggesting that texts that were once considered education are now only of historical interest as medical knowledge has advanced and new information has been accepted and integrated into scientific knowledge and practice.<sup>1</sup>

This more primary research into my subject matter is also informed by work done in communications and media studies that studies the relationship of medicine to culture, such as Lisa Cartwright's work on medical imaging and Deborah Lupton's work on medicine as culture, among others. Since these images of the digestive system only exist because technologies were created to see inside the body in increasingly precise ways, theories on how technology "works" in culture need to be brought in, such as those of Carolyn Marvin, Jennifer Daryl Slack, Vivian Sobchak, Ella Shohat and, with regard to "new media" and data organization, Lev Manovich and Manuel Castells. These theories posit, in slightly different ways, that technologies are only created and can only exist as a

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<sup>1</sup> For instance, the 1918 edition of Gray's Anatomy is available for free online at <http://www.bartleby.com/107>. At the same time, more publishers are providing full on-line versions of their textbooks and encyclopedias, though they charge for them. For example, the three-volume Encyclopedia of Gastroenterology from Academic Press (2004), which sells for over \$1000 US, is available to subscribers, including educational institutions and their students and faculty, online: <http://www.sciencedirect.com/science/referenceworks/0123868602>

part of culture – that their relationship to history and cultural institutions is symbiotic. The endoscope extends the human eye so that it can look into the inner workings of bodies, just as the film camera and television screen have extended the human eye in other ways. Theories of technologies that have a visual aspect to them are especially important in making the link between medical technologies and media.

The endoscope is not a film camera in the sense that we know film to be the camera, the director, editing process, finished product meant to be viewed (including reception of product), but such a camera, even with its specialized origins, uses and users, and purpose, does relate to the technologies, mechanisms and screens and images of cinema. This technology and these images have relationships with and parallel cinema in several ways and we, as spectators of what the endoscope sees, draw parallels automatically as we view the moving images of the inside of the body. The body becomes something to be gazed at and explored visually. Because of this multi-faceted nature, my topic requires a multi-methodological approach. While one of my main methodologies is discourse analysis, particularly of the visual, at the same time I will use theories from communications and media studies to define my particular way of looking at endoscopy, the digestive system, and how popular understandings of complex “expert” information come to exist and change. In discussing issues of origins and change, I will turn to gathering historical information about medicine and technologies. And in discussing technologies, I will turn to theories of technology and culture. All these theories and methodologies build upon each other in a non-hierarchical way, I think, and all are necessary to move towards an understanding of the subject matter of this thesis.

The primary locus of analysis is the website GastroSource.com, which includes a database of video images as well as encyclopedias of information on gastroenterology. I will approach this analysis by placing the subject matter within a historical and cultural context, where medicine and popular culture are given equal footing, and explaining the technology of the endoscope and its relationship to media technologies. I will also use a methodology that takes up the writings of Foucault, specifically using theories of bodies, discourse analysis, archaeology and genealogy, and biopower (as found in *The Archaeology of Knowledge*, *The Order of Things*, *The History of Sexuality (part 1)*, *The Birth of the Clinic* and secondary texts addressing these subject areas) and theories of the visual in/as culture. I've found Foucauldian theories to be the most broadly enlightening for the angle I am taking on these images of the digestive system. At first I found his language to have a link to the subject, especially theories concerning the visible, the medical "gaze," the prevalence of surface, and the functioning of systems. As I read further, I realized that I was interested in these images of the body not necessarily for what they represented but for how they worked as information within and through different areas of thought. They "mean" differently in different cultural contexts, yet each context, and each overlapping discourse, informs the other.

Humans are said to be visual creatures, relying far more on our vision than our other senses: "visual ability has become conflated with cognition" (Jenks 1) and while seeing things brings us new information, the relationship works the other way as well, where the more, we know the more we are able to see (Natharius). Our relationship to vision is consequently complex and full of contradictions. While the eyes are said to be the window to the soul, they are also thought of as the seat of superficiality and snap

judgment. We question how deep vision really goes, how much knowledge it can really give us. The endoscope pushes the limits of vision with technology. While primarily an instrument of the eye, it is also an instrument of exploration, discovery and problem solving and comes to involve the other senses as well – the endoscope touches the intestine’s wall and its tool attachments cut and cauterize – this “touch” is performed by and felt by the surgeon and is integral to performing the operation. The surgeon’s “gaze” here goes beyond the visual, as Foucault writes in *The Birth of the Clinic*, to be “endowed with a plurisensorial structure. A gaze that touches, hears, and, moreover, not by essence or necessity, sees” (164). In “seeing” comes discovery and knowledge but also socio-cultural contexts specific to each person and situation – knowledge and discovery require contextual space and time in order to exist and change.

The images brought to our own eyes via endoscopic video technology appear to offer a form of visibility that creates more knowledge of patients and their bodies that can be used to cure and maintain health. But because these images exist in a broader cultural context, because we aren’t talking about medical discourse alone, these images offer something more. The technology used to capture them (the endoscope, fitted with a video device) and the technology used to disperse them (the internet and the computer screen) also do not exist solely within medical discourse, but are understood as forms of media capable of communicating countless amounts of information from countless sources.

In Ursula Franklin’s *The Real World of Technology*, technology is understood as a practice, a system of interactions, or an organization of work and people, procedures, symbols, mindsets, etc. Technology changes the nature of our experience and acts as an agent of power and control – it can define content and vice-versa. Franklin writes:

“Technologies are developed and used within a particular social, economic and political context. They arise out of a social structure, they are grafted onto it, and they reinforce it or destroy it, often in ways that are neither foreseen or foreseeable” (49) The endoscope and its images have already begun to move past their original intentions and expert uses. Endoscopy is not only about the technical specifications of a technology but about the individuals and groups who use the technology to "construct and maintain" themselves, as Carolyn Marvin has written (1989). Because part of this study involves a wish to further explore how Foucault sought to understand the “history of ideas” (*Clinic* 195), Carolyn Marvin’s work on media history and technologies is particularly helpful. She writes that the “history of media is never more or less than the history of their uses, which always lead us away from them to the social practices and conflicts they illuminate” (Marvin, cited in Huhtamo 1996). While endoscopy was intended to be used medically and continues to be used in this area, the images associated with it have entered into the information of everyday life. “What is useful about information is its meaning, which in exchange or transfer may be shared or augmented rather than used up... [Information is part of] a complex social system for regulating and negotiating social meaning, including especially power and privilege” (Marvin *Information* 55-56).

Jennifer Daryl Slack’s work on technology and culture also informs my research through her exploration of the problem of identifying social context in studying communication technologies. Deciding what a social context actually involves and how a new technology develops within it relies on understanding that “social forces” have complex and varying relationships that are “neither determined nor necessary” (331). The original intention of a technology, for example, does not mean that it won’t be

reconfigured to have another use or be used by another group or contribute to a seemingly unconnected discourse. Slack dissects the connections between new technologies and progress to show how these connections are “broken and rearticulated” (332), with power enabling certain connections: “Power, as the condition of possibility, enables (or empowers) specific connections and identifies as they variously originate, take form, and develop in concrete historical junctures at different levels of abstraction” (Slack 334). Our lives are lived with these articulations, some of which we identify with more than others, some of which are so socially or culturally dominant that they seem to be common sense and we live with them without question. Slack urges that we examine the connections between technology and society so that we can really know the relativism of world we live in.

Vivian Sobchak’s article “The Scene of the Screen: Envisioning Cinematic and Electronic ‘Presence’” also takes into account the important complexity of social context by exploring the effects of cinematic and electronic media in our “moving-image culture” and our “cinematic and electronic lives” (83). She writes: “Technology never comes to its particular material specificity and function in a neutral context for neutral effect. Rather, it is always historically informed not only by its materiality but also by its political, economic, and social context, and thus always both co-constitutes and expresses cultural values. Correlatively, technology is never merely ‘used,’ never merely instrumental. It is always also ‘incorporated’ and ‘lived’ by the human beings who engage it within a structure of meanings and metaphors in which subject-object relations are cooperative, co-constitutive, dynamic, and reversible” (84). Sobchak delves further into how bodies live in the world and the effects technologies have on how bodies are both present and

represented. Her work on media technologies that involve moving images and screens directly corresponds to how endoscopy technologies that incorporate screens can be understood on a broader social level through theories of media studies: “Images on television screens and computer terminals seem neither projected nor deep.

Phenomenologically, they seem, rather, somehow just there as they confront us” (101), she writes. The screen that relays the images taken by endoscopic cameras is part of an electronic medium, which Sobchak says has certain qualities of film and photography is somewhat removed from those media forms as far as signification and referentiality are concerned. The “presence” of these electronic yet film-like moving images exhibits a cyborg uncanniness that is neither fully subjective or objective – it is both “me” and “not-me,” an image that can be at once related to yet distanced from (Haraway). These images of the body are connected to the real world and to real bodies – they are perhaps one of the closest representations of a body we have – yet they appear so foreign to us. Is this a relationship that can be or should be resolved?

Ella Shohat’s work on “endo discourse and the inscriptions of science” lends a specifically medical perspective to my inquiries about the links between technology and culture. She argues for a cultural studies “intervention” in medical discourses of the interior body, focusing on the disease of endometriosis, where she contrasts the “up-to-date endoscopic panopticon” with “an old, myopic discourse concerning femaleness” (241). She takes a social and historical approach to examining texts and practices around this disease, describing how medical writings categorize endometriosis patients and prescribe treatments according not only to physiological findings but to more social influences (e.g., a woman’s reproductive age, her desire for fertility, her sexual

orientation, income, class, race, etc.). This perspective lends itself to the diversity argument of my thesis – that our social differences and physiological differences are intertwined in terms of identity and representation in dominant discourses of science and medicine. Shohat writes: “Video laparoscopy narrates the very act of transformation from the inside out. Whereas in physiological cinema the camera, as Lisa Cartwright points out, was ‘incorporated as an instrument within the life of the body under study,’ in video laparoscopy the camera not only observes and documents the surgery, it also performs it, thus becoming an agent ‘acting not only on the body but in and through it’” (259). A media or cultural studies intervention disrupts the dominant discourse and attempts to acknowledge and bring some clarity to the in-between places these images have in fact always been a part of. For instance, looking at the technology behind these images sheds light on the circumstances of their mediation, which informs us about how they are looked at, used and understood in multiple ways.

In exploration of endoscopy in terms of the discourses it appears in, it can be defined as a communications medium and a part of what Lev Manovich calls “new media” – media that have become computerized and interwoven into our understandings of our culture and ontology as a whole. As part of new media, the information or data of the body seen by and through the endoscope can be reconfigured and the same data interpreted through many different realms or discourses. Through technology, the insides of our bodies are forms of information producing reality and knowledge of ourselves and the world with imaging technology that is formulating, recording and processing information as well as transmitting it. Manovich writes that new media have a “cultural layer” and a “computer layer,” that is, content and structure that affect each other,

changing over time: new content and structure is created and transcoded to form a composite of human and computer meanings. In this way, it could be said that culture is being constantly reconceptualized in terms of a computer's ontology, epistemology and pragmatics (47).

Linking our bodies to concepts of new media might seem to be far-fetched at first, but the issue of diversity of information or data is another link. The power of information is decentralized and diffused in the concept of new media (Castells): it delivers the promise of multi-media and enhances interactive communication. In this, the state is downsized, the individual and his/her experience is fore-fronted in a possible kind of hyper-democracy in which flexibility and networking of localized and regional politics reflect globalization of the economy. "Societies of the information age cannot be reduced to the structure and dynamics of the network society... our societies are constituted by the interaction between the 'net' and the 'self,' between the network society and the power of identity" (Castells 372). This is a way we can handle the mass quantities of information we now have: by understanding the importance of quality of information, being aware of its meaning (to individuals) in theory, even by subconsciously using meanings in everyday practice. This awareness on individual levels in a society based on the individual creates broader change. Even theory and research, according to Castells, as a means for understanding our world, should therefore be seen on an individual level, in specific social contexts and on behalf of their values and interests. We will know things and be informed, but we will not be sure of anything, or rather, we will be sure of change and the impermanence of meaning. Deborah Lupton writes that "in the wake of post-structuralism, the human body can no longer be considered a given reality, but as the

product of certain kinds of knowledge which are subject to change” (22). The body may be made up of parts that can be categorized and named, but in a way the body is still and always being created. If these images of the inside of the body are thought of as information within a “new-media” culture, they are inherently part of our constant construction and reconstruction of ourselves and the world. In referencing Foucault’s texts and secondary texts, and texts influenced by his theories, I will describe why his theories on discourse and information offer a distinct perspective for analyzing the communicative properties of these images.

Regarding the analysis of the GastroSource.com website itself, I will describe its construction and “legitimacy” of healthcare and medical information. Through determining its authorship, knowledge base and audience, and analyzing its use of language, especially its use of images, I will build an argument for why this website can be used as one way to understand how the communication of healthcare and medical information functions at this point in history.

And while this thesis is not primarily ontological, issues of being are always present due to this being a study concerning the human body, which when looked at in terms of information as knowledge, creates both subject and object out of us who always are the body anyway. Here is one place where this study can go on to inform future work, in that it is not only about the body rendered visual but about the ways in which we come to understand ourselves. I look at how to answer the question of why medicine has not addressed this research area in such a way and describe what research has been done already in terms of cultural studies/visual culture about the inner body. Bernadette Wegenstein’s work on modern medical representations of bodies highlights how these

images are a part of a similar discourse of representation in popular culture: “In recent examples of popular culture, from high fashion to cinema to even cosmetics advertisement, we can trace a movement that leaves behind the fragmented body, that moves beyond the notion of a body in pieces... What counts foremost in our current analysis is that this *Organs Instead of Bodies* is a ‘flattened’ body that has attained the value of a screen, a surface of reflection – in other words, a medium in itself: the medium has taken the place of the body.”

Video images of the inside of the body are not only communicating medical information but related to the media of film, video and television, filtering the information in certain ways: “the camera not only observes and documents the surgery, it also performs it, thus becoming ‘an agent not only on the body but in and through it’” (Shohat, quoting Cartwright). We need to look at how information “works” – not only what it conveys but by whom, in what form (medium), and how it is situated in “a history of ideas” – and the unique aspects of the visual communication of information. How do technologies of healthcare/medicine also act as technologies of communication outside intended discourses?

Chapter 2 gives a history of endoscope technology, including how it was invented and why, its functions, and how it focuses on a specific body part/system, that is, the gastroenterological or digestive system. This descriptively heavy chapter focuses on medical history of endoscopy in surgical procedures, the endoscope as a technology with broad sociocultural and media-related connections and relevance, and how the images of the digestive systems came to be and how they changed and proliferated over time. I discuss the digestive system itself and how it is understood in popular culture as an

important part of our lives, even before we knew what it looked like in the flesh, so to speak. This section illustrates, through an outline of the historical and technological facets of my subject, how information, especially that of something as humanly, or even animally, universal as the stomach, colon and esophagus, builds into a constantly changing, multilayered and culturally relative knowledge.

Chapter 3 analyzes the website GastroSource.com, using it as a case study in which theories on visual rhetoric/discourse presented in Chapter 1 come into play and can evolve. I reference the historical, cultural and technological aspects of endoscopy discussed in Chapters 1 and 2 via a close reading of the multimediations of the endoscopic gaze, that is, how the visualization techniques of endoscopy create a layered media situation. I give a thick description (Geertz) of the database of images on the site in which I describe the site architecture, site background, the people involved and their professional roles, and situate the site as it relates to similar online health and medical information. In this process, I will show the website as a source of information that exists in specific medical and broader cultural discourses, but also as a presentation space and virtual library of information consciously organized around a particular purpose and from a particular point of view.

Following the website analysis, I take up the theories and ideas discussed in Chapters 1 and 2 and reflect on what GastroSource.com means in terms of health information and visual culture. This chapter elaborates on how the analysis of the visual information dynamics of the website provides a way towards further understanding of the role of communications studies in health and medicine. I take examples from Chapter 3 and show how looking at them in terms of discourse analysis and visual rhetoric offers

insight into their roles in popular culture – how they “work” as information simultaneously existing in a number of contexts. I don’t want to make assumptions about how doctors use this information – though I will present some articles on this – rather, I am interested in how the website and its images serve a number of functions and attract a diversity of audiences. The images themselves are not up for analysis, but how they fit into the layers of existing information on the inner body is – this is about acknowledging the importance of this way of addressing the subject matter – that information communication is inextricably tied to information itself, that the two are one in the same in terms of discourse analysis. The sub-question of this chapter addresses the collapsing of subjectivity and objectivity in what Prado calls one of Foucault’s most basic questions: how “the human subject took itself as the object of possible knowledge?” (Foucault quoted in Prado 14). Images of the inside of the body are part of a larger social process of “scientific classification” and human identification in which “the subject is objectified by a process of division either within himself or from others” (Foucault, in Rabinow 8).

This thesis builds upon the importance of exploring endoscopy in terms of the discourses of communications and culture, discourses of medicine, and discourses of the image of the human body, by looking at the place of the technology of the endoscope itself in history as related to these discourses. Erkki Huhtamo writes that “the reality of media history lies primarily in the discourses that guide and mold its development” (302). What are the discourses that guide and mold the development of endoscopy if “media are not fixed objects [but] constructed complexes of habits, beliefs and procedures embedded in elaborate cultural codes of communication”? (Marvin, cited in Huhtamo). Representations of the body via medical technology have affected our perception of

bodies in general, whether our bodies as identities, bodies as fact-based sources of knowledge, bodies as culturally determined forms of communication. How we understand our bodies has come to include representations within medicine – a historically contextual evolution of images created within scientific discourse. To explore our own views of the body, these images must be reconciled with current and past images and interpretations of the body across a variety of interlaced cultural contexts.

## Chapter Two

### **I See, I See: History and Technology of the Endoscope**

A media and cultural studies perspective on discourses that seem to exist solely within medicine can inform our concepts of the relationships between technology and knowledge by questioning how technology shapes knowledge and vice-versa. By looking at broader social and cultural spheres that interact in medical discourses, we can address issues of how knowledge is organized according to power relations in cultural hierarchies, especially with regard to how technology lets us “see” – that is, how the invisible is made visible, how light is shed on what is not known. The sciences and medicine, with their socially specific yet rapidly evolving discourses, especially require a media-studies perspective on the social contexts of knowledge and technology (Slack). The production of knowledge and of a cultural realm in which it exists with all its hierarchies seems set to continue throughout time: “Not only did new forms of knowledge allow scientists to see more accurately, but the productivity of these trained eyes – and, importantly, the development of new technologies of seeing – went back into building even more knowledge, and producing more categories of things” (Webb and Schirato 137).

To truly understand how endoscopy can be considered not only a part of media, but a part of broader cultural histories, the history of endoscope technology itself needs to be examined. In looking at how endoscopy was invented and why, as well as its functions, with a particular focus on the gastroenterological/digestive system, we can also see the social and cultural formations surrounding it. In doing this kind of history, I am not only interested in the object of the endoscope itself, but the medical history of

endoscopy as an exploratory (or therapeutic) and surgical procedure, and how it connects to the endoscope as a technology with broad sociocultural and media-related connections – especially the media of moving images, film and television – and in turn the connections to how the images of the digestive systems came to be and how they changed and proliferated over time. I will also briefly discuss historical understandings of the digestive system and how it is understood in popular culture as an important part of our lives – and how that changes when we know the details of its anatomy and what it looks like from the inside. This historical approach to endoscopic technology builds upon Chapter 1, showing how information, especially that of something as humanly universal as digestive system, grows into a constantly changing, multilayered and culturally relative knowledge.

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The endoscope moves inside the human body as an extension of the human eye, peering into the insides of the human body for medical purposes. Yet its vision is more complex than merely an extension of the eye, and that eye itself becomes more complex in turn, as it is part of gathering new information through images and creating new knowledge about the human body. In the past twenty years, endoscopy has been paired with video and the television screen. This produces images of the inside of the body that, though created within an expert medical discourse, found their way into broader mainstream culture.

One way to explore and attempt to understand the social/cultural affects of endoscopy is to look at it in relation to the history and development of the technology itself. This means looking not only at the mechanisms of the endoscope from its

inception, but at the socio-cultural contexts surrounding its development. A historical perspective on this technology can shed light on how the human body is constituted, and in this case, how we come to understand our bodies in terms of medicalized anatomical images. Because the endoscope, paired with an electronic screen, is the technology by which images are created, it can be said to be part of a broader visual medium made up of cameras, light and screens, that includes film, television and the internet. The images' uncanny familiarity comes partly from our familiarity with this broader medium – we make alignments between the different screens and maintain a certain distance from the subject matter because of them.

From Lennart Nilsson's mid-70s groundbreaking photographic images and video, "The Miracle of Life," of the inside of the human body, to the current world-traveling Body Worlds exhibition and Channel 4's video series on anatomy and dissection featuring Body World's creator Gunter von Hagens, to television shows such as *The Operation*, *Nip/Tuck* and the BBC's "The Human Body" series, our insides have been magnified and dramatized on screen. The endoscope, while not intentionally creating narratives of the body for public consumption, has become a part of our knowledge of the inner body as seen on screen. Similar to what Lisa Cartwright intends with her work on medicine and film motion study, the images of endoscopy are important in their "function as an intertext between popular and professional representations of the body as the site of human life and subjectivity" (Cartwright 4).

Certainly, medicine's history can be read in many ways, but in terms of cultural relevance, reading history as part of interconnected discourses allows for greater understandings of the factors involved, from individuals to institutions to technologies.

At the beginning of the 19<sup>th</sup> century, writes Foucault in *The Birth of the Clinic*, medicine entered its modern age with the “rejuvenation of medical perception” – “the relation between the visible and invisible – which is necessary to all concrete knowledge – changed its structure, revealing through gaze and language what had previously been below and beyond their domain” (xii). Here the empirical, rational, quantitative medicine constantly met up with “the marvelous density of perception,” and the human eye, or rather, the physician’s or scientist’s eye, and became “the depositary and source of clarity; it has the power to bring a truth to light” (xiii). It is this empirical “gaze” that gathers information and elicits knowledge, places objects and subjects (which become interchangeable) within culture in certain forms. This phenomenon continues in medicine today – endoscopic technologies provide a clear place to examine where these theories meet concrete reality.

### **Gastroenterology and the World of the Interconnected Expert**

It is common knowledge that the digestive system begins with the mouth and ends with the anus, and in the middle are the esophagus, stomach and intestines, following the logical line of an elementary digestion process. Maybe this is all we need to know, and more than we need to know simply in order to survive – food goes in, food comes out. Of course, it is not always that simple – hence the development of medical treatments and their ongoing evolution in the quest to if not solve, at least alleviate ailments. Even doctors will simplify the digestive system down to its basic reality: “a tube running through the body that interfaces the body with the outside World. Its two major functions are first, to allow useful and necessary substances into the body to promote growth and

health, and second, to keep harmful substances out of the body” (Schachter).

Gastroenterology goes a little outside this tube. As a branch of medicine concerned with digestive diseases, gastroenterology concentrates on the esophagus, stomach, small intestine and large intestine (colon), liver, gallbladder, and pancreas (organs that produce digestive juices and enzymes). More detailed information on the digestive process is usually found in medical textbooks, but with the growth of the internet as a source of health information, more health organizations, hospitals and doctors’ offices are maintaining websites explaining endoscopic procedures and the gastroenterological system to patients, as part of health care information.

Research into the gastroenterology and the gastroenterological medical community immediately reveals a world of expertise with language and references of its own. Names of pioneers, discoveries, ducts, tumors, ulcers, diseases, sphincters and technologies appear throughout the literature and boggle the mind. Who knew that all this existed within the human digestive system? To name and categorize is to claim knowledge of, to acknowledge levels of control and power regarding bodies, from our digestive tracts to our political positions in society.

Carolyn Marvin writes on how history can be re-evaluated in an interdisciplinary and culturally focused way, as Foucault and other theorists have done. If approached like this, an artifact or technology of media history is defined and understood through more than the categories its professional field places it in, as more than distinct objects with transformative properties: “they come as elements to be absorbed into existing rules and expectations about the structure of social relations” (*Experts* 191). Therefore, to properly analyze a technology and its impacts, especially a media-related technology, we have to

look at the “society-that-exists when artifacts are introduced” (191), we have to look at history in a particular way. Looking at endoscopy as a media technology that spans a number of fields of expertise and non-expertise takes up Marvin’s call to “expand rather than narrow our horizons about what communication is and can be” (189). While the technology of the endoscope appears to be my focal point, as it is a tangible object with a tangible history of images and use, my true focus is on how the evolution of the endoscope unfolded as it did as part of a scientific quest for progress and further knowledge within a social context whose evolution clearly parallels the technology. That the endoscope evolved from a visual tool or extension of the surgeon’s eye to an image-producing body-mediating technology in a world increasingly focused on images and the post-modern state of reproduction of representations points to how “media uses cannot be deduced from the physical characteristics of black boxes but must be recovered from evidence of evolving cultural constructions... Media use is socially assigned and constructed” (Marvin 192-193).

Yet the fields in which endoscopy is used, such as in gastroenterology, consider themselves specialized and distinct from the generalities of broader culture. They name and celebrate inventors and discoveries not as part of a “public imagination” (Marvin 193) but as part of a group of experts and their accumulated knowledge. But this expert group also bends to the public will, which finds all groups trying to make sense of “how new ways of associating affect the stable social structures and amenities of life” (194). Social relationships within and between social/cultural groups and with technologies naturally must rearrange – doctors and patients renegotiate boundaries, patients conceive

of their bodies in new and different ways, engineers design equipment and demands increase, industries aim for higher profit, and so on.

Marvin writes that the “locus of communication” is not about the artifact even as instrument, but the “group that used the artifact to construct and maintain itself” (192). She sees technology as a concept, perhaps even an essence – technologies are possibilities in ongoing social objectives, and “media uses cannot be deduced from the physical characteristics of black boxes but must be recovered from evidence of evolving cultural constructions” (192). Each technology “exercises social influence through a singular code.... media were stages on which a variety of codes played with, elaborated, and contradicted each other” (195). Gastroenterologists and other experts who use endoscope technology have codes based not only in medicine but in their specialty within medicine – this is part of being an expert. To use the technology effectively and safely and to be literate about its associated images, implies being part of a group. Whereas not having this knowledge implies not understanding.

However, understanding comes in many forms. The mere presence of new information from new media sets a series of connections to work in the mind, no matter what social or cultural “group” that mind belongs to – information is integrated and understood in a manner specific to the viewer. Are the layperson’s connections wrong? I would argue that because they are not in the business of medicine and diagnostic quests, that right and wrong don’t enter the picture. What is more important are effects and beliefs, and the grouping of what makes up knowledge. “Different cultures at different times do different things with the same ‘technology,’” writes Marvin (197) – though it is a tangible product of knowledge and thought, the artifact/technology is not actually the

focus of how communication and culture function and progress, but instead acts as a “pretext” to unveil the groups that use the artifact/technology to “construct and maintain” themselves. Ultimately, this is a study of people (as social and cultural participants and groups), not of things – of the transformation of knowledge and understanding, rather than static artifacts and bodily representations.

### **A Brief History of the Art and Science of the Digestive System**

The human body has been represented in art throughout history, but representing the human body as scientific anatomy caused a cross-over of art and science. Questions arose regarding what was fact and what was artistic interpretation – anatomists strove for accuracy through both text and image. “Medicine is both an art and a science, and anatomy is certainly no different. Proverbially worth a thousand words, pictures and anatomical studies have long been interdependent” (382) writes Sean Smith in an article outlining the blend of art and science found in the field of anatomy. Art is often separated from science by a difference in how much art relies on interpretation and creativity, while science is said to be closer to the “real,” with less distance between the real and the representation. While anatomy as a field began circa 5<sup>th</sup>-century-BC with text-based descriptions, by the 15<sup>th</sup> century Renaissance anatomists began to incorporate illustrations into their work, gradually becoming less focused on artistic flourishes in favour of “precise depictions of individual structures and their functions” (Smith 382). Hieronymus Fabricius ab Acquapendente (1533–1619) was the first anatomist to employ a strictly scientific approach to anatomic drawings (Smith 383). However, the more artistic and emotional skeletons and text-based anatomical approach of Leonardo Da Vinci and

Andreas Vesalius (1514–1564) still prevailed at the centre of anatomy. Over the next few centuries, “anatomists began to illustrate bodies and organs in a schematic, impassionate, and scientific manner that became the new standard” (Smith 386). Modern anatomists are almost entirely focused on detail and scientific information imparted by their illustrations, drawing emotionally neutral faces and limbs that imply function rather than action, writes Smith. However, I would say that these illustrations are not necessarily artless and maintain a parallel to filmed anatomy in that the non-neutral human eye remains responsible for them, however apparently neutral the emotional investment would seem.

Before art and science were further separated in the discipline of anatomy, ancient and medieval anatomists speculated on the connections between the rest of the body and the structures of the stomach, colon, and intestines, which they had fairly accurate gross physiological knowledge of: “They recognized the importance of digestion as a key aspect of maintaining the humoral balance of the body, suggesting that, if the stomach and intestines' functions were impaired, other bodily functions would suffer” (History of the Stomach and Intestines). At this time, medical practitioners considered the stomach an active, almost “thinking agent” in the body. The ancient Greek physician Galen saw the stomach as “an animate being that could feel its own emptiness and generate the sensation of hunger,” while considering the intestines and colon more passive. In the age of Christopher Columbus, the intestines were compared to trade ships carrying cargo, while Renaissance anatomists moralized the digestive system, “associating the stomach and intestines with the impurities of the body, organs devoid of innate spirituality that were nonetheless essential to the proper functioning of the body” (History of the Stomach and Intestines). In the 17<sup>th</sup> century, anatomists turned to more chemical descriptions of

digestion, and as knowledge and dissection evolved, a more neutral, scientific objectivity became the norm.

The advent of photography and film brought new incorporations to anatomy. In an article on visual knowledge in medicine and film, Hugh Crawford writes that “The nineteenth century was a time when a number of technologies were developed to sharpen vision, but, at the same time (in part because of those technologies), understanding that vision became increasingly difficult. Lisa Cartwright raises this issue in medicine, arguing that, ‘Paradoxically, as imaging becomes a more central means of diagnosis and study throughout the nineteenth century, sensory perception (including sight) is progressively destabilized as a source of anatomical knowledge.’” (Crawford 24). When photography and film first became popular in the late 19<sup>th</sup> century, accuracy appeared to be inherent in the medium. Cartwright states that “it is by now a commonplace of film history that many of the techniques and instruments that contributed to the emergence of the cinema were designed and used by scientists, and that they were developed as a means of investigation into optics and physiology” (3). Science and cinema art emerged at the same time and their techniques and technologies borrowed from each other, as they continue to do today. However, the “analytical and quantitative gaze” (Cartwright, xiii) demonstrated by the combination of photography, film and video with modern medicine is not altogether objective, that is, artistic interpretation and human subjectivity remain in these media – somewhere there is always a human eye and mind if not crafting the image, judging or manipulating the image and access to it, as well as viewing and responding to it.

The photographic technologies of vision we now have come out of a long line of advances towards a realism based on what we see with our own eyes, whereas the endoscope, with its shallow field of vision, unnatural light source and digital encoding of visual information, aims both to represent the realities of the inner body to achieve diagnosis and to gather as much true data as possible. Yet at the same time, that “modern sense of scientific objectivity,” writes Crawford, quoting Susan Bordo, that “the construction of the objective point of view upon which scientific rationality depends, directly parallels the development of perspective in the visual arts. To maintain the illusion of accuracy or realism, perspective requires an object that can be presented within the frame and, more important, an audience properly schooled in viewing such an object willing to occupy the single position that affords the illusion” (Crawford 26). In this way it is like other imaging technologies, such as MRIs, that present only vaguely familiar human forms, being much more concerned with data analysis via the image than the “reality” of the image itself. Yet as far as medical imaging goes, images transmitted from endoscopic cameras do represent reality much closer to how our eyes see it, or perhaps as we want our eyes to see it, somehow with more detail and clarity. These images are part of the endoscope’s evolution to be smaller, more mobile and more accurate a tool for the surgeon to use. Part of the technology’s accuracy relies on advances in digital storage capabilities – images can not only be saved as data and examined after the initial surgery, but become a learning tool in themselves as they present both the inner body and techniques of how to view it. These advances in technology do parallel how apparent accuracy and realism in representation are given credit as truth or fact – they allow the surgeon to get closer to the technology, meld

comfortably with it in a way, and see as it sees while at the same time see as the human eye sees, gaining access to a kind of truth and able to solve problems through it.

### **Evolution of the Endoscope**

Just as the human body was a primary subject from the very beginnings of visual art, so too was it a primary subject of early science. Anatomy, as described above, is a place where these two realms have much in common, and from early on in its development, the endoscope was used to gather anatomical information. The earliest descriptions of primitive endoscopy are by Hippocrates (460–375 BCE), who described a rectal speculum similar to that in use today (Shah 649). The endoscope shows the inside of the human body, creating an image of it that can, in a sense, be dissected by physicians – in this way it becomes information within medical discourse.

Initially, endoscopy was used only to explore the more accessible body cavities of the abdomen or uterus, which were inflated with air so the physician had more room to move and see. The first major advancement for endoscopy was made in the early 19th century by obstetrician, Phillip Bozzini (1773–1809), who, while ridiculed by other doctors for his invention, which added light to the scope, laid the foundations for others to build upon. “In 1806, he designed an elongated thin funnel that could be passed into a large orifice. The proximal end of this funnel was attached to a stand carrying a light, where a beeswax candle was placed. The silver stand was covered in sharkskin to prevent burns and the user’s eye was protected from the candle by a reflector that directed the candlelight down the funnel. At the time, the instrument was used for inspecting the

bladder, rectum, vagina and nasopharynx, as many funnels of different sizes could be used (Shah 645).

A series of new inventions followed, bending different forms of light (from candles to burning chemical compounds) inside a tube (usually metal, sometimes utilizing mirrors) to illuminate the body. With Thomas Edison's invention of the incandescent light bulb in 1880, endoscopy leapt forward again with illumination that would not harm the body (as much as previous light sources anyway) and could be placed deeper within a tube. Around this time, flexible endoscopes were created, which allowed for deeper exploration. In 1930, bundles of glass fibres were used as a conduit for a light source and could be bent with no effects on light transmission – but this idea did not gain popularity until 25 years later when Harold Hopkins a physics professor at the University of Reading, UK, invented the rod-lens system in 1959, which allowed for more light and contrast (Shah 649). Cotton writes that “the practice of digestive medicine changed irrevocably with the introduction of commercial flexible fibre-optic endoscopes in the 1960s. Gastroenterology at that time was a simple contemplative endeavour. Many digestive complaints were attributed to stress and treatments were restricted to diet, antacids and bed rest... Endoscopy gradually became the first-line investigation for most patients with suspected upper digestive disease” (614).

As the century unfolded, more therapeutic uses were explored, such as treatments for the management of oesophageal obstruction, foreign bodies and acute gastrointestinal bleeding (Cotton 615), and tools such as levels, catheters and devices for electric cauterization, were added to the endoscope; scopes have become small enough to explore all areas of the body, including larger blood vessels (Society of Laparoendoscopic

Surgeons). Alongside these therapeutic explorations, beginning in 1874, came inventions of visual data collection and documentation, that is, cameras attached to scopes – a phenomenon in direct parallel with the first moving picture cameras, which were invented between 1886 and 1890 (Josephson, 1961). The endoscope was used primarily as an extension of the human eye at first, while the film camera, also acting as an extension recorded what was seen in order to show it on a screen. The endoscope only later in its history saw the addition of a television screen on which images of the body were seen. “The combination of electronic endoscopy and television radically changed the way in which endoscopy and endoscopic surgery were performed in particular” writes Litynski (1999). This allowed surgeons to view a magnified image; however, it can be argued that this image distances the viewer from the actual body, or, in fact, creates a new kind of body to view and be performed upon.

The first television camera scope attachment was created in the mid-1950s, just as television was becoming integral to popular culture. These cameras became smaller and smaller to facilitate ease of use, and provided more and more detail as camera technology in general improved (Shah 650). The addition of a high-resolution camera, light source and screen to the endoscopic procedure allowed surgeons to operate not by looking directly into the scope itself but at a screen showing live images of the inner body – this new level of accuracy of vision and control caused a huge increase in the popularity of endoscopic surgery among physicians in several specialties (Society of Laparoendoscopic Surgeons).

Now, small-calibre screening endoscopes can be used without sedation and therapeutic endoscopes are becoming more complex, along with the change from fibre-

optic endoscopes to videoscopes, which have the advantage of “freeing up the field of view for everyone in the room” (Cotton 615). Cotton also points to the great importance of improved image quality on the television screens themselves, and to the ongoing integration of digital computing technology into endoscopy.

A recent medical journal article on endoscope light technology, details this specific area of change in videoendoscopes over the past 50 years and shows how the endoscope as a viewing system attempts to mimic the human eye while at the same time extending it and providing as much light as possible to provide not only clarity of vision but comfort in viewing: “It is important to know where you have come from to understand where you might be going. Current videoendoscopes use a xenon light source for illumination transmitted by fiberoptic light guides arrayed as headlights on the tip of the endoscope. A lens mounted over a video chip processor focuses light reflected from the gut surface. There are two principal systems used to reconstruct video images from reflected light, nonsequential and sequential. [A sequential system] emits a flicker’ effect that some endoscopists (myself included) find distracting, perhaps owing to a greater familiarity with nonsequential systems” (Ginsberg 193). As it is, endoscopists must become familiar with whatever system they are using and be able to correctly interpret what they see, as what is seen varies from system to system. In this sense, the trained eye literally sees things the untrained eye does not.

Since the first issue of *Surgical Endoscopy* was published in 1987, followed by the First World Congress on Surgical Endoscopy in June 1988 (Shah 650), countless articles in journals have been devoted to endoscopy, speaking to the expert level of training and knowledge required in using this technology – and to how physicians must

constantly keep up with new gastrointestinal discoveries, techniques and technologies. Every year, new endoscopic-related patents are approved – new kinds of optics, new lenses and magnification, light sources, materials from which the scope is made, and the addition of robotic functions and control. All with the aim of not only seeing better or clearer but seeing deeper, to beyond even a microscopic level. In so many ways, the trajectory of this technology follows the trajectory of so many technologies – that of exploration, discovery, accuracy and new crops of answers.

Technological innovations abound in endoscopy, as in any field where technology is a driving force, medical or otherwise. The boom in endoscopic innovation began for real in the 1980s, when the video camera attachment was introduced along with better light sources. “This technical development had consequences for the culture of surgery,” writes Joel Howell. “...A burgeoning biomedical devices industry sprang up almost immediately to provide the necessarily ancillary technology” that made endoscopy practical and accessible to most hospitals (352). Patient demand affected the evolution of the technology as well. In endoscopy, new technologies offer more accuracy, better ease of use, more patient comfort, a decrease in more invasive surgeries and their associated costs, and many other, however seemingly small, advances. Some advances even merge technologies. Not only is the endoscope being coupled with more surgical tools that allow traditional scalpel surgery to be done from within (Saltzman 2004), but it is also being used with other imaging technologies in what is called “mixed reality,” merging “real images with virtual ones” to create more accuracy of inner body information. One group of researchers developed a way to “map intra-operative endoscopic video to 3D surfaces derived from preoperative scans for enhanced visualization during surgery” (Dey et al.

2000). Other researchers are developing robot arms and tools that will limit and even remove the physician's direct contact with the scope and the patient.

One of the newer gastroenterological image technologies mimics the endoscope and its images, but is in the form of a pill that travels through the digestive system over the course of several hours ([www.givenimaging.com](http://www.givenimaging.com)). While much like endoscopy but without the manual probing of the physician, this technology still remains a kind of scope, that is, a way of seeing – and an instrument with inherent scopophilia – the desire to see. That is, there are users of the technology and a history of it that are involved with what is seen and how. The medical gaze remains and is able to access body spaces too small for traditional endoscopy to accurately capture digital images of, such as the small intestine (Hopson 2007). The images the PillCam produces are similar to those of traditional endoscopy, but the 11mm by 26mm video capsule works with the body's own peristalsis – the involuntary contraction of the digestive system. The 4-gram digital camera in pill form has a 140 degree field of view and generates approximately 57,000 images at a rate of 2 frames per second in the 8 hours it takes to pass through the body. These images are recorded onto a data recorder that is worn by the patient (statistics from Given Imaging, 2005).

In an editorial in the medical journal *The Lancet* about then-recent conferences on health technology assessment, an anonymous writer observes that the “tidal wave” of new endoscopic technology could be seen as a threat to western health care systems if it is not properly assessed and integrated, going on to state that, “Europe has seen a huge growth in endoscopic surgery in the past two years... The patients' enthusiasm for this keyhole surgery is matched by the manufacturers' extravagant support for trade

exhibitions at surgical conferences... Surgery needs to be on its guard against fashion... Surgeons may feel under pressure to remain fashionable, especially if they are in private practice, but the surgical ethic requires them to question, to be able to justify any intervention, and above all do no harm... The problem is that innovation is very rapid in surgical science and innovators tend to be ahead of the market; they may even stimulate it, albeit inadvertently. To develop 'their' operation, surgeons ally themselves with manufacturers to produce instruments, forgetting that manufacturers are seeking not a technologically proven surgical procedure but profit" (Surgical innovation under scrutiny 187). This is one way in which the discipline of medicine interacts and is in fact part of broader cultural phenomena, such as the economic sphere and issues of fashion and personal achievement.

M. V. Sivak, former editor of the journal *Gastrointestinal Endoscopy*, writes in a March 2006 article about the need for links between disciplines related to endoscopy,<sup>2</sup> connections that have been apparent throughout its history but which should be examined to aide the present and future state of gastroenterology. These include the relationship between craftsman and physician and relationships with industry, as well as awareness of the following factors: "(1) intrinsic factors (the laws of physics, optics, electronics,

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<sup>2</sup> "Endoscopy" is actually a general term combining the Greek words for "within" and "scope." However, there are specific words regarding certain parts and organs of the body. Endoscopy done through existing body openings can usually be done under local sedation, but procedures that require an incision can require hospital admission and a general anaesthetic. The following is a list of the major types of endoscopy:

Gastroscopy: To see the gullet, stomach and upper small intestine.

Esophagoscopy: Transnasal to see the gullet, stomach and upper small intestine

Colonoscopy: To see the large intestine.

Cystoscopy: To see the urinary bladder.

Bronchoscopy: To see the air passages to the lungs.

Laryngoscopy: To see the larynx or voice box.

Nasopharyngoscopy: To see the nose and related cavities.

Laparoscopy: To see the "stomach cavity" and the organs therein.

Arthroscopy: To see inside joints such as the knee joint.

Thoracoscopy: To see inside the chest cavity.

There are a number of other sub-types of "scopies," and these include *proctoscopy*, *sigmoidoscopy*, *nepbro-ureteroscopy*, *mediastinoscopy*, *choledochoscopy*, *angioscopy* and others. (List from <http://www.endoscopepartsplus.com>)

computers); (2) external factors (non-technical, non-scientific, non-endoscopic), cost, and societal issues foremost; (3) the ever changing nature of digestive diseases (for example, Barrett's oesophagus, which evolved from relative obscurity); and (4) developments in other medical fields, notably radiology, but also non-medical fields (for example, telecommunications)" (Sivak 1061). Sivak appears to be aware of the myriad social/cultural effects that influence the state of his highly specialized medical niche, and calls for interdisciplinarity. He acknowledges also that "most of our technology was not, in fact, invented specifically for endoscopy. In retrospect, the fundamental elements for every major technological advance existed for some time, in most cases many years. Because endoscopy borrows heavily from other fields, it is possible to know its future potential by reference to existing technology, although this requires particular insight" (1062).

Sivak outlines a number of factors external to the development of endoscopy techniques and technologies that have a great effect on the state of endoscopy diagnostic and therapeutic capabilities and innovation. From the decrease in federal funding for medical education and proper specialist training to the aging population of endoscopists (who, he speculates, are therefore less likely to adopt new technologies), to the ongoing consolidation of manufacturing, to "risk aversion, a steady loss of the necessary infrastructure and tradition of innovation, a growing emphasis of outcomes research, essentially the evaluation of existing technology, and lastly the evolution of radiological imaging, specifically virtual imaging." The gastroenterologist, while fundamentally concerned with the patient and patient's body, works within multiple parallel and overlapping systems that are constantly changing and adapting.

To change and adapt means to be responding to something – larger social forces that demand progress, higher cure rates, more answers to yet more questions. The rapid evolution reflects the realities of economic desire but that desire is also bred from a social/cultural situation in need of examination. Riskin et al. call for study into innovation in surgery itself, using gastroenterological surgery as an example: “While innovation in surgery has a rich tradition, the field and study of surgical *innovation* are new... An increasing number of surgical leaders think that innovation may be the only way to maintain the quality of their profession... A comprehensive evaluation of surgical innovation would include discussion of ethics, economics, policy, and education, all important aspects” (686-687).

While Riskin et al. and Sivak do not decry continued innovation in endoscopy and its technologies, the articles also raise the question of the use value of these new technologies if the circumstances of their invention is not monitored properly. Our bodies, in terms of biological evolution, are not changing so rapidly as to require new technologies every year, but in terms of knowledge, the information that can be gathered from our bodies continues to grow and change with new technologies. “High resolution endoscopes, a virtual certainty, will reveal new findings that will lead to new problems with interpretation,” writes Sivak, going on to list technologies, therapies, and procedures outside the gastroenterological specifics that will affect the direction of endoscopic developments (1063).<sup>3</sup> So while new technologies increase knowledge, they also bring

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<sup>3</sup> “As potential paradigms the following items could markedly shift the direction of endoscopic development: (1) technologies based on light-tissue interactions (for example, optical coherence tomography, laser induced/ light scattering spectroscopy, light induced fluorescence endoscopy, Raman spectroscopy); (2) photodynamic diagnosis and therapy; (3) use of tissue glues in therapeutic procedures; (4) computer aided diagnosis; (5) application of Doppler ultrasound, specifically to the problem of

with them another set of problems to solve, that is, how to correctly use and apply this new information.

### **Body Parts, Images and Realities**

Walter Benjamin in “The Work of Art in the Age of Mechanical Reproduction” compares the cameraman to the painter, writing that the cameraman is much more like a surgeon cutting into a patient's body: “The painter maintains in his work a natural distance from reality, the cameraman penetrates deeply into its web” (233). In this way, the moving image might appear to be free of the equipment of its making – only the cameraman can show its many levels of reality construction. Applied to endoscopy, the cameraman is also a physician and explorer and problem solver, couched in a discourse of empiricism and objectivity and, of course, the quest to create and maintain healthy bodies/people. The images of endoscopy always point to their own construction, yet understandings of them vary from viewer to viewer. The “real” inner body becomes manipulated by viewer context and interpretation, to the point where these images could be misunderstood as part of fantasy or science fiction rather than the actuality of our own inner body worlds. The images, on one hand, “extend our comprehension of the necessities which rule our lives,” on the other hand, they “manage to assure us of an immense and unexpected field of action... A different nature opens itself to the camera than opens to the naked eye... The camera introduces us to unconscious optics as does psychoanalysis to unconscious impulses” (Benjamin 236-37).

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recurrent gastrointestinal bleeding; (6) injection pharmacotherapy, with particular reference to EUS guided injection; (7) narrow band imaging; and (8) high intensity ultrasound ablation” (Sivak 1063).

Robert Kolker writes in *The Altering Eye: Contemporary International Cinema*, that “the word ‘realism’ is the most problematic in any discussion of cinema. Because the first principle of filmmaking is the photographic reproduction of something that exists... the idea that film has a close relationship to the physically real world is inescapable” (16). Kolker goes on to explore cinema that attempts to present the real in many different ways, while aware of the medium as an articulation of reality. This kind of cinema asks itself what the best way to represent reality is while being aware that it is still only a representation. Yet the representation has agency and effects that make the images themselves powerful and real. While endoscopy is not the type of film or video Kolker writes about here, it does share some of the characteristics of the medium and its images, when placed outside the field of medicine and expert interpretation, become more like representations – the hyper-real that is not real and representation/image, but simulacrum, a disappearance of the real wherein the referent, the reality of our own bodies, seems suddenly so foreign or surprising that it might as well not exist.

In the discourse of medicine, where these images are actually measurable data used to solve health problems, technologies of quantification and accuracy beyond the unadorned human senses became integral to medicine as objective and empirical – mass data/information collection, sometimes from visual images, becomes central. This continued throughout the past century, with new technologies being created to probe further into bodies, gathering more, and in theory more accurate, data. Now, in the age of body imaging, the metaphors of machines and mapping dominate descriptions of not only the digestive system but the entire body. The mechanical metaphor has been frequently used in discourses on the body since the industrial revolution (Lupton). This metaphor

includes the dissection and division of the body into parts – parts that can stop working or malfunction, that need to be fixed or replaced. Medicine follows this metaphor, showing its historical roots in societal change and values. From Litynski's medical-biological perspective, which outlines the history of development of the tools for endoscopy, we can understand the tool from an instrumentalist/functionalist point of view and use the historical time and place information to build a broader picture of the socio-cultural situation during the evolution the technology. In doing this, we can see that the endoscope is technology in Heideggerian terms; more than a tool, but a way of understanding our being in the world.

Another important additional characteristic of the moving images of endoscopy is that while they mimic and remind us of cinematic images, with their moving-photograph quality, as digital video they are in fact primarily electronic and therefore much more a part of the world of "new media" information. Vivian Sobchak's "The Scene of the Screen" addresses this very quality when she talks about cinematic and electronic screens and how these small differences in representation can change the meaning and interpretation of the subject, and for that matter of subject-object relations. In this case, she writes about a moment in the film *Blade Runner*, where the character of Deckard is looking at a screen on which he, through the use of digital camera technology, is able to zoom in and examine an image of the character of Leon: "Transmitted to what looks like a television screen, the moving images no longer quite retain the concrete and material 'thingness' of the photograph, but they also do not achieve the subjective animation of the intentional and prospective vision objectively projected by the cinema. They exist less as Leon's experience than as Deckard's information" (100). This sentence illustrates the

dynamic nature of information that is attached to electronic visual media – it is more like a “simultaneous, dispersed, and insubstantial transmission across a network” (100) – information that has a concrete and important use to the group of people (e.g., surgeons) who have the knowledge and expertise needed to navigate the images, but a more nebulous and decentred referentiality to most other groups (e.g., patients, general public). The images of endoscopy in the latter case have more freedom in how they mean, yet this freedom points out how narrow and constructed their meaning is to the expert group. There is obviously space for multiple meanings to come from the same images and for the disruption of normalcy or an idealized anatomical body as a central place from which alternate meaning comes from. Understanding and knowledge accumulation in this case is freeform and individualized, as the image information works itself, data-like, into personal knowledge histories.

José Van Dijck suggests that: “Gradually, during the course of the 20th century, endoscopy was no longer restricted to amplifying a doctor’s ocular capacities, but also aimed at extending a surgeon’s manual skills under the skin, so that examining and operating could occur during one and the same surgical expedition” (220). What was invisible is made visible as data or information to be examined and manipulated. To do this, the body is made divisible via images, sectioned into parts, as if splicing or dissecting a language to arrive at a clear meaning. Stafford argues that now the body is dissected with “visual cognition embodied in noninvasive and nondestructive medical probes,” which require “a new science of sensory detection” (37). This illustrates a waning relationship between “corporeal segments and coherent whole” – the parts become data, information to be stored, retrieved, and manipulated. As this kind of new

information, the images seen via the endoscope have a freedom to travel and interact with any other information. Visual technologies in science and medicine not only map bodies but make “the human body into a virtual territory, inaugurating new forms of knowledge and popular fantasies of travel through the body itself” (Marchessault and Sawchuk 3). This mobile and exploratory discursive turn makes sense in terms of technologies of depth (probes) and vision (scopes) and the images they transmit.

As a technology of medicine with film-like characteristics, the endoscope’s main use is still in body exploration as it pertains to gathering information regarding pathology and surgery, not in cultural representations of the body. One might think that a frontier in subjectivity has been reached – the physician appears to have no motive but care of the body, and the resultant images are purely for medical use. Yet doctors are subject within a much wider culture as well and these images do move out of the operating room to meet the untrained eye where any authorial intentions become secondary to personal interpretation.

Before endoscopy and other medical imaging techniques, the body was explored through dissection of the corpse and later through surgery. However, before the eighteenth century, the “cutting open of bodies, even in the quest for medical knowledge, was subjected to deeply rooted taboos of that time” (Lupton 45). Our views on the body and on medical advancements have obviously changed over time as our social/cultural environments have changed. While the body is still negotiated on many levels, part of this negotiation now includes technology not only as a tool to fix the ill body, but as a medium of understanding the body. “By far the most important insight is that which views the body and its ills not as universal biological realities but as a combination of

discursive processes, practices and physical matter which have a symbiotic and symbolic relationship with the discourse and ideologies governing social regulation” (Lupton 49). The image-producing technology of endoscopy also then becomes part of the socio-cultural discourse, and the discourse around images of the body not only in medicine but in film, art and broader social/cultural realms.

Lisa Cartwright claims that the “cinematic apparatus can be considered a cultural technology for the discipline and management of the human body, and that the long history of bodily analysis and surveillance in medicine and science is critically tied to the history of the development of the cinema as a popular cultural institution and a technological apparatus” (3). In *Screening the Body*, Cartwright explores how the cinema is “an institution and an apparatus for monitoring, regulating and ultimately building ‘life’ in the modernist culture of Western medical science” (1). She argues that the motion picture and its conjunction with “nineteenth century medical recording and viewing instruments and techniques... was a crucial instrument in the emergence of a distinctly modernist mode of representation in western scientific and public culture – a mode geared to the temporal and spatial deconfiguration and reconfiguration of bodies as dynamic fields of action in need of regulation and control” (1).

Medicine, in comparison to film, would not seem so clearly tied to art and creativity and interpretation. However, as Rick Carlson writes in his critique about the end of medicine, “The history of medicine reflects the constant interplay of art and science” (30). Empirical observations were blended with ritual beliefs and individual interpretation. With these theories and the mass production of medicine, the body became a thing of universal knowledge, mapped out and applicable to all, medicine became the

realm of empiricism, based on objectivity, on facts. The physician works on the body piece by piece, usually specializing in one part or another, but not the whole. If one part of the body needs to be fixed, a person goes to a specific doctor whose knowledge has been compartmentalized. This physician does not usually see the whole, but only the parts he or she is a specialist in, the parts he or she knows. The physician directs the endoscope and actively searches for something, using the camera as an active, eye in a body that has been partitioned within the discourses of medical specialties. In this way, subjectivity and objectivity are called into question even though the machinery used may appear scientifically objective: “Reason-extending apparatus supposedly ferrets out questionable aesthetic and biological signs invisible to the unassisted and fallible eye” (Stafford 143).

In looking at the history of endoscopy, we can see that it originated with medicine related to the abdomen and gynecology and only crossed over into other medical areas due to individual's realizing how the tool could be used in different areas of medicine, in slightly different ways. Van Dijck points out that further explorations of endoscopic technology increased when the media disseminated video images of the inside of the body, sparking the interest of the general public. This shows how a technology that seems to exist in a specific area only, actually affects and is affected by a broader socio-cultural sphere, especially when it is or becomes a technology of representation, as Sobchak writes: “During the last century, historical changes in our contemporary ‘sense’ of temporality, spatiality, and existential and embodied presence cannot be considered less than a consequence of correspondent changes in our technologies of representation...” (84). Looking at our relationship to technology and how technology mediates our bodies

in different ways specific to each person's social and cultural situation is key to understanding how and by whom knowledge is built and used – and how this constantly changes.

While endoscopy was intended to be used medically and continues to be used in this area, the images associated with it have entered into the information of everyday life – thus, these images have also given endoscopy media characteristics. Marvin writes that the “history of media is never more or less than the history of their uses, which always lead us away from them to the social practices and conflicts they illuminate” (Marvin, cited in Huhtamo). Of importance in this exploration is the question of how the idea of endoscopy as a communications medium works with ideas of the body itself as a communications medium, a way of representing self through a melding of physiological and mechanical technologies. Cyborg theory argues that the body is not simply an object to be explored and enhanced by instruments or technology, but that the interaction of technologies, socio-cultural environment and the body form a hybrid creature whose meaning fluctuates as “the categories of ‘humanity,’ ‘nature’ and ‘culture’ [are] themselves highly malleable” (Graham 5). The question about technology, knowledge and society is focused on a world made up of information that comes from the interactions of these component parts and their “social forces” (Slack), yet information can't just float freely – it is always connected to something and takes some kind of form, just as atoms always take some kind of form in matter. That is, “what is useful about information is its meaning, which in exchange or transfer may be shared or augmented rather than used up... [Information is part of] a complex social system for regulating and negotiating social meaning, including especially power and privilege” (Marvin

*Information 55-56*). The information presented in a video of an endoscopic procedure comes to us visually through technology but also through a series of social forces that give it meaning.

New medical technologies have brought us images of the body we may have never seen before, “they have changed the ways we think about human identity, connectedness, and the limits of the life span” (Brodwin 1). Though these technologies come with the medical establishment's aura of expertise and objectivity, the “meanings of these technologies quickly escape professional control and infiltrate the diverse domains of everyday life” (1). Brodwin writes that “biotechnology” denotes more than material devices, such as the endoscope, meant for particular medical functions, but includes the techniques for using them: “the background practices and treatment rituals in which a given device acquires its meaning” (2). Therefore the values and meanings of these technologies, as with all new media technologies, are derived from the people who experience these technologies, whether through using them directly, being the body they are used on, or simply knowing of their use (and, in the case of endoscopy, of the images they create). Stafford writes that we need to “reconceptualize visibility historically... We confront mutable fragmenting and coalescing forms of humanistic, scientific, and technological knowledge that temporarily converge because of imaging – an activity itself constantly changing... We need to forge an imaging field focused on transdisciplinary problems to which we bring a distinctive, irreducible, and highly visible expertise” (Stafford 10).

The disciplines of science and culture are not only complexly tied, but the lines dividing them are blurred: “Although scientific facts are fabricated, they are

simultaneously certified as not fabricated, and therein lies the key to their ideological power” (Treichler, Cartwright, and Penley, cited in Brodwin). This would seem a bold statement to many scientists, and to most people in western culture, who have come to understand science as fact. Yet when scientifically derived information is deconstructed through the lens of social context and the lens of power relations, one begins to see that truth and beauty, science and art, fact and emotion, have much more in common than dominant discourses imply. “The representations of the body produced within medical culture have intersected with representations in popular culture since their invention” (Sawchuk 9). We do not necessarily have to be the subject of medical tests, but can watch these images on television or in film. These images are a part of mainstream culture even though they may not have originally been meant to leave the examination room or the medical community. This shows that we are innately curious about the inside of the body, ready and willing to view images of our bodies, to become “biotourists” (Sawchuk 10).

If we are biotourists, then we are looking in a way to entertain and/or educate ourselves by going places that are foreign to us. In the process, we learn more about ourselves and the world of our bodies and consequently, our concepts of these changes. Lupton writes that “historical writings on the body have demonstrated the ways in which western societies’ notions about corporeality have changed over the centuries” (44). These changes depend on different interpretations of the body through socially and culturally informed aesthetics and knowledge. Our bodies without a doubt exist in solid form, but the names and categories we give to our parts, the strengths and weaknesses we attribute to bodily characteristics, and the multitudes of different representations of bodies prove that the body is a social construct with a long, complex history: “Not only

has it been perceived, interpreted, and represented differently in different epochs, but it has also been lived differently, brought into being within widely dissimilar material cultures, subjected to various technologies and means of control, and incorporated into different rhythms of production and consumption, pleasure and pain” (Gallagher and Laqueur, 1987, cited in Lupton 21).

Heidegger writes that “history is neither simply the object of written chronicle nor simply the fulfillment of human activity. That activity first becomes history as something destined” (24). What requires our attention is how any “activity” fits or is made to fit into the human continuum. The development of certain technologies goes hand in hand with ideas of how they will be used. However, how they are used and the results of that will naturally change as temporal and spatial locus changes. In the case of the endoscope, its original use as a technology to see inside the human body at once with similarity to how the human eye would see it (as opposed to, for instance, how medical resonance imaging or an x-ray present it) and with the objectivity of science, is altered as the technology and its associated images of the body are understood to exist within and between certain discourses. As these images become more widely viewed, their presence and interpretation in wider cultural realms shows just how prone to subjective interpretation they are in any context, including the originally intended one within medicine. These images of the digestive system form part of a technological assemblage of bodies in time, of information in space, and the discourses of knowledge that run through them as part of an ongoing history.

Chapter 3 of this thesis will take up this concept of intertwined and discursive history with an analysis of GastroSource.com, a present-day website database of

gastroenterology information and images of endoscopic exploration and surgery. Through analysis of the website's organization of information, I will address the "medical gaze" as part of popular culture and discuss the connection between "seeing" and "knowing" and the power dynamics at play in the positioning and repositioning of the viewer as both subject and object.

## Chapter Three

### **Going Inside Online: GastroSource.com and Layers of Information Organization**

The social shaping of new technologies has contributed to the proliferation of video endoscopy in medicine as a surgical, explorative and diagnostic tool and as a mediated form of medical education and communication. Images captured by endoscopes become a part of the ongoing education of medical professionals, shared in hospitals, academic conferences and universities. However, images do find their way outside of these regulated institutions: one of the most public ways that endoscopic techniques and procedures are shared professionally is online through websites that vary from the extensive and academic to the more basic and patient-focused. Though these sites may have educational intent with specific audiences in mind, their content does not remain in that realm alone. The compelling nature of endoscopic images and the fact that everyone can relate to them on some level, even simply by virtue of having a gastro-intestinal system in the first place, makes such websites places of cultural exploration. By this I mean that the gut is not simply an anatomical diagram with flesh added – these images prove that it is not static and that it changes from one person to the next.

In this chapter, I will look in depth at GastroSource.com, an encyclopedic website hosting hundreds of still images and video footage of surgical and exploratory gastroenterological endoscopy. In analyzing this website, I've seen that field-specific textual and visual rhetoric are apparent on every page, making up part of a much larger historical discourse on anatomy, surgery and the medicalized inner body.

The “medical gaze” identified in these images comes out of specific cultural organization. The medical gaze’s existence and power come via groups of people and the construction of a language or rhetoric made up of both words and images arranged in ways that communicate relationships of information and power. GastroSource.com exhibits a specific organization of knowledge in which the medical gaze manifests and affects the viewer differently depending on who that viewer is, on the kind of understanding that viewer has not only of the inner body but of how to understand images of this nature. A gastroenterologist who performs endoscopic surgery, GastroSource.com’s primary audience, will look at images of the large intestine from a differently informed perspective than most people, who have come to understand the gut from a more “outside-in” perspective attached more to eating and “feeling” than to visceral images of well-lit intestinal walls.

My analysis details GastroSource.com as a database of images and as a structured website with architecture, background, and various people involved in professional roles. The website is a source of information that exists in specific medical and broader cultural discourses, but also in relation to similar online health and medical information. Because these images are presented via a website, the endoscopic gaze is multimediated, that is, the already mediated visualization techniques of endoscopy are part of a multi-layered media situation. Through analysis of the website’s construction and information, I will address the “medical gaze” as part of popular culture and discuss the connection between “seeing” and “knowing” and the power dynamics at play in the positioning and reposition of the viewer as both subject and object.

This chapter reflects on what GastroSource.com means in terms of health information and visual culture and elaborates on how the visual information dynamics of the website provide a way towards further understanding the role of communications studies in health and medicine. I will take examples from Chapter 3 and show how looking at them in terms of discourse analysis and visual rhetoric offers insight into their roles in popular culture – how they “work” as information simultaneously existing in a number of contexts. I am interested in how the website and its images serve a number of functions and attract a diversity of audiences. The images themselves are not up for analysis, but how they fit into intertwined and discursive layers of existing information on the inner body is –acknowledging the importance of this way of addressing the subject matter – that information communication is inextricably tied to information itself, that the two are one in the same in terms of discourse analysis. The sub-question of this chapter addresses the collapsing of subjectivity and objectivity in what Prado calls one of Foucault’s most basic questions: how “the human subject took itself as the object of possible knowledge?” (Foucault cited in Prado 14). Images of the inside of the body are part of a larger social process of “scientific classification” and human identification in which “the subject is objectified by a process of division either within himself or from others” (Foucault cited in Rabinow 8).

We know that the internet is a vast, seemingly unorganized clutter of information spanning popular topics from pet health to film reviews and an unholy number of less common, niche interests – there’s something for everyone. But one of the most popular topics online is health care (source), spanning wide-ranging issues that affect everyone to highly specific problems that affect a small number of people. Some sites are run by

health care professionals, while many sites are blogs or forums run by laypeople, though they often feature clearinghouses of research. Many appear to be selling something. So, when wading through looking for information on one's health condition, one always has to bear in mind not only the motives behind every site – motives that are not always apparent – but how one's unique perspective on any information affects one's understanding of it.

GastroSource.com is a compelling blend of professional information, colloquial tone, and stylized presentation – all reflective of the different participants that contribute to the site. Doctors, surgeons, technicians and other health care professionals provide most of the content on endoscopic procedures, including all the images. But the site is in fact created and maintained by the international pharmaceutical company AstraZeneca. Of course, knowing that this is a for-profit drug manufacturer and marketer sets up a red flag immediately regarding the veracity and trustworthiness of the GastroSource.com's information – a conflict of interest exists by definition. At the same time, the presence of multiple participant groups from a tradition of apparent impartiality (academia, front-line medicine) does make the site's construction and purposes more transparent, especially in comparison with the publicly oriented, advertising-centric AstraZeneca main site to which it links.

Split between corporate and medical professional interests, the site acknowledges the presence of the patient, though not the patient's personal perspective, and does not address the patient directly. However, the literal patient is always present in the database of images of the gastrointestinal system and in the presence of the pharmaceutical company's support, which though subtle is clearly there. For example, the left sidebar

menu on the home page offers nine choices, one of which is “Nexium Information,” seeming a little incongruous among the other choices, which include “scientific resources,” “publication services,” and “congress reports.” From the site: Nexium (or esomeprazole) is a type of drug called proton pump inhibitor (or PPI). It reduces the production of acid in the stomach. Nexium is used to treat conditions such as heartburn and stomach ulcers. The language used in this case is not specialized, meant to appeal to the “layperson” who might request or inquire about the drug to their doctor. It constitutes a form of advertising.

Though GastroSource.com requires viewers to register before they can see any of the gastrointestinal images, the registration involves nothing more than a valid email address and a user name. One doesn’t have to prove a medical professional status; one only has to be curious or concerned about one’s health – in this way, it doesn’t matter *why* anyone would access the site, it only matters that one *can*. So though the site is aimed at a medical professional audience, it is not closed off for experts only. How knowledgeable most “non-experts” are about what they’re looking at is unknown, though the site does provide two educational atlases aimed at medical students and professionals. Regardless of a viewer’s expertise, the images are nonetheless interpreted on an individual, subjective level.

### **GastroSource.com and AstraZeneca.com**

One of the world’s largest pharmaceutical companies, with a broad range of prescription drugs treating everything from breast cancer to stomach ulcers, AstraZeneca labels GastroSource.com “an international website for health care professionals with a

special interest in gastroenterology.” A written welcome from AstraZeneca at the top of the GastroSource home page, a link to the company’s home page is in the top right hand corner, and the company logo in the lower left hand corner (that also links to AstraZeneca’s site, [www.astrazeneca.com](http://www.astrazeneca.com)) ensures their presence, if not their branding, of GastroSource.com. The AstraZeneca main site lists some rhetorically tailored key facts about the company:

- AstraZeneca is “Backed by strong science and wide-ranging commercial skills, we are committed to sustainable development of our business and the delivery of a flow of new medicines that make a difference in the lives of patients and create value for our shareholders and wider society.”
- The focus is on six therapy areas, including cancer, cardiovascular, gastrointestinal, infection, neuroscience and respiratory & inflammation.
- Products include: *Arimidex* (cancer), *Crestor* (cardiovascular), *Nexium* (gastrointestinal disease), *Seroquel* (schizophrenia) and *Symbicort* (asthma and chronic obstructive pulmonary disease).
- Active in over 100 countries with growing presence in emerging markets; corporate office in London UK; major research and development sites in Sweden, the UK and the US.
- Sales in 2006 totalled \$26.5 billion, with an operating profit of \$8.2 billion.
- Spend over \$16 million a day on the research and development of new medicines that meet patient needs. (Total R&D spent in 2006: \$3.9 billion).
- Employ around 12,000 people at 16 research and development centres in 8 countries.
- 27 manufacturing sites in 19 countries.
- Over 66,000 employees (58% in Europe, 27% in the Americas and 15% in Asia, Africa and Australasia).

While GastroSource is primarily a medical information website, the AstraZeneca site focuses on science and medicine as a means to creating products based on their employees’ scientific and medical research. The rhetoric is dominated by assurance of business viability based on solid research and a social conscious: “Our success is based on a commitment to discovery, finding new ideas that are inspired by life and which in turn help to inspire the lives of our stakeholders;” “We discover new medicines that are designed to improve the health and quality of life of patients around the world –

medicines which are innovative, effective and which offer added benefits such as reduced side effects or better ways of taking the treatment. We also focus on getting the best from every medicine we make by exploring all the ways it can be used or improved.” At this point in history, with the continued rise of at least some social and media criticism of corporation interest and power, we know that by virtue of it being a for-profit corporation, AstraZeneca’s bottom line is not necessary health care. That is, while money is obviously necessary to support research into new treatments, research dollars are different from profit, which extends far from the lab and the best interests of people’s health. As well, the best interests of people’s health encompasses much more than treatment. For example, the home page of GastroSource.com links to physician information about the GERD (Gastroesophageal Reflux Disease) “Impact Scale,” which consists of a one-page questionnaire to ask patients – “knowledge of how GERD impairs patients’ everyday lives can help you to make appropriate management decisions” – and how this condition can be treated with Nexium. This is not actually about GERD but a constructed advertisement about GERD treatment, rather than information on the physiology of the condition or its prevention.

Like GastroSource, AstraZeneca features still and moving images, but in this case these images are of their offices, board members, and laboratory and pharmaceutical information – the latter partnered with a site called “News Market” ([www.thenewsmarket.com](http://www.thenewsmarket.com)) that provides broadcast-standard video press releases and company information to journalists, who must register to the site to access these materials. The AstraZeneca site provides links to company news, events, and media releases, information on its wide product range – cardiovascular, gastrointestinal,

infection, neuroscience, oncology, respiratory, and non-pharmaceutical treatments – as well as information for investors and partnerships. By all appearances, AstraZeneca.com does not skimp on providing information – one could easily get lost in it all, overwhelmed by all that is included and overlooking what isn't included. To know what isn't included, one would have to be aware of less (or different) partisan sources of gastroenterological information, whether these are other websites, medical textbooks, or alternative therapies.

Giving further insight into what drives AstraZeneca, information on company management shows that the Senior Executive Team is made up of mostly men with business management backgrounds. Two of the eight members have a medical education and have published articles in medical and/or scientific journals – fittingly, these two men are the heads of Research and Development. The company also publishes its “Remit of the AstraZeneca Science Committee” (December 2006) online – a document meant “to provide assurance to the Board regarding the quality, integrity and competitiveness of AstraZeneca’s science based research and development activities. The Committee will aim to assure itself that the approaches and targets adopted throughout the R&D organisation are competitive and an appropriate use of shareholder funds, but it will not be expected to review individual research or licensing projects.” Again, here the bottom line is not health care but dollars. Certainly, health care in the form of pharmaceutical treatment is the core of this profit, a health care definition that doesn't mean a focus on ethics, morality or acceptance of the best possible treatment. The site does indicate that the “Science Committee” also looks at new areas and future trends in science and

medicine, bioethical issues and is made up of members who are “expected to have a knowledge of, or interest in, life sciences.”

AstraZeneca is quite obviously a major company with huge investments in scientific and medical research into health care treatment. In hosting GastroSource.com, the company expands their network of experts and thereby increases their profile among the scientific/medical community and with potential stakeholders. They are also aware though that because these networking strategies are online, a portion of the site’s audience is bound to be laypeople looking for information and advice about endoscopy and certain medical conditions (or are simply curious about their bodies, the images and the technology, as I am). The site’s legal notice takes care to state that nothing on the site should be considered “advice” or “recommendation” and that the site is not responsible for any actions or decisions taken as a result of accessing this information: “Any medical information on this website is not intended as a substitute for informed medical advice.” In many ways, a legal notice is simply a formality of any website of this nature, but it does confirm that this “nature” is public and that the information provided is of some value. As well, the first words in the legal notice reflect the site’s marketing interest: “In respect of any promotional content, this international website has been prepared with reference to the IFPMA code of pharmaceutical marketing practices ([www.ifpma.org](http://www.ifpma.org)).” I feel this is important to point out because even though the information and images found throughout the website are surrounded by a discourse of medical expertise, problem-solving and education, they are shadowed by a concurrent context of marketing and profit-driven business, however altruistic AstraZeneca’s rhetoric appears. This company is in effect not a library or information repository, but a publisher:

“RIGHT TO USE INFORMATION SUPPLIED BY USER: In the event that you submit any material for inclusion on this website (including without limitation, personal information, know-how, comments, ideas, questions, techniques, abstracts or similar), you agree (i) that such material will not be deemed to be confidential and (ii) to grant to AstraZeneca and its group companies a world-wide, perpetual, royalty-free, non-exclusive licence to use, disclose, copy, modify, adapt, publicly display and translate all or any of such material for any purpose whatsoever without restriction.

We reserve the right, in our absolute discretion, to remove or delete, without notice, any material you submit for inclusion on this website.”

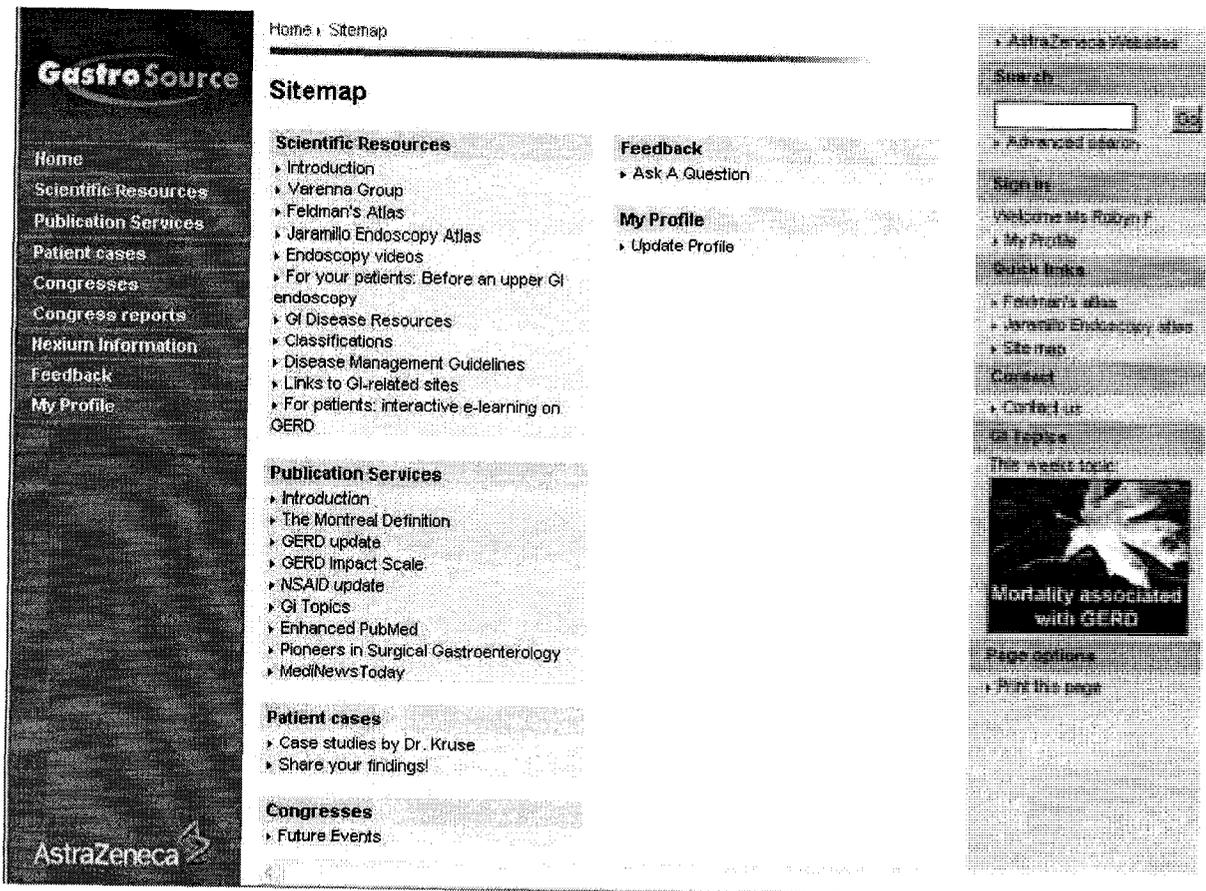
And while this wouldn't appear to alter the physical material of GastroSource's images, I would argue that it nonetheless has an effect on the context in which these images are viewed and understood. They are now imbued not only with the authority of medical professionals, but with the authority of a heavily invested partner whose rhetorical implies progress, social responsibility, and great personal interest, whether it be for profit or medical problem-solving.

AstraZeneca's presence, while not physically *seen* directly in the images of the gastroenterological system, is still influencing their overall meaning and context. It is part of the “absolutely integrating gaze that dominates and founds all perceptual experiences” (Foucault *Clinic* 165), reflecting the reality of corporate funding sources in ostensibly “neutral” zones. What is perceived through looking at the images on GastroSource.com comes through a series of seen and unseen lenses that project, filter and affect our reactions.

### **GastroSource.com as Information Database**

With GastroSource's background support now established as insight into socio-cultural context as well as practical factors such as how the site maintains its quality, timeliness and gastroenterological image database, I will turn the discussion to how the

website acts as a host and communication tool for the images of gastroenterological endoscopy itself. Its sitemap points to its compendium of information and to the professional level of its intended users/audience.



GastroSource.com, an “international gastro resource,” presents images in three ways: as patient cases submitted by independent physicians and health care professionals, as case studies from Danish Aksel Kruse, MD, and as parts of two different atlases of gastrointestinal endoscopy: Feldman’s GastroAtlas and the Edgar Jaramillo’s Interactive Atlas of Gastrointestinal Endoscopy. The patient cases and Kruse’s case studies include more written background and detail alongside the images. The Atlases feature images of

all parts of the digestive system, videos, a glossary of terms, and even quizzes for health care students and professionals.

GastroSource encourages its members to post images of surgery and thanks them for their contributions, including their names and institutions or affiliations. Site members receive regular email updates on new submissions, patient cases and developments at GastroSource.com, the tone of which is professional in language and excited in tone (often using exclamation marks). Members are encouraged to “share interesting gastroenterology findings within your daily practice with colleagues around the world.” These are submitted via email, reviewed and “the most interesting findings will be published on GastroSource.” Some recent submissions include:

- Patient case 1: Patient who swallowed a chicken bone during eating
- Patient case 2: Patient who swallowed a tooth pick during eating
- A polyp in the duodenal bulb  
A middle age gentleman was referred with iron deficiency anemia for which an upper GI endoscopy was done and it showed the above findings. Click on the link above to read more...
- Solitary mass in the liver  
Here follows two scan slices for two different patients. To read more, please click on the link above.
- Unusual case of *Enterobius vermicularis* worm  
A patient was referred for gastroscopy due to symptoms of peptic ulcer disease... Click on the link above to see what was found.

Dr. Kruse’s case studies appear once a month, while the patient cases are not always dated or as consistently added to the site. Not all the cases are presented with video of the surgeries, but those that do have accompanying video images usually begin with an on-camera introduction from the physicians, who then narrate the scenes on screen. Each of Dr. Kruse’s cases follows a similar pattern:

- Multiple gastric carcinoids type I

Jun, 2007

Gastric carcinoid tumours are rare. Three different types are recognized: Type I carcinoids are associated with autoimmune atrophic gastritis (Type A) and hypergastrinaemia. Type II carcinoids are associated with Zollinger-Ellison syndrome, multiple endocrine neoplasia-1 and hypergastrinaemia. The sporadic type III carcinoid tumours are gastrin-independent and carry the worst prognosis. Click on the link above to read more...

- Self dilation of recurrent benign oesophageal stricture

May, 2007

Our patient is a 26-year-old female who suffered from corrosive or ischemic esophageal injury. After matrimonial disagreements, as an affective reaction to punish her husband, the patient ingested alkaline fluid and got corrosive burns in the mouth and pharynx... Click on the link above to read more.

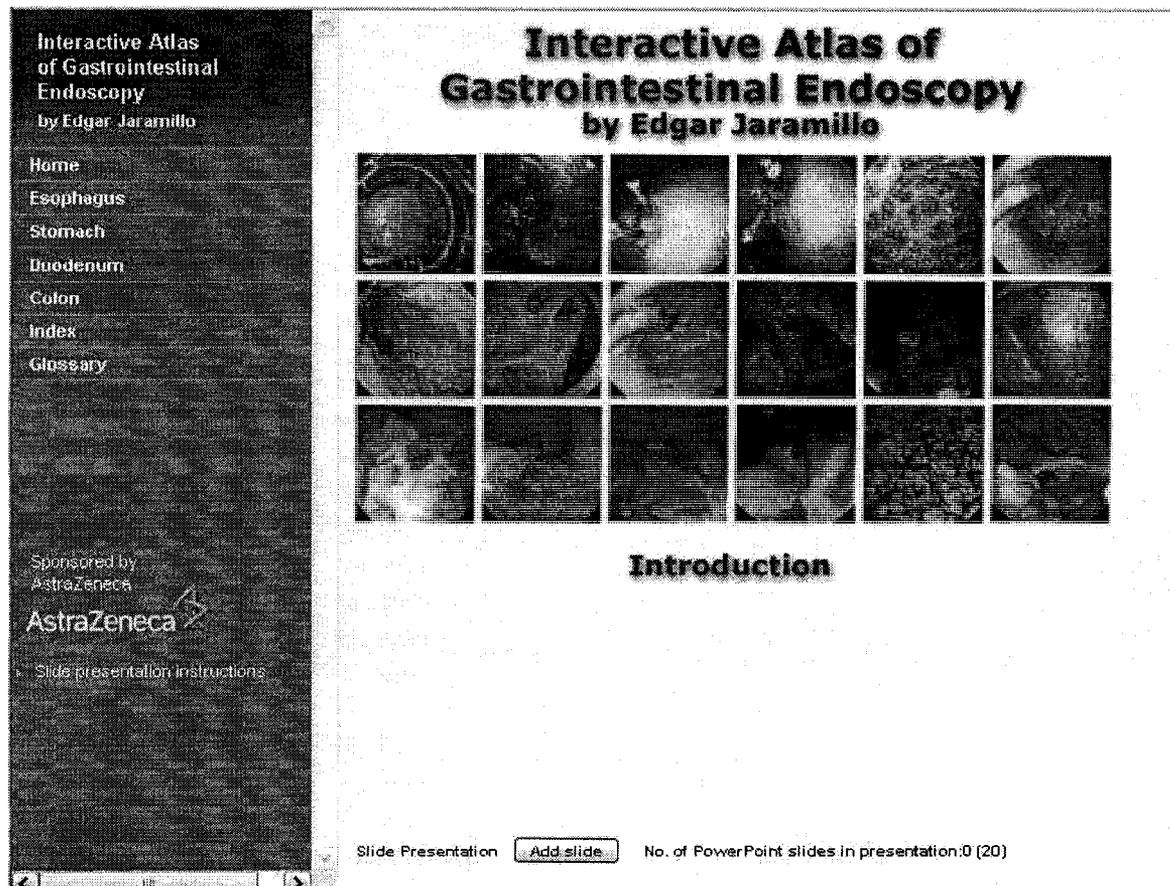
- Rare late complication after laparoscopic cholecystectomy

Apr, 2007

Our patient is a 40 year old female who had been cholecystectomized 7 years earlier in another hospital. For a couple of years she had had intermittent upper abdominal pain treated with H2-receptor antagonist on demand without endoscopic examination or other investigation. She was admitted with an episode of mild biliary pancreatitis. Ultrasound demonstrated stones in the gallbladder. No bile duct stones were seen at ERCP. Variation in biliary anatomy was not reported. Click on the link above to read more...

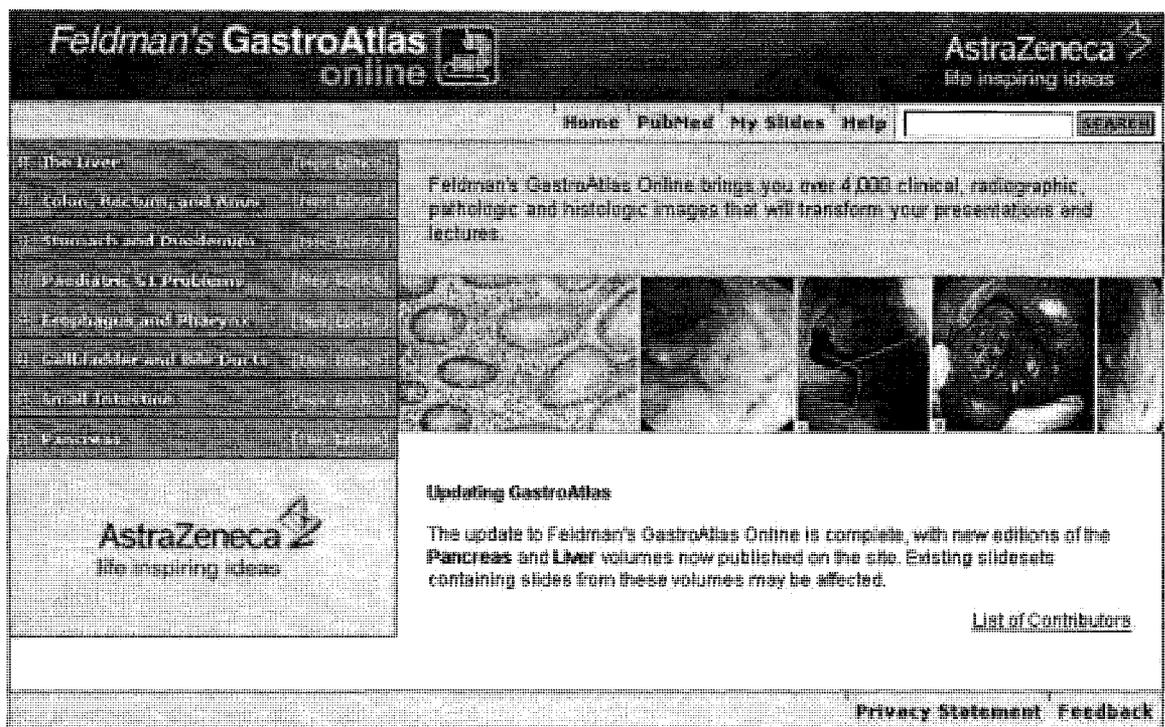
The Jaramillo Interactive Atlas of Gastrointestinal Endoscopy is “addressed both to clinical and surgical gastroenterologists and to all other physicians including medical students who wish to increase their practical knowledge in the area of gastrointestinal endoscopy” and as such appears to be both an anatomy tool and a presentation tool, though not every image or video includes an about what it is. This plus the option to add each image to a power-point presentation suggests that it is a tool for those who already are familiar with the anatomical structures and pathology but need to familiarize themselves and/or others with the anatomy as it is presented through endoscopic technology. Jaramillo’s take on the atlas is that “medical education should be beautiful, enjoyable, entertainingly and presented in a simple and accessible manner.” The

educational focus is clear here too, as in Feldman's atlas, with, for example, images that when clicked on provide names of structures and even an animated film on polyp removal. Both atlases provide information on physiological structure and on endoscopic surgery technique.



Feldman's GastroAtlas offers over 4,000 clinical, radiographic, pathologic and histologic images, all of which can be added to presentations and lectures. But unlike Jaramillo's Atlas, the focus is less on images from clinical endoscopic procedures and more on biology, physiology, digestive system function, and identifying illness and disease. Mark Feldman, MD, of the Department of Internal Medicine, University of

Texas is the Editor-in-Chief, who along with dozens of other editors and contributors is responsible for the Atlas being more of a professional's presentation tool than a medical student's educational supplement – each series of highly technical, presentation-ready slides focuses on a certain part of the gastrointestinal system from esophagus to rectum.



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All of the images and their associated text found at GastroSource.com add up to form a kind of database or archive of gastroenterological endoscopy, with the atlases acting as indexes to the events described in patient cases. In his thesis on archival aerial reconnaissance images of World War II, Neil Balan discusses how images of war are “rendered as both representation and presentation, as an accumulated figuring” (73). They exceed the terms of representation because of how they figure truth and fact. Balan posits that the presentation of these images in the archive forces the image to become

textual, part of broader and sometimes unexpected systems of meaning. Much like the WWII archive, GastroSource.com, with its encyclopedic and database qualities, contains an abundance of images considered as fact, all from and for highly specific purposes related to individual's own bodies and health diagnoses.

Similar to reconnaissance photography, capture of images of the gastrointestinal system is done by experts in the art and technology, and viewing the images once remained with medical professionals. If in this case, medicine represents the art and the endoscope the technology, we have a similar situation, though embedded in the more specific discourses of science and medicine that are opened up to a wider cultural context via this website and its images. "Before embedded reporters and hand-held digital video cameras, the traditionally exclusive zone within which war images are generated...confers authority upon whatever body captures, manages and administers the images in the act of display" (Balan 73). As described in Chapter 2, as endoscope technology evolved, the addition of a screen and video capture meant the images could be seen by those outside of the medical profession. The images reach an even wider audience on GastroSource.com.

Technologies of new media are both a kind of storage and reproduction – this website is a database that aims not only to hold digitized information but for that information to be perpetuated and be a part of medical progress. GastroSource.com is part of a database society that accesses information from multiple sites and manages that information in a non-linear, malleable way (Manovich). In this, these images as information have both a cultural layer and a computer/technology layer. They have come out of a symbiotic and multi-leveled relationship between practices and productions of

medicine/science and socio-cultural conceptions of bodies and digestion. Why do these images look like they do? Why does the scope have its design, the screen its shape and size, and the website its navigational structure? Medicine has used the media available to it – and it is media we already know and are familiar with.

As a database, GastroSource.com fits with current discourses of health and medicine as areas of expert knowledge, yet as an accessible online tool, the site points to the proliferation of investigation done by laypeople. Other gastroenterological sites online, such as the American Society for Gastrointestinal Endoscopy (<http://www.asge.org>), act as communities and information providers, though not in the way that GastroSource does. The ASGE site caters to health care professionals but acknowledges patients with a “patient information” section where they can learn the basics of endoscopic procedures (from their point of view) and find a surgeon in their area.

Contrast the helpful and community-oriented rhetoric of ASGE’s site with the high volume of images of endoscopy combined with third-party advertising found on Gastrolab (<http://www.gastrolab.net>), and it becomes clear that how one understands or interprets endoscopic images really does depend on the context and mediation of the images as much as on one’s own background knowledge. Gastrolab.net is a site run by Dr. Hans Bjorknas, the principal investigator at Gastrolab, a medical research centre founded in 1983 in Vasa, Finland, dedicated to endoscopic examinations of the digestive canal. Bjorknas is a specialist in Internal Medicine who has been carrying out endoscopic research for over 20 years and has performed about 40,000 endoscopic examinations. The site indicates that knowledge sharing and education are its primary goals. The website

itself began in 1996 as a means to: “maintaining an endoscopic image gallery free to use for all interested health care personals; maintaining a gastroenterologic calendar and a gastroenterologic link collection including a nearly complete list of medical journals; maintaining contact information about support groups and associations all over the world; providing historical texts about gastroenterologic topics; providing information about gastrointestinal health care topics for the general public in Swedish and Finnish” ([www.gastrolab.net](http://www.gastrolab.net)).

Without going into great detail on these other websites that provide access to video images of the gastrointestinal system, it is important to note that their online presence shows that different approaches to similar material affect how that material is understood and whether it is accessible at all. Representations go hand in hand with perspective and cultural context. GastroSource.com has resources at hand to run a website that looks up-to-date and authoritative in a mediascape where communicating information depends as much upon the information itself as upon the means of presenting it. The visual rhetoric of Gastrolab.net communicates that it is more of an educational project than an enterprise – while it houses an impressive collection of videos (<http://www.gastrolab.info/tvclip.htm>), still images and documentation (<http://www.gastrolab.net/lc1.htm>), it still maintains a friendly familiarity.

The site’s main contact is Dr. Bjorknas himself, who welcomes correspondence, and each video is accompanied by music, presumably chosen by Dr. Bjorknas as well. Sure it is kind of comedic, but in this there is a sense of personality and enjoyment of the subject, a subjectivity that in contrast to GastroSource.com might seem unprofessional. The images still speak with medical authority; they just seem to speak more openly and

to a wider audience. In terms of medical discourse, this site doesn't quite fit in – unlike GastroSource.com, Gastrolab.net doesn't have the aura of peer acceptance and objective scientific perspective that gives medical information its credibility, that places fact over opinion. Dr. Bjorknas' site though does contain much fact, but perhaps because more attention is given to the character of these images, they do become more filmic to the viewer, more obviously a mediation of bodies than bodies themselves. This acknowledgment of mediation in the context these images are presented in creates more room for personality and a place where subjective and objective don't just meet but blend together.



**GASTROLAB**

MAIN PAGE

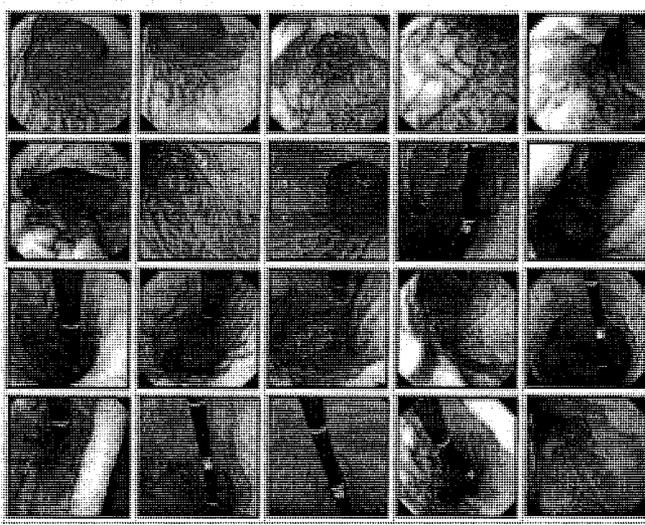
**Endoscopy  
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### The Gastric Corpus (Body), Normal Findings

Click on any image to get a magnification (and then click "Back" on Your browser). Click here to get back to the index page.



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## **The Medical Gaze**

Even without knowing the background and deeper reasoning for GastroSource.com's image database, the spectacle of the inner body itself speaks volumes. The recent popularization of these images through new media technologies aligns them with spectacle and entertainment as much as it aligns them with medicine and knowledge production. José Van Dijck's comparison of the "endoscopic gaze" with Laura Mulvey's "cinematic gaze" centres on how the invisible is made visible: the "endoscopic gaze signifies the surgeon's view from within the body, enabled by medical technology" (221). This new and technologically mediated visibility of the inside of the body changes our perspective of bodies and ourselves, with these images causing a rift in common knowledge of what exteriors and interiors, surfaces and hidden depths, mean.

In Foucault's definition of the medical gaze, from his 1963 *The Birth of the Clinic*, it is a way that medical professionals separate themselves as observers and separate the body from the individual. People become patients and in this position, they are thought to be wholly public, wholly visible (107). What is made visible becomes knowledge, which becomes part of a field of expertise concerning health, medicine and the body. Writing about cosmetic surgery, Anne Balsamo says that the cosmetic surgeon's gaze "doesn't simply medicalize the female body, it actually redefines it as an object for technological reconstruction" (57). Essential to this argument of the gaze is how power functions in these situations. The medical gaze comes not just from the doctor but from the relationship between doctor and patient regarding their imbalance of knowledge.

The term the “gaze” was used by Laura Mulvey in her work on cinema, in which she writes about the relationship of power and meaning between those who are looking, those who are being looked at and the context in which that contact is occurring (in this case, in mainstream narrative film.) In being looked at in this way, women become the object of the male gaze, to be controlled and enjoyed. Mulvey points to the influence of social and cultural historical context and cinematic codes that allow for the gaze to exist: “It is these cinematic codes and their relationship to formative external structures that must be broken down before mainstream film and the pleasure it provides can be challenged” (756). The three “looks” within cinema – that of the camera as it records, the audience as it watches, and the characters within the film – are all responsible for the construction of the gaze’s particular power formation. Looking at these images of the inner body in relation to the medical gaze, it is possible for the social conventions surrounding the images, such as doctor-patient relations, to, just as Mulvey says of mainstream narrative cinema, cause the first two “looks” to be subordinated to the third (756), so we may be left with a constructed reality without the understanding of its construction or even the desire to know it. The “how” of the visual representation becomes less important than the world created on screen.

The on-screen world of GastroSource.com however presents a much less consciously orchestrated narrative and a more complex and mediated power relationship between the camera technology, the viewer and the “character” of the inner body – a relationship that if addressed using a socio-cultural lens, could be a site of struggle and possible change in dominant medical discourse. It is also a relationship in which construction of the images is harder to subordinate, especially given the presence and

relative newness of the endoscopic technology that makes the images possible: “Infused in all visual culture, is the notion of the body whether it is its absence, its consumption, its abjection or its seduction” (Fuery 16). The endoscopic image is what the surgeon sees, and when the image is accessed online, the patient or anyone else is able to see what the surgeon sees. However, seeing is not actual visibility in this case: while one can see the body from a new perspective, without the prior medical knowledge that the surgeon has, the image can only say so much. Hence, these images add to everyone’s knowledge in different ways, but can’t be the “speaking eye” that Foucault describes as turning into “speech that states and teaches” (*Clinic* 114) and “the servant of things and the master of truth” (*Clinic* 115). In these images, knowledge is definitely being expressed, but it is dependent on social apparatuses.

It is hard to say exactly though what kind of “gaze” is found throughout GastroSource.com. That is, whether the images are transparent with regard to their construction, or whether they act only as useful tools for surgeons and satisfying yet ultimately empty spectacles for lay people. I would say it depends on the viewer’s position. While we know that the endoscope is being used by a medical professional, the doctor is not in the room with us while we view these images; somehow, it is easy enough to forget about the process of their construction, especially when there is almost no “behind-the-scenes” footage available. Opinions would be different if one had undergone a procedure, however, and had intimate knowledge of the operation – distance between oneself and these images might not be as great.

## **Normal vs. Abnormal and Familiar vs. Foreign – Images On-line and On-Screen**

Seeing is a familiar way of detecting and images have become an accepted part of knowledge, but these particular images of the inner body raise questions as to how well we know what we think is familiar to us and how in control we are of how our bodies speak.

These images are added to one's medical record and become a part of their own personal identity. Though he is writing about Foucault's *A History of Sexuality*, C. G. Prado's words resonate with the situation of an endoscopy subject: "The subject comes to want to tell all, because doing so is seen as requisite to achieving normality. Everything told is categorized and assimilated into a record, which then assumes a greater authority about the individual's states of mind than any introspective conviction she or he may hold. In this way, the subject is constituted as an object of knowledge by the relevant disciplines, and any 'internal' counterinfluences to adopting the resulting conception by the individual are minimized" (101). The individual, told by physicians that an endoscopy may provide the key to better or normal health, becomes a patient and his or her body "speaks" during an endoscopic procedure, providing valuable, once-hidden information about the state of their health: "There are no limited imposed by modesty or propriety on questions that health practitioners may put to patients, or even on what the patient may tell the practitioner. The patient cooperates willingly, sharing the assumption that only total candor can enable effective diagnosis – and thereby facilitate the achievement or reachievement of normality" (Prado 102). As a patient, the individual is subject to a system of which he or she is an intractable part. "Attaching a camera to the end of a tube finished the ocular privilege of the surgeon; her gaze *from the inside out* could now be

shared by patients and others” (van Dijck 232) – the patient’s private interior is publicly opened. When it comes to problems of the body that can be attacked through surgery, privacy does not appear to matter. The evolution of medicine has been such that privacy is almost erased by the overwhelming importance of maintaining health and life at all costs. Our understanding of the procedure is that it is a *professional* experience, detached from the private histories of anything in the individual’s life that have no effect on the body part in question.

These images are changing our bodily experiences, though how they change is dependent on interpretation – the cultural context one brings to the image, the environment it is viewed in, the website it is located on. In some ways, these images create a nameless, homogenous, universal body that is constantly being probed, but in other ways, the images show the vastness of difference between individuals literally at gut level.

In Foucault’s “Two Lectures” (1982), he calls “genealogy” the “union of erudite knowledge and local memories which allows us to establish a historical knowledge of struggles and to make use of this knowledge tactically today” (Hoy 83). Genealogy as a concept is about not only dissecting systems of knowledge to understand their construction, but identifying what has been left out of certain discourses and why. It is no coincidence that Foucault’s work aligns physical bodies with bodies of knowledge – featuring named and categorized component parts as well as a more holistic and encompassing discourse, neither of which can exist without the other. Lynda Birke, a biologist, writes about how the body should be understood as organs and physiological processes while at the same time acknowledging needs to visualize the body as a whole,

and know it through representations developed within culture (through scientific diagrams, the endoscopic gaze, body scans, art, media, among others). Yet we still have to ask when such things are made visible, what is done with the information gained from that perspective. What is visible or visual is not necessarily one truth or the answer to what we are looking for, but only part of a larger puzzle of information. For example, seeing abnormalities in the intestine is not the answer to disease but a way towards the answer – we become aware that something is wrong, can pinpoint its place, but now we have to figure out how to go about fixing it as part of the larger, non-static, in-part culturally-defined body it exists within. The visible is part of the broader conversation, as Foucault has argued – we are able to talk about these images, theorize them, and integrate them further into our environment – but not necessarily in that clean order.

The images that come from endoscopy are part of how we see ourselves and others, and forefront the importance of visibility in culture, especially in medicine/science. Integrating these images into our knowledge of bodies adds another dimension to walking down the street – we might understand people not only for their faces and their hair but as their stomachs and colons, much more obviously wet and fleshy, just like ourselves. However, just seeing the images on GastroSource doesn't mean we all understand them in the intended way or in the same way. We get a sense of what they are – the inside of the digestive system, someone's digestive system, but there isn't a personal historical and cultural basis for certainty of meaning and response. This explodes our understanding of surfaces – the places we judge others and ourselves and how we come to know them. This idea conjures Jameson's articulation of postmodernism as a “new depthlessness” in a “new culture of the image.” In this world, the body as

material has fluctuating meaning, and so does the social that the material exists in, being tied symbiotically. Simply because something is hidden from view, does not necessarily make something "inside" something else or a "depth" – it is a surface yet to be revealed. Content and surface, object and subject become each other. If we are "all surface," then we are not actually consciously "expressing" anything, we just express constantly – we are a part of our own and others texts, that is, and act within or through them. The images on GastroSource.com, while exposing our previously unseen surfaces, really derive their meaning or affect from what exists around them. When these images are found online by someone unfamiliar with the anatomy of the digestive system and how an endoscope renders it, despite being on a website run by a pharmaceutical company and imbued with the authority of being a site for health care professionals, the images still tend to lack a greater or dominant narrative (Jameson 65). Though they obviously refer to a body, they are unspecific in this referencing and still up for interpretation. In a way, they are information run wild, accumulated and influencing people in unknown, or at least unstudied, ways.

If we think of the physical body as a series of surfaces exposed through the visual technology of the endoscope, we have to think about how these surfaces interact with the world they touch, as the surface carries a great amount of personal and cultural meaning and identity. Looking at endoscopic technology and images of the digestive system from a media and cultural theory point of view can allow more conscious integration of historical context into a world of surfaces. Where Jameson's fractured postmodern subject is something more than spectacle, but is wrapped up and around genealogical layers of cultural information.

Visualization of the body changes due to medical imaging technologies that are part of “interfaces” that communicate, as Timothy Lenoir writes: “Surgery demands an interface. The surgeon is on the outside. The targeted anatomy is on the inside” (361). With the endoscope, the surgeon appears to be immersed in the patient’s body, though clearly he or she is physically outside of it. This inside/outside distinction may not be all that useful though because for all intents, through endoscopic technology the surgeon has full access to the inner body, physically and visually. Lenoir calls this “medialization” – how the medical body is redefined as the digital body – “media not only participate in creating objects of desire; they are desiring machines that shape us. Through medialization we come to desire the digital medical body” (371). Such images are, in a way, very easy to get used to once they become familiar to us. They represent greater knowledge and understanding of how the human body functions and how the body is not a mysterious and solid mass of flesh, but an accessible, navigable place that can be changed if given the right tools.

However, van Dijck would argue that “the endoscope tricked us into believing that we get a perfectly mechanical reproduction of our bodily interior – endoscopy being the landscape photography of medicine. We have now learned, though, that every new visualizing technology raises new problems of perspicuity and interpretation” (233). In endoscopy, we get one more perspective to add to those we already have of the inner body and bodies in general. While its technology promises that it goes “deeper” and shows us things we, or more accurately, physicians, have not been able to see before, it is also dependent on how the institutions of medicine and science view bodies in the first place: “Troubling epistemological relations between optical technologies and viewing

codes, according to Crawford (1998), cause the illusion of transparency while being fraught with complexities” (van Dijck 233). As Foucault argues throughout *The Birth of the Clinic*, this view, this knowledge, is not only about progressing the science of bodily function, but progressing a certain kind of institutionalized knowledge creation and organization. To not be a health care professional and look at these images may seem in some ways transgressive or at least as if becoming part of a secret – but to look without questioning this feeling of transgression makes it far less meaningful. We have to ask what keeps these images within certain bounds and how they can move past spectacle for the majority of viewers.

### **Can a Website Change Your Health?**

If these images are understood as information within wider expert discourses, then they are imbued with a power/knowledge. Sharing information in this way through a website is one way for medical professionals to communicate their findings and learn from each other. The lay person is also granted almost instant access to information that, given their inclinations, can contribute to knowledge of health and the body.

What do these images say about the body parts they represent? What do they say about health? The images found on GastroSource.com kind of exaggerate the realities of the gut – they are not on the same size scale as our digestive systems, they use artificial light, the patients must cleanse their systems of any “debris” before surgery, and we are only afforded a narrow view through some of the body’s mysterious passageways. We are told that this is the gut, but faced with such unfamiliarity, how closely do we really associate these images with our own inner rumblings?

The distancing that technology allows gives us intellectual space but also gives space to social and cultural influences, opening up the inner body to our senses but also to our interpretations. Foucault's uses the term "body" in two senses in order to critique how the body and our views of it are constructed: "There may be a 'knowledge' of the body that is not exactly the science of its functioning, and a mastery of its forces that is more than the ability to conquer them" (Foucault 1987 cited in Fuery 15). Can our bodies be healthy outside of medical institutionalization, or has the institution created "health"? Regardless, we know when we don't feel well, but we go to an expert to tell us why. We know when we are in pain but before knowing how our insides looked, was there any concept of why that pain was happening? These new medical images do help us make these connections.

## Conclusion

### **Gazing Beyond the Gut and Inside/Outside: Whole Bodies and Future Directions**

After spending many months looking at the inner walls of stomachs and intestines, I still look with amazement – at the diversity of bodies, that each represents an individual (a stranger whose inner workings I have been allowed access to), and the new landscape of the body made possible by innovation and technology, that I am able to see these images at all. Every video presents new information that integrates into what is already known, yet my own arrangement of it all lacks the kind of solid structure provided by a medical education, with its authority and institutions. In this lack of sanctioned expertise, I am made constantly aware of my position as an outsider. What can I offer but a set of eyes that watch from a distance far from the physical object in relation to both time and space. Why would I continue to look? Voyeurism and spectacle on their own get old, but the lure of discovery remains strong.

As the endoscope moves through the gut, guided by the physician's hands and eyes, an uncanny sense of knowing comes to me, in which I recognize that the camera's eye is being directed by someone yet I also lose that distance within the image, somehow finding identification, character or narrative in it. The similarity of these images to film images isn't all in my head though – these are also representations of the body, as art is, and just as dependant on the source of their "creation." We still have to ask how a reliable, factual or authoritative source is determined – that is, how discourses are actually formed.

The focus of this thesis has been on how information moves in and between specific discourses and how technology plays a strong role in that – that is *how* knowledge works and in what systems. My focus on the how has meant that less of my research time has been spent on what these images mean and why, especially regarding aesthetics. The original purpose of these images might be said to not concern aesthetics, yet one of the repeated reasons that many scientists and physicians give for doing the work they do is their fascination with the beauty of nature and of scientific explanation. For example, Lennart Nilsson’s photography work on the inner body in the 1974 book *Behold Man* and his 1983 video, *The Miracle of Life*, an exploration of the male and female reproductive systems, combined the aesthetically oriented photographer’s eye with the expert knowledge of medical physicians and technicians. The book and film are meant for a general audience, however, and the images are full-colour and overwhelming in their disorienting beauty – the text and narration guide us, the language of medicine made simpler for this purpose, but this information takes second place to the half-foreign aesthetics of these images. The hand behind the endoscope in this case is that of a photographer, who was much more interested in images and the technology needed to produce them than in medical categorization of information the images contained, yet still shared the drive of discovery: “We try to create or see something, which has not been known before – just to discover something together,” says Nilsson (*Behind the Lens*). The beauty of the gut’s construction and the fact that we are able to repair damage is seen at the same time. The great strength of the medical gaze is that even though it categorizes and privileges, putting patients in their place as ill or not-ill, normal or abnormal, in charge of their bodies or without any control of them, it also allows doctors the power to

not let bodies be damaged, deformed or diseased. True, these are classifications of “problems” but in being named they are added to a larger puzzle of information that can bring solutions.

In the autumn of 2007, I saw a theatre piece called “The Anatomy Lesson,” wherein the artists played forensic experts who investigate from an objective stance and with an aim to solve the problem of why a baby died before it was born. One of the artists had created an anatomically correct newborn baby out of woven thread and yarn and the other artist examined the baby’s body with a small digital camera as well as with an endoscope. The images were projected on a screen behind the artists and the examination table the baby’s body laid on. While on one hand a morbid examination of death, the piece evolved to become a celebration of existence – no scientific cause was found to blame for the death; it was more important in the end to look at the images of the body as beautiful in their own ways, as parts of a whole body whose significance extended beyond it. The attention to anatomical correctness in a body made of cloth and not “purposeful” functioning flesh and blood, went to show the intricate beauty of the inner body, aesthetically and as a zone where personal and medical information overlap to show a genealogy from which understanding of a *how* if not a *why* could unfold. Moving from the present state of death and into the body as a place of beauty and significance despite its lack of physiological function, the theatre piece moved as Foucault suggests, “tracing patterns of intellectual descent from the present backward without seeking to ascertain their formal beginnings” (Hutton 129).

The endoscopic camera in this case went from forensic probing for answers to the perhaps unanswerable to asking how it is we’ve come to think of death, at this point in

history and within this particular cultural formation, as so final and as bodies so cold and detached from who we are as people. If a representation of a dead body can speak this much, then a live one also speaks – what does it say? Mona Hatoum’s art piece “Corps Etranger” (“Foreign Body”) explores the artist’s own very alive body with an endoscope, yet the resulting images in this context present not body ownership but an invasive roving of spaces one might not relate to but in the interest of personal power and knowledge might feel one should. Hatoum’s video piece is called art, she is the hand and eye that guides the endoscope, and because of that the resulting images seem to give the viewer’s personal or emotional reaction more validity. The inner bodies that we are looking at in medically based images of endoscopy also provoke emotion and “non-objective” reaction in us – yet with these body parts understood mainly through discourses of medicine, it somehow seems wrong that we get emotional over them. But this is the dominant discourse speaking, not the inner exploration itself and what it means to us personally – that a liver is not just a liver in its lobes and colour and texture but in what it makes us think of and how it makes us feel – our gut reactions on all levels should be considered as significant, if not more significant than being told or learning the “correct” scientific terminology and functions. These terms come from creative and cultural places too. Why can’t we call the liver by any other name? It would still function just as well. The knowledge gained from seeing our bodies through the lens of medicine is just as important as the knowledge gained through art and personal interpretation – each way should be considered as a way to try to discover and understanding that ways of answering that shut out all the alternatives might be more detrimental than helpful. In looking at the how of things, we are not necessary looking for the way towards “answers”

but simply a way, an opening, a tunnel to move through and come out of. We anticipate finding things, progress, but we never really stop once we've found the answer – there is always more mystery, more things are discovered, more things come into our vision as information every day.

Part of my reasoning for dedicating so much time in this thesis to the history of technology of the endoscope is because it is a way of gathering together a certain kind of documentation that answers questions that came out of a feeling that I felt needed to be substantiated. How to prove and give validity to a feeling, however intellectually derived it might be? As in all cases of modern problem solving, the answer is in evidence gathering. But evidence needs a structure to make it worthy of the name or risks being just more information floating in space. The history of the gastroenterological system and the endoscope help show the cultural context that connects the artifacts – tools, diagrams, video images – to people – doctors, patients, technicians and so on – and gives the artifacts an expanding connectivity in both their tangible, hands-on use and in their form as new media data, where content is as much about linking to other content as it is about the information itself. At the same time, this isn't an information free-for-all, but an openly structured sense of logic that can “externalize and objectify the mind's operations” (Manovich 61) without needing to resort to limited understandings of ourselves with distinctively separated zones of external and internal, subjective and objective. I still use these words, but I'd prefer to have new words instead of using these ones as compounds, separated by a hyphen or slash that indicates their symbiosis. These endoscopic images of bodies show that the internal even at its most tangible level is being

constantly externalized, mediated and put into context or structure in multiply unfolding ways.

Intellectual examination of the subject of medicalized body images and body imaging technologies should continue as these images and technologies advance and proliferate. As it stands right now, the inner space of our bodies continues to expand as our capacity to make it visible extends with new technologies. Microsystems technology (MST), for instance, “has become a significant enabler of novel medical devices and implants over the last years” (Schurr et al.) These devices monitor and integrate into the body as part of a new classification of “micro systems” – systems that are just now being named and integrated into current medical knowledge. Devices include heart monitors, intra-corporeal devices such as intelligent surgical instruments, temporarily incorporated or ingested devices, such as telemetric endoscopes, and long-term implantable devices such as telemetric implants. “Medical applications of MST are growing at double-digit compounded growth rates, leading to a forecasted global market volume of over USD 1 billion in 2006 or 2007, making MST devices a relevant segment of the medical technology market,” states Schurr et al. In a world where market realities exist among social, cultural and physiological health factors, the plight of the inner body is the plight of its cultural context, where health and illness are not confined to a closed physical body but are influenced by the world that bodies live in.

The growing popularization of images of the inner body, especially online where they are more freely accessible, is creating a growing number of questions that need to be asked by more people – and given better answers relevant to our everyday lived experiences. Why is it not regular practice for us to at least be offered the opportunity to

see the video recordings of our own surgeries? Or examine our removed cysts or tumours? Certainly, many people won't want anything to do with this level of self-examination or knowledge, but from the perspective of power and knowledge sharing, with respect to a truer democracy of knowledge at least, this appears to be a way forward. Traditional medicine and its discourse currently doesn't include this kind of knowledge and power sharing, yet if our own bodies are the ones on screen and if our own bodies grow these cysts that require removal, should we not at least be given a nod of significance in the knowledge creation game? The naming of new microsystems should point out to us that simply because something – a body part, for instance – exists is not enough – its true significance comes from authority that deems it somehow significant. Naming a cyst or tumour as a thing that doesn't belong in our bodies – an abnormal state in an otherwise normal zone – shows the imbalance of power that exists when our lives are at stake, as medicine is often quick to point out or fall back on as its ultimate reasoning. Yet just because we are told these parts don't belong among the rest of us doesn't mean we have to refute that they were and that they affected us at physical or emotional levels, in distinct and different ways, in distinct and different contexts.

Recognizing these distinctions within a medical discourse of categorization and problem solving derived from a system of generalizing and homogeneity of bodies is a step towards undoing culturally imposed dualities of how we come to know things. The hidden and the seen, the normal and the abnormal, objective and subjective do lose their footing when complexities shake them. The perspective that comes from the field of media studies brings awareness of the context and technology-oriented production of images regardless of the primary discourse they speak within. Further research could

extend into other areas of science and medicine as they evolve to incorporate and create more technologies with media characteristics and implications. Bolter and Grusin's work on the idea of remediation comes to mind as one way to trace the presence of specific media in different contexts over time. In stating that "remediation is reform in the sense that media reform reality itself" (61), Bolter and Grusin's work raises questions that need to continually be addressed on how images that come to us through mediated medical technology shape the lives and identities of particular individuals, groups and organizations. With each new view we have of our bodies, comes a new conundrum in understanding our realities.

In the multi-billion dollar industry of gastroenterology, with its range of treatments, technologies, pharmaceuticals, and research specialties, images of an unhealthy stomach, an abnormal gastric body or even a seemingly benign peristaltic wave have a clear point and purpose – because they fit into a discourse that makes that point and purpose possible so that questions can be answered and problems solved. From a media studies point of view, however, these images change and in them we see a whole new set of questions relating to their metastructure. This kind of investigation helps make connections between the things we think we don't understand and the things we think we do, revealing our knowledge as composed of layers that while appearing to make up a solid thing – us – interweave with all kinds of space in between and around them. But because they reflect everything around them, these spaces aren't empty of content – they point out that there is room for standing back even at the closest range and questioning.

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