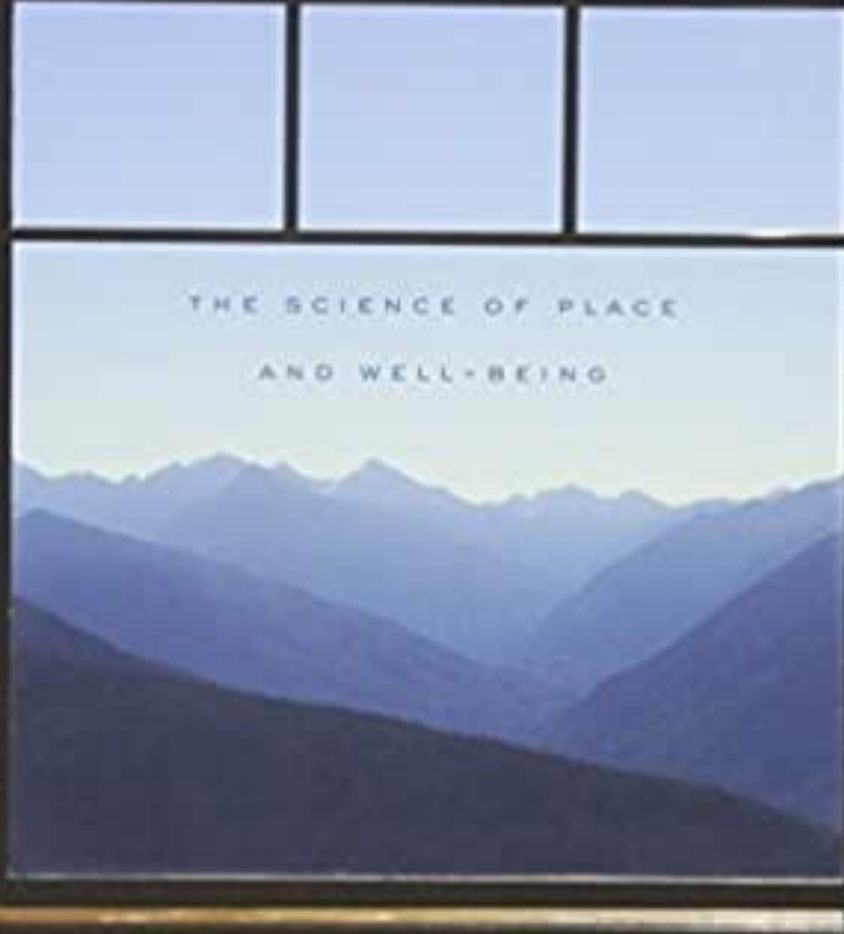


healing spaces



Healing Spaces

by Dr. Esther Sternberg

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Chapter 1: Healing Places

- Place influences healing as physical surroundings change the way one feels
- Turning point in healing: “turning of your mind’s awareness from a focus on your inner self to a focus on the outer world”
- Alvar Aalto’s TB sanatorium completed in 1933 became standard for later hospitals (south facing, light-filled rooms overlooking pine forest; furniture with patient’s comfort in mind)
- 19th century hospitals were built with large windows and skylight (for visibility purposes) whereas late 20th century hospitals were designed to optimize care of the equipment rather than the patient’s care
- Roger Ulrich's 1984 study showed patients heal more rapidly when hospital rooms have windows looking out into the natural world
 - Found patients with a view of nature left almost a full day sooner and required fewer doses of moderate and strong pain medication than those with a brick wall view
- "notion that nature was important to healing had been around for thousands of years – going back to classical times"
- “just as healing is a constant process, so is sense of place. Our perception of place changes not only with our location, the weather, and the time of day—the physical elements of space—but also with our moods and our health”
- Left to question whether windows....provide a portal to escape of boredom? allow stepping into space of meditation? or a look into how we perceive the world?



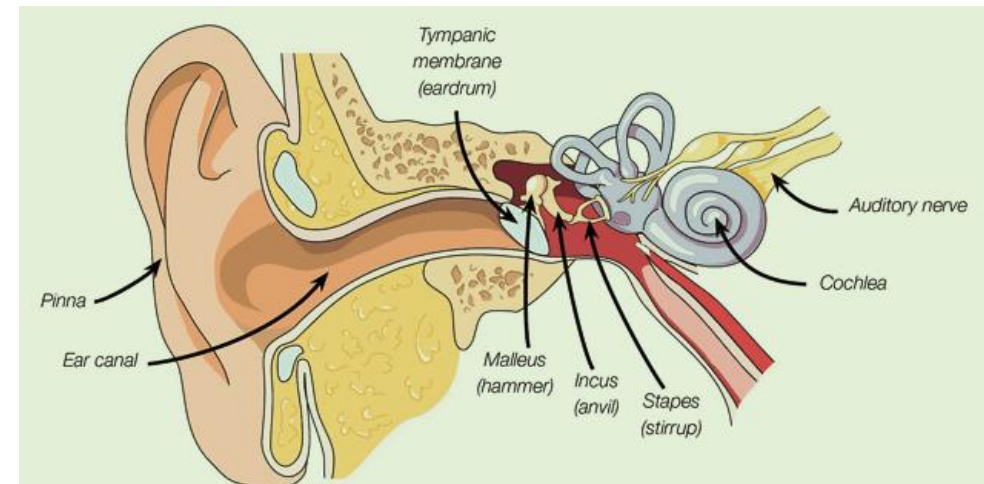
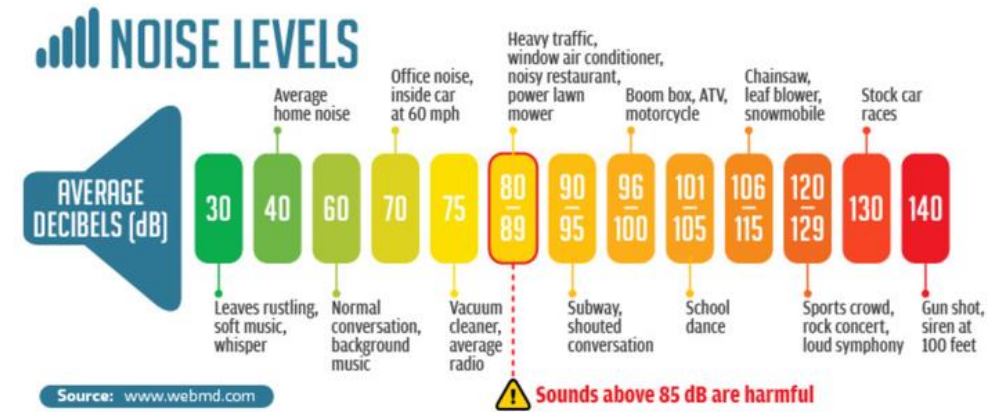


Chapter 2: Seeing and Healing

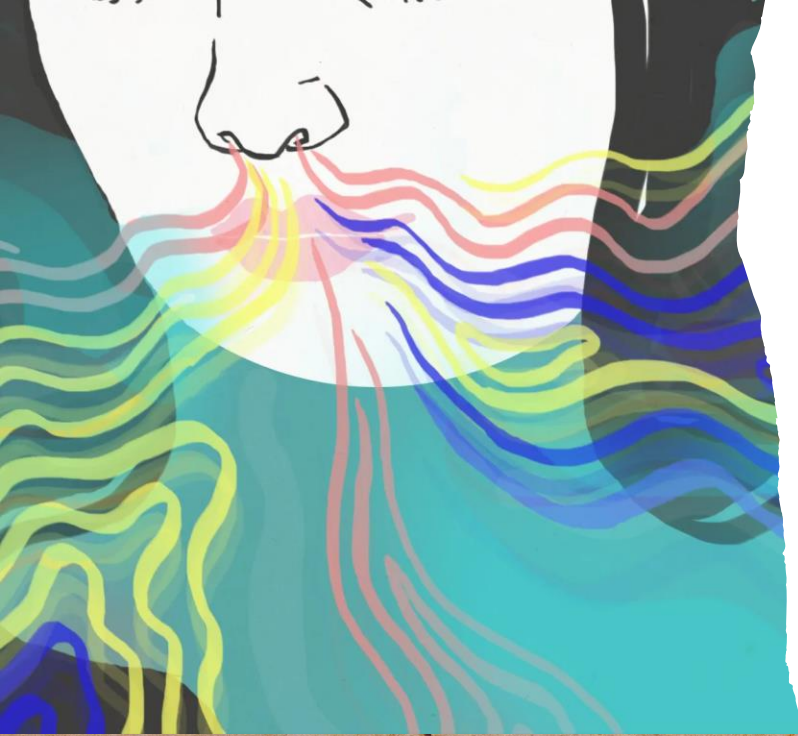
- Scientific and medical terminology pertaining to vision and the eye
 - Ex: cones & rods, wavelengths, colorblindness, retina, etc.
- We can see all colors of the rainbow with just 3 pigments as the brain is able to add and subtract
- “Color can get attached to a mood when cone cells send signals to the visual centers in the brain that recognize the color, and along the way some electrical impulses travel to the brain’s emotional centers”
- Light has also been proven to affect not only the mood of office workers and shoppers, but also the length of hospital stay in patients with depression
- Each category of object you see is recognized in a different place in the brain (ex: faces in one, objects in another, and even one for buildings)
 - Brain’s building recognition area is beneath another that recognizes scenes, *parahippocampal place area*
- Carla Shatz' knowledge of the visual system was essential in the effort to understand how architectural space could affect the visual pathways in the brain
- Some cycling is linked to light-sensitive proteins in the eye, similar to ones that register color
 - Best at detecting light intensity; linking circadian clock to the light cycles of the day
- Light can affect our immune system changing the way we heal

Chapter 3: Sound and Silence

- Medical terminology pertaining to ear anatomy along with connection to the brain
 - Ex: pinnae, tympanum, basilar membrane, auditory cortex, habituation, tinnitus
- Sound arrives at one ear just a few thousandths of a second sooner than it arrives at the other
- Sounds in intensive-care units range from 45-98 decibels
- Just like vision, hearing works best with contrast
 - Nerve cells respond better to a sudden change than they do to repeated stimuli of same intensity
- Hippocampus + prefrontal cortex are involved with sound perception; they govern different sorts of memory functions
- “it is through changes in these nerve pathways and the nerve chemicals they release that changes in the brain’s emotion centers affecting the immune system + healing”
- Julian Thayer, musician-turned-scientist, studied people as they listened to music
 - Chose a silent movie and wrote 2 different musical scores for it (one being stressful and the other being relaxing)
 - Stressful music resulted in signs of activation of their stress responses; relaxing music resulted in showing a calming effect
 - Went on to study effects of different types of music on the nervous system+ heart
- Few conclusive studies have been done to prove whether listening to music or silence can really help people heal



Chapter 4: Cotton Wool and Clouds of Frankincense



- Touch and smell are the only two senses that require direct contact
- Olfactory Organ (Structure inside the topmost of 3 fleshy shelves in the nose): Detects odors and identifies an object's chemical structure
- Olfactory system works similarly to the visual and auditory system
 - Takes compounded smells and uses them to produce an olfactory image of the surroundings
- Olfactory nerve cells are hit as molecules pass through the olfactory organ
 - Olfactory Nerve cells have cilia (tiny hair-like structures that contain proteins of different shapes)
- 1991: Linda Buck and Richard Axel discover a “super-family” of more than 1000 genes that determine the ability to detect and distinguish odors
 - Most genes are more active in rodents, but only about 350 are active in humans, but they are sufficient for humans to detect the full range of odors in our environment
 - These genes produce a group of closely related proteins that fold into different configurations
- Each nostril registers a slightly different concentration, which shows us where smells are coming from
 - We are less skilled at this than dogs, but can be trained to follow trails
- People’s perception of smell will vary based on intensity and how quickly we move through the cloud
- Humans form a 3-D image of the chemical composition of the world around us (also tells us about our social landscape)
- Monell Chemical Senses Center: devoted to the senses of smell and taste
 - Curious about dogs’ ability to detect any difference in people, unless they are identical twins
 - Major Histocompatibility: what gives each person a unique immunological identity
- Humans can detect other’s emotions through their senses of smell
 - Aromatherapy: Use of oils to treat illnesses (Frankincense)
- Psychological effects of smells, taste, and touch are subjective
- Touch tells us about the world around us in a much more fine-grained way than other senses
 - Mechanoreceptors in skin create an electric current to tell you how hard you are pushing on something
 - Ion channels for touch are very sensitive and can recognize a wide variety of textures
 - Haptic sense: the ability to form an image of something with touch

Chapter 5: Mazes and Labyrinths

- Stress: a body's negative physical response to its environment
- The body releases specific hormones when under stress
 - When exposed to stress, the hypothalamus releases the brain's stress hormone: Corticotrophin releasing hormone
 - This hormone hits the pituitary gland and makes it produce adrenocorticotrophic hormone
 - This travels to the adrenals glands and they release cortisol
- Choices, uncertainty, and novelty (being introduced to a new environment) are all potent triggers of stress
- While stress is unpleasant, it helps us to survive
- Stress levels is measured in a U-shaped curve called the dose effect
 - The further left on a curve, the more relaxed you are and the lower your productivity is
 - In the middle of the curve, productivity is at its peak and stress is manageable
 - The further right on a curve, the more stressed you are, which still lowers productivity
- Stress levels are affected by our knowledge and level of control in a situation
- Stress can be managed through slow-steady breathing
 - Activates the vague nerve which counters the adrenalin-like sympathetic nervous system response
 - Techniques such as yoga, tai chi, and meditation focus on breath control and enhance objective measures of cardiac function
- Herbert Benson studied mind and body interventions & produced the relaxation response
 - Focused on heart rate
 - Blood pressure and psychological responses have a strong connection
 - Developed a treatment with meditation for people with high blood pressure, focusing on attention to breathing
- Exercise improves mood
 - Low grade exercise can produce improvements within thirty minutes
 - Low to moderate intensity exercise is best for managing stress



Chapter 6: Finding Your Way...

- Frank Gehry designs buildings that do not look like buildings
 - Instead of neat, square boxes, Gehry's designs are fluid, eccentric, eye catching metal clad forms
 - He captured the brain's response and created features that maximize the brain's ability to remember differences
 - His design process involves crumpling a piece of paper and studying its folds
- Up close, his buildings provide a sense of anxiety
 - When they are entered, it permits a sense of calmness with cool and warm interiors
 - Utilized nature but without any form of mimicry
 - He used a technique he called "handrails" that are areas of comfort to draw the eye away from the discomfort the exteriors of the build make them feel
- Walt Disney was another important designer during this time, and bore many similarities to Gehry
 - Brought in animators for their expertise on exploiting aspects of perception to create an environment that feels real and imaginary at the same time
 - Lighting was a major aspect of creating this effect
 - Effective lighting design in the Pirates of the Caribbean ride and creating an ambiance makes the ride feel like a real pirate cove and not just a warehouse
 - Created "Wienies," or specific areas that incite people to keep moving through the park
 - Cues allow for a gradual shift from one world to another
- As you navigate spaces, the brain receives visual cues constantly that determine where you are going, called proprioception
 - These include sensations from your inner ear (your balance system), and from muscles and joints (telling you how far you've traveled)
- Wayfinding
 - Two different ways of navigation
 - Utilizing landmarks
 - The use of grids
 - Easier form of navigation
 - Nerves that develop the sense of navigation are called place cells (Located in Hippocampus)
 - One set of nerve cells determines your position while the other set responds to head direction



Chapter 7: ... and Losing It

- Psychologist Brenda Milner , 1953
 - examined patient with Memory Loss
 - Start of decades of research on how memories work
- Neurosurgeon Wilder Penfield enlisted Brenda Milner's help in mapping the human brain to see what the purpose was for each part.
- One of the most memorable patients was a 46 year old engineer that had seizures. They removed the diseased part of his brain (parts of the temporal lobe), and it did not help. They operated again and took more of his temporal lobe and parts of the hippocampus. After the second surgery, his seizures decreased, but his recent memories disappeared. Which lead them to believe that the hippocampus is what is involved with memory.
- H.M. had parts of both of his deep temporal lobe and most of hippocampus removed. He developed severe memory loss, and could not make any more memories.
- Dr. Goehler conducted a study using the nervous system of a Rat. Dr. Goehler figured out that when the vagus nerve was stimulated, the electrical impulses would release a chemical called interleukin-1. Interleukin-1 was needed to make the memory be stored correctly.
- They then figured out that if you had any injury that prevents your body from producing Interleukin-1, then your ability to store memories would not be done without difficulty. I.e Alzheimer patients with the common brain swelling



Chapter 8: Healing Thought and Healing Prayer

- Saint Bernadette, prayed over the water (after the Lady of Lourdes and everyone that came to the water after that day was healed whenever they drank/ bathed in the spring

- From then on, the practice of prayer healing illnesses became a common occurrence

- The Mass – a big group of religious leaders and their followers would have a big prayer circle for the sick/impaired citizens of the community

I.e. 10-year-old child in wheelchair

- Those that attend the Mass, feel as though the prayer cures them and brings them closer to God
- Although some of the participants know that their illnesses have no cure, they go to the Mass to experience the joyous energy to give them inner peace.
- Testimony: Jean-Pierre Bely is a 48-year-old man that has multiple sclerosis. His condition became grave, so he went to the Mass for Our Lady of Lourdes for spiritual healing. The first day of worship the numbness/tingling in his spine subsided to the point that he was able to grab a handkerchief because he could slightly feel his skin and fingers (which he had not been able to do for years). A few days later, he was up and walking again.
- There has been many occurrences where gravely ill people are cured by the time, they leave the Mass festival.
- Other medicine free practices that help heal is meditation.

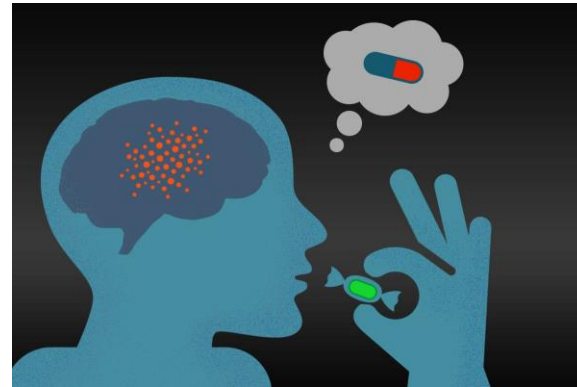


Chapter 9: Hormones of Hope and Healing

- Placebo Effect

- Jon Levine and Howard Fields conducted an experiment on people with impacted wisdom teeth at the University of San Francisco

- They discovered that brain has its own form of morphine molecules that it produces called Endogenous opiates AKA endorphins.
- The participants were given a drug to stop their endorphins from reacting, so the researchers could isolate the actual effects of a placebo
- Some of the participants were treated with morphine, some were given Naloxone (which blocks endorphins when mixed with morphine molecules), and the others were given saline disguised as morphine.
- Those that received morphine and those that received the Saline had the same levels of pain, which were mild to none at all, while those that received the Naloxone, reported to have a tremendous amount of pain since their endorphin releasers were blocked.
- All the participants knew that there was a possibility that they could receive the placebo. With further exploration, they found that the participants that got the Naloxone had extra nerve activity(due to more hormones being released), which made them have more pain than they would have if they did not know that a placebo was involved.
- I.e Woman are more prone to certain infections because they tend to release more hormones. The more hormones you release, the more your immune system is affected/ weakened.



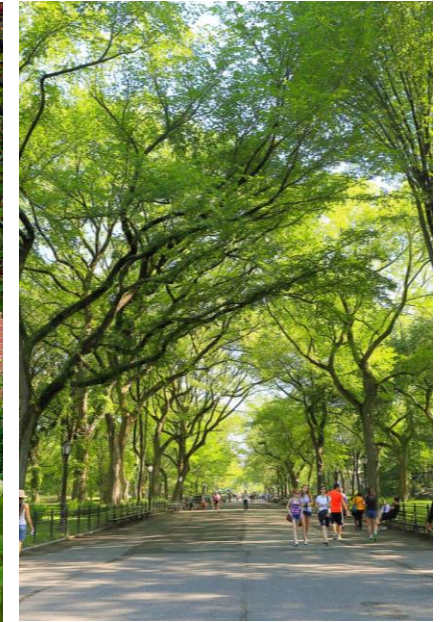


Chapter 10: Hospitals and Well-Being

- Chapter objective: study of how hospital design can impact the health of patients.
- Evidence-Based Design: uses health-outcome measures
 - length of stay, amount of pain medication, complication rates, and patient stress, mood, and satisfaction.
- One study has been done to show how noise in the environment is one of biggest stressors to patients in a hospital setting.
 - Noise can increase heart rate, blood pressure, and other measures of stress.
 - Also interferes with sleep (which is necessary for healing)
 - Noise is often associated with the hospital's "sterile" environment. Hospitals have metal, stone, or tile that are acoustically reflective because of their cleanability.
 - Makes the space colder, nosier, and less comforting. Makes "sterile" have a negative connotation (lacking ornament or color).
- Pavilion Principle: emphasized ventilation, airiness, and sunlight.
 - Hospitals were beginning to be designed with daylight and views in main patient rooms.
- To provide a healing environment hospitals need:
 - Improved air quality and ventilation; use of sound-absorbing ceiling tiles and flooring; better lighting and access to natural light; pleasant environment with gardens and nature views; making hospitals easier to navigate; improved features such as nursing stations.

Chapter 11: Healing Cities, Healing World

- Chapter objective: how to design cities that prevent the spread of disease and create a healing environment.
- Main cause of urban mortality: infectious disease
 - Causes of infectious disease: overcrowding, poor sanitation, badly designed sewers, lack of potable water, and streets filled with rotting refuse.
 - "Rural Advantage" - rural areas have less impacts of these diseases due to the distance between people.
- Encouragement of Walking in Cities
 - Features that enhance safety to encourage walking: adequate lighting, shops, other people on the streets, the physical condition of the neighborhood, and access to sidewalks.
- "Attractors" also encourage walking. (interesting landmarks)
- Suburban areas discourage walking due to:
 - Long winding streets, lack of sidewalks, sameness of homes, lack of activity and interesting sites, sprawl, and long distances from residential areas to local shops and amenities.



Chapter 12: Healing Gardens and My Place of Peace

- Chapter Objective: Finding a place of peace and spending time in nature.
- Author's place of peace: Being with her dad on the front porch of her childhood home looking out onto his mother's garden. She expressed the true power of nature and its ultimate beauty.
- Gardens and their benefits to healing.
 - Gardens are seen all through history and cultures in legends, poetry, and song, the Garden of Eden, the hanging gardens of Babylon, and the garden along the Silk Road of Persia, India, and China.
 - Garden also contain architecture for experiencing nature: pavilions, pergolas, quiet spots to sit and meditate or talk with friends. Also, walkways, windows, and pillars.
- Emotions attached to place
 - A certain place will make you feel emotions, whether good or bad. The hope is to create a garden that offers peace and promotes healing.
- Learn to live in one with the environment instead of altering and changing it for temporary benefit.

