HEALING THE HOSPITAL
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In every era there are new discoveries that change the way the human being looks at the world. These discoveries do not necessarily have to be technology based; they can be social, economical, musical, or even geographical. Numerous examples exist of world changing novelties across time. To name a few, the split of the great Roman Empire made the world tremble; there is the discovery of the Americas by Christopher Columbus, or the theory of the sun being the center of the solar system by Galileo Galilei. The whole period of the Renaissance is dedicated to Man rethinking his position in the world, and the things he has learned or was taught until then.

The world today is no different than those past periods of time. The discoveries are different, but fundamentally the situation is the same. Societies advance, the world picture is constantly changing, and Man is adapting himself to the ever moving planet. Another thing that hasn’t changed is the fact that evolution in one domain can and often does spawn evolution in another. It is in this line of thought that the following work establishes itself. The latter seeks to express the different future trends that will modify the way we design hospitals and how perceive the medical world.
The history of medicine is something that can be traced back until the beginning of civilization, in the Mesopotamian basin. It started with the simple observation of the human as a being. The first step was just observing how he functioned, and how illness had an effect on him. With the evolution of civilization, came also the evolution of the thinking process of man. Slowly, his capacity to analyze and his natural thirst for knowledge made him have a more and more introverted look upon himself. Anatomy of the human body was a major part of the Greek civilization. Greek medical science, like that of all civilized populations, shows, in the beginning, a purely theurgical character. Apollo is regarded as the founder of medical science, and, in post-Homeric times, his son Æsculapius is represented, as the deity whose office it is to bring about man’s restoration to health by means of healing oracles. The medical way was purely statement of the illness, and then comforting the patient by easing the pain, or through simple remedies, slowing death. The latter was unfortunately inevitable.

Slowly over time and the different eras, medicine went from purely observational and in a way theoretical to something more and more practical. Initially treatment for illnesses was based on diet. Then, gradually the interventions were more and more invasive, with the beginning of simple surgeries. The medical ideology was changing step by step to a more curative way of thought. By collecting the different intellectual writings, images, observations, and experience physicians were slowly understanding more and more of the human body. The comprehension of anatomy and simple physiology led to the advance in surgery.

Definite markers of the history of medicine cannot be clearly noted. The reason for this is that it is an iterative venture, especially in the past, where a lot of trial and error processes were
common. It is also difficult to pinpoint all the factors that have led us to our modern medicine because the knowledge also came from painters, botanists, philosophers, and others yet. The path that leads to nowadays medicine is a winding one, with many small paths leading to and from it. What has to be taken into account is also the fact that the development of medicine cannot be attributed to a certain culture or country. The discoveries and advances range from Germany, the Netherlands, France, to Italy, the Arab culture, and even all the way to China.

It is also obvious that fundamental steps and discoveries were made more and more often as the centuries passed. This is logical because as in all scientific fields one bases his research on what has been discovered before. The more past experience one has the quicker new ideas and strategies can be imagined and put into practice. This quickening in the domain is also linked to technological advances that man has had over the centuries. The microscope, new types of syringes, needles, and scalpels are just a few of the technical parts that have been developed over time.

Today’s medical world is again very different from the past centuries. Man has understood many fundamental things about how the body functions and reacts to disease and to illnesses. The knowledge he has of the human is rigorous, and based on scientifically proven experiences. He is no longer groping in the dark and merely observing. He is diagnosing, and then treating. The medical precision with which he undertakes every manipulation and procedure has been studied, practiced, and verified. Medicine is now truly wholly a science.

Again, this astounding understanding of the human entity in its whole is also linked with the technological advances that we have experienced over the past century. We have seen the rise of machinery that the ancient Greeks couldn’t even fathom.
The possibility of seeing bone with X-ray machines, to watch a growing baby in the mother’s womb through an ultrasound, or even creating a complete 3D model of human tissues by magnetic resonance imaging, is a concept that allows for in depth understanding. By having these two worlds, technology and medicine, merge doctors have achieved a level of expertise about the human body that is unimaginable.

Up until this point, the pure medical science has been discussed. It is a fact, that the place of administering care has also evolved over the centuries not to say millennia. As mentioned above, initially, when medicine was attributed to the gods, a temple was the place of healing. Healing temples were sacred sites created for the sick to receive divine aid. They were often associated with public baths and spa-type facilities whose priest-physicians administered rituals of healing, massage, and herbal medicines. Overall, Greek medicine combined a philosophy of proper living, with regular exercise, proper diet, and massage, augmented by herbal drugs and regular visits to a healing temple for ritual devotions and tribute. Physicians, surgeons, and other specialists would typically provide specific treatments including surgeries and amputations at the home of the patient. Both Greek and Roman cultures were engaged in bloody wars and found it necessary to make advances in the medical treatment of wounds and illnesses. The Roman Empire was built by and dependent upon its powerful military, and although it was not a physician-friendly society, it did advance the concept of the military hospital, as well as the public water supply and sanitation systems.

During the Italian Renaissance, a new model is born. In the second half of the 15th century, the Italian architect Antonio Averulino said Filarete, designed and constructed the Ospedale Maggiore of Milano, the first hospital of that era. The new design concept was based on the organization of courtyards, covered galleries, and linear buildings housing the sick. This innovative point of view was achieved through the use of three simple geometric forms: the cross, the square, and the right angle. This new conception brings answers to hygiene and functioning principles that will be the example for the next three centuries.

Towards the beginning of the 17th century, French architect Claude Vellefaux built the oldest Parisian hospital, Hôpital Saint-Louis. It is known for its four 1 story buildings that make up a 120m long square plan around a magnificent interior courtyard and garden. The closed nature of the design was initially thought to diminish the risk of the sick being contaminated by the plague epidemic that was ravaging Europe at the time.

During the period of the French revolution in the late 18th century, the architect and physician Jacques René Tenon will be the inspiration for a new hospital model that is still functioning today. Looking up to the British model of the Royal Navy Hospital of Plymouth, designed and build by Rovehead in 1764, Tenon will create a pavilion hospital. Several buildings stand alone, but are distributed by one main pathway. This new approach searches to avoid risks of contagion and infection, through the separation of pathologies and distribution. Together with the new interest in fresh air ventilation and gardens, the
British model of the Royal Navy Hospital of Plymouth, designed and build by Rovehead in 1764. This model will become one of the main inspirations for the Tenon pavilion model, that is still used today.

Johns Hopkins Hospital in Baltimore, build from 1876-1889 by Niernsee. A known application of the pavilion style hospital. Several separated buildings connected by a single common pathway, to prevent propagation of sickness.
new pavilion hospital looks for maximal conditions of patient surveillance and hygiene. The Tenon model quickly spread through Europe and the United States. The well known Johns Hopkins Hospital in Baltimore, build from 1876-1889 by Niernsee, is another good example of the pavilion hospital.

In the following decades, technological advances together with medical progress will once again change the architecture of these medical centers. In the way of building techniques, the arrival of new construction methods such as reinforced concrete and steel, and the novelty of the elevator will allow to build vertically. New techniques of ventilation and lighting brought a new conception to buildings, making them thicker and more compact.

The many changes in the medical field brought a new line of thought to the conception of the medical building. Even though penicillin only appeared in 1943, the beginning of the twentieth century saw the application of strict rules concerning antisepsis and especially asepsis. These new rules allow the concentration of medical specialties and services. The development of medical procedures also requires closer links between the different sectors. For the first time, the notion of different pathways for patients, personnel, and visitors is put forth.

On an urban scale, these decades were the times of industrial and urban development which implied strong real estate speculation, inciting for the reduction of foot print of the establishments. This was put together with statistics proving that, at that time, construction cost was 40% cheaper when constructing vertically rather than a pavilion hospital.

With all these novelties and changes, the hospital became more dense, compact, and vertical. This was the beginning of the hospitals we encounter today. Two examples of these new massive blocs and towers are the Mayo Clinic in Rochester, Minnesota, or even the St Luke’s Hospital Medical Tower in Houston, Texas.

Nowadays, the reflection of how a hospital should look like and function is based more on the patient experience rather than the new construction capacities, and medical advances. What is being done is taking different typologies in which people are the prime benefactors and applying the model to the hospital world and to its patients. There are three main external typologies that are being used.

The first model that is being reproduced in collaboration with hospital design is the shopping mall. A mall is a complex where shops, boutiques, and even restaurants are spread alongside public walkways. Generally, a main “road” is the principle distribution method. The private boutiques in such a complex are also accompanied by various public spaces that can vary from squares to enclosed parks. Hospitals have incorporated these different elements into their design. A main road, often double or triple height, divides a main building, and is the source of smaller distribution arteries. The boutiques are replaced in such a model by the different specialties, offices or even patient rooms. One even finds smaller boutiques that are of a medical nature: a pharmacy, an optician, or a therapeutic shoe store.

The second model that is being re-looked at for symbiosis with hospital design is that of a hotel. Ironically, they both originate from the same Latin origin, hospes, meaning a host. This common point is not only linguistic. The fact is that in both cases we are dealing with people staying for a certain period of time in a foreign place. Hospitals are strongly being inspired by hotel lobbies, and receptions. The patients no longer come into a sterile, emotionless space, but into a luxurious and welcoming
one, like one would in classy hotel.

The last external typology that is an inspiration for designers is that of domestic residence. It has become more and more important for the patient to feel at home during his stay at the hospital. Therefore, things have to be like at home, so as to be the most at ease as possible. This idea is mostly pushed for in the patient rooms, where less and less apparatuses are apparent.

We see that external factors reign throughout the modern hospital. From the most public to most private, a patient no longer feels like he is in a plain hospital, as he might have at the beginning of the 20th century. But this is not all benefit. By humanizing the hospital, and by making it into a home, or residence, away from home, are we not taking away its primary character of a hospital?

Every institution has a meaning and has its symbolism. If, for example we take a bank. It is the symbol of course of money and wealth, but also of strength, security, and stability. Those elements have to be key factors in a bank building design for it to be compatible with the human vision of a bank as an institution. The same applies to a hospital. A hospital is not a hotel, and it is most definitely not a home, especially not our own home. It is an institution that is there to treat illness the best way it can. It is a place of sterility, high-end technology, and great human expertise. Of course it should not be inhuman in its approach for it is the human that will be treated there. But it should neither pretend to be something it is not, and will never be. A very delicate balance has to be achieved between the high-tech, clean, expert space and a cozy, warm, homely one.

Mayo Clinic is the first and largest integrated, not-for-profit group practice in the world. Doctors from every medical specialty work together to care for patients, joined by common systems and a philosophy of “the needs of the patient come first.” More than 3,300 physicians, scientists and researchers and 46,000 allied health staff work at Mayo Clinic, which has sites in Rochester, Minn., Jacksonville, Fla., and Scottsdale/Phoenix, Ariz. Collectively, the three locations treat more than half a million people each year.
We have seen in the precedent chapter that hospital design has evolved with time, from a temple, to a pavilion, to a mall and hotel. In our society today many changes are taking place that will again change the conception of hospital infrastructure and the perception of the medical world. It becomes important to identify these major domains of change, and then to see what the impact is, architecturally first and foremost.

To be able to effectively diagnose potential novelties in the architecture of hospitals, it is very important to have a broad point of view. Then to be able to, when needed, plunge in depth into a certain matter. From this perspective, three major influencing domains have been identified.

The first of the three is a very present one in our society since it concerns technology and the different things that are being developed today. Questions in regards to the role of IT in hospitals, or new research domains are examined in this part.

The second major influencing factor involves the environment and the ecological approach to the world that we are experiencing. What are the possibilities in which we can design a hospital to be environmentally friendly?

The third factor is probably the most important seeing that it concerns the essence of any hospital: the human being. A great change is being undergone in the way Man sees himself. A vision of health is floating over society in every day life, and this new view will have certain effects on the hospital life.
In the past century, major technological advances were discovered and developed that would come to change the world for ever. Imagining a world without cars, airplanes, television, computers, or even telephones, is nowadays more or less impossible. Most everything has integrated computer chips, electric circuitry, or cables. Without judgment on whether or not it is right, these elements have become part of the way people live and function in today’s society.

The technological novelties that surround us today go hand in hand with another sector: science. More accurately, the development of science and research relies on the new technological advances as utensils that will allow to further investigate a certain aspect of the scientific world.

Scientific research and the quest for the understanding of Man, his origin and his development have always been a very present topic for thousand of years. Today, combining science and technology we can finally go further, and start answering a few of our yet unanswered questions.

It is in this sense that the chapter will develop itself. In the medical world, certain technologies and research are developing themselves that will induce major changes in the way that hospital will function and look.

Four major domains have been identified and will be looked at in more detail. The first is the emergence of new molecular size technology: nanotechnology. What can these new elements do, and what would be the implication of having these new features in a hospital?

The second is the arrival of the robot in the hospital. We have seen machines take over many other industries. Why do we need
robotics in a hospital, and how would this change the functioning of the latter?

The third domain that is now a booming sector into today world is genetics. Understanding the bricks that makes us humans is one of the major preoccupations of today. Again how will this research influence the medical world?

In the fourth and last part of this chapter, the important communication technologies have found their way into the hospital. What will the changes of such new interactions be and how does a hospital have to adapt itself to this new technology? The second is the arrival of the robot in the hospital. We have seen machines take over many other industries. Why do we need robotics in a hospital, and how would this change the functioning of the latter?

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Nanotechnology refers broadly to a field of applied science and technology whose unifying theme is the control of matter on the atomic and molecular scale, normally 1 to 100 nanometers, and the fabrication of devices within that size range. It is a highly multidisciplinary field, drawing from fields such as applied physics, materials science, interface and colloid science, device physics, supramolecular chemistry, chemical engineering, mechanical engineering, and electrical engineering. Much speculation exists as to what new science and technology may result from these lines of research. Nanotechnology can be seen as an extension of existing sciences into the nanoscale, or as a recasting of existing sciences using a newer, more modern term.

The application of nanotechnologies to the medical domain is related to as nanomedicine. It covers areas such as nanoparticle drug delivery and possible future applications of molecular nanotechnology and nanovaccine. Current problems for nanomedicine involve understanding the issues related to toxicity and environmental impact of nanoscale materials.

Research is looking into using these new nanotechnologies to provide new methods of helping the immune system of the human being. One would inject nanoshells that would target a certain type of illness or disease, such as cancer for example. These shells would have substances to destroy the wanted cells. With such a method cancer medecine, for example, would only be sent to the cancerous cells, and nowhere else in the body. This would allowed no other organs to suffer, it would diminish side effect of certain drugs. For example, a chemotherapy treatment
will attack the cancerous cells but will also destroy the healthy cells that are in the vicinity of the targeted area.

Another definition sometimes used is a robot which allows precision interactions with nanoscale objects, or can manipulate with nanoscale resolution. Following this definition even a large apparatus such as an atomic force microscope can be considered a nanorobotic instrument when configured to perform nanomanipulation. Also, macroscale robots or micro-robots which can move with nanoscale precision can also be considered nanorobots.

Nanomachines are largely in the research-and-development phase, but some primitive molecular machines have been tested. An example is a sensor having a switch approximately 1.5 nanometers across, capable of counting specific molecules in a chemical sample. An application is the detection of toxic chemicals, and the measurement of their concentrations, in the environment or even in a human body.

Even though many of these nanotechnologies are still in a research form or on a theoretical basis, some of the actual applications already function. Some of the earliest medical uses of nanotechnology have involved antimicrobial coatings - often made of nanoparticulate silver - on wound dressings to prevent infection and on things like catheters to prevent the formation of biofilms. There has even been work on application of silver nanoparticle solutions directly to wounds to prevent infection.

**Implications**

The implications of such a new technology applied to the medical world are vast. A hospital has to be the epitome of cleanliness

Moving right along from the outer to the inner universe, the smallest robots of all, nanobots, will be exploring the human body, as well as other organisms, repairing and correcting, providing information on how we work on the inside. An example of how nanotechnology robots might interact with our bodies in the future, repairing and maintaining red blood cells.
and sterility. The antimicrobial coatings could be applied to the paint in the buildings themselves. Such a venture would allow for lesser in-hospital, or post-operation infection. A new era of asepsis, and sterility would see the light for the benefit of the doctor and the patient.

Treatment efficiency would be the next issue that would live a major change. Patients would need to invest less time and effort into their treatment. Maybe therefore, spend less time in the hospital recuperating. If the way the treatment is administered is altered to just the injection of nano-substances, then there will a considerable change in the space where these injections will be done. Seeing that the treatments are very cell and tissue specific, the will be more direct in their functioning.

Since the Industrial Revolution in the middle of the 18th century, the machine has slowly taken a solid place in our society. Then, machines were used to make tapestries, and to weave things. Now, high-tech robots build and put together the different parts of the cars we drive in giant manufacturing plants. In the last two decades, the performance level of such machines and robotics has reached another level. It is only normal that they have found their way into the medical world. The latter is one of precision exercise and sterility. What better then a mechanical arm and hand to do operations?

In 1985, a robot, the PUMA 560, was used to place a needle for a brain biopsy using CT guidance. Since then, many different operations from various specialties are done through robotic surgery. Cardiac valve replacement, gastrointestinal surgery, and urological surgery are just a few of the different procedures that can and have been done through robotic surgery with great success.

In the prosthetic domain, there is a great use for robotics. During the surgery, the precision required for the well-fitting of the new limb replacement, such as a hip, can only be optimally achieved through the combined work of the doctor’s expertise and the robot’s precision.

Staying in the same domain, but looking at the prosthesis itself, research laboratories from across the globe, USA, Germany, Russia, are coming around to developing new limbs, such as knees, ankles or even hands, arms. These new robotic body parts would recognize the electrical impulses from your brain as well
as external stimuli to give a more natural biological use.

If the process of creating individual body parts has already started, it is not too much of a shock to explore the next step. Many science fiction movies or literature have already integrated this future step. An android is a robot designed to resemble a human, usually both in appearance and behavior. The reality is that research in this domain has already commenced. Japan, China and especially Korea are investing millions of dollars into the research and development of these androids. Several different models of these robot humans have seen birth. Some can sing, others can talk, others yet can laugh and cry. Soon these machines could maybe bring trays of food, clean up dirty floors, or administer shots.

Implications

The architectural implications of robotics for a hospital are very real. In the automotive industry, the manufacturing belt and spaces are designed around the machinery that will be used to create the various parts to make the car. The process of this mechanization has augmented the need for space to house the machinery. This need for more physical space is the same when is come to the hospital on the operating room. The surgeon is no longer standing directly next to the patient. He is seated not far from the operating table, looking into a screen and manipulating small joystick like buttons and levers. These will move the robotic arms of the machine that is conducting the operation. Such a machine, with its hull, circuitry, cooling device, power source, all need more space. The robotic change in medicine will necessitate the operating rooms to be able to allow for them, space wise.

Due to a motorcycle accident, Claudia Mitchell lost her arm. She is the first woman to replace the severed limb with a “bionic arm”. It works by detecting the movements of a chest muscle that has been rewired to the stumps of nerves that once went to her now-missing limb. The device is designed by The Rehabilitation Institute of Chicago, which is part of a multi-lab effort, to create more useful and natural artificial limbs for amputees.
The next major change that will arrive due to the use of robots and machinery is the emergence of a new specialty. A specialized technician has to be formed to be able to use and eventually repair the different components that make up the machine. His knowledge of electronics and of medicine has to be substantial. This new “robotician” would be the one in charge of the high end prosthetics on a medical basis, seeing that the movements are as close to reality as possible, and that the body parts around the prosthesis does not reject it. But he would also be the specialist in charge of the circuitry and electronics that analyses the nervous impulses that make the limb move or react.

Together with this new technician comes a completely new space. A maintenance facility will have to exist to store spare parts, and to conduct the eventual repairs. The degree of precision that the machinery needs and the quantity of electronic material will make these maintenance facilities resemble a high tech computer lab more than the image of a garage.

When eventually machines take on the aspect of humans, as was depicted before, the role of staff will be redefined. Nurses and doctors alike will have a different contact with the patients, seeing that some of their responsibilities will be given to the new “medibot”. The question that arises from such a situation is the reaction of the patient. How will he see the fact that he isn’t being taken care of by a human, but by a machine emulating one?

Genetics

A revolution is going on in biology with the new ability to manipulate human genes and cells at a molecular level. As early as 1998, researchers had persuaded a few cells to grow in the laboratory. From this beginning, stem cells have become a promising way of growing tissue to repair damaged hearts, skin or other organs – or replace them all together. The Human Genome Project has jump-started our understanding of heredity and disease while giving us an ever clearer vision of what it means to be human.

The Human Genome Project was one of the great feats of exploration in history - an inward voyage of discovery rather than an outward exploration of the planet or the cosmos; an international research effort to sequence and map all of the genes - together known as the genome - of members of our species, Homo sapiens. Completed in April 2003, the Human Genome Project gave us the ability to, for the first time, to read nature’s complete genetic blueprint for building a human being.

The discovery and manipulation of human genes – together with the use of special new drugs – are unlocking a future where the human body might be able to confound and defeat its ancient enemies. Research is heading towards a place where someone’s genetics predisposition for a certain disease can be altered and even nullified. In a way we are trying to eliminate the structural weaknesses that are within the smallest building blocks of our being.

While these advances are certainly mind- boggling, they can also be sobering, raising issue of control and privacy that trouble
many even as they give hope for extended, healthier lives. With the cloning of sheep, a few years ago, people raised moral question about genetic advances. How far does one go? What will genetic engineering do to the human gene pool? How will it affect human ecology and evolution? A heavy change will be the way people look at Humanity. By playing with the above mentioned building blocks of our beings we are touching upon things that nature has set out for us. Is trying to tamper with such a precise machine as the human body and genetic code an intelligent thing?

And then of course, there is the ethical question of whether or not genetic modification is even desirable. And from that ethical stand point comes a philosophical one. If we could cure disease through genetics, would it be a good thing? Is it even possible? An eventuality would be the development of a resistant disease, as we have seen happen with bacteria and viruses that are resistant to medications. What would be the implications of not having disease? First of all, if everybody had access to this treatment, then the actual overpopulation of the world would become an even more critical issue, seeing that there would be no more natural population control. Obviously enough, such gene treatment would be for a select few that have the means of paying for it. This would then create a major disparity between “normal” humans and “modified” ones, with all that a situation like that can imply socially, politically, and economically.

Implications

It is evident that the genetic side to medicine will only pick up speed. It is rapidly changing from being pure biology to a completely new medical specialty. With it comes the development of a new practitioner: the geneticist. As the roboticist is the link

Gattaca is a science fiction movie directed by Andrew Niccol, released in 1997.

Vincent is one of the last “natural” babies born into a sterile, genetically-enhanced world, where life expectancy and disease likelihood are ascertained at birth. Myopic and due to die at 30, he has no chance of a career in a society that now discriminates against your genes, instead of your gender, race or religion.
between electronics and medicine, so is the link between biology and medicine portrayed through this new specialist. The new specialty would be the one to sequence a person’s DNA, and to analyze what “defects” that person has. He would then set up a treatment program. Finally the implementation of the treatment program would also rely on this new specialty.

The above mentioned novelty will imply the arrival of new laboratories and research facilities to conduct the furthering of this domain. What it will also imply is the arrival of more patients. With gene therapy and treatment comes a whole new line of illness for patients. People with minor genetics flaws, that have never been an issue for anyone, can now amend them. By creating the new medical specialty, we have also created a new reason for people to seek out treatment whether it is crucial for them or not.

Communication Technologies

No one could have imagined how strongly the development of a computer program in the 1960’s would impact our society today. The internet has spread from being a purely military web to a world wide web. This is very evident in today’s life style. In the developed world it is unimaginable no to be connected. We are living in a connected era, and more to the point a wireless era.

The internet is no longer just an information highway. It has evolved into a way of communication that connects one side of the world to other in split seconds. People can talk, write and even see each other even though they are several thousand kilometers apart. This possibility has touched almost every domain. The medical world is not an exception.

In such a specialized world as Medicine, the emergence of telemedicine is a very logical step. It is a rapidly developing application of clinical medicine where medical information is transferred via telephone, the Internet or other networks for the purpose of consulting, and sometimes remote medical procedures or examinations. By combining the expertise, knowledge, and experience of more than one doctor, the patient obtains more in depth care.

It may be as simple as two health professionals discussing a case over the telephone, or as complex as using satellite technology and video-conferencing equipment to conduct a real-time consultation between medical specialists in two different countries. Telemedicine generally refers to the use of communications and information technologies for the delivery of clinical care.
All these things are naturally dependent on the level of computerization that is available. Computers are everywhere nowadays. Without them, none of the technological revolution could be possible, or even imaginable. It is coming to the point where paper and pencil are disappearing to be replaced by flat screens and super-slim line keyboards. A very actual example of this is in the domain of radiology. Fewer and fewer hardcopy images are being used. The X-ray machine or the scanner directly sends the images to a computer where the doctor visualizes them. The computer also allows for a quick 3D reconstruction of the different images made by an MRI. It becomes easier for a doctor to flip between images and to call up past one to compare.

Implications

As stated above the digitalization of information is replacing the analog pencil and paper. This will radically change the functioning of a hospital. There is the desire to get rid of the clipboard and replace it with an electronic devise resembling a PDA. Such a change would allow the patient to be connected to all of his doctors at one time. The information that one doctor in one certain specialty would be put onto the PDA, instead of the clipboard. The PDA is then synchronized with the central computer system and the PDA’s of other doctors. The information is thus immediately in the hands of those who need to know, and is always accessible at the press of the button. The computer facilitates the transfer of information, speedier and more reliable.

Such a computerization of information relative to a medical file would hinder misunderstandings between physicians, because everybody has direct access to the protocol followed by others. The patient’s records are clearer to the doctor and other

Positron emission tomography scan. A modern procedure in which a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body. These images can then be sent across the globe for second opinions and diagnosis.
specialists allowing for fewer mistakes, and easier follow up on a patient throughout his treatment. For example, any doctor can quickly see what medications have been prescribed to the patient, in what dosage and what for, and thus not administer a new one that could be harmful. Of course, this could also be the case with standard papers and pencils, but the new computer clipboard reduces risk of losing a paper, of bad handwriting, or misplacing the charts.

Following this computerization of the patient and his data, comes the question of archiving. Digital information takes up a lot less space than endless amounts of folders and files. Thousand of patients’ medical dossiers can be stocked on a single computer. In concrete, the change towards the computer indexing of patients and their medical history and treatment will induce the lessening of archive space.

On the other hand a new thing has to be taken into account with the arrival of all this new digital information. Yes paper will be replaced by harddrives and sticks of silicon memory. But storage of these drives will still be an issue. And more to the point: the backup of this information. With this new technology come new architectural spaces. A datacenter will become necessary. The latter is a space that acts as a storage facility for computer harddrives. They are specially cooled, ventilated, and powered to allow optimal conditions for the computer parts. The security of such datacenters is also an issue for the information on the drives is confidential, and so has to be protected.

Above was mentioned the fact that information transfer would be facilitated inside the hospital. This increased facility can be widened to the connected world, thanks to the progress of the internet. For example, X-ray images can be sent to a consultant across the world for a second opinion. But what such a data

Since the September 11 terrorist attack, every bit of information that travels over the World Wide Web is stored on harddrives and analysed for security reasons. Many of these data centers house back-up drives that can contain severa terabytes of memory. They are part of the backend architecture of today’s world.
We have seen in this chapter the influence that the technological domain has on the future development of hospitals. It touches more or less every part of the coming infrastructure, especially the computerization of the information and the wireless connectivity towards other specialties in the same hospital or across the world.

One can also see the interconnectivity between the different technologies, that one is being pushed forward by the development of the other. The intimately linked robotic surgery and telemedicine are a good example of this.

It should also be mentioned that technology is always a great investment for hospital. The machinery that is necessary are multi-million dollar acquisitions. This being the case, it might be difficult to envision all future hospitals to have all the newest instruments and electronic infrastructure mentioned above. Economically it isn’t always feasible.

Another thing that should be added is the fact that some doctors aren’t for the new advances that will shape the design of their future work areas. Unfortunately, some things are unavoidable, seeing the way the society is moving. Accepting these changes is probably the easiest way to move forward. Once this step has been achieved it will be easier to adapt to the novelties that are restructuring the hospital.

Conclusion

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The planet that we live on is in equilibrium. In the last century, Man has started tipping that equilibrium towards its destruction. He has done so through technological advances such as the automotive industry or through the by-products of the machine he uses, such as the CFC’s in refrigerators. Per say these different elements are not destructive, but when used in excess they are. Unfortunately, and paradoxically, for nature, Man is the expert in excess by nature. He uses, he consumes, he reproduces all in excess, and he pushes others to do the same.

Luckily, the tide is turning. Man has also another characteristic which is his intelligence to solve problems. That is where the new trend takes birth. The environmental status of the planet is something that has turned into a problem that needs to be solved. We can no longer go on without regards to the impact of our actions. Slowly we are depleting the natural resources of our planet natural and mineral. We are even poisoning the air we breathe. This is true in all domains. The medical world with its hospitals is no exception to this rule.

The governments are taking a stand for ecology, and for helping the planet recover from the damage it has sustained from our polluting. A very big first step was the signing of the Kyoto Protocol. It was agreed on 11 December 1997 at the 3rd Conference of the Parties to the treaty when they met in Kyoto, and entered into force on 16 February 2005. The latter is a protocol to the international Framework Convention on Climate Change with the objective of reducing Greenhouse gases that cause climate change.

As stated in the treaty itself, The objective of the Kyoto Protocol is to achieve “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”
We can also see a green trend that is happening in the other industries also. A good example is the important change that is coming upon the automotive industry. Many companies now are boasting the eco-cars. The number one in this advance is Toyota, with its Prius Hybrid model. Then coming up are Mercedes and BMW with their hydrogen cell concept cars.

Actually, a hospital, more than any other institution, should probably represent the symbol for a clean and healthy planet, seeing that it is the bringer of health in all of its forms. In this regard, the ecological trends will spread, without a doubt, into the design and functioning of a medical center.

The diminishing of energy consumption is at the forefront of many minds. In which ways can such a new line of thought influence the conception of hospital?

Besides consuming too much energy, we also create too much waste, in all its forms. A hospital is again in the forefront of this dilemma. Changes will have to occur. In what form will they be made and implemented?

Another thing that has to be taken into account is the fact that things have already changed in today’s world. We have already made some damage and unfortunately still are. Therefore it is also important to see how these changes influence the design of a medical center.

In any small town or little city, the new preoccupations are how to consume less energy, or how to produce clean energy. By clean is meant, a source that is naturally renewable, and does not drastically deplete the earth resources, and does not create harmful waste when used.

Renewable energy effectively utilizes natural resources such as sunlight, wind, tides and geothermal heat, which are naturally replenished. Renewable energy technologies range from solar power, wind power, and hydroelectricity to biomass and biofuels for transportation. About 13 percent of primary energy comes from renewables, with most of this coming from traditional biomass like wood-burning. Hydropower is the next largest source, providing 2-3%, and modern technologies like geothermal, wind, solar, and marine energy together produce less than 1% of total world energy demand. The technical potential for their use is very large, exceeding all other readily available sources.

The most commonly known one is the sun. It is continuously sending us its light and heat. Solar power would create electricity that will then run the different elements that need energy. All this without creating by-products that are harmful to the environment. Solar energy technologies harness the sun’s energy for practical ends. These technologies date from the time of the early Greeks, Indian, Native Americans and Chinese, who warmed their buildings by orienting them toward the sun. Modern solar technologies provide heating, lighting, electricity and even flight. Solar power is used synonymously with solar energy or more specifically to refer to the conversion of sunlight
into electricity. This can be done either through the photovoltaic effect or by heating a transfer fluid to produce steam to run a generator.

The fuel cell is another crucial technology that converts hydrogen and oxygen into electricity and heat—powering and heating buildings, machinery, and cars, for example. Fuel cells are hardly new. In 1839, British physicist William Grove reasoned that if an electric current could split water into hydrogen and oxygen, the reverse process of combining the two gases might produce electricity and water. Unlike sun, wind, water, petroleum, and coal, hydrogen is not an energy source, but rather an energy carrier. An energy carrier is a way of transmitting energy, not creating it. While crude oil is an energy source, gasoline is a carrier—it provides portable mobility fuel. Electricity, which can transmit energy over hundreds of miles, is a pure carrier.

Hydrogen is the most concentrated energy carrier in the universe: 2.2 pounds of it can carry the same energy as 6.2 pounds of gasoline. That’s a key reason why liquid hydrogen makes excellent rocket fuel. Unlike electricity, hydrogen is easily stored in large amounts as a gas or a (costlier) supercold liquid. Hydrogen doesn’t support life, but it is nontoxic. Though it is seldom burned as a plain fuel like coal, hydrogen gas can burn, but requires four times the concentration of gasoline fumes to ignite. When it does burn, hydrogen’s clear flame produces only heat and water—no choking smoke or soot, which are carbon products.

The most common way of obtaining hydrogen is through another system which is the Use of a device called a fuel processor or a reformer. With it, one can split the hydrogen off the carbon in a hydrocarbon (ethanol or methane) relatively easily and then use the hydrogen. The leftover carbon is discarded to the

Geothermal energy offers a number of advantages over traditional fossil fuel based sources. From an environmental standpoint, the energy harnessed is clean and safe for the surrounding environment. It is also sustainable because the hot water used in the geothermal process can be re-injected into the ground to produce more steam. In addition, geothermal power plants are unaffected by changing weather conditions.
atmosphere as carbon dioxide. The problem with it is the fact that the end product is still one that is potentially dangerous for the environment. Through a process called electrolysis, where one passes an electric current through water, splitting it into hydrogen and oxygen, hydrogen can also be created. The only problem is that one needs a cheap and sustainable source of electricity to run through the water. This source can as mentioned before be solar, or even wind energy.

A hospital is an energy consumer by nature. It is a building that needs always to be active. The electricity is always running for the lights, machines, and most importantly ventilation. Besides this, heating is also always on to keep the building at a constant temperature.

Implications

With this ecological revolution that we are living at the moment comes several elements that need to be taken into account.

The fact that the hospital needs to diminish its consumption is a fact. It is no longer possible to use so much energy. With the arrival of new possibilities, mentioned above, to diminish energy usage and to use clean energy, a hospital has to take onboard this new trend.

Seeing that a medical campus can be as large a small town, with nearly 10’000 people, it should try and be an autonomous energy site. By this is meant that the hospital should try to produce as much of its energy that is consumes on its own. Even though the initial cost of implementing these new sources is high, this autonomy would diminish energy cost in the long term. Even if the cost would stay the same, the clean environmental factor that it would create is a non negligible output. Therefore, it is an investment that should be made. Above, we looked at solar and hydrogen power. Both of these sources, together with wind energy, need to be integrated into the initial design of a hospital. Of course, things like natural ventilation and passive solar heating are also very important features to the building and have to be designed beforehand.

Solar panels, with their distinct look, but also with their necessity to be placed in the right location and position, need special attention. Furthermore, instead of just placing the large panel surfaces “randomly” they can and must be a part of the general design, enhancing the quality of the architecture. The same applies for eventual wind turbines. Seeing their size, and the noise they create, their positioning is also a very important point that cannot be left to chance at the end of the design process.

In a way, the new hospital campus should have its own power plant. Depending on the size of the hospital, the power plants capacity would change also. Such a new architectural space would have all the space for energy storage and distribution. It would be a coming together of different types of energy makers (wind, solar, hydrogen, maybe even geothermal).

Having a power plant on campus is a major change. But it allows for the autonomy that a hospital should have. It is a reversal of typical energy ideology. Normally, a public space is on the main power grid and when in trouble, it switches to emergency generators. Now, this is inverted. The hospital is on its own power grid, giving it independence, autonomy, and security. When in need it can always connect itself to the main power grid as a backup.
Together with the integration of new power sources and the diminishing of energy consumption, comes another important problem that needs to find a better solution: waste.

Two things have to be altered to manage the waste better. First of all, it is finding a way to make less of it. Secondly, it is how you manage it afterwards that is crucial. This waste problem is a very important one when it comes to the medical world. It does not only concern the typical biohazard materials and substances, but also food, and water.

A hospital is a sterile place. To reduce the possibility of infections or of contamination, bacteria are not allowed to proliferate anywhere. It is from this necessity that the “one time use” items have taken a dominant place in hospital cupboards. These items vary from needles, blades, syringes to gauzes, and catheters. Besides the problem of the before mentioned items, comes the problem of their packaging that is also a major waste provider. It is a very common debate topic the one that opposes sterilization to one time use items.

We have all heard the terms “reduce”, “reuse”, and “recycle”. They should not be neglected in such a waste creating environment that is a hospital. Of course the difficulty lies in identifying the object that can be reused. This dilemma is not only for the hospital and its staff to elucidate, but it should be a joint venture with the manufacturers. It is the latter that need to produce objects that can resist a second or third usage, and that can be cleaned or sterilized easily and effectively. Material scientists and engineers also need to pitch into this area to allow for things to be recyclable. This shows once again that it isn’t up to one entity to solve the waste problem.

With the physical waste problem, comes also the water waste and consumption that is also very real in a hospital. The larger the number of beds, and thus patients, the larger the number of liters of water used. Beds need linen; linen that needs to be washed. It has come to the point where in some hospitals, to save water and money, staff has been advised not to change the linen if it hasn’t been “too used”. A statement such as this is understandable, from an economical and saving point of view but at the same time fundamentally wrong from a hygiene standing point.

Patient water needs such as showers, toilets, or just periodic cleaning are also a major part of the water consumption of hospitals. The latter is an institution that groups thousand of people, and that is the epitome of cleanliness. It is therefore only normal that water is being used to obtain the hygiene standards that the patient and the staff members require. This is of course a factor that cannot be eliminated, but that has to be reduced.

**Implications**

The waste management of such a large machine that is a medical center starts with an awareness program. All people in that center, whether patients, doctors, or other staff, need to be aware and an active part in the disposal of waste. It is through this type of education that things will slowly be impacted upon.

The disposal of things to be recycled can also be facilitated if there are spaces that are adapted for this. These new spaces can be seen as a waste centers. They can just have clearly indicated boxes for trash disposal, like the ones seen in recycling centers.
From these localized points in a hospital, the waste can then be brought into a dedicated space just for waste triage and disposal. Most probably this space would be separate from the buildings but still accessible on campus. This would allow for the waste to be away from sight, giving a clean image to the campus, and more to the point facilitate its disposal by the local authorities.

In the same way, sterilization points will become more present in hospitals to be able to cleanse large amounts of materials, before reusing them. The work of scientists W.B. Underwood and J.J. Perkins was instrumental in encouraging health care facilities to establish a separate and distinct department, the “Sterile Processing Department”, with specialized expertise and direct responsibility for providing clean and sterile medical/surgical supplies and equipment to patient care areas.

The next change is the changing of all the taps, faucets, and shower-heads to obtain lower water consumption. Looking into electronically regulated ones can be an initial solution to reducing the water waste of a medical center. Then, in a larger step, one can look at the creation of a water treatment facility. Just filtering the water and being able to reuse it a second time, even for things like watering plants and park, is already a huge step into the right direction.

It has become common knowledge that the climate of our planet is changing. Some people say it is due to pollution, others sustain that it is a cyclic matter. Both these theories do not change the fact that temperatures are rising, quantities of rain and snow fall are different, and that climates in various areas of the world are evolving. These new facts all have effects on our health and will change the way we live in certain parts of the globe.

Whether or not this is connected with the quantity and severity of the natural disasters that the planet has been subjected to in last decade is not clear. But what can be observed is that several major natural disasters have occurred and have ravaged our world. No one must be reminded of the tragic earthquake on the West coast of Sumatra, and the tsunami that hit Indonesia and Thailand, in December 2004. Everybody recalls the strength of hurricane Katrina, in August 2005, which flooded the whole city of New Orleans. Another example, the heat wave that swept through Western Europe in 2003 was responsible for more than 30,000 deaths.

These are just the most mediatised of the natural disasters that have occurred in the last decade. More have likely hit in other places of the world.

For the last 6 years we have also been witness to a new phenomenon, one that destroys quickly and without warning: terrorism. The destruction of the Twin Towers in New York, on September 11th, 2001, was a tragedy that was the beginning of this new phenomenon. Since, then periodically there have been other attempts. Some failed, others didn’t. March 11, 2004,
bombs went off in Madrid injuring many. Then, of course, London on July 5th, 2005, bombs in the metros and the buses. In all three cases, many were injured, and much infrastructure was destroyed. Therefore, it is something that should not be neglected when constructing important new structures.

On a different line of thought, we are counting too many inhabitants on the planet. That number still rising every day. This implies many ecological problems, but one the one that is interesting to us, is that the more people there are, the more transportation methods there are. The number of cars, buses, planes, and bicycles, all are rising. This is a logical consequence of the overpopulation: more people need to move from point A to point B. By increasing these numbers we also increase the risk of having transportation accidents. Often these types of accidents involve many people, injuring many.

The relation between the above mentioned situations is the possible impact on the medical field. Whether it is an earthquake that decimates entire neighborhoods, a terrorist attempt targeting a building, or an accident on the highway between tens of cars, they all mean a quantity of injured people at once.

Implications

Through the examples above, the problem that is recurrent is the sudden quantity of people needing medical care, all at the same time. A hospital cannot just pick out some of the needy; it has to take in all. That is the major change that has to occur in hospitals. In the designing stage, contingency space has to be made available for the disaster eventuality. This could be a dedicated area or zone that can always be set up as a sort of treatment camp. But more likely, the design of the hospital

The New York City Freedom Tower, which will stand 1,776 feet tall on the site of the former World Trade Center, is the work of the Lower Manhattan Development Corporation. It will serve as a beacon of freedom, and demonstrate the resolve of the United States, and the people of New York City.

The Freedom Tower is due to be completed in 2012.
should be flexible enough to be able to exchange spaces rapidly and efficiently from for example a waiting area, or bed storage space into a provisory operating and treatment space.

This is for the eventual catastrophe that implies numerous patients at once. Concerning the hospital itself, it too needs to put into application measures to protect itself. This is obviously constructing with the right norms for the geographically location it is in. In California, a very earthquake prone location, the hospital itself needs to be up to speed with the security norms and regulations. It would be disastrous if the place that is needed most in such a situation crumbles. The hospital should stand strong as a rallying point. A hospital also needs to inspire security in general. It is a safe haven for those who need help. The patients at no time must feel that their life can be threatened through external factors.

Living in a cleaner world is the mentality change that is being elaborated in people’s minds. Making it a better place to live for us and for our children is the recurrent leitmotif.

Hospitals are such large institutions that they resemble small cities. Therefore, it is primordial to minimize the impact of these huge infrastructures on the environmental scale.

We have seen that the environmental objectives that people have towards other constructions such as houses or office buildings also apply to hospitals. There is no reason why they should not benefit from solar panels, clean energy sources, or effective waste management.

Besides aiming towards the future, it is also necessary to act upon the existing issues that man has influenced over the decades, such as climate change or over-population.

In a way, it might even be easier to make these places environmentally friendly because it is a place of healing. Therefore, it touches all. In many countries, medical centers are sponsored by governments or private donors. This allows for an economical foundation that is inexistent in other domains such as residential housing.

A green hospital can be a symbol to the world, what to aim for.
In the previous chapters we have looked at factors that are the furthest away from the human side of a hospital. Obviously, one of the most important factors when looking at a domain that is human inclined, are the humans in question.

The way we look at our own health has changed over the centuries, and is experiencing a change again at this point in time. Awareness of our personal well being is coming to the forefront of our daily preoccupations.

A certain change is happening that brings medicine from a diagnostic stand point to one that is more inclined to prevent problems instead of curing them once they has been established. How does such a new healthy lifestyle fit in with hospital design?

Studies have shown that architecture can influence the way people feel about a certain space. It can make them have a sense of been crushed or on the contrary feel open and safe. In a domain where healing is the keyword, design must be optimal. It is with this in mind that the healthy hospital must be explored.
In the last couple of years, there has been a certain change in the way people live their everyday lives. People’s priorities have altered. They look towards a healthier way of life.

A general growth in quality of day to day things that surround us is noticeable. One that really comes to mind is the emergence of many bio labels and products. The natural foods and drinks are taking up more and more space in the shelves of supermarkets. Eating correctly has really become a major part in a child’s education. “La Fourchette Verte” is a quality label in Switzerland that promotes healthy food in restaurants, school, or even large enterprises. It is but one of many new quality labels that are to be seen today.

This awareness of a new lifestyle is shown also through the vision of physical health. People want to eat better, healthier, to keep in shape. They have become more and more conscious of their own physical necessities. Keeping their body healthy is a major change. Sports have become a non negligible part of someone’s life. The reasons for sports vary from keeping in shape, letting out stress from work, to just spending some time doing something for yourself. Smoking is another good example of how things are changing. Already banned in all public spaces in the USA, the same trend is slowly coming to Europe.

It is nearly impossible to dissociate the physical and the mental part of a person. In this regards, the physical health trend goes hand in hand with a mental health trend. People realize that there is more to life than always been stressed about work, or problems that have become constant worry factors. Negotiating time for

Obesity is a condition in which the natural energy reserve, stored in the fatty tissue of humans and other mammals, is increased to a point where it is associated with certain health conditions or increased mortality. Although obesity is an individual clinical condition, it is increasingly viewed as a serious and growing public health problem: excessive body weight has been shown to predispose to various diseases, particularly cardiovascular diseases, diabetes mellitus type 2, sleep apnea and osteoarthritis.
leisure activities or spending time with family members, is becoming more common practice when signing work contracts. People more and more often work part time to allow for enough time to fulfill these others needs.

These three trends, search for quality, physical health, and mental health, all link together to show an overall trend: prevention. By making all these changes to one’s life, a person is preventing possible health problems. Cardiovascular diseases can be prevented by eating correctly, and through regular exercising. Having the time to relax and to let go can reduce burnouts and depression. Man is realizing that you cannot buy a new body, so he is learning to keep it clean and working properly. It is easier to prevent an illness rather cure it once it has been diagnosed.

Implications

These changes in a person’s way of looking at life have to be promoted and enforced in a hospital. It is exactly in the headquarters of health that these different new resolutions need to be present. This is true not only for patients but also for external people. The hospital turns into a location to seek health, whether one is sick or not.

With such a sharp turn towards health, new spaces have to arise also. The first of these spaces is an area for sports and physical activities. Theses facilities could be a fitness, a swimming pool, or even a track. For the patients, it can be used for rehabilitation and physical reeducation, or to keep in shape while undergoing a prolonged stay in the medical center. These sports facilities can be indoors as well as outdoors. One can imagine that these spaces can be used by external people also during specific hours, thus promoting health.

When a person thinks of hospital food he generally does not make a very satisfied face. That is where the next change will take place due to the search for quality. Instead of having only a cafeteria, restaurants will provide better choice of food for patients and staff alike. “You are what you eat” will take on a new meaning.

In regards to the patient life at a hospital, changes will occur. A patient seeks, at times, to escape his medical predicaments, therefore spaces for leisure need to exist. Only staying in your room isn’t healthy and doesn’t promote quick recuperation, and will only affect the mental health of a person. These spaces can be things like a projection room to watch movies, or a library to relax over a book, or even a billiard room. It is just important for the patient to be able to leave, to find somewhere where he can be, instead of being perpetually confined to the walls of his room.

These spaces can also go together with spaces where a patient can see family members. Often visits happen in the room which isn’t necessarily the most joyful of places. To change this, family spaces need to be created that will be more intimate to provide better for the reunion with loved ones.

All these different spaces bestow on the patient a sense of humanity that is now often lost. Life continues even in a hospital. The latter shouldn’t be a place where a person is quarantined to, but it should allow the continuation of a normal everyday life, as best as possible.
Healthy Hospital

As much as a healthy lifestyle can change a person, a healthy environment can do the same also. In a hospital this notion becomes primordial seeing that it is a place for sick people and for people to become healthy again. The brain takes in its surroundings and sends information to the body relative to what it has perceived. Elements can make the brain send soothing signals, or on the contrary stress signals. It is obvious that recuperation in a relaxed body and mind is quicker and more efficient than in one that is stressed and secreting chemicals substances that influence blood pressure and heart rate. It is therefore important to try to diminish or even eliminate completely these stress factors in a hospital, to obtain maximal recuperation capacities.

These effects are obviously as beneficial towards the patients as towards the doctors, nurses, and other staff members that have to work in the medical facilities. Having a healthy work environment will stimulate a person to work harder and better. Even by saying that a hospital is build uniquely for the benefit of the patient, neglecting the needs of the doctors and staff, would in the end do harm to the patients, thus going against the initial axiom.

The first major element that affects a human being is light. It is known that in the Nordic countries, during the winter period where natural sunlight is scarce, the level of depression rises. This is due to the fact that the lack of sunlight creates imbalances in our organism (serotonin levels) which can induce depression, or anxiety. This lack of natural light cannot be replaced normal lighting unless in a light-therapy environment, which isn’t the case in everyday patient rooms, or hospital hallways. The second element that plays a considerable role on the organism of a human being is fresh air. Yes good ventilation can allow for quality air that isn’t to dry, or too cold. But the fact of being able to really breathe outside air is again something that is irreplaceable. It is like going into a hotel room where the windows cannot be opened. One feels confined inside, the walls feel oppressive which again will have a negative effect on the body and mind.

The third major element that can influence a person strongly is the presence of nature. The human race is still animal, in the fact that it still has its roots within nature. In a sterile environment such as a hospital, one quickly forgets this primitive affinity towards nature. Having a view of the greenery outside, seeing a tree with swaying leaves in the breeze, a glimpse of the sky, or even having a planted area in a waiting room have a soothing effect on a person. It shows him that there is more than the white walls of the examination rooms that he spends his days in. The hope that these elements give to a person are essential for the mental stability which will in turn allow the body to recuperate quicker.

Other stress factors exist that also need to be reduced in order to create a healthy medical environment. Little things such as the constant beeping of a electrocardiogram, or the noise of a respiratory machine, or even the talk of nurses between themselves can create stress for a patient lying in his room or for someone waiting for treatment in a sitting room. Other things like the choice of colors, or pictures and paintings on walls can also influence a person. Imagine having a picture of a grey sky, with lightning clouds over a dark forest. Then on the opposite side of the spectrum we can imagine a painting of golden fields, with a bright blue sky, and a couple of birds flying in the sunshine.
Reading these two descriptions already has a different effect on the body, seeing them will only amplify the despair of one and the joy of the other.

The image of the hospital is also an important factor that can shape to well being of a patient of staff member. It is a place of knowledge, of expertise, of cleanliness, of efficiency, of precision. The clarity that is expressed by the building itself is a business card for the work that takes place on the inside. Getting lost in a building, not finding the entrance or the department that one needs, are all stress factors that need to be avoided. The traveling distances inside the building is a necessary factor to be optimized also. Having to walk back and forth long stretches throughout the day can get tiring on the long run.

All these little things can have major impacts on the way a doctor or staff member works. It can affect their mental state through stress, fatigue, nervousness, that will all be then projected onto the patient. The latter will thereby only have his own worries amplified.

**Implications**

The willingness to reduce stress factors of the hospital has to be included in the project during the design process. The architecture of the building plays a major role as we have mentioned before. By pin-pointing the problems that are stressful for the people around, independent of patient of staff, the way to remedy them is pretty straight forward.

The design of the hospital needs to integrate natural light as much as possible. This can be achieved either through windows or through light shafts. This connection between the interior and
exterior can be coupled with the wish to have as many possibilities for fresh air as possible. The windows would be able to open to allow for ventilation as much as possible. Another possibility is to create spaces where the patient can go outside and be in direct connection with outside nature. This area can be a balcony, a terrace or even a patio or park.

To reduce the labyrinth effect of a major medical center, the signage has to be clear and precise. The choice of lettering, color and supporting media is essential. This is brought together with a simple and user friendly distribution of the building. Access to the different specialties also has to be clearly indicated. The creation of computerized information points or having general electronic map points would help for the patient to be able to situate himself where ever he is in the hospital.

One of the most important factors to work on is the walking distance that a doctor or patient has to make through out his working day or his medical stay. The more horizontally build a hospital is the longer the walking distance. The obvious solution is to go vertical. This is not necessarily the best for the practice of medicine. The more floors you have the less over all surveillance you have, and the more you have to multiply different stations or personnel. Therefore, a balance between vertical and horizontal build has to be struck.

The way people look at themselves is changing together with their basic needs. We have seen that different factors now take a large part of a person’s life such as leisure, sports, and family. We actively seek this new healthier lifestyle in the ways we act in our everyday lives.

Seeing that at the end of the day, architecture is made for humans all spaces will need to change, the hospital is no exception. It is difficult to predict changes involving people. What the hospital needs at least, is to be up to standard on the present state of the human mentality. Some factors such as stress are more or less always negative, therefore, it is easy to hone in on these elements and reduce them. By doing so, the overall quality of life in a hospital is increased. A healthy architecture is born.
From the early stages of anyone’s life, a person is submitted to acquiring knowledge and to developing their mental capacities. From these first moments, a child internalizes his surroundings, and the things that his parents tell him. These are the first steps into the education of a person. He learns manners, virtues, what is right and wrong, amongst so many other things.

From this family education, quickly the child is subjected to the social education and intellectual furthering that is school. Here he fulfills his thirst for knowledge by learning science, history, mathematics, physics, and even languages. He is followed through this process by his teachers. The latter represents the wisdom figure. The teacher is also a person who has the role to educate their students. Education not necessarily in the form of generally politeness issues for which the parents are responsible, but education in the sense of social behaviorism, how society works, how the living world function.

It is fundamental for the teacher to be a guide for his students. He is a moral guide that indicates the path of righteousness, and that helps a person not to stray too far from that path. This is especially true seeing that a person, in developed countries, spends great amounts of time in a learning institution. A teacher, independent of his domain of excellence, must have as a primary goal to further his students.

The reason why a whole chapter is given to this concept of education is because it is the one and only foundation for any society. No society can advance, and will eventually crumble, if this crucial piece is neglected. This is especially true if one
looks at a long term timeline.

Throughout the different chapters above, we have seen that the world is drastically changing. It is an entity that is always transforming. The changes that are occurring concern almost, if not every, part of humanity. It is up to mankind to adapt himself to the modifications that the world picture is having. The only way to achieve this adaptation is through education.

Through education, many of the problems that are being encountered in today's society could be addressed. Surely, they could not all be solved, but at least the situation would be modified, and thereby, maybe a solution could then be found.

This education factor is something that touches humanity on a global scale. It is a major part of planetary health. It is through this bold affirmation that it merits a place in this piece of work. Education and health are intimately linked, and one could even say in-dissociable. Health in this case does not necessarily only have to be human physical health, but it can be seen also as the health of nature and the planet.

Let's take a quick picture of the state of the world, and see where education can be or is being used to better a situation in relation to health.

One of the first problems that education can help with is the HIV/AIDS situation in Africa, and maybe worldwide. It is a sexually transmitted disease that suppresses the immune system that will allow the human body to be attacked by other pathogens. A cure for this disease is being researched and until now, only medication that slow down the symptoms are on the market. Huge global awareness projects exist that educate the population into using condoms and having safe sex. This form of mass education is brought forth through flyers, posters, TV clips. It is also brought to the population through doctors that hold speeches in public spaces in African cities, and who are on site teaching local inhabitants the benefits of condoms. In more educated parts of the world, and in most developed countries, it is more or less normal for children to have sexual education classes in their school. It has become common practice, and generally accepted that AIDS is an issue. Rare is it to see anyone that is completely oblivious to the problem. This awareness on a global scale is due to essential health education that is becoming more and more active. What these programs are trying to achieve is to limit the propagation of this retro-virus, by diminishing the transmission factors such as unprotected sex.

Another problem that would need an educational check is the world population picture. It is a fact that the world has an excess in population, and that it is having negative effects on mankind. What is needed is that people become educated about what it
implies to have too many humans walking the surface of the planet. By showing them that many diseases come from being too many in not enough physical space. It is a simple concept: there is not enough space for everyone. By reproducing without any foresight about implications, we are actually affecting our quality of life. In nature, when a population becomes too large, an external factor comes in to regulate. In the case of humans, we do not have any natural predators, so that will not be the regulating factor. But something that we are seeing is the increase in disease. One example has been discussed above, but others like SARS exist also.

We are also seeing that the augmenting population is creating ecological issues. More people means more mouths to feed, but also more people needing shelter, or using energy, and more people wanting cars and creating waste. This is a very current issue concerning developing countries such as India and China. It is every country’s right to develop themselves. But when your population is over 1 billion, the way you develop cannot be the same way as Europe did 200 years ago. Where every car and energy company sees a gold mine, an educated individual can see an ecological disaster brewing. The disaster would not only be localized to the Chinese territory, but the polluted air and its effects will be experienced by the whole globe. Again, education is the solution to finding a balance between the development of the country and the health of the planet which will suffer by it.

Not only do the people in charge need to be aware of the situation but also the general population who will be affected by the situation. We have seen in a precedent chapter that there is a change that is happening in the social habits of people. The new healthy lifestyle that is growing is also due to the education that people have and are receiving. We are eating more healthily, working out more, and just generally taking more care of our

This German AIDS campaign posters shows an infant’s face in close-up with the words, “The chin is Grandpa’s. The eyes are Daddy’s. The HIV is from Mommy.”

“The pictures are meant to provoke,” Linda von Neree, an employee of the Micheal Stich Foundation, told the online site of the daily Die Welt. “Young people especially have lost sight of the problem.”
bodies. We have been taught that by doing so we will live a better and probably longer life. It is through education that we learn how to cope with different aspects of our health. How to prevent cardiac disease, or lower one’s cholesterol, or what are the implications of being overweight; all these matters have answers, and those answers come to us through education. Through the latter we start to understand what we are allowed to eat, how much, and why. We are taught how the machine that is our body functions and how its upkeep is done optimally. It is important to know that education is a long term bet, and that the fruits of it are generally seen down the line, and rarely directly. That is one of the reasons that often it is a neglected solution to problems. It should be implemented together with a short term view. Even if the initial investment is quite substantial, it becomes a more economical solution afterwards.

To illustrate this we shall take the example of seat belts in cars. The installation of seat belts and the global awareness programs that they can save lives represent multi-million, if not more, investments. One could say that the individual gain from such an action is minimal, seeing that it isn’t common practice to have accidents, and that therefore the money could be invested better elsewhere. This way of thinking is flawed and too individualistic. An action such as seat belts benefits a whole. Even if personally, one doesn’t feel the effect, in the grand scheme of things it reduces the number of accidents, which reduces the hospital costs for society, which in turn then allows for more financial liquidity. The latter can be re-invested into the system to benefit the whole once again.

In a precedent chapter, the way the internet would change a hospital was mentioned. It is going to open up the world to distant consultations, and replace the standard clipboard. But what it has also achieved is to make any person into a potential novice doctor. With the arrival of the internet, the access to knowledge has become a lot easier for anyone with an access to the web. A person can look up more or less anything that interests him in virtually any domain. He is becoming his own specialist in an area of expertise that interests him. This human curiosity is very real in the medical world. A new reflex is starting to root itself into society when a person has a health problem. He no longer directly goes to his general practitioner to find out what is happening. The person searches on the internet what are the possibilities with the symptoms that he is demonstrating. If this is not the case, the patient after seeing his doctor, goes onto the web to find out more about the illness that he has been diagnosed with. In both situations the patient is developing a self education to further himself.

The human thirst for knowledge is also really beginning to blossom. Is it due to the internet? Maybe. It is also possible that we have reached a point in time where there is so much that happens everyday that we do not comprehend. The internet is just a new means of quenching that thirst for knowledge. We do not necessarily have anything wrong with us, but we will look up the procedure of a knee operation because we know someone who is going to have his ligaments replaced. This simple curiosity is spurred by the elements around us. People want to know more, and to understand what is happening.

This growth in education is an opportunity for health to increase. Many problems can be avoided if the knowledge exists to prevent a certain situation or knowing how to act correctly in that given moment. Previously, we have looked at the mentality switch towards prevention that is spawning with a new healthier lifestyle. These preventive measures go hand in hand with a new level of health education.
Though many more examples exist, the few that we have seen show that a person’s mind has to be formed, and given all the elements to make the right choices. Sometimes the choices made by individuals affect the whole, sometimes the contrary is true.

Education is the factor that can change societal behaviors at the deepest levels. If the base is correctly constructed, all that is set upon it will also fit better. The question that then comes to mind is who or which entity should be responsible to construct this stable foundation?

As we have said earlier, the family is the first line of education that any child has. The second person who influences the education of a person is a teacher. But throughout a lifetime, a person should become more and more educated every day to know which of his actions and ideas are the right ones to follow. In terms of health, which is turning into a strong need for society, an institution already exists that should promote it and instruct the population. A hospital is at the center of this institution and therefore is the perfect candidate. To most people when evocating a hospital or a medical facility, images of people healing others, of high-tech machinery, and excellence are conjured in their minds. Who better knows how to be healthy than a person who heals injuries, and cures disease than a doctor?

It is precisely because he is the most knowledgeable person in his domain that a doctor has the unspoken obligation to share with those who are more ignorant than he. He must open his knowledge and his experience to benefit all. This is where a complete mentality change has to come about the hospital. Until now it has been a place where doctor teach students to become doctors. They have arrangements with universities which send their students for a period of the curriculum through the different sectors. Here they learn the practical skills that being a doctor entails and what they will have to be able to perform during their career. The new teaching hospital would be there to teach normal people that don’t have anything to do with the medical world. As you would go to school or to a class to learn a new language or computer skill, why not go to your hospital to discover about your body and how to lead a healthy life? A hospital is no longer solely a place to heal, but also a place to learn.
If we take this new concept as the premise for a new hospital, the design of the latter has to be adapted. It becomes very important to think of the new spaces that have to be integrated into the hospital. To do this, it is interesting to look into what the new “services” of the teaching hospital would be. Once these have been analyzed, the needed spaces become then more obvious and straight forward.

The point of this new teaching hospital is to give people who have nothing to do with the medical world the possibility to further themselves, to learn about the health issues of the world. The way this would function is the following.

The first important possibility that the hospital could offer are “open seminars” or workshops. For a very good example of these, we turn ourselves to the famous computer company, Apple Inc. When you walk into an ‘Apple Store’, be it in New York City, or in London there is always a space where you see people intently listening to a speaker and watching a projection screen. As you walk closer, you start understanding that these people here are not the new computer geniuses of the generation to come. This audience is a group of interested individuals learning about a certain topic that is presented over an hour by a specialist. In the case of the ‘Apple Store Workshops’ you learn tips and short cuts, as well as how to use a certain program. The space itself is open, not at all a closed room separated from the rest of the store and its functions. People come and go as the please, staying for as long as they feel the need to do so.

Taking this example to the hospital is an easy step. All that needs to be done is to replace the computer specialist with a medical specialist. The new speaker would hold seminars on things that concerns people’s everyday life. It would be evident that many topics would concern issues that we have seen are changing in

“Free Apple Workshops
Mad about movies? Passionate about pictures? Totally into tunes? Our free, hour-long Apple Retail Store Workshops let you extend your knowledge, boost your skills, and meet people that share the same interests. Qualified Mac Specialists present tips, tricks, and advice that’ll get you up to the next level.”
terms of prevention, and in conjunction with the new healthy lifestyle trend that we are experiencing. Examples of these topics could be cardiovascular disease, obesity, or even things like smoking, or healthy dieting and keeping in shape. Again like in the ‘Apple Store’ example, there would be tips and advice on how to apply methods to everyday life. But the topics could also be in regards to new medical technology or research that is taking place.

What could be argued is the fact that a doctor who is presenting these workshops is not using his time to help someone actively. This is true in a certain fashion. From another point of view he is promoting health, which again goes down the line of saying in the greater picture it might be more useful to society. Another point, doctor need to keep up to speed on latest medical standards, technology, and research. Such a workshop will also imply that the doctor knows precisely the topic he is discussing. A possibility is that students give such workshops, under supervision or not, to hone their presentation and human interaction skills. Through this notion, the ‘medical workshops’ become a complete learning and teaching process.

The next thing that the New Teaching Hospital would provide is a variety of classes and courses concerning medical issues. A soon to be mother would be able to take classes on how to care for her future child. The classes could be a lot more extensive than learning how to change diapers or how to feed the newborn, regrouping other specialties that could be psychology of children, given by a pediatrician or psychiatrist.

In Switzerland, it is mandatory to have basic first aid skills to be able to eligible to pass a drivers license. This is in the case where you are facing an eventual accident, so that you know what the first procedures are to be able to potentially stabilize a person long enough until specialized personnel arrives. This view on teaching the population medical care goes down the same line of prevention trend explored before. What better a place to acquire such knowledge than in a hospital, with doctors? The course can become a lot more impacting on a person. Already the simple fact that you are in a hospital, and a medical practitioner is giving the class brings things really down to earth. There could also be the possibility of going to see certain types of injuries that car accident victims have sustained, as a first hand experience, again making it a much stronger learning experience.

This last eventuality brings us to the next new aspect that this learning hospital would provide to the norm of the population. For now some operating rooms have large glass windows for the medical students and staff to follow an operation in real-time. Again this observation room is only accessed by the above mentioned medical staff. On the other hand people are curious to see how the hospital world really functions. We can see this trend in today’s media. The television timetables are just overflowing with series such as ‘ER’, ‘Grey’s Anatomy’, or even ‘House’. On television you can actually pay for the medical channel, or in the UK you have a program where human dissections are shown in a television studio. Taking this idea to the next step, let us imagine a more serious and instructional approach. The hospital could have an ‘Open house policy’. In specific situations, of course with complete knowledge and accord from the patient, people could follow certain procedures, like the medical staff do.

Again, this first hand experience can be invaluable to anybody. This possibility could go together with the ‘Workshop’ idea. Let us imagine a scenario that illustrates the power of such a possibility. Since the beginning of 2008, new European Union laws are being put into action in relation to the ‘Smoking Kills’
campaign: now shocking images are being used. The New Teaching Hospital would take things one step further than scaring people into stopping to smoke or into showing them in a shocking way the results of what could happen. The new concept would be teaching them what is actually happening to your body when you smoke. This part would be in ‘Workshop’. It would be the theoretical part to the learning process. After one of these classes, the group of people would attend a lung or throat cancer operation in which they would see first hand what they have just learned. In such a way, they are put in front of the reality. This way of approaching matters links in to the efforts of prevention that are being taken in society and takes them into major institutions, in this case the hospital.

A dominant idea of the hospital is to bring it to the people. In a way, it is to open it up, to expose the insides of medicine, lots of which is knowledge. In one of the early chapters we have seen that the influence of the internet is growing and that it is coming into the hospital itself. People use the internet to learn, it is a known thing of today’s information era. Using it as a tool for medical teaching is also becoming more and more actual. An example is the Mayo Clinic’s, in Rochester Minnesota, website, under the “ask a specialist” tab. In this part of their website, numerous health questions are answered by specialists in that domain. The questions themselves vary from: “Disk replacement: An effective treatment for low back pain?” to “Heart palpitations: A cause for concern?”

There is this new side of a hospital, which is his virtual counterpart. Unfortunately, even in our connected world, not everybody has access to the World Wide Web. It then becomes interesting for the hospital itself to provide access points for patients, or for their families, or even just for interested people. Such an internet medical lounge would allow for medical instruction to

Shock tactics are bringing these type of images to the cigarette packagings in addition to the already existing “Smoking Kills” slogans. It is supposed to make people aware of the risk they take. What would the effect be of promoting clean air instead?
become a very attainable thing for anyone. The same lounge, with again the new coming internet technologies, could serve as a conversation platform to other countries. Through this idea, patients, visitors, or family members of patients could contact a specialist around the world to get his diagnosis. This contact could be imagined also as a video conference, bringing the doctor as close as possible to the concerned person.

Continuing down the line of opening the medical world to outsiders of the profession, the hospital should turn it into something as public as possible. By making medicine something that could potentially touch everybody, it becomes a matter that everyone is aware of and then takes onboard in their everyday lifestyle. ‘The Amazing Human Body Exhibition’ displays in a public manner the human body by stripping down the different layers. It allows people to experience different aspects of human anatomy and physiology that were until now only reserved to medical students and practitioners. The exposition boasts some 20 million visitors since 2005. Such numbers show the curiosity and the interest that the average person has to learning about his body. The New Teaching Hospital needs to have the same capacity of attracting interested people, to quench their thirst for knowledge. An exposition space would allow for such a possibility. A rotation of exhibitions throughout the year would ensure a certain dynamic and allow a flow of people to come again and again. Even if exhibitions would always be health related, this would entail a wide variety of topics. We have seen that health can touch upon the environment, as well as technology or human lifestyle. The exposition space of the hospital would become a place to visit as much as a place to learn.

In the same line of thought, a conference hall, or an auditorium would allow for the possibility of enjoying the venue of a speaker that would hold a conference on a certain topic. Once again, it would be a public event bringing it into the lives of those working in different domains. It would actually also be possible to combine the two last ideas. The necessary spaces could function hand in hand. Also, during the time of an exhibition, the conferences that are held would compliment the latter, giving a certain general theme to the exposition area of the hospital.
Now that the fundamental ideas behind the New Teaching Hospital have been exposed, the architectural novelties become more apparent. Up until now, a hospital was a public institution because it is open to anyone as health touches everyone. But until now it has never lived up to its “public” side. In truth, there is nothing more private and personal than a hospital. The patients are put in front of sometimes very hard realities that they face alone. Yes, often in the presence of family members, but fundamentally the afflicted person deals with his pain, his sorrow by himself.

The existing vision is directed to accommodating a person as best as possible to his medical predicament. The hospital has the connotation of a place not only of death and sickness, but also of the unknown and the unpredictable. People do not willingly go to the hospital unless it is to cure an ailment or to visit someone who is being treated. The actual architecture of such buildings only follows this mentality and can only, at best, try to hide this strong and ever present underlying point of view.

It is not enough to change and develop this existing architecture, for it will not take away the stigmatization process of the institution. Again, the base of the matter has to be changed and then the correct architecture will follow. The latter is only the physical, tangible reflection of human perception of a certain matter. Change the perception, change the architecture.

With this in mind, the innovative educational aspect of the New Teaching Hospital searches to reach out to the population. You will no longer come because you have to, but because you want to, because you know it will further you as a person, because you will learn. If people start seeing it in this fashion, the architecture of this public institution takes on a new public face. This is only possible with the new theoretical basis expressed throughout this chapter. By proposing spaces where people can come and go as freely as their interests brought them, you are progressively changing the view of a hospital. It is through the integration of new architectural programs such as exposition and gallery spaces, open internet zones, or even classrooms and auditoriums that the hospital really starts to play the public role that it has always professed to be as an institution.
We have seen the huge impact that the change in the base of society through education can be. By giving knowledge to people who have nothing to do with the medical world you are giving them a better chance of surviving. This term is not only meant for the rudimentary eat, drink, find shelter way of survival. It relates also to the fact that an important part in the existence of any human being is life and how you live it. Through the health education, you learn how to sustain your mind and body at the best possible level. You also start having a more critical point of view of the society we live and the values that it has brought forth as being essential. With this new critical eye, problems can be perceived more easily and most importantly quicker. This allows for amendment before things become out of hand.

The New Teaching Hospital becomes through its very presence a very important part of the new lifestyle that we are looking for while staying true to its main function: healing. It remains obvious that the hospital must not put its teaching side ahead of its curing side. The two functions must work together, side by side in symbiosis. One must pull the other forwards and vice versa. Again it is all about finding the right balance to things and remaining distanced from the excess of one or the other.

Through instruction the hospital places itself as a leader in the realm of prevention. The latter we have seen is the turn that medicine is taking nowadays, to prevent is better than to cure. So by changing the theoretical basis of the medical center, you are actually strengthening the new medical position.

In 1977, Gunther von Hagens invented the plastination technique which marked the beginning of a second anatomical revolution. The aim of the BODY WORLDS exhibition is to inform visitors and to open up the opportunity particularly to medical laymen to better understand their body and its functions. When viewing the exhibits we can become aware of the naturalness of our bodies and recognise the individuality and anatomical beauty inside.

Conclusion
The different parts of this work have led us to understand that several domains of this world are changing. In truth, we are living in an era where the face of the planet is changing as we know it. Three major elements are coming into play to do this reshaping process. The first is the every growing technology that our society bases itself upon. Whether through the internet, the elaboration of smarter robots, or researching the building blocks of mankind, these directions are actively changing the way a hospital functions and how healthcare is administered. By combining this with a more and more present environmental consciousness, we are looking even more for a change. By cleaning up what we are spoiling, and by ensuring that we won’t destroy more, we are creating a path that has a future. This green path also passes through the medical facility in its whole. Finally, the third changing factor, that is probably also one of the strongest, is the way humans are changing their view about themselves and the way they live their lives.

By combining these three new future trends, we can have a global overview of what will happen in the next couple of years in the medical world. It is true that any one part can be taken individually to be pushed and researched to the smallest detail. By doing so you may risk losing sight of the overall picture. It is the latter that is necessary for any initial approach to redesigning and rethinking the way hospitals function. Over and over we see the links that one domain has with another and how a simple change in one can create a new balance in the other.

All this has architectural consequences on the small scale and large alike, ranging from the type of paintings on walls to how a whole new power station can be integrated on the campus. We have seen the apparition of new medical specialties that will then induce new functioning. Also new external programs that will help build up the new hospitals to come, have been portrayed.
These novelties force the design to be rethought and brought up to speed. No easy task lies upon the architects as they will try to integrate as many changing factors into their new designs.

Their work becomes even more difficult when the elements of their site come into play. The ideas and trends that have been portrayed in the precedent chapters are all non site specific. They show what will be a potential truth in all hospitals no matter where it is implemented. In a certain fashion, the architectural novelties shown throughout this work are the parts of a new hospital brief. This new brief is then taken and applied and adapted to a specific site.

But independent of the construction site, the new hospital should aim to be a symbol. Of course, a symbol of health and curative skills is primordial. But it should also reach out further, to touch the people in a deeper fashion. Through its architecture and through the way it functions, the hospital should be an icon for technology, but also for the environment. Most importantly, it must stand for the human institution that it is. Only when these three factors are correctly dealt with is the hospital close to optimal.

And as a human institution, we must acknowledge the necessity for the hospital to perform as an education tool. By becoming this, it allows people to learn about essential things that will allow them to live a healthier life. Thereby, they will inherently contribute to the overall well-being of the planet. Health touches all, so it should be felt by all, and also taught to all.

Unfortunately, there is a last factor that needs to be introduced at one point. This is an economic one. A major problem that arises in the medical domain, as in many others, is the price of constructing these medical facilities, and the price of running them afterwards. One must not be mistaken, at the end of the day it is a business like any other. This is a reality, as harsh as it might seem, that needs to be accepted. Money is needed to pay for the machines, for the energy that the buildings need, for the food the patient eats. Money is also needed to pay the doctors and other staff members. They are the ones that are there day in and day out, making sure that everything runs as smoothly as possible. Often they are neglected, but they are what make the tissue of a sound hospital.

Instead of cutting salaries, or jobs, or saving on things that are essential to the well being of patients and staff, maybe a new status should be created for the medical world. Seeing that it is an institution that is essential to society and that everyone profits from, perhaps it would be possible make it benefit from this status. Financial backing could be sought from private companies and from the state, instead of only tax payers’ money or generous altruistic contributors. The amount of the funding could also base itself on how much a certain company or industry contributes to the global health disorders. This measure is not to punish them for what they are doing, but more to stimulate them to change their way of looking at their trade.

Once again, we see that it all whittles down to education. It isn’t possible to expect the best medical care without investing sufficient amounts of money in it. By educating people, also in other domains, realignment will be possible. The priorities, that seem fundamental to all, will be reassessed and thereby funds can be liberated and invested where it is really necessary for a healthy society.
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