Medical Martyrs

MD **HISTORY**

Science, especially medicine, owes its progress largely to daring experimenters.

DANIEL CARRION

One fall day of 1892 a 73-year-old physician, world renowned as a public hygiene expert, prepared a bouillon of cholera bacilli, drank one cubic centimeter of it. Said he:

> Even if I be mistaken, and this experiment that I am making imperils my life, I shall look death quietly in the face. . . . I shall die in the service of science as a soldier perishes on the field of honor.

Professor Max von Pettenkofer (1818–1901) showed no ill effects from his bold experiment. Others equally daring were less fortunate: some paid for medical progress with their lives.

FORTUNATE PROBERS. Often overlooked in an age when scientific experiments are planned to the minutest detail is that the basic principles of research are barely a century old. For early medical researchers there were neither clear guides nor principles; brave and sometimes foolhardy auto-experiments were common even though results were often meager and misleading.

Among most famous self-experiments is that of renowned surgeon John Hunter (1728–93) who in 1767 inoculated himself with pus supposedly gonorrheal, developed both gonorrhea and syphilis, thus confirming the then current assumption that the two diseases were identical. Hunter's death some 26 years later was ascribed to coronary insufficiency.

An almost equally famous auto-experimenter was the Czech physiologist Johannes Evangelista Purkinje (1787–1869), who once took enough digitalis to kill nine cats; he survived, although he suffered cardiac pain and arrhythmia for more than a week.

Dentist William Thomas Green Morton (1819–68), who first demonstrated the anesthetic properties of ether, tried out the substance on himself after he had first prudently observed its effects on family pets.

Pierre Curie (1859–1906), who with wife Marie discovered the elements polonium and radium, once bandaged radium bromide to his arm, left it there for several hours to determine whether reports that the element could produce severe burns were true.

THE MARTYRED. Famed among United States medical self-experimenters are the members of the United States Army Yellow Fever Board, headed by Dr. Walter Reed (1851–1902), sent to Cuba at the conclusion of the Spanish-American war to investigate the disease then decimating the army.

Following the suggestion of Cuba's Dr. Carlos Juan Finlay (1833–1915), who as early as 1881 postulated that the mosquito was the vector, the board concentrated on *Aëdes aegypti*, but ran against a problem when no animal could be made to develop the disease.

Volunteering to allow suspected mosquitoes to bite them were American Drs. James Carroll and Jesse W. Lazear, and Cuba's Dr. Aristede Agramonte (1869–1931). Dr. Agramonte and Dr. Lazear appeared to be immune, but Dr. Carroll came down with a violent attack, lay delirious and at the point of death for more than a week. For the entire time he is said to have raved "It is the mosquito, it is the mosquito."

Memorial to x-ray investigator-martyrs, Roentgen Institute, St. George's Hospital, Hamburg

Dr. Lazear continued his duties in the yellow fever ward of a Havana hospital, once more allowed himself to be bitten by a mosquito which had definitely fed on yellow fever patients; five days later he was stricken with the disease.

Too ill to carry on his studies, he handed his carefully collected notes on the disease to colleague Carroll, related the symptoms he felt as the disease progressed. Within a week he was dead. Said Dr. Carroll: "Dr. Lazear died that his fellow men might live in comfort and happiness."

Another martyr to yellow fever was Japan's bacteriologist Hideyo Noguchi (1876–1929), who contracted the disease while treating misdiagnosed cases in West Africa.

He was famed for work on various serums for treatment of poliomyelitis and rabies, as well as for

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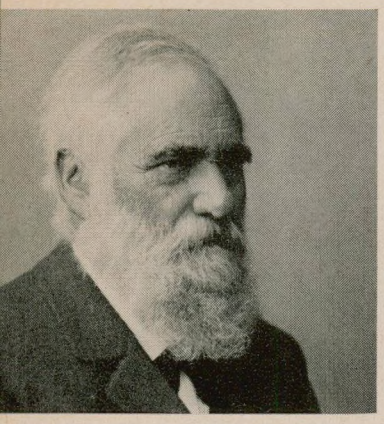
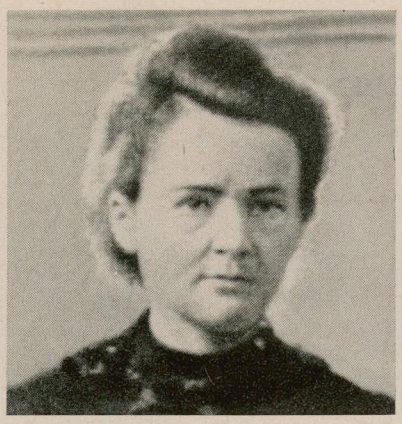


Heroic medical investigators, left to right, Max von Pettenkofer, Marie Curie, yellow fever conquerors (Dr. Jesse Lazear inoculating), Hideyo Noguchi,

work on syphilis (he demonstrated the syphilitic nature of paresis in 1913, devised Noguchi's luetin test for the disease). At the time of his last experiment Dr. Noguchi was attempting to unravel the relationship between African and South American yellow fever; unknown at the time were both the vector and the carriers of the African variety.

After Noguchi contracted the disease, an injection of his blood into a monkey demonstrated the existence of a ready-made reservoir for the disease. He advised the Rockefeller Institute in New York that he had discovered the carrier of the disease, prepared to return with his findings; two days after he was scheduled to sail he died of the disease he was studying.

Others who have died of yellow fever while studying the disease in the 20th century include Paul A. Lewis and Adrian Stokes; established by the latter was that certain monkeys could be given the disease experimentally.

Similarly self-sacrificing was the experiment of Peruvian medical student Daniel A. Carrión (*MD*, November, 1957), who boldly had himself inoculated with blood drawn from patients with *verruga peruana*, established with his death that this disease caused benign verruciform eruptions in some cases but produced the highly fatal "Oroya fever" in others.

Pathologist Howard Taylor Ricketts (1871–1910), who devoted his entire life to teaching and research, proved that the mysterious Rocky Mountain spotted fever (caused by *Rickettsia rickettsii*) was transmitted by a wood tick; he later died of Mexican typhus (*tabardillo**), likewise transmitted by an insect.

Long one of the great epidemic diseases of the world, typhus periodically ravaged Europe in the wake of wars, was widespread in many cities until the middle of the last century.

Noting the remarkable similarities between *tabardillo* and some forms of Rocky Mountain spotted fever, Dr. Ricketts journeyed to Mexico in 1909 to investigate the disease, reported within a few months that the disease vector was the *Pediculus vestimenti*, and that it was experimentally transmissible to monkeys.

Reported in April of the following year was Dr. Ricketts' belief that the causative organism was a bacillus, but he was unable to confirm his suspicions; he was stricken with *tabardillo* late in April and died on May 3.

X-RAY PERILS. Perhaps the longest roll of medical martyrs is that of victims of roentgen-ray research. The biologic effects of x-rays were not suspected by early experiments; many developed chronic and painful ulcers on hands, face; other exposed areas that proved resistant to all therapy ultimately became cancerous. Some died slowly of recurrent skin cancers, others from aplastic anemia, before it was learned that lead shields or glass high in lead content afforded protection.

*From Spanish tabardo, a colored cloak, designating the mantle-like spotted rash.

Prominent among the numerous x-ray martyrs are: Germany's H. E. Albers-Schönberg, Austria's G. H. Holzknecht, England's J. F. Hall-Edwards, the Americans C. L. Leonard, M. K. Kassabian, R. D. Carman, W. E. Caldwell.

Among the most heroic was French radiologist J. Bergonié (1857–1925), who began a study of x-rays almost as soon as Roentgen's discovery became known in France; in 1896 he published one of the earliest papers on the medical applications of the mysterious rays. In later years he advanced the principles of diathermy, with another colleague he formulated the basic laws of x-ray effects on living cells; in 1913 he was named to the first chair in radiology-electrology created in France.

Serving with the French forces in World War I, he invented an electric vibrator widely used in treating the "shell shocked," also devised a magnetic apparatus for the removal of shrapnel. Immediately after the war Bergonié concentrated on the study of cancer; almost simultaneously the first signs that he himself had cancer appeared. Remarked Bergonié when it became definite that he had cancer: "Let us hasten, for in two years Bergonié will be no more."

First his right hand was affected and was amputated; next cancer appeared on the left hand and three fingers were removed; later the right arm was amputated. But

HARVARD DOCTOR, 24, DIES MEDICAL HERO

Alfred S. Reinhart, Doomed by Heart Malady, Suffers Pain to Record Disease.

HAD FOUR MONTHS TO LIVE

He Devoted That Time in Bos-

Daniel Alcides Carrión, Howard Taylor Ricketts, "New York Times" headline for Dec. 6, 1931, announcing the death of Alfred Reinhart.

in the face of all hardships Bergonié continued his research, was named head of France's newly formed Cancer Commission in 1922. Shortly before his death Marshal Pétain pinned on him the Grand Cross of the Legion of Honor; Bergonié was carried to the ceremony on a stretcher.

Equally heroic and pathetic was the struggle of Johns Hopkins radiologist Frederick H. Baetjer (1874–1933), who began research with x-rays in 1901, suffered serious burns followed by infection a few years later. Amputation of eight fingers in succession did not arrest the development of cancer; Dr. Baetjer continued his studies, underwent more than fifty operations before his death.

Virtually unknown in his own day and still largely unrecognized is Spanish medical martyr José Salvany y Lleopart (d. 1809), who died during one of the world's first and most extraordinary mass vaccination campaigns, the "Vaccination Expedition" of the last century. Even though complete data on Salvany's death are lacking, records indicate that it came as a result of steadfastness in carrying out the pioneering smallpox immunization campaign.

Under the command of Dr. Francisco Javier de Balmis, the expedition left Spain in 1803; besides Balmis, Salvany, other physicians and nurses, there were 22 children with the crew; each was vaccinated in turn with Jenner's recently discovered vaccine, thus ensuring that the expedition would arrive in the New World with a vaccine of unquestioned freshness and potency.*

In what is now Venezuela, Salvany was placed in charge of a secondary expedition, set out overland for Buenos Aires with four children bearing the precious vaccine, while the Balmis group continued into Central America, Mexico, journeyed to the Philippines and Spanish African possessions before returning home.

Obstacles facing the Salvany expedition included forbidding natural hazards: ranging from dense tropical rain forests to arid desert and desolate Andean highlands; added to these were the fear and suspicion of the populace, the indifference and occasional opposition of local authorities and local medicine men.

No sooner had the two parties split than the Salvany group was shipwrecked and nearly all perished. Continuing up the treacherous Magdalena River, Salvany showed first signs of the infection that apparently took his life, lost one eye, later suffered ear infections. In spite of great suffering Salvany continued into Ecuador, northern Peru, following a route that has remained virtually impassable until modern times.

During one leg of his Peruvian trek, he was feverish, without water for two and a half days, nevertheless managed to vaccinate 623 people the very evening he arrived in a village.

Salvany himself attributed his strange illness to the fact that he had changed too quickly from the cool climate of the highlands to the heat of the lowlands; but for five years he traveled through Peru and Bolivia, vaccinating Indians; he was still at work in 1809 when he was last heard from and presumably died.

An unusual American medical martyr was Alfred S. Reinhart (1907–31), who was completing his third year at Harvard Medical School when he died, aged 24. In his second year of high school Reinhart suffered an attack of rheumatic heart disease, apparently recovered despite valve damage; he resolved to study medicine to learn as much as possible concerning his own condition.

Deduced later by the medical student was that he could reasonably expect streptococcal endocarditis. He prepared accordingly for the appearance of the tell-tale petechiae. Characteristic signs indicating his impending end appeared some six months before his death; as he had planned, Reinhart spent them in tracing the ravages of the streptococci through his body. Refused until the very end were all analgesics. Necropsy, carried out within two hours after death as he had requested, confirmed the accuracy of the student's diagnosis, fulfilled exactly his predicted findings.

SUMMING UP. In the annals of medicine's struggle to conquer disease there are few braver chapters than those left by researchers who risked their very lives that medicine might triumph. END

*These and other children who joined the expedition were orphans; each later received a pension from the government for his part in the campaign.