Vivisection in

Herophilus of Alexandria: father of scientific anatomy – dissector and vivisector of humans

Detail of a Woodcut depicting ancient scholars of medicine "Herophilus and Erasistratus" *Wellcome Images*

"Nox, somni genetrix." Dr. Knox is dissecting a cadaver during a lecture. *National Library of Medicine*

Aurelius Cornelius Celsus, Author of ***DeMedicina***. *National Library of Medicine*

Doctors dissect a hanged criminal, "The Reward of Cruelty" designed by W. Hogarth. *National Library of Medicine*

Whereas there is broad consensus that Herophilus (ca 330 BC) practiced human dissections for the first time in history, the question whether he also performed vivisections on human subjects remains one of the most contentious issues of Greco-Roman-era medicine.

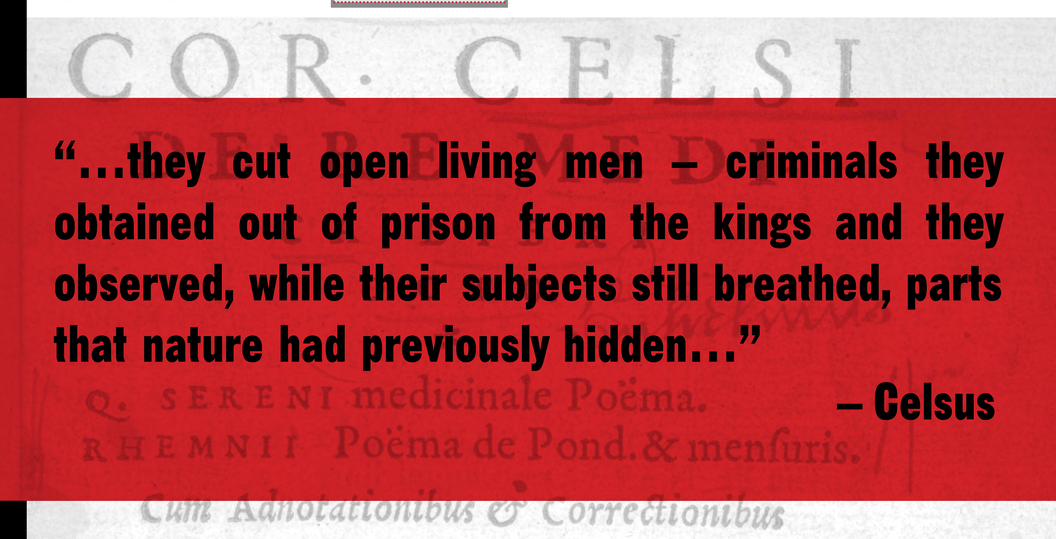
Anatomical dissection in antiquity: Cultural-historical aspects

There were dissections and vivisections (surgery conducted for experimental purposes on a living organism to view living internal structure) before Herophilus, yet these were exclusively experiments on animals; anatomical findings gathered were then applied to humans. Prior to the study of medicine in ancient Alexandria (ca. 320 BC), dissections of humans met with serious religious, cultural and philosophical resistance. The sacred law of Greek tradition regarded soul and body as inseparable, so any interference with corpses was a sacrilege; in addition, contact with a dead body was taboo in civic and religious respects because of its impurity. But at the beginning of the 3rd century BC, various circumstances enabled the Greek upper class living in Alexandria to overcome the taboo.

The "philosophical secularization" of the human body that started with Plato (428 BC) ("the fate of the body is not germane to a man's true being") and then continued by Aristotle (384 BC) ("a dead person … is not a human being") prepared the ground for the dissection of humans as the human corpse lost its associated mystery and fear.

The strongest evidence of vivisectory experiments on humans can be found in the treatise "De Medicina" written by the Roman encyclopedic author Cornelius Celsus (ca. 25 BC): "*...it is therefore necessary to dissect the bodies of the dead and to examine their viscera and intestines. Herophilus and Erasistratus, they say, did this in the best way by far when they cut open men who were alive, criminals out of prison, received from the kings. And while breath still remained in these criminals, they inspected those parts which nature previously had concealed, also their position, color, shape, size, arrangement, hardness, softness, smoothness, connection, and the projections and depressions of each... Nor is it cruel, as most people maintain, that remedies for innocent people of all times should be sought in the sacrifice of people guilty of crimes, and of only a few such people at that.*"

Celsus was an independent compiler of medical knowledge who justified the vivisections representing the "sacrifice" of criminals as a contribution to the general welfare. He considered that this historical practice of Herophilus was scientifically and morally legitimate.



"...they cut open living men – criminals they obtained out of prison from the kings and they observed, while their subjects still breathed, parts that nature had previously hidden..."

– Celsus

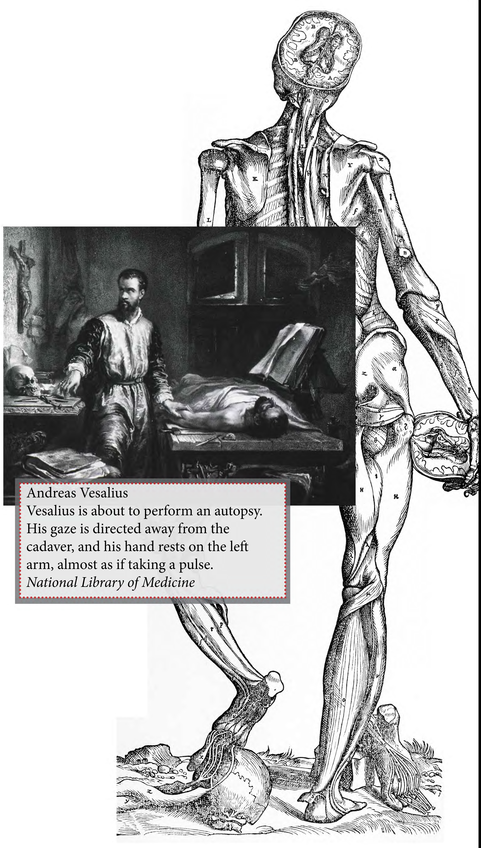
Ancient Times

Anatomy after the Alexandrians – the end of human dissection and vivisection in antiquity

Various factors explain the abandonment of human dissections and vivisections after the death of Herophilus – not only in Alexandria, but in the entire Greco-Roman world. One essential aspect was the increasing predominance of the school of Empiricists, which considered any human dissection unnecessary; other reasons included social and political changes in Alexandria and a reassertion of traditional religious-cultural taboos.

In the succeeding Roman Empire different medical schools fought each other ferociously: Methodists and Empiricists rejected any dissection, physicians of the Dogmatic School especially in Alexandria continued to dissect, but increasingly only animals. Galen (Roman physician, ca.130 AD) confined himself to the dissection and vivisection of animals.

In late Antiquity (ca. 284 BC) and in Byzantine medicine even the vivisection of animals had been abandoned. Latin Christian authors condemned human dissection (Tertullian and Augustine) but one report, written in Byzantium in 8th century AD, represents an absolute exception, telling of an execution of an apostate from the Christian faith: First the convict's hands and feet were cut off, then physicians dissected the still living man to gain anatomical knowledge ("this they did with a view to understanding the structure of man").



Andreas Vesalius
Vesalius is about to perform an autopsy. His gaze is directed away from the cadaver, and his hand rests on the left arm, almost as if taking a pulse.
National Library of Medicine

Impact of Herophilus' human dissections and vivisections

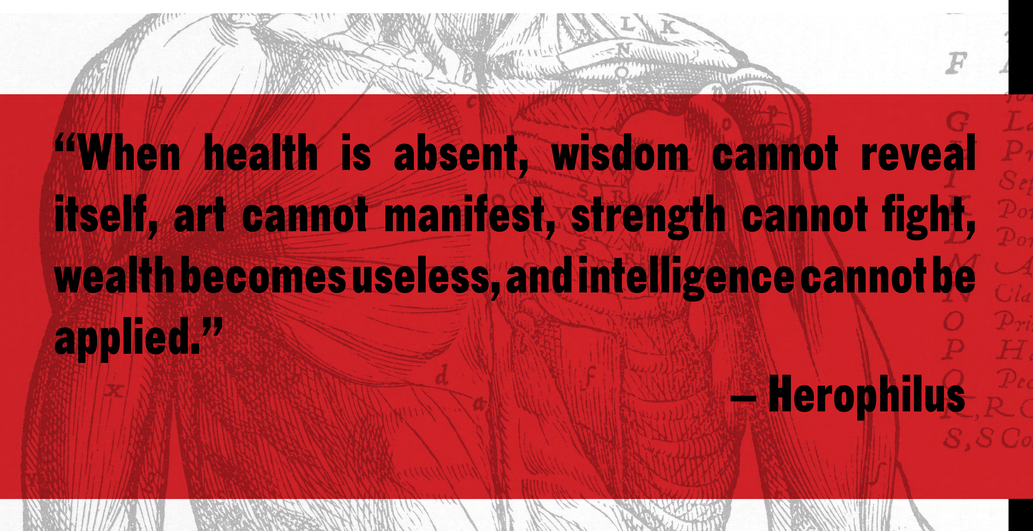
The original descriptions and namings of anatomical structures by Herophilus are extensive. He paid special attention to the dissection of the brain and to the anatomy of the peripheral nerves. It was he who distinguished them from other cord-like structures (e.g. sinews) and named them (neuron). He described the Dura Mater, the different coats of the eye, the venous sinuses of the cranium; he discovered and named the cerebral ventricles and their vascular network and differentiated more than seven pairs of cranial nerves.

Of special importance is the differentiation of sensory and motor nerves which most likely, according to Rufus of Ephesus, has also to be ascribed to Herophilus. This discovery that goes beyond descriptive anatomy serves as evidence that vivisections were implemented to gain new insights ("dissection alone would not have made this discovery possible").

Today, we judge human vivisection as an act of unimaginable cruel surgery and an offense against human dignity – but these are philosophical concepts which only obtained recognition in 18th century Europe and America. The hellenistic physician had an idea of man that was fundamentally different from ours. Though some reasoning about the equality of humans had set in, society generally accepted exploitation of slaves. In the Greek-Macedonian upper class of Alexandria, the indigenous Egyptian population had minor status. One level below ranked criminals sentenced to death – probably Egyptians – delivered to Herophilus for vivisection, which was legitimized by the authority of an absolutely reigning "God-like" ruler.

Herophilus, despite his rooting in the Hippocratic tradition from around 400 BC, most likely did not know the Hippocratic Oath. There is no reference to it in any of the preserved documents of Greek medicine outside the Hippocratic Corpus, so the oath cannot be considered significant to the majority of Greek physicians of the 4th/3rd century BC.

Nevertheless it remains inconceivable to us that an individual could not only kill a man, but dissect him – still alive – for research reasons. Yet Aristotle asked physicians "to subordinate what frightens and disgusts to the search of the truth." There are no records of voices protesting against the vivisection of humans from contemporaries of Herophilus, although it could be that these sources have been lost. Only much later Christian authors like Tertullian and Augustine harshly condemned these practices.



"When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied."

– Herophilus

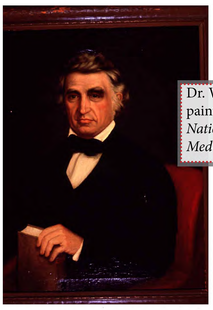
Dr. William Beaumont and the Ethics of Research

It can be said that behind the greatest medical discoveries are the experiment and the subject.

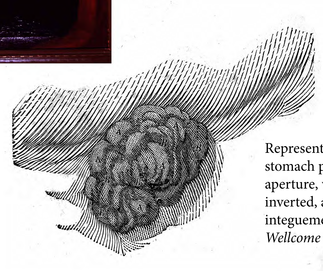
For Dr. William Beaumont (1785 – 1853), renowned pioneer physician and the "Father of Gastric Physiology," it was his patient, trapper Alexis St. Martin, who led Beaumont down the path for which he would become widely known.
His tale is not dissimilar from that of Dr. J. Marion Sims, whose career also benefitted tremendously from a fortuitous encounter with a particular patient.

In 1822, Dr. Beaumont was practicing at Fort Mackinac in Michigan when he was summoned to care for a young employee of the American Fur Company who had inadvertently sustained a musket wound to his gut. The patient, 19-year-old St. Martin, had what were believed to be mortal injuries – the blast had left a fist-sized hole from his side into his stomach, with damage to his rib cage. While he would ultimately survive, the injury left him with a large gastric fistula.

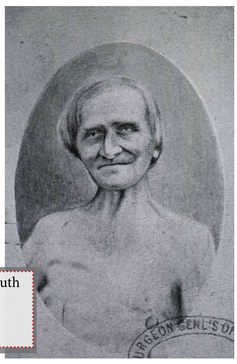
As Beaumont treated the young man, he marveled at the manner in which he could study the workings of the stomach, noting observations about gastric fluids and digestion. As his patient healed, the fistula remained. In 1825, Beaumont seized the opportunity to study digestion through St. Martin's unprecedented "window" into the body.



Dr. William Beaumont, painting by Ivan Summers. *National Library of Medicine*



Representing a portion of the stomach prolapsed through the aperture, with the inner surface inverted, and spread over the integuements of the side. *Wellcome Images*

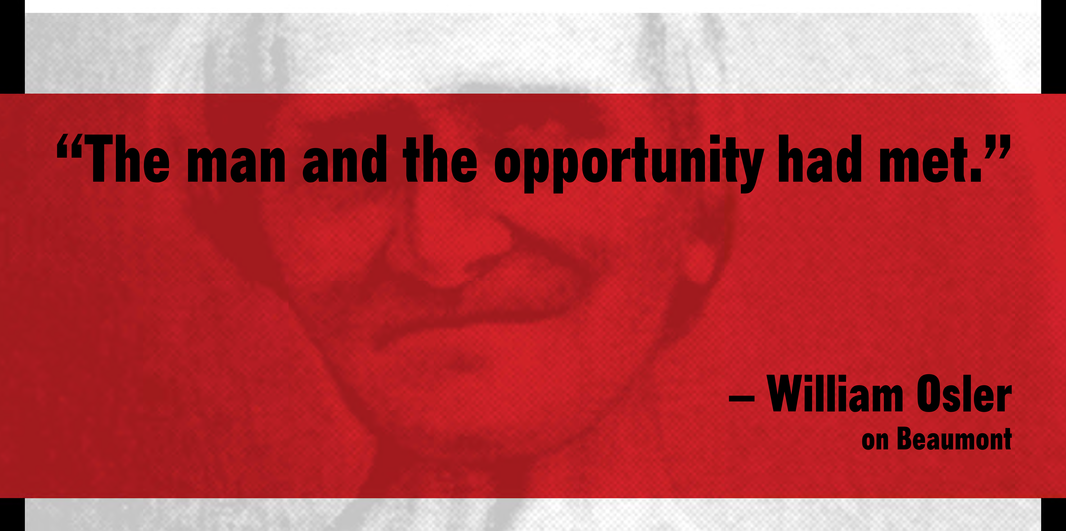


Alexis St. Martin in youth and in old age. *National Library of Medicine*

A New Life

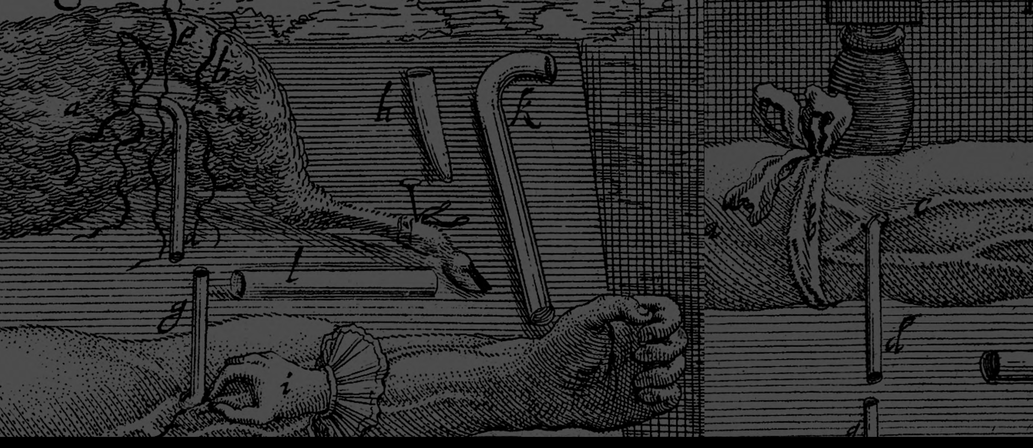
No longer able to work for the American Fur Company, the debilitated and destitute St. Martin was hired by his physician nearly 10 months after his accident, a move that not only gave the young man employment, but enabled Beaumont to study his patient. This would all, of course, be viewed favorably from the paternalistic, Hippocratic methods employed by physicians at the time. Beaumont's treatment of St. Martin was quite within the norm for this period and Sir William Osler, in a 1902 paper, stated that "Beaumont is indeed a bright example in the annals of the Army Medical Department, and there is no name on its roll more deserving to live in the memory of the profession of this country." It has been said, however, that St. Martin was coerced by Beaumont into signing a work contract, thereby ensuring his subject would remain nearby for study. Beaumont continued to study St. Martin and conduct experiments off and on until 1833, when the two finally parted ways. By his own account, Beaumont performed more than 200 experiments on St. Martin. His work *Experiments and Observations on the Gastric Juice, and the Physiology of Digestion* was published in 1838.

Despite ongoing efforts by Dr. Beaumont to get St. Martin to return for further study, he never did. St. Martin lived for nearly 60 years after his accident. In his later years, he went on tour, exhibiting his fistula to medical audiences. Following his death in 1880, his family is reported to have deliberately let his body decompose before burial, hoping to elude those interested in further scientific study.



"The man and the opportunity had met."

– William Osler
on Beaumont

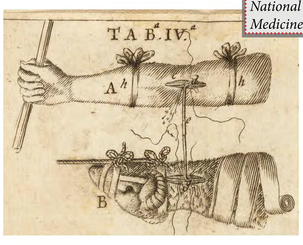


The Evolution of

Though blood transfusion is now a relatively safe and often life-saving therapy, the journey of transfusion medicine began with treacherous experimentation, and remains less benign than one might think.

Richard Lower M.D. performed the first direct transfusion of blood in 1665
National Library of Medicine

Three examples of blood transfusion: animal to animal, healthy to sick, arm to arm, 1679.
National Library of Medicine



Ragguaglio degl'esperimenti, Table 4 showing blood transfusion, 1668
Wellcome Images

Tuberculosis goat blood transfusion, carried out by Dr. Samuel Bernheim (1855-1915) involved transfusing blood from the goat to the female patient. He hoped to cure her tuberculosis, but transfusing animal blood into humans had been banned since the 17th century since patients died.
William P. Didusch Center for Urologic History

William Harvey (1578-1657), an English physician, described the circulation of blood in 1628. This understanding of the human circulatory system became the basis for future experimentation.

The first direct transfusion of blood was performed in 1665 by English physician Richard Lower (1631-1690), who used silver tubes to connect the carotid artery of one dog to the jugular vein of another. By 1667, Lower attempted to change a man's character by transfusing him with sheep's blood. That same year Jean-Baptiste Denis (?-1704), French physician to Louis XIV, performed four human transfusions. One case was a 34-year-old male who enjoyed spending his time in debauchery in Paris; Denis thought a transfusion of calf's blood might help, due to the creature's gentle nature. The patient experienced flank pain, chest heaviness, irregular heartbeat, nasal bleeding and bloody urine; he subsequently perished. This was the first reported transfusion reaction.

In 1678, the French Parliament prohibited blood transfusion into humans. The British Royal Society similarly abolished the procedure, and Pope Innocent XI made a special proclamation against transfusion in 1679.

Despite the halt in blood transfusion experimentation during the 18th century, there occurred other important scientific discoveries regarding blood. Italian anatomist Antonio Scarpa (1752-1832) performed experiments demonstrating that an animal with severe blood loss could not be resuscitated by plasma alone, but required whole blood (1788). Blood coagulation was addressed as William Hewson (1739-1774), English anatomist, noted the anticoagulating effects of nitrite and other neutral salts while observing the preparation of cattle blood for culinary purposes. The blood was first placed into a container with salt, which prevented it from clotting so that it could then be mixed with other ingredients.

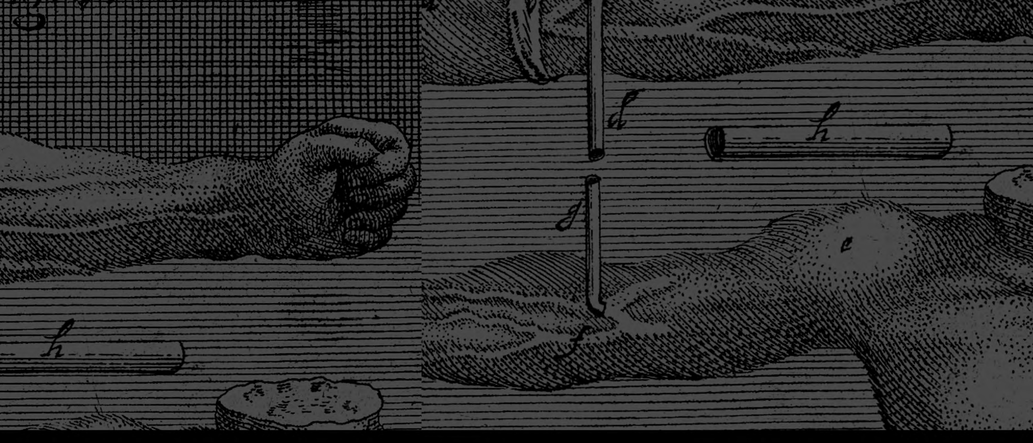
Animal to Human Transfusions

Interest renewed in blood transfusion in the 19th century, courtesy of English obstetrician James Blundell (1790-1878), who began performing transfusion experiments on dogs. After witnessing a woman die from postpartum hemorrhage, Blundell suggested transfusion be used only in cases of life-threatening hemorrhage and also gave a clear warning against transfusion with blood from other species (heterologous transfusions), stating that death would ensue. Such thinking was revolutionary considering the popularity of such transfusions.

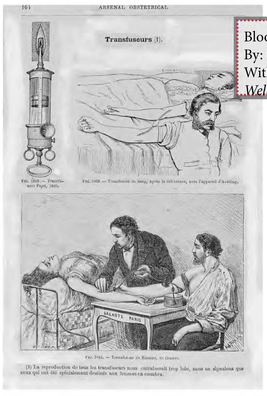
There was also an interest in transfusion reactions to heterologous blood. Oscar Hasse (1837-1898), a German physician, endorsed the use of sheep's blood for sheep-to-human transfusions. He noted a typical reaction consisted of dyspnea, cyanosis, convulsions, vomiting, loss of consciousness and, occasionally, death. Yet he continued to recommend sheep's blood as a treatment for "incurable diseases." Emil Ponfick (1844-1913), a German pathologist, and Leonard Landois (1837-1902), a German physiologist, published their extensive research on the dangers of heterologous blood transfusion in 1874, finally putting an end to this therapy.

"Blood is the most dangerous substance we use in medicine."

– Dr. Charles B Huggins
Nobel Prize Recipient



Transfusion Medicine



Blood transfusion
By: Gustave-Joseph Alphonse Witkowski, 1887
Wellcome Images

Human to Human Transfusions

With the 20th century came the realization that even homologous transfusion could result in hemolysis. Karl Landsteiner (1868-1943) discovered that the serum of certain individuals will agglutinate erythrocytes from other individuals. Landsteiner published his work in 1900, grouping blood types into three classes (A, B or C) based on isoagglutinins; this discovery was pivotal for the safe transfusion of blood. Landsteiner was awarded the Nobel Prize in Medicine in 1930 for his work in immunology and the discovery of blood groups. Later, the Viennese specialist for internal diseases, Alfred von Decastello (1872–1960), and his co-author, Adriano Sturli, discovered the fourth blood group AB, present in about three percent of individuals. Despite this phenomenal discovery, surgeons—who were responsible for performing transfusions at the time—did not start using the cross-agglutination tests prior to blood transfusion until 1911. Reuben Ottenberg (1882-1959), an American physician, endorsed the use of cross-agglutination tests prior to blood transfusion.

Storage of Blood

In the beginning of the 20th century, transfusion was accomplished by artery-to-vein anastomosis to prevent clotting, however, this cumbersome surgical technique made the volume of blood transfused unreliable. In 1913, Edward Lindeman (1879-1919), an internist at Bellevue hospital in New York, introduced his "Lindeman needle," allowing blood transfusion through a syringe-cannula system. With these new techniques, blood transfusion entered the domain of the internist. The use of citrate as an anticoagulant was the next major breakthrough in transfusion medicine; this discovery led to the ability to store blood and the creation of cold "blood banks," which revolutionized surgery. By the end of the 20th century, surgical procedures previously life-threatening due to hemorrhage became common occurrences.

Our present century has brought about a new understanding of the risks and benefits of blood transfusion.

With the increased safety of blood transfusion due to infectious disease screening and red blood cell antigen crossmatching, it seemed that blood transfusion had minimal risk compared to its promised benefit. Recent studies have brought a new appreciation of the risks, especially in surgical patients. A retrospective study on patients with superficial transitional cell carcinoma of the bladder showed blood transfusion during surgery to be an independent risk factor for disease recurrence. Transfusion requirement has also been shown to predict a higher likelihood of post-operative ileus in patients undergoing radical cystectomy. Other studies have shown perioperative blood transfusion to be associated with increased total hospital cost, greater risk of infection, longer hospital stay and increased mortality. Given the associated risks, medicine has begun to favor a restrictive strategy of blood transfusion.

Illustration of a blood transfusion, c. 1921.
National Library of Medicine

"...blood component therapy is inherently hazardous and results in some degree of harm in every patient."

– Strategic Blood Management (2007)

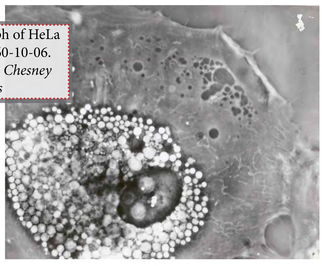
The Legacy of

Henrietta and David Lacks (ca. 1945) Courtesy of the Lacks family

Richard TeLinde, 1940
The Alan Mason Chesney Medical Archives

George and Margaret Gey
The Alan Mason Chesney Medical Archives

George Gey in laboratory, holding test tube in front of roller drum
The Alan Mason Chesney Medical Archives



Photomicrograph of HeLa cell, 3 days - 1960-10-06.
The Alan Mason Chesney Medical Archives

"Clinic patients" were often used for research without their knowledge. Dr. Howard Jones (1910) illustrated the medical community's acceptance of the custom when he stated, "[Johns] Hopkins, with its large indigent black population, had no dearth of clinical material." Using a Hopkins clinic patient, Jones would partner with Richard W. TeLinde (1894-1989), then Chair of the Department of Gynecology and Obstetrics at Hopkins, and later, George Otto Gey (1899 – 1970) to propagate one of the oldest, most well-known cell lines to change biomedical history.

In the 1940's *carcinoma in situ* of the cervix was a new and controversial concept of interest to TeLinde. Physicians questioned whether *carcinoma in situ* was in reality carcinoma at all; many classical pathologists then believed it was not a carcinoma unless invasion could be identified. TeLinde disagreed.

Heckled offstage when presenting some clinical findings at a major pathology meeting, TeLinde returned to Baltimore intent on reviewing all biopsies from patients who had been diagnosed with invasive cervical cancer to see how many had been initially diagnosed with *carcinoma in situ*. Together, Jones and TeLinde showed that 62 percent of women with invasive cancer first presented with *carcinoma in situ*.

Gey, a pioneer geneticist working to grow cells in culture and head of tissue research at Hopkins, became involved when TeLinde wanted to grow living samples from normal cervical tissue, as well as *in situ* and invasive cancer of the cervix. However, no cells would grow in culture.

The Growth of Henrietta's Cells

On February 1, 1951 a 21-year-old African-American woman appeared in the gynecology outpatient department at Johns Hopkins complaining of intermenstrual spotting. Jones described a slightly elevated and ragged purple lesion about 2.5 cm in diameter located on the patient's cervix. The tissue was soft. The remainder of the pelvic exam was normal, though firm touching of the unusual tissue caused bleeding from this vascular lesion. Jones considered a primary syphilitic lesion, but the dark field examination showed no spirochetes. A subsequent biopsy revealed carcinoma. Eight days later, a resident treated the patient with radium therapy and obtained more biopsy material, including samples for Dr. Gey. Despite early and adequate radiation therapy, the cancer – labeled an epidermoid carcinoma – rapidly metastasized and killed Henrietta Lacks in October, 1951.

Even as Lacks succumbed to her disease, the tissue samples taken at biopsy – labeled with the abbreviation "HeLa" – fascinated researchers. The cells were multiplying at an almost alarming rate in culture. After the first day, the cells had doubled. Gey's assistant split each sample into two tubes and, within 24 hours, they had doubled again; the cells grew 20 times faster than Lacks's normal cells.

Over the course of six decades, HeLa cells – taken from a simple cervical biopsy –have played a role in some of the greatest of all medical discoveries: the development of Jonas Salk's polio vaccine, an understanding of cellular damage from nuclear radiation and life in outer space. HeLa cells also replaced laboratory animals in cosmetic industry testing. Though Henrietta Lacks

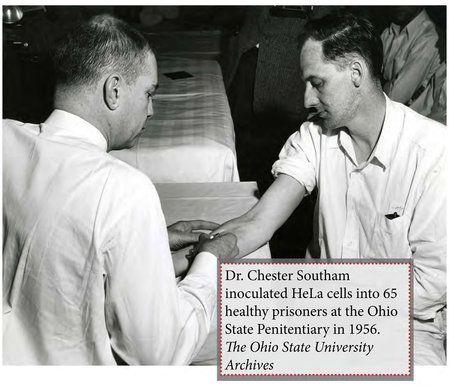
"It sounds strange," he said, "but her cells done lived longer than her memory."

– Cousin Cootie

Rebecca Skloot, ***The Immortal Life of Henrietta Lacks***

Henrietta Lacks

Cancer Experiments using HeLa Cells



Dr. Chester Southam inoculated HeLa cells into 65 healthy prisoners at the Ohio State Penitentiary in 1956. *The Ohio State University Archives*

Penitentiary isolation ward.
The Ohio State University Archives

would go on to be recognized as the mother of the HeLa cell line, her legacy also raises questions about informed consent, the commercial value of biomedical materials, compensation and donor recognition.

Just as the HeLa cell line had become one of the most prolific available, it was also causing problems for researchers: HeLa cells were infecting and overpowering other cultures. Worry that these cells could infect scientists prompted *Sloan-Kettering Institute for Cancer Research* virologist Chester Southam to experiment. In early 1954, he injected about 5 million HeLa cells into the arm of a female leukemia patient. A week later she began to grow hard bumps at the injection site; he removed several. Two weeks later some of the lesions had grown to two centimeters. Southam removed some of the lesions, but not all, in his quest to determine whether the patient would fight off the disease. In another patient, cancer metastasized to the lymph nodes. He continued injecting patients, hypothesizing that bodies with cancer fought HeLa cells less effectively than healthy ones. Southam believed that the cells could be used as a means of cancer diagnosis. Ultimately he injected more than 600 people with HeLa cells.

In July, 1963, Southam entered into an agreement with Emanuel Mandel, Director of Medicine at the *Jewish Chronic Disease Hospital* in Brooklyn, to use the hospital's patients for his studies. They planned to have staff physicians inject 22 patients with cancer cells. But when Mandel instructed his staff to give the injections without giving information, three young Jewish doctors refused, quoting the Nuremberg Code and stating they would not conduct research without patients' consent. Those physicians sent their resignation letters to the press. An investigation soon began, and The New York Board of Regents, through its "Division of Professional Conduct," found Mandel and Southam guilty of "unprofessional conduct" and "fraud and deceit in the practice of medicine." Their licenses were suspended for one year, but this suspension was stayed; both were placed on probation and allowed to continue to practice.

HeLa Today

The story of the HeLa cell line came to the attention of the public in *The Immortal Life of Henrietta Lacks,* in which author Rebecca Skloot explores the history of the cells, including Southam's experiments. In an April 2000 Johns Hopkins Magazine interview, Ruth Faden, Director of the Berman Institute of Bioethics at Johns Hopkins, summarized issues behind the controversy:

There are at least two issues that cases like Mrs. Lacks's raise. One is the question of consent and the other is, what, if anything, is morally or legally due to a person if something of commercial value is developed from their cells.

The Lacks's story is a sad commentary on how the biomedical research community thought about research in the 1950s. But it was not at all uncommon for physicians to conduct research on patients without their knowledge or consent. That doesn't make it right. It certainly wasn't right. It also was unfortunately common.

"Scientists don't like to think of HeLa cells as being bits of Henrietta because it is much easier to do science when you dissociate your materials from the people they came from."

– Robert Stevenson, researcher

Rebecca Skloot, *The Immortal Life of Henrietta Lacks*

U.S. Public Health Service Studies

Nurse Eunice Rivers with officials of U.S.P.H.S. Nurse Rivers attended to the men in the Tuskegee Study. *National Archives.*

National Archives.

When it comes to stories of human experimentation, perhaps there is no more notorious experiment in the United States than the government-funded 40-year study of syphilis in Tuskegee, Alabama that began in the 1930s. Indeed, the Tuskegee study has shaped policy decisions regarding medical research in this country ever since Jean Heller broke the story in 1972. Certainly the Tuskegee study, along with the subsequent research on Guatemalan nationals in the 1940s, raises a great number of questions about the exploitation of vulnerable populations, ethics and government oversight.

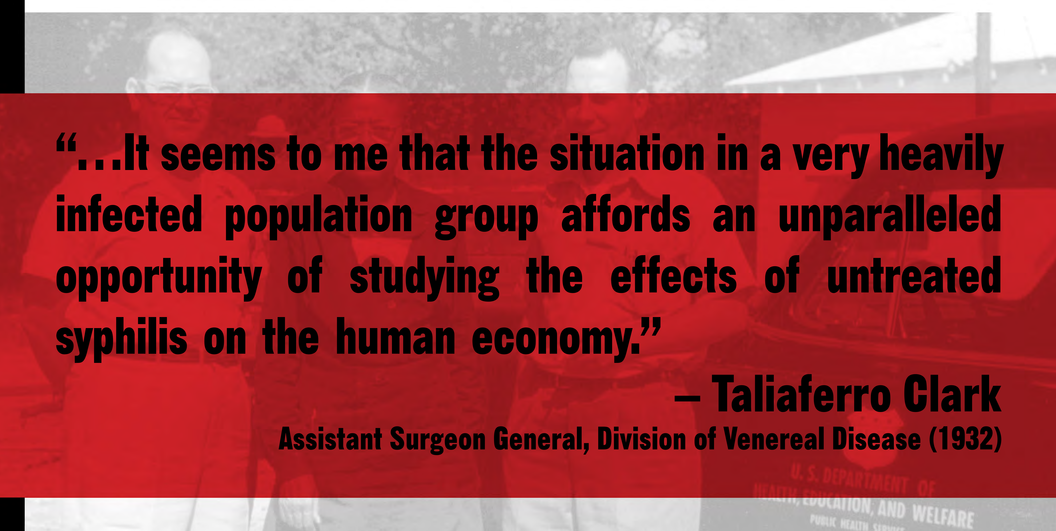
In the early 20th century, the medical community still struggled against the scourge of syphilis, and around the world researchers explored the etiology of the disease and potential treatments. When the Rosenwald Fund syphilis control demonstration and treatment program noted a 35 percent positivity result in Macon County, Alabama (1930), it seemed as though the strong concentration of disease presented a unique opportunity to study the disease in a single race, single gender population.

Taliaferro Clark, Assistant Surgeon General, Division of Venereal Disease wrote to Dr. J.N. Baker in the Alabama State Health Office in Montgomery, AL (Aug, 1932) that, "It seems to me that the situation in a very heavily infected population group affords an unparalleled opportunity of studying the effects of untreated syphilis on the human economy."

In September, Dr. Baker responded positively. "The (Macon County Health) Board was quite enthusiastic about the previous project, and was quite willing for this new understanding to proceed along the suggested lines," he wrote. "According, they passed a motion approving the project, but with the distinct understanding that treatment be provided for those people."

For the Treatment of "Bad Blood"

Soon after, the Public Health Service (PHS) convinced 399 Negro men with late latent syphilis and 201 Negro men free of disease (by clinical exam and Wasserman reaction) to participate in a non-therapeutic controlled study of untreated syphilis. The men, however, thought they were patients in a joint federal and local medical and nursing program of the Tuskegee Institute and the Macon County Health Department for the treatment of "bad blood"- a local expression for syphilis and anemias. The men did not consider themselves subjects because they did not know that the study existed. During the course of the study the PHS physicians prevented the men from receiving syphilis treatment (after allowing some inadequate treatment at study initiation in 1932) and prevented the men from receiving penicillin when it became available. The men were never given a diagnosis. The PHS provided the men with tonics, aspirins, iron pills, award certificates, free lunches and burial insurance. In exchange, the families of the men agreed to allow for autopsies. The researchers sought to document the ravages of syphilis present in the men at the time of necropsy. Over the course of the study, 13 progress reports were published in respectable medical journals.



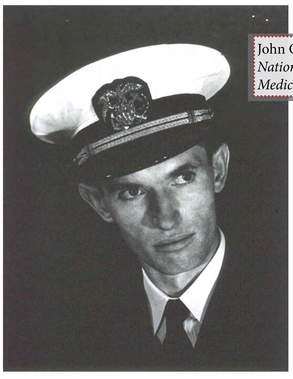
"…It seems to me that the situation in a very heavily infected population group affords an unparalleled opportunity of studying the effects of untreated syphilis on the human economy."

– Taliaferro Clark

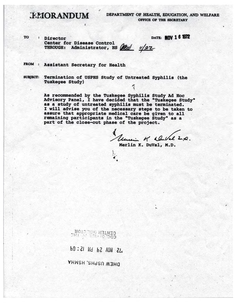
Assistant Surgeon General, Division of Venereal Disease (1932)

in Alabama and Guatemala

The ethos of human research in 1932 did not require the preparation of a formal study protocol nor was informed consent of study participants required. Civilian scrutiny did not exist in any form at that time. Following World War II and the adoption of the Nuremburg Code, the Tuskegee study was not re-examined to ensure that it adhered to the new principles for experimentation.



John Cutler, 1942
National Library of Medicine



MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY

TO : Director
Center for Disease Control
THROUGH: Administrator, HSMHA

DATE: NOV 14 1972

FROM : Assistant Secretary for Health

SUBJECT: Termination of USPHS Study of Untreated Syphilis (the Tuskegee Study)

As recommended by the Tuskegee Syphilis Study Ad Hoc Advisory Panel, I have decided that the "Tuskegee Study" as a study of untreated syphilis must be terminated. I am asking that the Center for Disease Control take steps to ensure that appropriate medical care be given to all remaining participants in the "Tuskegee Study" as a part of the close-out phase of the project.

Merlin K. DuVal, M.D.

Syphilis in Guatemala

As the Nuremberg Trials got underway, PHS physician John Cutler, with the cooperation of several government agencies in Guatemala developed human models of transmission of Treponema and inoculated prostitutes, prisoners, soldiers and mental asylum patients with syphilis through various methods (1946). The purpose of the study was to assess the effectiveness of potential chemoprophylactic regimens.

Without their consent, 696 subjects were exposed to syphilis with 61 percent infected. Of those infected, 89 percent received what was considered an adequate amount of treatment penicillin. Consent was provided by the Guatemalan institutions and, in exchange, the institutions received much needed medical supplies via National Institutes of Health funding.

Cutler acknowledged the implications of the Nuremberg Trials. Writing to fellow PHS physician R.C. Arnold, Cutler says: "As you can imagine, we are holding our breaths and we are explaining to the patients and others … that the treatment (i.e. inoculation) is a new one utilizing serum followed by penicillin. This double take keeps me hopping at times … a few words to the wrong person … might wreck it."

"Civilizations can be judged by the way they treat their most vulnerable…we failed to keep that covenant"

– Dr. Amy Gutmann,
head of the Presidential Commission for the Study of Bioethical Issues.

The Importance of APOLOGY

Those who inflict humiliation commonly defend their behavior as justified by circumstances, and they also underestimate the harm they cause. The offended party wants dignity restored and to let go of hurt, anger and resentment. The restoration of dignity in response to humiliation emerges as one of the most important functions of apology. After the 1999 Institute of Medicine report "To Err is Human," the profession of medicine now recognizes and recommends that an apology is an appropriate and necessary response following the disclosure of a medical error. Dr. Lazare, a leader in the apology and patient safety movement, writes:

Apology is a universal healing force for resolving interpersonal or intergroup conflicts in which one party acknowledges responsibility for an offense. The profession of medicine appears to be one of the last to recognize the importance of apologies except for medical errors. At the same time, the tensions, stress and history of medical practice have resulted in a time honored tradition of humiliating behaviors toward patients, colleagues and trainees.

President Clinton's Apology

More than two decades following the termination of the Tuskegee syphilis experiments, President William Clinton apologized to the participants and their families:
Many Americans would prefer not to remember, but we dare not forgot…our nation broke the trust with our people … It is not only in remembering that shameful past that we can make amends and repair our nation, but it is in remembering that past that we can build a better present and a better future. And without remembering it, we cannot make amends and we cannot go forward.

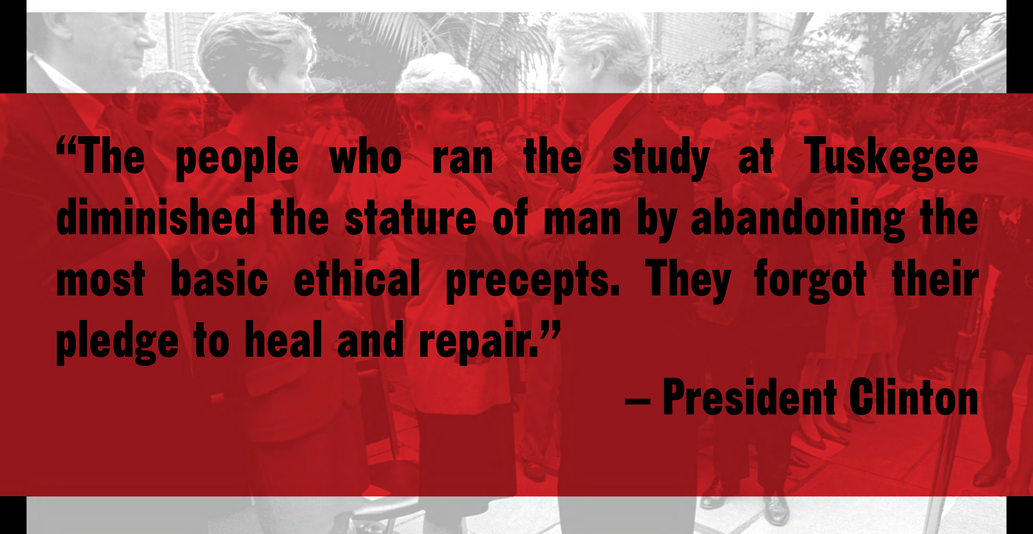
Herman Shaw, one of the oldest Tuskegee survivors, responded to President Clinton in this way:
The damage done by the Tuskegee study is much deeper than the wounds any of us may have suffered. It speaks to our faith in government and the ability of medical science to serve us as a force for good. (But)….in my opinion, it is never too late to restore faith and trust.

President Obama's Apology

On October 1, 2010, four months after learning about the Guatemala Inoculation Study, President Barack Obama apologized to President Alvaro Colom and the people of Guatemala.

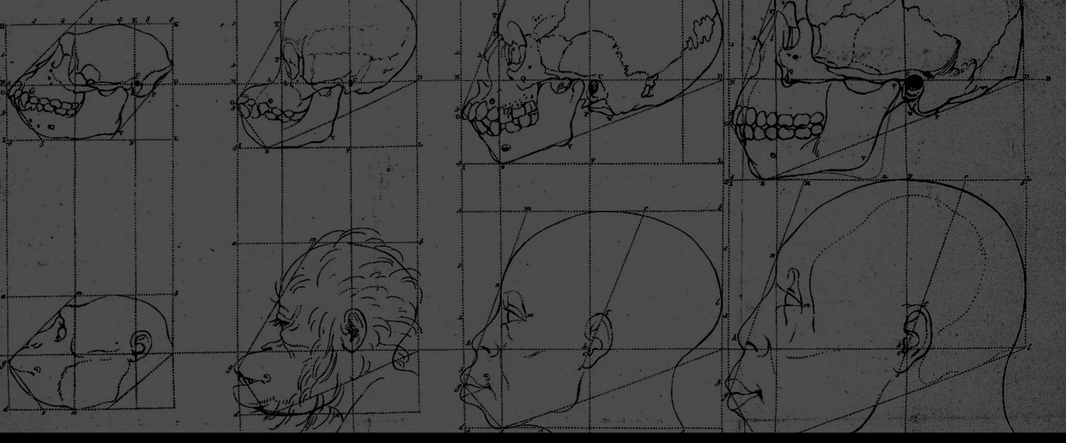
The socially and economically vulnerable remain at risk as subjects of human research. The present market-place-driven multicenter research environment, including for-profit institutional review boards with pressure to accommodate sponsors, is an environment that allows for the generation of unethical human research.

As Fletcher, former director of the Center for Biomedical Ethics, comments: "because physicians are not trained to look for conflicts of interest, they often find themselves enmeshed in them without recognizing the problem."



"The people who ran the study at Tuskegee diminished the stature of man by abandoning the most basic ethical precepts. They forgot their pledge to heal and repair."

– President Clinton

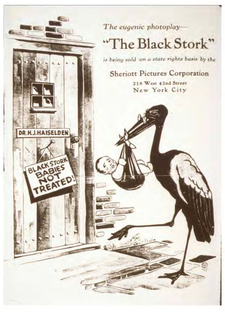


Eugenics and Therapeutic

Control over sexuality and procreation has been the goal of different states and regimes throughout history.

While castration has been used as both punishment and to make prisoners more servile since antiquity, from the late 19th century onward, the vasectomy operation provided a less drastic way to sterilize men.

Vasectomy, an operation in which the vas deferens is severed, was first used in 1885 to treat micturition issues due to an enlarged prostate, replacing the more drastic orchiectomy. Between 1920 and the 1940s, vasectomy was used as surgical rejuvenation for the aging male. Since the 1950s, it was promoted in developing countries in Asia to curb population growth.



Left: Chicago Tribune, November 17, 1915, page 7
Used with permission from Martin S. Pernick
Below: Motography, April 14, 1917, advertising page 2
Used with permission from Martin S. Pernick

Dr. Harry Haiselden, in Chicago, put euthanasia in the spotlight in 1915, when he allowed a newborn with congenital syphilis to die rather than perform surgery. He then exposed his actions to the media, taking credit for his bold decision. This case was turned into a cult film, *The Black Stork*, that was used as a eugenic propaganda device and shown in theaters for almost a decade.

The modern eugenics movement was founded in the late 19th century in England, but quickly spread to North America and continental Europe. Its goal, according to founder Francis Galton, was to improve the quality of a population by promoting procreation of people with perceived positive characteristics while impeding procreation by people with perceived negative characteristics, such as hereditary diseases, disabilities or "moral defects."

Even before 1900, surgical sterilization of criminals, individuals with hereditary diseases or those otherwise deemed of low social value was proposed for eugenic reasons. In addition, vasectomy was proposed as therapy against masturbation and mental diseases associated with the practice by Victorian physicians.

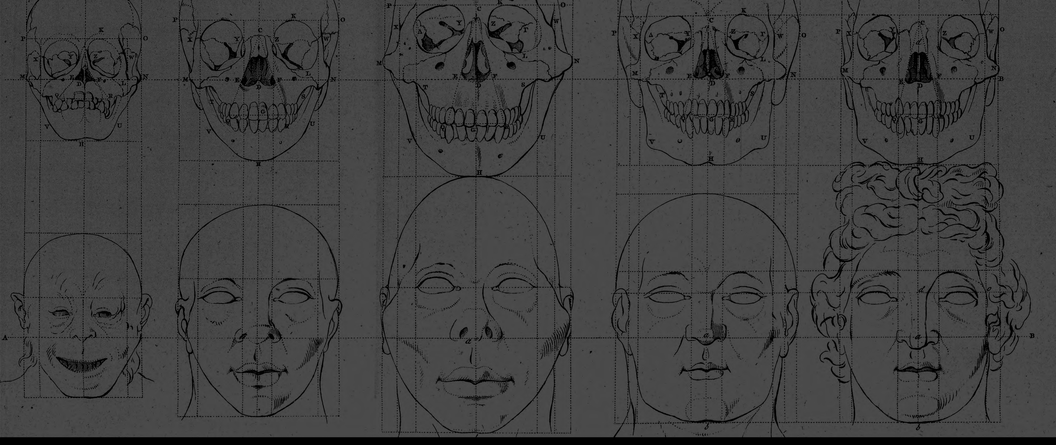
Indiana State Reformatory

From 1899 on, Dr. Harry Sharp performed vasectomies on inmates at Indiana State Reformatory at Jeffersonville, where he served as reformatory physician from 1896 to 1908 and trustee until 1919. Though all operations were performed on consenting subjects, reformatory inmates were vulnerable not only because of their imprisonment, but also because they had been given indeterminate sentences, the eventual length of which were decided according to their compliance with reformatory rules.

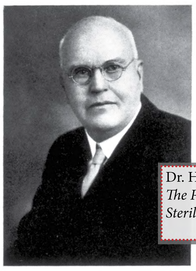
Sharp wrote that a young inmate asked him to perform castration on him to help him stop masturbating, but Sharp instead performed a vasectomy, which, over the next year, led to increased weight, improvement in mental condition and a cessation of masturbation. The inmate "became an enthusiastic advocate of the operation, and upon his recommendation many of his fellow inmates made application for relief from the same condition," so that in his first publication in 1902, Sharp reported 42 vasectomies on men between 17 and 25 years of age. Between 1902 and 1908 (no number available for 1907), Sharp performed not only 191 vasectomies at Jeffersonville, but also 276 circumcisions. Of the 1159 surgical operations performed during that time at Jeffersonville, 543 were on inmates' genitals.

"What nature does blindly, slowly and ruthlessly, man may do providently, quickly, and kindly. As it lies within his power, so it becomes his duty to work in that direction."

– Sir Francis Galton
1905



Compulsory Sterilization



Dr. Harry Sharp
The Progress of Eugenical Sterilization, Paul Popenoe

Convinced by his therapeutic successes, Sharp threw his support behind the Indiana sterilization law, which included the explicitly eugenic goal to "prevent procreation of confirmed criminals, idiots, imbeciles and rapists" and was signed into law in 1907. The same year, he was elected president of the National Prison Association and used his national reputation in support of compulsory sterilization laws in other states.

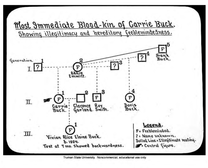
During the heyday of the American eugenics movement, 30 states enacted compulsory sterilization laws. By 1943, approximately 41,000 people had been sterilized with eugenic indication, half of them for "insanity" and half of them for "feeblemindedness." Another 22,000 were sterilized between 1944 and 1963.

Eugenics in Europe

In Germany, like other European countries, a strong eugenics movement existed in the early decades of the 20th century. Compulsory sterilization legislation had been publicly discussed and even introduced to parliament, but failed to pass. When the Nazis seized power in 1933, the "law for the prevention of hereditarily diseased offspring" was one of the first laws passed. A cornerstone of the new health politics, it called for the compulsory sterilization of individuals who suffered from certain diseases considered hereditary. Those diseases included "congenital mental deficiency, schizophrenia, manic-depressive insanity, epilepsy, Huntington's Chorea, hereditary blindness, hereditary deafness, any severe hereditary deformity and severe alcoholism."

The law took effect in 1934, and before the start of World War II, 350,000 people were sterilized in Germany and another 50,000 in Czechoslovakia and Austria, which had come under German control.

Though eugenics became less popular after 1945, some sterilization laws in the United States and Scandinavia remained in place until the 1970s.



Pedigree of Carrie Buck
Arthur Estabrook Papers, M.E. Grenander Department of Special Collection and Archives University at Albany Libraries

The Tragedy of Carrie Buck

Carrie Buck's life story encapsulates the inherent tragedy of the eugenics movement.

Emma Buck, Carrie's mother, lost her husband and turned to prostitution to support her family. Arrested for vagrancy in Charlottesville, Emma was sentenced to life in Virginia's Colony for Epileptics and Feebleminded. Charlottesville policeman J.T. Dobbs and his wife adopted Carrie, but when she was raped, possibly by Dobbs' nephew, they had Carrie committed to the same institution as her mother. Carrie's daughter Vivian was given to the Dobbs family to raise. In 1924 Carrie became the banner case for the eugenics movement for forcible sterilization of the feebleminded. Virginia Colony Superintendent Dr. Albert Priddy recommended forced sterilization on Carrie to test the newly passed state law. For three years, her case wound its way through the courts, reaching the Supreme Court.

Justice Oliver Wendell Holmes Jr. wrote the majority opinion (6-1) favoring the eugenics law and forced sterilization:

It is better for all the world, if instead of waiting to execute degenerate offspring for crime or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind. The principle that sustains compulsory vaccination is broad enough to cover cutting the Fallopian tubes. Three generations of imbeciles are enough.

Carrie's sterilization was performed in 1927. Shortly after, she was paroled from the Colony for Epileptics and Feebleminded and married. Her daughter, still with the Dobbs, died in 1932, age 8. Late in life Carrie expressed her sorrow at not being able to have more children. Following her death at 83, Carrie was buried next to her daughter Vivian.

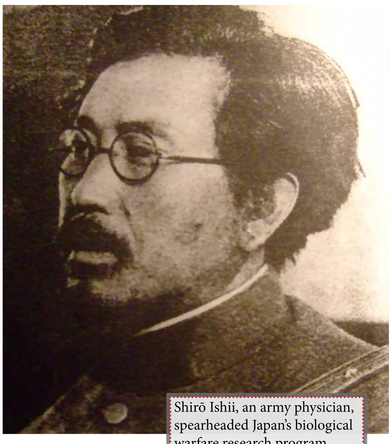
Left: Carrie Buck (1934)
Above: Carrie and Emma Buck (1924)
Arthur Estabrook Papers, M.E. Grenander Department of Special Collection and Archives University at Albany Libraries

"The great problem of civilization is to secure a relative increase of the valuable as compared with the less valuable or noxious elements in the population…"

– Theodore Roosevelt to Charles B. Davenport
January 3, 1913

Japanese Biological Warfare and

Before and during World War II there were secret research bases throughout Manchuria in which Japanese physicians and scientists performed biological and chemical warfare research on humans, killing thousands of subjects in the name of medical advancement. When the war ended all test subjects were killed and the buildings demolished in hopes of covering up atrocities.

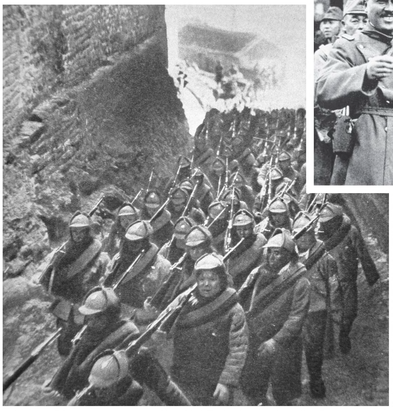


Shirō Ishii, an army physician, spearheaded Japan's biological warfare research program.
Public Domain

Shirō Ishii (1892–1959), an Army physician, spearheaded Japan's biological warfare research program. In 1932 he was given land, financial support, and staff to build a facility to pursue biological warfare research. The first biological warfare research base was in the occupied Manchurian village of Beiyinhe. Prisoners were injected with contagions and their symptoms were documented as they suffered and died. Others were subjected to inhalations of toxic gases and cyanide. He conducted frostbite experiments by repeatedly freezing and thawing the limbs of prisoners. Once prisoners were too weak to be of any research value they were killed, dissected, and cremated.

The Ping Fan Complex

Under the cover of the Water Purification Bureau, eighteen stations were created in Manchuria for the purpose of human experimentation using infectious agents and chemical weapons. The Ping Fan complex (Unit 731) was the main base of operations. More than one third of the 15,000 workers employed at Ping Fan from 1936 until 1945 died from their brutal treatment.



Above: Japanese Officers toasting victory with sake, 1933
Left: Japanese invasion of Manchuria, 1933
Bridgeman Art Library

"I was afraid during my first vivisection, but the second time around, it was much easier. By the third time, I was willing to do it."

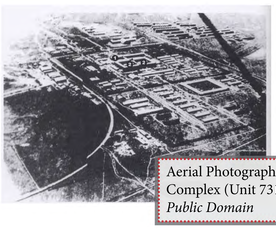
– Ken Yuasa
wartime surgeon, in Shanxi Province, 1942

Human Experimentation 1932-45

In February 2011 the BBC reported that Japan has begun excavating the former site of a medical school that may contain the remains of victims of Unit 731. The Japanese government launched an investigation after Toyo Ishii, a former nurse, said she had helped bury body parts on the site as the US occupation forces moved into Tokyo at the end of World War II. "We are not certain if the survey will find anything," Kazuhiko Kawauchi, a health ministry official, told Associated Press. "If anything is dug up, it may not be related to Unit 731."

Ishii's goals included the culture and dissemination of biological warfare agents: plague, cholera, typhoid, dysentery, anthrax, tetanus, gas gangrene, tuberculosis, and sexually transmitted diseases. Infected prisoners were observed as they suffered and died. Prisoners were also tied to poles and struck with artillery shells containing pathogens to determine if they would become infected. Other victims were repeatedly frozen and thawed, leaving limbs and other body parts blackened and gangrenous. Females were raped by men with venereal disease, then dissected alive to observe the effect of the disease in-vivo.

Many who served under Ishii in the death factories went on to have successful careers, becoming deans of medical schools, senior science professors, and university presidents in the post-war era. Known war criminals were employed at Japan's National Institute of Health and they continued to use humans as subjects without consent for more than forty years. Dr. Masami Kitaoka, Vice Director of Japan's National Institute of Health, carried out experiments on prisoners, babies, and patients in psychiatric hospitals in 1947 and from 1952-55. The United States, eager to obtain the results of his biological and chemical warfare research and fearful of the information falling into the hands of the Russians, granted General Ishii complete immunity from prosecution in return for handing over his research. Ironically, by 1945 the United States' own biological warfare research had already surpassed that of Unit 731. Shirō Ishii died in 1959 of throat cancer at the age of 67.



Aerial Photograph of Ping Fan Complex (Unit 731).
Public Domain

Japanese invasion of Manchuria, 1932
Bridgeman Art Library

"We took the samples out of the glass containers and dumped them into the hole. We were going to be in trouble, I was told, if American soldiers asked us about the specimens."

– Toyo Ishii
in a statement to the Japanese government

Plutonium and

Experiments in Radiation

Many of us remember August 1945, when the United States dropped an atomic bomb on Hiroshima and three days later, a bomb on Nagasaki. Few of us, however, remember that, while the first bomb contained uranium as the radioactive component, the second bomb contained plutonium, a relatively new element. Our knowledge of the physiological effects of these elements lagged far behind our knowledge of their destructive capabilities.

The discovery and study of radioactive isotopes that culminated in the atom bomb began with Marie Curie (1867 – 1934) and her daughter Irene (1897 – 1956). Marie won two Nobel prizes for her work – the first in physics in 1903 and the second in chemistry in 1911; her daughter Irene received a Nobel in 1935. In the early 1900s, commercial companies produced medications containing radium, such as face creams and toothpaste, unaware that the ionizing emissions from these substances could cause serious damage to the human body. In fact, Marie, who liked to carry a vial of radium in her pocket because of the "warm glow," eventually died from aplastic anemia caused by radiation exposure, and Irene died at age 58 of leukemia, also caused by radiation exposure.

Radiation and the War

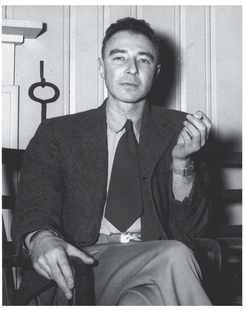
Belgian businessman Ernest Solvay funded the first international conference of scientists to clarify issues relating to these new and unusual elements. With the rise of dictatorships in Germany and Italy, scientific communities there were soon cut off from the rest of the world, while the persecution of Jewish scientists caused a flood of chemists and physicists to leave Europe. International conflict ensured that nuclear research rapidly became classified information in both Europe and the United States. In Germany, Werner Heisenberg investigated the possibilities of creating atomic weapons as part of the German Nuclear Energy Project, or Uranverein (Uranium Club). Almost simultaneously the Allies began research of their own, and Albert Einstein warned President Franklin D. Roosevelt about a potential German weapon as early as 1939. In 1942, the Manhattan Project recruited J. Robert Oppenheimer to head a laboratory at Los Alamos, New Mexico; secondary sites in Chicago, Oak Ridge, and Berkeley became hotspots in the development of radioactive fissionable material. Sites such as the Pacific Proving Grounds and the Nevada Test Site were used for testing, and it was not long before the first accident.

Plutonium Spill

On August 1, 1944, nuclear chemist Don Mastick accidentally spilled a small vial containing plutonium; droplets landed in his open mouth. Noticing the metallic taste, he reported to the medical doctor's office, where he swished his mouth with solutions and spit out plutonium until he had removed all but one microgram from his body. Nevertheless, even with such a small amount, he could blow the needles on the radiation monitors off the scale. While Mastick survived and excreted plutonium in his urine for years, Manhattan Project leaders recognized the need to develop animal and human exposure experiments; there was now information on the toxic side effects of radium, but little was known about uranium and nothing about plutonium.

By January 1944, the Manhattan Project had succeeded in producing milligram quantities of plutonium; 10 percent of this was set apart for research. Following animal studies at Los Alamos, injections of plutonium using human subjects were scheduled. The first patient was injected April 10, 1945, at Oak Ridge Hospital; subsequent injections were given in Chicago at the Billings Hospital, and the University of California at San Francisco injected humans in May 1945. Between 1 and 10 micrograms of plutonium were injected, and waste materials such as feces and urine, as well as blood, went back to Los Alamos for analysis. If a patient died, autopsy material also went to Los Alamos for study. All patients had code names, and it appears that 18 patients were unwittingly injected with plutonium. The physicians, possibly in an attempt to contain the risks of the experiments, selected subjects with terminal diseases. At least one child was injected.

Don Mastick, who accidentally ingested plutonium on August 1, 1944.
The Plutonium Files



J. Robert Oppenheimer, 1946
Public Domain

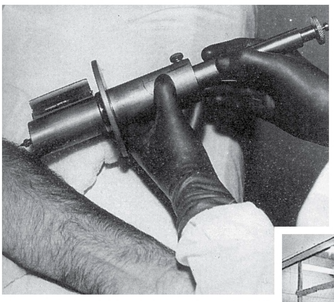
"There is a great variety of substances and effects in radioactivity. There is always a vast field left to experimentation and I hope that we may have some beautiful progress in the following years."

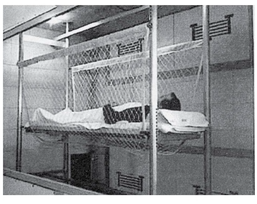
– Marie Curie
1941

Atomic Warfare

Despite their terminal diagnoses, four of the test subjects survived for more than 20 years. In 1973, a researcher at the Lawrence Livermore Radiation Laboratory, Patricia W. Durbin, restudied three of these survivors. The scientific study was published on the long-term outcomes of plutonium retention, excretion, and side effects. The federal government then probed into the Manhattan Project "secret program," which led Albuquerque Tribune reporter Eileen Welsome on a decade-long quest to identify the human subjects. Federal reports suggest that only one of the 18 patients might have given his informed consent. At a press conference in 1993, U.S. Secretary of Energy Hazel O'Leary publicly apologized for the decades of secretive experiments of radioactive materials on humans from government-sponsored experiments. U.S. President Bill Clinton issued two Presidential Executive Orders that established a national bioethics advisory commission for the protection of human research subjects. This Advisory Committee found fault with solicitation of informed consent in many radioactive investigations, but they also found that the "human radiation experiments in the 30-year period under review contributed significantly to advances in medicine and thus to the health of the public."

U.S. Secretary of Energy Hazel O'Leary with U.S. President Bill Clinton
Public Domain





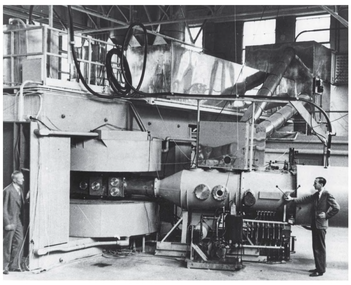
Above: Lead-covered syringes and lead-lined gloves used to inject subjects with plutonium.
Right: A medium exposure total body irradiator (METBI), used to expose subjects to radiation.
National Archives

There have been other radioactive substances tested including Strontium 90, Cesium 137, Iodine, Iron, Sodium, Potassium, Uranium and Americium. Children, pregnant women, healthy volunteers and prison inmates all have been injected with radioactive materials in our attempt to better understand these elements. Most of these studies started during the Cold War, and informed consent was rarely obtained.

Increasing nuclear weapons testing in the 1950s and subsequent fallout radiation led to macabre research endeavors around the world that used entire bodies of deceased citizens to obtain information about the cumulative dosage of radioactive materials. Britain, Scotland, South America, Australia and Hong Kong all contributed human body parts — without knowledge or approval from families — to advanced radiochemistry laboratories to quantify human exposure and subsequent cell changes.

Operation Sunshine

One study called "Operation Sunshine" in Britain shipped stillborn and deceased infants around Britain to be immolated and studied to detect exposure levels. The former head of the operation stated, "What's unethical about chemically analyzing ash? There was a huge benefit for mankind." Dr. Peter Campbell, a former director of pathology at the Royal Children's Hospital in Melbourne, offered this explanation, "We're talking years ago when attitudes were different. It's true that fetuses were discarded or buried anonymously. Certainly some babies were disposed of. At the time there was a lot of anxiety about atomic energy. It was the height of the Cold War, you've got to remember. You could justify all sorts of things."



60-inch cyclotron at the University of California Lawrence Radiation Laboratory, Berkeley, 1939
National Archives

"The real problem is in the hearts and minds of men. It is easier to denature plutonium than to denature the evil spirit of man."

– Albert Einstein

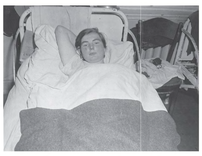
Nazi Medical Crimes and the

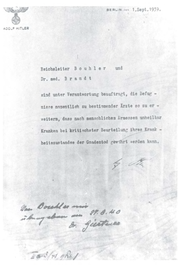
Nuremberg hosted two of the most famous war crimes trials of the 20th century: the Major War Crimes Trial (Nov 1945 – Oct 1946) and the Doctors Trial (Dec 1946 – August 1947). The defendants were charged with crimes against humanity and war crimes for the murder of patients—mainly psychiatric patients killed under the guise of "mercy killings"—and medical experiments on concentration camp inmates. Of the 23 defendants, 20 were physicians and three were government bureaucrats.

"Euthanasia" Programs

Under Nazi rule, physicians had planned and enacted the "euthanasia" program, a systematic killing of those they deemed "unworthy of life." Victims were children and adults with mental and physical disabilities who lived in state nursing homes. The first phase of the program started in August 1939 and was targeted at children with disabilities, who were sent to "special children's wards" and killed by lethal doses of drugs. The nature of these special wards was concealed from the public and from the children's parents.

The peak of the movement came after the start of World War II when more than 70,000 adults were murdered between 1940 and 1941 in what was called "Action T4," named for the street address of the government bureau that planned and oversaw the program. People were transported from local institutions in "grey buses," which soon became infamous, to six killing centers, established at former nursing homes. The main criterion according to which institutionalized patients were to live or die was their ability to work and contribute to their support. This centralized program was discontinued after public opposition started to mount. The Catholic bishop of Münster, Clemens August Graf von Galen, is widely credited for bringing the euthanasia program to public attention in 1941. Historians have identified this centralized murder, in which victims were killed by carbon monoxide in gas chambers and bodies were cremated afterwards, as a stepping stone to the Holocaust. After the end of the T4 program, decentralized "euthanasia" continued at many of the local nursing homes and hospitals.

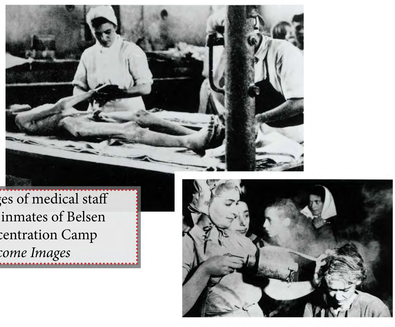




Above: Elizabeth Killiam, a survivor of the Hadamar Institute
Right: Letter authorizing the T4 euthanasia program, signed by Adolf Hitler.
United States Holocaust Memorial Museum

Medical Experiments

Medical experiments were carried out on prisoners at many concentration camps. Victims included Jews, political prisoners, homosexuals and prisoners of war. Experiments fell into two major categories. Many of them were directly related to the war effort: physicians studied how the human body reacts to extreme conditions, such as high altitude, extreme cold, nourishment by sea water and starvation. Camp doctors also tested toxins, pathogens, experimental drugs and therapies, including bone grafting, in an effort to eventually improve the treatment of soldiers in the field and personnel in occupied territories. The second major category was concerned with Nazi racial, genetic and population policies. This included Joseph Mengele's study of twins at Auschwitz, as well as sterilization and castration experiments, which were supposed to provide a way to render large populations in Eastern Europe sterile after the war had been won. The purpose of these experiments was to develop methods to sterilize millions of people with a minimum of time and effort, and possibly without their knowledge. These experiments were conducted by means of X-ray, surgery, injections and pharmaceutics. X-ray treatment usually also led to castration in women and men and, in many cases, tissue samples were taken from victims, increasing mortality as well as physical and psychological suffering.



Images of medical staff with inmates of Belsen Concentration Camp
Wellcome Images

A Czech victim suffers from dysentery at a Nazi Camp in Flossenburg, Germany.
Library of Congress

"We must always take sides. Neutrality helps the oppressor, never the victim. Silence encourages the tormentor, never the tormented."

– Elie Wiesel

Nuremberg Doctors' Trial

Defendents during the Doctors Trial at Nuremberg
United States Holocaust Memorial Museum

Herta Oberhauser's sentencing at the Doctors Trial
United States Holocaust Memorial Museum

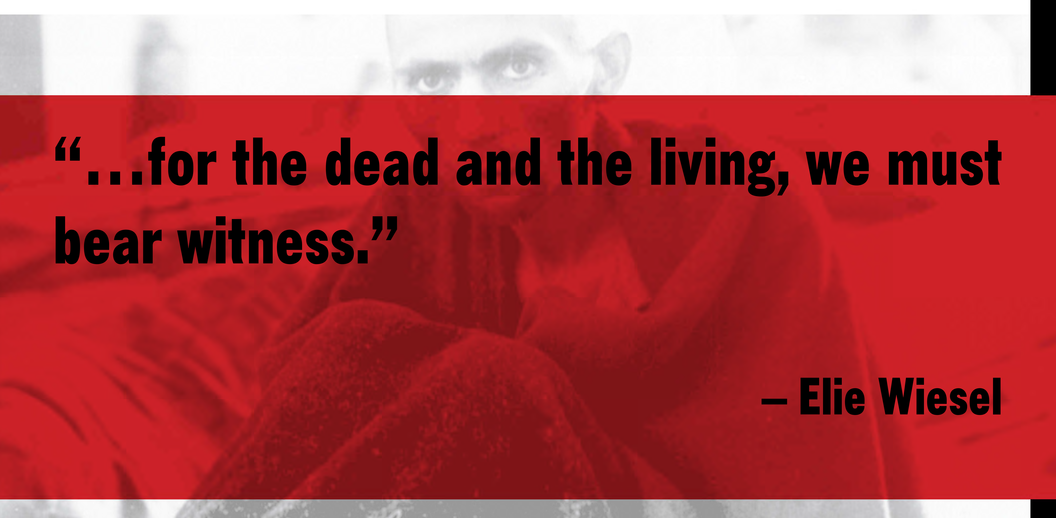
Pathological Museum of Concentration Camp Gusen I
Courtesy of Gusen Memorial Committee

Jadwiga Dzido appearing as a witness at the Doctors Trial
United States Holocaust Memorial Museum

Verdicts and Aftermath of the Trial

After almost 140 days of proceedings, including the testimony of 85 witnesses and the submission of almost 1,500 documents, the American judges pronounced their verdict on August 20, 1947. Sixteen of the doctors were found guilty – seven were sentenced to death and hanged at the Landsberg: War Criminal Prison on June 2, 1948; the other nine were sentenced to terms ranging from 10 years to life. All of them were released early, and none served more than eight years for their crimes. The remaining seven defendants were found not guilty. Several major perpetrators were never tried for their crimes, among them Josef Mengele, who escaped to South America, and Aribert Heim, who fled to Egypt in the 1960s.

Together with their verdicts, the judges of the doctors' trial also gave their opinion on medical experimentation. Their 10 points became known as the Nuremberg Code of Medical Ethics and stress the rights of experimental subjects and the concept of informed consent. Though they were never directly codified as law, they form an important building block of medical ethics today and contributed to the World Medical Association's Declaration of Helsinki.



"…for the dead and the living, we must bear witness."

– Elie Wiesel

THE NUREMBERG CODE

1 The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonable to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment.

The duty and responsibility for ascertaining the quality of the consent rests upon each individual who initiates, directs or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity.

2 The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.

3 The experiment should be so designed and based on the results of animal experimentation and a knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment.

4 The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.

5 No experiment should be conducted where there is a prior reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.

6 The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment.

7 Proper preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability, or death.

8 The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.

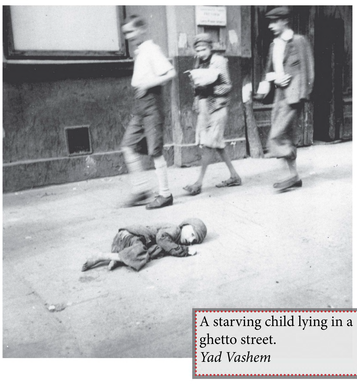
9 During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.

10 During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject.

The Hunger Disease Study

The Warsaw Hunger Study is not one that could normally be ethically undertaken. An extremely detailed study, carried out by an extraordinary group of doctors under extraordinary conditions, provided unprecedented and critical understanding of the physiology of starvation. Most of the Jews in the Warsaw ghetto had daily food intakes well below starvation levels. More than 100,000 of the ghetto's residents died due to rampant disease or starvation, as well as random killings, even before the Nazis began massive deportations to the Treblinka extermination camp in July 1942.

Under these circumstances a group of Jewish physicians decided to study the effect of starvation on the people of the ghetto. An organizing commission, set up in November 1941, developed a plan of work, found resources and made assignments. All sorts of obstacles, both physical and psychological, had to be overcome. By February 1942, the project formally began in two large hospitals in the ghetto.



A starving child lying in a ghetto street.
Yad Vashem

The work actually consisted of two separate studies - the first being a careful clinical examination of every adult or child admitted with a primary diagnosis of "hunger disease," and the second a careful study of the dynamics of metabolism and circulation in patients suffering from hunger disease alone. The diagnosis of "hunger disease" was made if the patient consumed fewer than 800 calories per day and had no obvious evidence of any other disease. In children, the number of calories consumed was much lower; the exact amount was dependent on the child's age. The state-of-the-art measurements in these studies were made using equipment smuggled into the ghetto from hospitals on the outside.

Results of the Study

The results of these studies showed that the body made a series of complex circulatory and metabolic changes during starvation. Metabolic output is very low, with even resting metabolism well below normal. Most of the clinical changes — the slow heartbeat, the low temperature, the lack of movement, the shallow and slow breathing — were to conserve energy. The body itself began to provide fuel. The body first used its store of glycogen, with fat then becoming the primary fuel (this phase could last from weeks to months, depending on how much fat the person started with and the number of calories in the diet). Finally, protein was broken down and muscle tissue began to waste away.

Bodies in Warsaw
Yad Vashem

"Have pity, have mercy, good people! Drop me a piece, a piece of bread, A tiny, tiny piece of bread, Only a few crumbs, some crumbs of bread! Have mercy, have pity, good people!"

– Song of Warsaw ghetto children

in the Warsaw Ghetto

Jewish physician examines patients in Warsaw Ghetto
Yad Vashem

Starvation and death in the Warsaw Ghetto
Yad Vashem

After these measurements were made, re-feeding was begun. It was found that the adaptation to starvation did not reverse evenly when abundant food became available. The metabolic changes reversed quickly, yet the circulatory changes took much longer. This situation put an extra strain on an already weak heart, and the person went into heart failure. Repeated observations were made, checked and rechecked, and the findings were summarized in charts and tables on a scale never before done in a study of this nature.

There was plenty of autopsy material. From January 1, 1940, to July 22, 1942, approximately 3,600 autopsies were performed. Of these, 492 were cases of "pure" starvation, proved by the absence of any complicating disease.

Smuggling Out the Study

Work was halted in July 1942 as the Nazis began deporting the residents of the ghetto en masse and further study became impossible. During a temporary lull in the deportations, what data had already been gathered was collated and written up. This information, along with a letter from the editorial committee, was then smuggled out by a woman who acted as a liaison with the "Aryan" side and handed to Professor Orlowski, chairman of the department of medicine at a university hospital in Warsaw (outside the ghetto). The letter asked him to preserve the manuscript and have it published after the war if none of the researchers survived to retrieve it.

One of the doctors taking part in the study escaped the ghetto in 1943, and lived just long enough to retrieve the manuscript from Dr. Orlowski and pass it on in 1945 to the American Joint Distribution Committee. He died of a heart attack shortly thereafter in 1946. The majority of the other researchers did not live to see the end of the war.

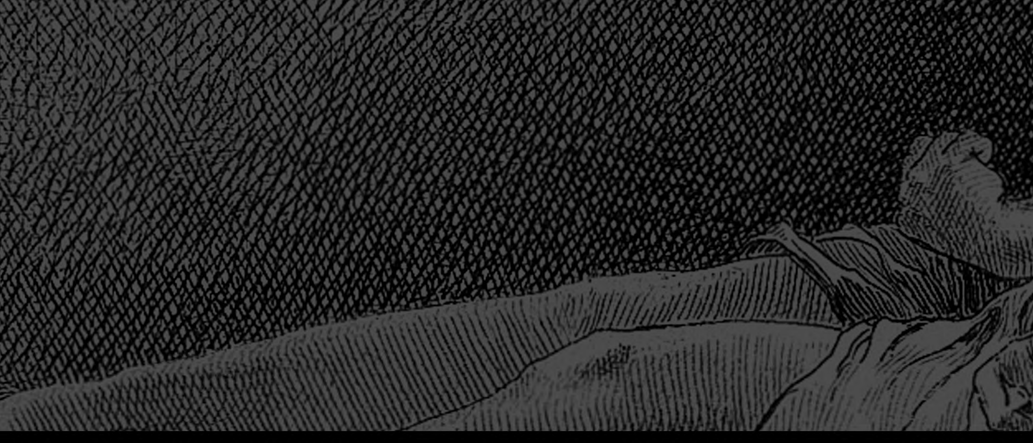
The manuscript was published in 1979 – more than three decades later – by John Wiley and Sons under the title *Hunger Disease: Studies by the Jewish Physicians in the Warsaw Ghetto*.

One key finding that is particularly striking is that the best way to treat starvation is to re-feed people slowly. Had the Allies known this, they could have saved the lives of many liberated from concentration camps. These survivors were often given too much food too quickly in the initial stage of rehabilitation, which proved fatal by causing heart failure.

The study's investigators recognized that it was sensible to study starvation because everyone was starving. Its value lies not only in the study's contributions to medical understanding, but also in the suffering from which these discoveries were made.

"Non omnis moriar
(I shall not wholly die)."

– Quintus Horatius Flaccus (Horace)



The Sphinx known

Portrait of J.M. Charcot, Ca. 1875.
Wellcome Images

Over 2000 years ago, Greek physicians described a condition labeled "Hysteria" after the Greek word for uterus, and prescribed massage of the genital area of suffering women. In the late 1800s the famed Jean-Martin Charcot began extensive studies on hysteria and eventually called it "a sphinx that defies anatomy". Prescriptions for hysteria have been inconsistent and bizarre in medical practice throughout history. Treatments varied from the simple act of sex to metallotherapy (the use of metals and magnets) to provide relief from symptoms. Charcot's personal favorite therapy was the ovary compressor; the ovaries, thought to be hysterogenic zones, were believed to ward off a hysteric attack when compressed. Birthing children was, on several accounts, purported to cure hysteria. Another method used to treat symptoms was hydrotherapy; it was believed patients benefited from cold showers, or even large hoses with forceful jets directed at their hysterogenic zones (primarily the ovaries and breasts). Massages of the pelvic area were also known to be a treatment, and in 1869 the first steam-powered vibrator was added to the list of therapies.

Charcot's Demonstrations

Jean-Martin Charcot demonstrating hysteria in a patient at the Salpetriere, P.A.A. Brouillet, 1887.
Public Domain

Hysteria became popular during the late 19th century through the teachings of Charcot, well-known for his medical lectures at Salpêtrière Hospital in Paris, France. His lecture series spanned several topics, but most notably hysteria, and under Charcot's influence, hysteria became a "fascinating and fashionable spectacle" with a sexual subtext that was exciting for 19th century Europe. Charcot was known to have his female patients perform demonstrations of their hysterical symptoms in front of audiences, and allowed male spectators to interact with them:

> *She was put into a somnambulic state and then 'divided in two.' She was told that each side of her body, her left side and her right, had its own husband and was reminded that it was her duty to be faithful to both of them. Two men were chosen to play the roles of the husbands…. 'We could caress our side… and she received our caress with marked pleasure. But if one dared encroach on the side of the other, watch out!'*

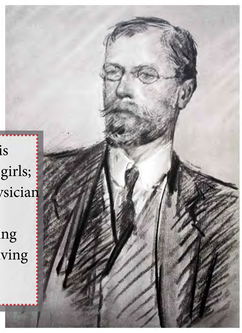
The female patients, or "medical divas", were all residents of Salpêtrière Hospital. They volunteered and actually competed to demonstrate, hoping to become the star of Charcot's show. It is debatable whether Charcot and his girls were putting on an act for the audience or if they truly believed that such states had an underlying medical cause. Charcot was soon criticized for his treatment of the Salpêtrière girls; Axel Munthe, a Swedish physician, accused Charcot of "exploiting vulnerable women."

This illustration, published in 1887 in Revue Illustree, shows female patients in various states of mental disorder.
Bridgeman Art Library

"This bizarre apparatus was attached to the patient's abdomen and worked like a vice grip with a descending knob that applied pressure to the ovary."

– Asti Hustvedt
Medical Muses

as Hysteria



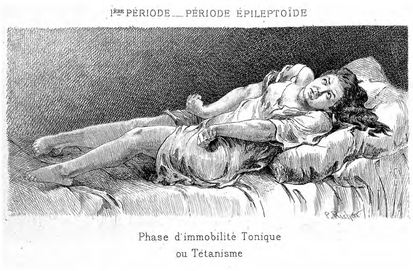
Charcot was criticized for his treatment of the Salpêtrière girls; Axel Munthe, a Swedish physician (1857-1949)(shown here), accused Charcot of "exploiting vulnerable women" and "driving the poor girls mad."
Public domain

"Some of them smelt with delight a bottle of ammonia when told it was rose water, others would eat a piece of charcoal when presented to them as chocolate. Another would crawl on all fours on the floor, barking furiously when told she was a dog…many of these unfortunate girls spent their days in a state of semi-trance, their brains bewildered by all sorts of absurd suggestions, half conscious and certainly not responsible for their doings."

– Axel Munthe

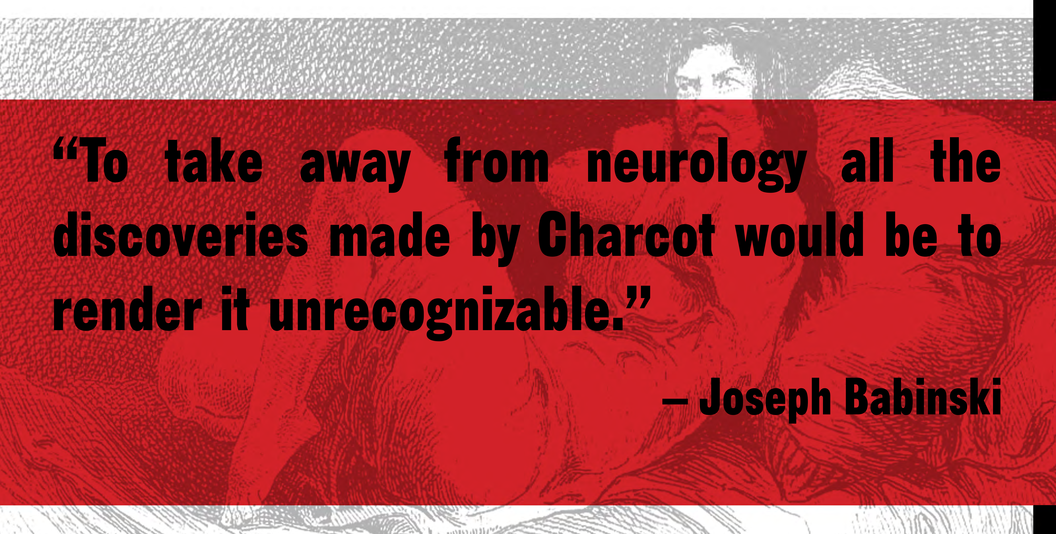
Even fellow physicians who deeply respected Charcot were skeptical of his lectures on hysteria. Charcot's hysteria studies raise questions as to whether these girls were humiliated, or did they in fact enjoy the attentions of the stage? Was it ethical for Charcot to exploit such bizarre behavior for educational purposes that became twisted into social theatre?

Charcot himself was determined to discover an anatomically-based medical reasoning behind hysteria. Though hysteria was thought to be an inherited neurological disease, Charcot was never able to find an anatomical root. Though he tried to put a scientific twist on hysteria, Charcot's theories were disproven shortly after his death, jeopardizing his post-mortem reputation. To the medical community his relation to hysteria will be forever viewed as a "slight lapse in an otherwise brilliant career," but from a historical perspective Charcot is tied to the erotic experiments and sexual illusions of 19th century hysteria.



One of Charcot's most famous patients, Genevieve, was even known to have cut off her own left nipple during a hysteric attack.

Grande hysterie "epileptoid period."
Wellcome Images



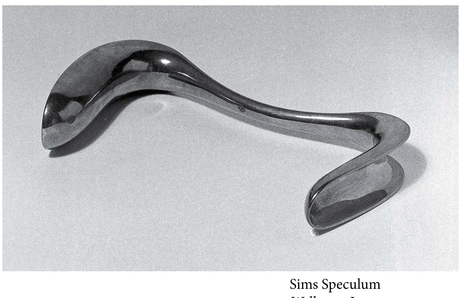
"To take away from neurology all the discoveries made by Charcot would be to render it unrecognizable."

– Joseph Babinski

J. Marion Sims and

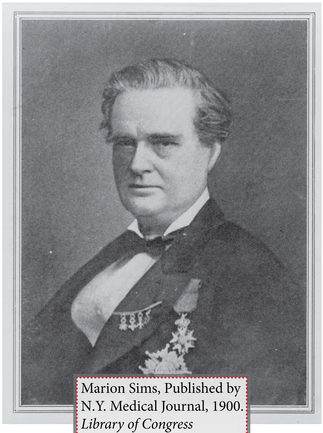
A highly decorated plantation doctor in the American South, James Marion Sims — "father of modern gynecology" — is widely credited with the origination of the vesicovaginal fistula repair. What is less known is that Sims' achievement was made possible through his access to slaves suffering from this condition. It was a call to care for a young 17-year-old slave, Anarcha, that led the doctor toward developing his technique for vesicovaginal fistula repair.

Anarcha had been in labor for three days, and Sims recounts using forceps to deliver her baby. According to Sims' autobiography, Anarcha later presented with an "extensive sloughing of the soft parts, the mother having lost control of both bladder and the rectum." He declared her, along with the two other young slaves he had seen with fistulas, completely incurable. Then one day, after positioning a patient on her side and using a bent spoon to better examine her pelvis, he discovered he "saw everything, as no man had ever seen before." Using his bent spoon – the predecessor to today's speculum – Sims hypothesized that he could visualize the vesicovaginal fistula and successfully repair it.



Sims Speculum
Wellcome Images

Dr. James Marion Sims
National Library of Medicine



Marion Sims, Published by N.Y. Medical Journal, 1900.
Library of Congress

Sims' initial attempts at fistula repair failed and, over the next four years, he would continue to experiment, not only on Anarcha, but on other slaves, including one named Lucy. Sims describes this time as his "memorable era" and writes, "there was never a time that I could not, at any day, have had a subject for operation." As part of his quest to perfect his fistula repair procedure, Sims also experimented with means by which urine could be diverted from the repair site. He first used a small piece of sponge attached to a silk cord to block the urine from flowing into the vagina, postulating that the silk would "act as a capillary tube; the urine will be turned, and the fistula cured." That intervention resulted in the patient (Lucy) becoming septic.

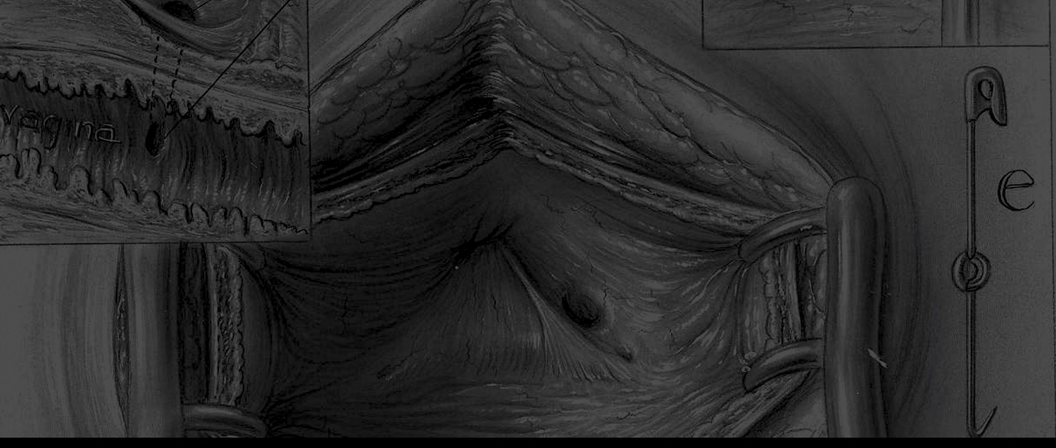
Initial Repairs Fail

He continued to experiment on Lucy and Anarcha, using catheters instead of sponges to divert urine flow. After more than three years of repeated attempts, not only on Lucy and Anarcha but four to five other slaves as well, his repair operation continued to fail.

Infection was a major cause for fistula repair failure due to the use of standard, unsterilized suture materials (common at the time). As infection spread along the suture line, the silk or gut suture would degrade, allowing the fistula to re-open. Having read reports of lead sutures, Sims allegedly contracted a local jeweler to develop silver wire sutures, with which he reported success in curing Anarcha's fistula. He concluded, "I had made, perhaps, one of the most important discoveries of the age for the relief of suffering humanity." He had reportedly operated on the young Anarcha more than 30 times.

"I knew nothing about medicine, but I had sense enough to see that doctors were killing their patients; that medicine was not an exact science..."

– J. Marion Sims



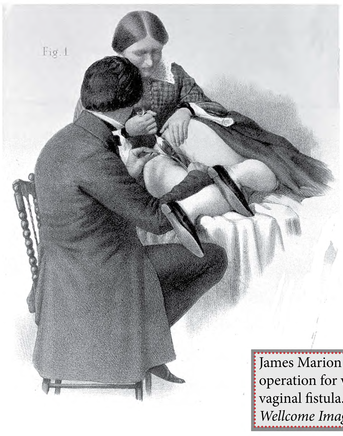
Vesicovaginal Fistula Repair

Sims did not administer any anesthesia during surgery on the slaves (though he did give high doses of morphine postoperatively as the "bowels are to be kept perfectly quiescent."). The lack of anesthesia has been used against Sims by his critics. His biographer notes that "[white patients] seemed unable to bear the operation's pain and discomfort with the stoicism shown by the Negroes. … These free white women, while with better living conditions, also likely suffered horribly from their vesico-vaginal fistulas. However, despite the potential cure, these patients had the ability to refuse Sims' operations -- and did so. As a critic notes on the degree of autonomy, "Slaves did not have to be recruited, persuaded and cajoled to endure pain and indignity; they could not refuse."

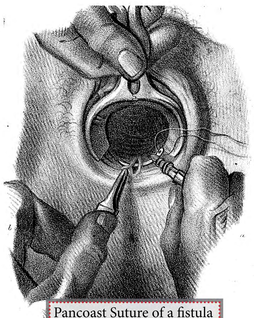
Sims published his paper on vesicovaginal fistula repair in 1852, reporting, "I think I may say that almost every case of this hitherto intractable affection is rendered perfectly curable." He moved to New York City, where he would go on to have a highly successful career based on his promotion of this repair. He was one of the founders of Women's Hospital in New York City and, while involved in several aspects of the growing field of surgery, in particular for the gallbladder, he is largely recognized for bringing acceptance to the field of female pelvic surgery.

The Legacy of Marion Sims

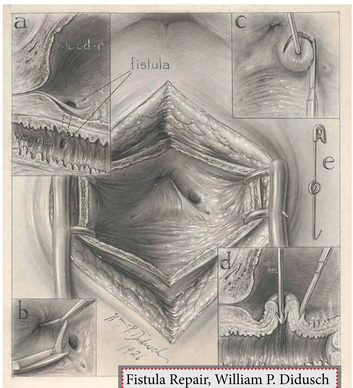
Even 150 years later, Sims' legacy inspires passionate debate. For years he was portrayed as a hero of women's health, but now is often mentioned alongside the Tuskegee syphilis study and Nazi war criminals as examples of ethical failings of the medical profession. However, in the vast majority of medical textbooks and articles, he is still portrayed as a surgical innovator without mention of his legacy. A 1963 *Journal of the American Medical Association* article writes, "There is no more romantic story in all medical history than that of his (Sims') valiant effort to design an operation for the cure of vesicovaginal fistula." This version was not changed in the 2007 edition (9th) of *Campbell-Walsh Urology*, which writes of Sims, "Of note, it was not until his 30th attempt at closure of [vesicovaginal fistula] that he achieved success" without mention of the female slaves used to perfect his technique.



James Marion Sims' operation for vesico-vaginal fistula.
Wellcome Images



Pancoast Suture of a fistula
Pancoast's Operative Surgery, 1846



Fistula Repair, William P. Didusch
William P. Didusch Center for Urologic History

"It is only by observing the practical operation of laws that we can judge of their fitness and usefulness."

– J. Marion Sims
1876, Presidential Address at the AMA

Hepatitis Experiments: Willowbrook State School

Willowbrook State School
Public Domain

Saul Krugman, M.D.
National Library of Medicine

The "loophole" argument makes clear that the potential for interpretation, even to an explicit directive, permits manipulation.


OUR CHILDREN'S VOICE

Retarded Children Can Be Helped!

VOL. XXIV, ISSUE NO. 2 JUNE, 1972

ARC SUES STATE

HEW TEAM INVESTIGATES CONDITIONS AT WILLOWBROOK

JOINT LEGISLATIVE COMMITTEE ON MENTAL AND PHYSICAL HANDICAP HOLDS HEARINGS

CHARGES INHUMANE CONDITIONS AT WILLOWBROOK

8 More Pag

THE NATIONAL TATTLER WEEKLY SPECIAL 20¢

Money! The World's Most Comprehensive Weekly Newspaper

Secret 'Horrifying' Experiments Conducted For 10 Years

TESTERS INJECT RETARDED CHILDREN WITH HEPATITIS

Doctors Forced Parents' Consent -- Knew Some Would Die!

Following World War II, the New York State legislature established Willowbrook State School on Staten Island to accommodate children who were mentally disabled and, for fiscal reasons, unable to attend private institutions. When doors opened to the public in 1947, the school intended to accommodate up to 3,000 residents, but by the late 1950s, it housed more than 6,000. As early as the mid-1960s, it was recognized that Willowbrook was overcrowded and unsanitary.

While Willowbrook may not have been the most ideal of institutions, it was a perfect environment in which to analyze the etiology, transmission and treatment of disease. From 1963 to 1966, Saul Krugman, MD., who would ultimately be recognized with some of the highest honors in the pediatric community, carried out a number of clinical studies on hepatitis at Willowbrook that are inappropriate by today's standards and continue to be a topic of ethical dispute.

Under Krugman's supervision, children at Willowbrook were "artificially" infected with strains of hepatitis prevalent at the school in order to observe the nature of the disease in a controlled setting. The intent for these trials was the development of a vaccination for hepatitis – one that would benefit the children, families and employees of Willowbrook so that this particular disease would no longer plague the school. The experiments were conducted with the approval of both the New York State Department of Mental Hygiene and the Armed Forces Epidemiological Board and were in compliance with the World Medical Association's Draft Code of Ethics on Human Experimentation, the gold standard at that time.

Though Krugman's experiments did not result in the vaccine he sought, they did lead to a better understanding of hepatitis and the identification of two separate strains of the virus - hepatitis A and hepatitis B - and the role that gamma globulin plays in preventing transmission of serum hepatitis. Following this determination, the studies continued with hopes of finding a vaccination to eradicate the disease.

Ethics of the Hepatitis Study

When the first article on the Willowbrook hepatitis studies was published in 1967, the medical community seemed to refrain from questioning the ethical nature of infecting children with hepatitis. Less than five years later, in 1971, the methodology of the studies began to receive harsh criticism by many outspoken physicians who claimed that Krugman was using a "loophole" in the code to have the studies approved, and that children residing in hospitals for mental disability should never be used for human experimentation. The implications of informed consent provide the basis for this argument. Parents admitting their child to Willowbrook consented and were informed if their child was to undergo the hepatitis study; those children received better care and monitoring from staff. Even though the code clearly states "children in institutions and not under the care of relatives should not be the subject of human experimentation," Krugman bypassed this clause by obtaining consent and excluding from all studies children who were "wards of the state" or without parents.

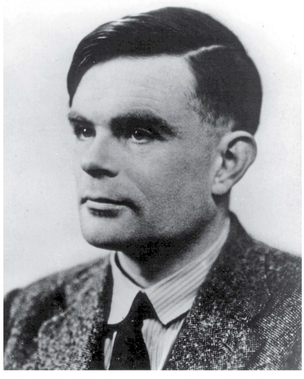
"The statement…accusing us of conducting experiments exclusively for the acquisition of knowledge with no benefit for the children cannot be supported by the true facts."

- Saul Krugman

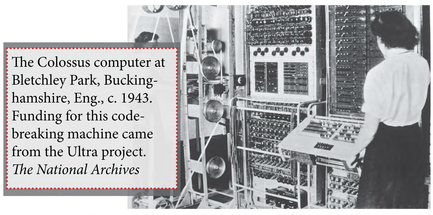
Alan Turing and Medical Therapy of Homosexuality

Alan Mathison Turing is one of those legendary geniuses with whom most people are familiar but cannot quite place.

Recognized in his own lifetime as a genius in mathematics, today Turing is considered the father of computer science. Turing's intellectual contributions to Allied war efforts in World War II forever changed the world. The condemnation and punishment of Turing for his homosexuality in the years that followed illustrate the world's longstanding struggles with sexual orientation and the sordid treatment of homosexuals.



Alan Turing
Public Domain



The Colossus computer at Bletchley Park, Buckinghamshire, Eng., c. 1943. Funding for this code-breaking machine came from the Ultra project.
The National Archives

In 1945, Alan Turing was awarded the Officer of the British Empire, one of the most prestigious honors for wartime service to his country for breaking the German code, which helped win the war for the Allies.

Turing's Early Life

Born in London in 1912, Alan Turing was recognized for his talents in math and science from an early age. His academic path included King's College, Cambridge, and Princeton's Institute for Advanced Study, where he earned his PhD in 1938. Turing returned to his native England and developed the instruments that broke the German codes during World War II. He also led the secret development of one of the first computers, called *Colossus*. As a reward for his efforts, Turing received the highest civilian award available, Officer of the Order of the British Empire, in 1945.

The Fall of Alan Turing

Turing lived openly as a homosexual. Though often an outsider because of this openness, he was widely admired in the elite circle of mathematicians. When Turing's home was burglarized in 1952, the police investigation shifted its focus to Turing's homosexual lifestyle, and he was found guilty of "gross indecency." Turing was sentenced to either a year in prison or forced feminization by female hormone injections. He accepted the latter.

The enforced estrogenization had a significant emotional and physical impact on Turing—he was devastated by his loss of security clearance, and the treatments caused him to become impotent and develop breasts.

On June 8, 1954, Turing was found dead lying on his bed; a half-eaten apple laced with cyanide lay beside him. The coroner's report stated, "I am forced to the conclusion that this was a deliberate act. In a man of ***his type*** [homosexual], one never knows what his mental processes are going to do next."

Chemical Castration of Homosexuals

By the 1930s clinicians focusing upon the effeminate behavior of some homosexual men attempted masculinization treatments with testosterone and other steroids. They found the treatment typically increased the homosexual behavior and had no effect on sexual orientation. This led to the evaluation of the effect of castration and the use of female hormones upon male homosexuals. The outcomes with these studies were less clear, and there was no clear benefit noted.

A Posthumous Apology

In September, 2009, British Prime Minister Gordon Brown issued an apology for the "appalling" and "utterly unfair" treatment of Turing. Speaking on behalf of "all those who live freely thanks to [his] work," Brown acknowledged that Turing "deserved so much better."

"Turing believes machines think
Turing lies with men
Therefore machines do not think."

– Alan Mathison Turing

Neisser and the First Prussian

Albert Neisser
National Library of Medicine

The issue of ethics in medical experimentation became prominent in the late 1800s when the new fields of bacteriology and immunology called for an increase in human experimentation. Research was performed primarily in general hospitals, often without consent, under the "ethos of science and medical progress." Though many well-documented experiments on humans involved deliberate infection of patients with diseases, research by Prussian physician Albert Neisser, one of the leading venereologists of the time, raised concerns about patient consent.

In 1892, Neisser ran a study to find a method of syphilis prevention by injecting cell-free serum from a patient with early syphilis into four female patients aged 10 -24. None of them developed syphilis. Neisser then injected serum samples from patients with syphilis into four prostitutes aged 17 - 20. Neisser argued that these patients subsequently developed syphilis not as a result of the serum injections but because of their profession. Neisser had not informed patients about the experiment nor obtained consent prior to injecting them; in 1898 he published his findings.

Neisser was considered a public health advocate in his quest to cure STDs, but he was ultimately brought to trial for deliberately infecting women with syphilis as part of his research. The trial led to a scandal in Prussia, and fervent consideration of ethical guidelines for researchers. Neisser was publicly censured and fined. The court ruled that, though Neisser (as a well-known authority in medicine) may have been convinced that the trials were harmless, he should have sought the patients' consent. Not questionable science but lack of patients' consent was the main principle for the legal judgement.

"The more I see, the more I am under the impression that the paralytic process is hastened by 606."

– Albert Neisser
1911

Directive on Informed Consent

The true legacy of the Neisser case, however, is found in Prussia's adoption of stringent moral and ethical research guidelines. On December 29, 1900, the Prussian government issued regulations on human experimentation, published by the Prussian Ministry of Religious, Educational and Medical Affairs. These directives are the first modern regulations by a state authority, and are specifically and exclusively directed at medical research. They state:

...medical interventions for purposes other than diagnosis, therapy, and immunization are absolutely prohibited, even though all other legal and ethical requirements for performing such interventions are fulfilled if:

1. *The person in question is a minor or is not fully competent on other grounds;*
2. *The person concerned has not declared unequivocally that he consents to the intervention;*
3. *The declaration has not been made on the basis of a proper explanation of the adverse consequences that might result from the intervention.*

Research on children and non-competent persons would never be allowed. It was only half a century before the Nazi physicians flouted every prohibition.

"New therapy may be applied only if consent or proxy consent has been given..."

– Circular of the Reich minister of the interior
***Guidelines for New Therapy and Human Experimentation*, 1931**

Contributors 2012

Sakti Das, M.D.
Lafayette, CA

Christopher Engel
Phoenix, MD

Rainer Engel, M.D.
Key West, Florida

Rainer O. Engel
Phoenix, AZ

Heiner Fangerau, M.D.
Ulm, Germany

Jennifer Gordetsky, M.D.
Rochester, NY

William H. B. Howard, M.D.
Baltimore, MD

Matthis Krischel
Ulm, Germany

Laura Kueny
Richmond, VA

Franz J. Marx, M.D.
Cologne, Germany

Friedrich Moll, M.D.
Cologne, Germany

Michael Moran, M.D.
Tucson, AZ

National Archives
College Park, MD

National Library of Medicine
Bethesda, MD

Ronald Rabinowitz, M.D.
Rochester, NY

Erwin Rugendorff, M.D.
New York, NY

Nancy Shafranski-Campbello
Linthicum, MD

Linda Shaw
Deale, MD

Sara Spettel, M.D.
Albany, NY

Peter Tiffany, M.D.
Stoneham, MA

United States Holocaust Memorial Museum
Washington, DC

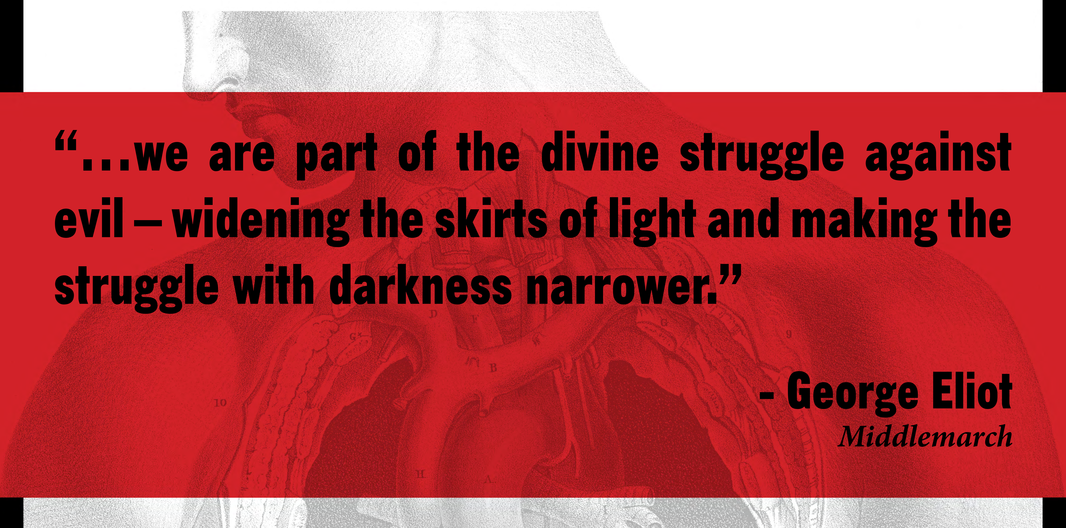
Mali Wagner
Key West, Florida

Wellcome Trust
London, UK

Special thanks to GES:
Clay Lovelace, Robert Redfern, Rob Noble, Smiley Carrasco

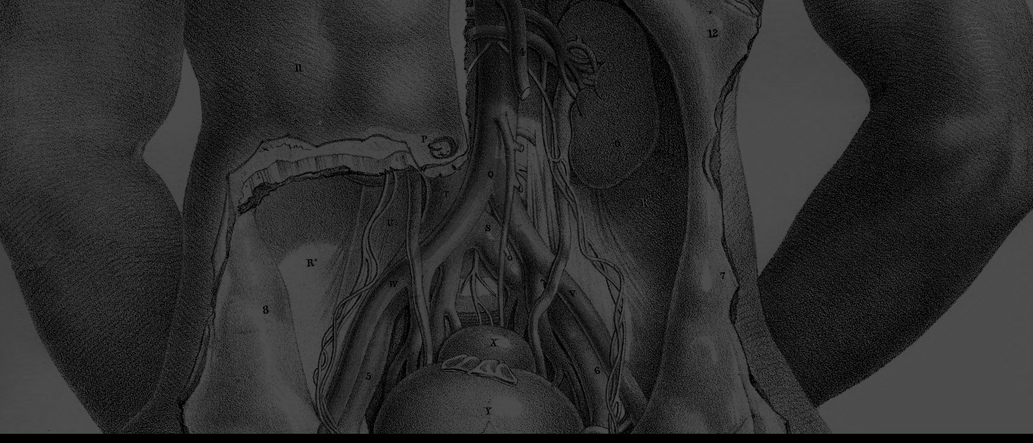
Supported by

ALLERGAN Urology
Pursuing Next.



"...we are part of the divine struggle against evil – widening the skirts of light and making the struggle with darkness narrower."

- George Eliot
Middlemarch

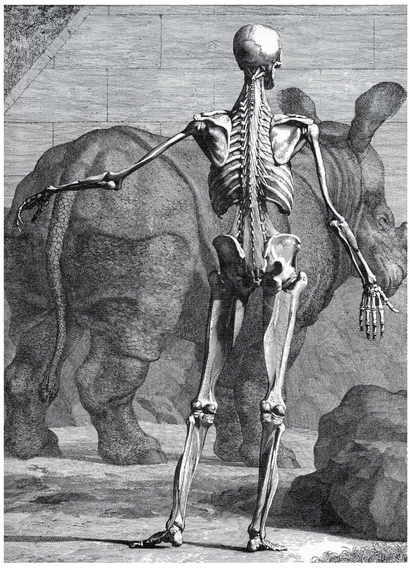


Conclusion

With this exhibit, The William P. Didusch Center for Urologic History shines light into the shadowy corners of our medical past to expose the skeletons in the closet. These panels share practices and experiments we now consider controversial and, in some cases, horrific.

Many of the dark tales told herein led to new insight into disease and paved the way to more stringent standards for clinical research and protections for patients. These accounts raise questions of context – some practices were, at the time, widely accepted. Nevertheless, we judge yesterday's tragedies by today's standards. Medicine has, in the wake of progress, left scars that cannot be denied.

Throughout this exhibit, many questions remain unanswered. Was Marion Sims led by ego in his pursuit of a surgical repair for fistula? Where was the true tragedy of Willowbrook – in the hospital wing or the general ward where disease was rampant and uncontrolled? Would we have the same understanding of physiology had Alexis St. Martin perished from his wounds or if the earliest vivisection studies had not been permitted? Where might we be in our knowledge of stem cells if not for Henrietta Lacks?



TABULAU SCELETI ET MUSCULORUM CORPUS HUMANI, Bernardi Siegfried Albini (1697-1770)
William P. Didusch Center for Urologic History

Above all, one question remains – one we must ask ourselves each day:

"Could my actions be deemed unethical today or tomorrow?"