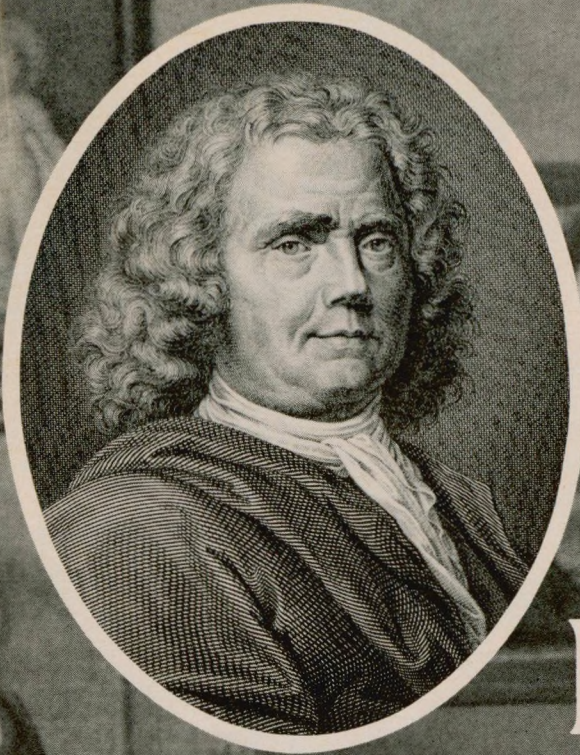


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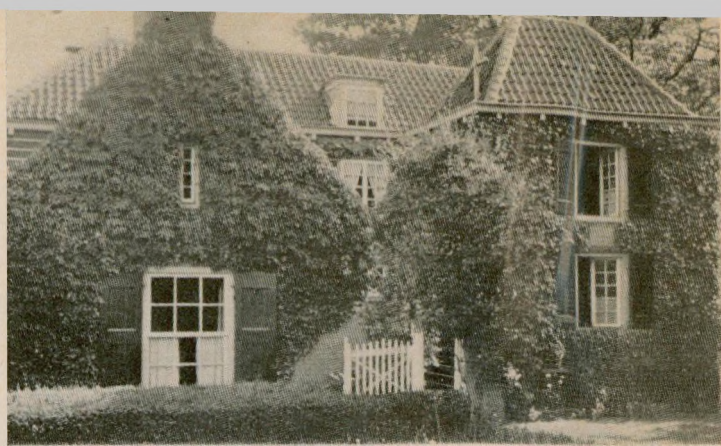


H. Boerhaave
**HOLLAND'S
HIPPOCRATES**

Set into a background painting showing the great Dutch clinician Hermann Boerhaave receiving patients at his home is a portrait conveying the amiability for which he was greatly admired.



Drawing, left, shows Boerhaave lecturing on medical botany at the University of Leiden where he taught medicine, botany, chemistry. Above, the Voorhout vicarage where he was born on December 31, 1668. Title page engraving, 1715, opposite, shows the throngs who attended his lectures in theoretic and practical medicine.



Leiden, the beautiful city that was once a center of the northern Renaissance, also saw a rebirth of Hippocratic medicine in the early 18th century, largely the work of Hermann Boerhaave, born three centuries ago.

Although neither an innovator nor discoverer he trained half the physicians in Europe who generally agreed that "never was preceptor more beloved, professor more celebrated nor physician more consulted."

EARLY LIFE. Boerhaave was born on December 31, 1668 in the vicarage at Voorhout, a small hamlet near Leiden where Rembrandt, Jan Steen and other noted artists were born in the same century. His father James Boerhaave was a scholarly impecunious preacher and his mother Hagar Daelder was the daughter of a dealer in nautical instruments. She died when Hermann was five and the following year the father married Eve Dubois who was a devoted stepmother to the boy and his six sisters and bore the parson's two younger sons and four daughters.

The Reverend Boerhaave, known for his tender behavior toward his offspring, taught Hermann the classics so well that the boy was well versed in Latin and Greek by the time he was 11. He also introduced him to the *scientia amabilis* of botany in his garden.

At 12 Hermann developed a large ulcer on the left thigh and when it failed to heal he was sent to school in Leiden where he could receive medical care. The stubborn lesion resisted treatment but after five years the youth cured it himself "by fomenting it continually with salt and urine."

Hermann's father wanted him to be a minister, his brother James to be a physician, but his death in 1682 left the large family impoverished. The older boy's future seemed imperiled until a burgomaster became his patron. At 15 he became a theology student at the university that William of Orange founded in 1574 to reward Leiden for defending it-

self against the Spanish siege. Within a century the school was more famous than Oxford, Cambridge or Paris; it welcomed students of all faiths, provided free books, salt, soup, beer, wine. Its atmosphere was so informal that students could stroll in the city's shaded streets and along the canals in their dressing gowns.

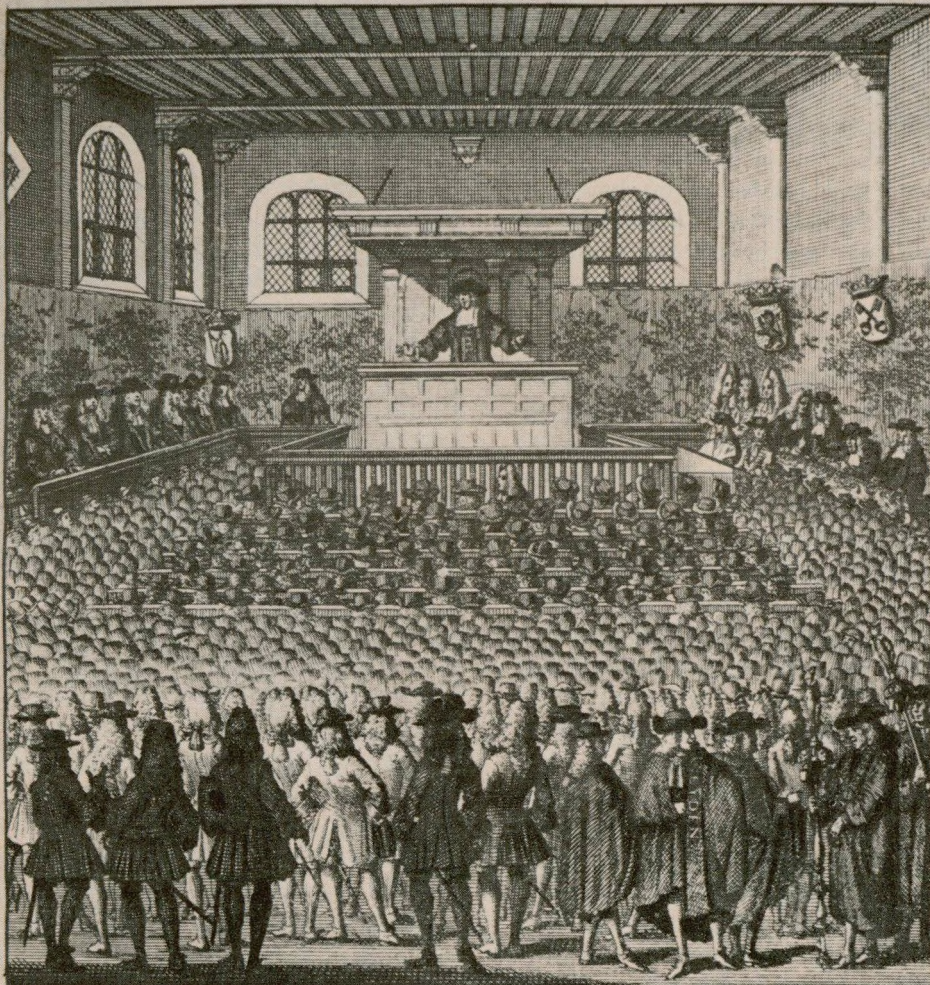
Boerhaave studied philosophy, ethics, languages, geography and helped to support himself by teaching mathematics to private pupils. He won a gold medal for an oration on "the doctrine of Epicurus," presented a dissertation on the distinct natures of mind and body for the degree in philosophy that he received in 1690.

For diversion Boerhaave read the works of Hippocrates, Vesalius and Fallopius and he also attended dissections and visited the local slaughterhouse. When he graduated he decided to study medicine and entered the University of Harderwijk in Gelderland, a school known for its boisterous, brawling students.

In 1693 he became a doctor of physic and was returning to Leiden to enter the ministry when a chance remark changed his plans for a career. On the boat he asked a fellow passenger who was abusing Spinoza if he had ever read the philosopher's works. It was an innocent question but it was repeated as proof that Boerhaave defended pantheism (considered blasphemous); he was denied his divinity degree and by default he became a physician.

LECTURER. Boerhaave declined an invitation to become court physician to King William III at the Hague. In 1701 he was appointed lecturer in theoretical medicine at the University of Leiden and when Groningen offered him a professorship he refused the higher post to stay at his alma mater. As was then the custom he gave private lessons to medical students in addition to his regular classes.

His lectures, delivered without any notes, were salted with quotations from the classics and laced with subtle humor. The first talk he delivered at



HERMANNI BOERHAAVE
 SERMO ACADEMICUS
 DE COMPARANDO CERTO
 IN PHYSICIS.

LUGDUNI BATAVORUM,
 Apud PETRUM VANDER Aa, Bibliopolam.

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Leiden stressed the importance of clinical observation and urged a return to Hippocratic methods. He could lecture extemporaneously in Latin, read Spanish and Italian with ease, and speak fluent English, French and German to the students who thronged to his classes from all over Europe. They appreciated his clear, graphic descriptions, his kind patience and amiably unassuming manner. His ideas for their education were quite modern: he thought they should have a good foundation in the basic sciences and then study anatomy through dissection, clinical medicine by comparing their own observations with the established literature.

BOTANIST. The university had promised Boerhaave the first vacant professorship and when the head of the botany department retired in 1709 he became his successor and director of the botanical gardens. It was said that Boerhaave's knowledge of plants at that time was very limited but within a year he knew many more species than any of his predecessors.

He filled the garden with European and Asian plants, American trees, 30 species of willows, all labeled and arranged in order. Dutch sea captains brought palms, bamboo, coffee, cinnamon, camphor and mahogany trees as well as turtles, crocodiles and other exotic animals for the garden's ponds. Specimens came from physicians serving in the East India Company, from the duke of Tuscany's horticulturist, from some 50 botanists with whom Boerhaave corresponded. In one year he received 1416 packets of seeds and by 1720 he had doubled the garden's size.

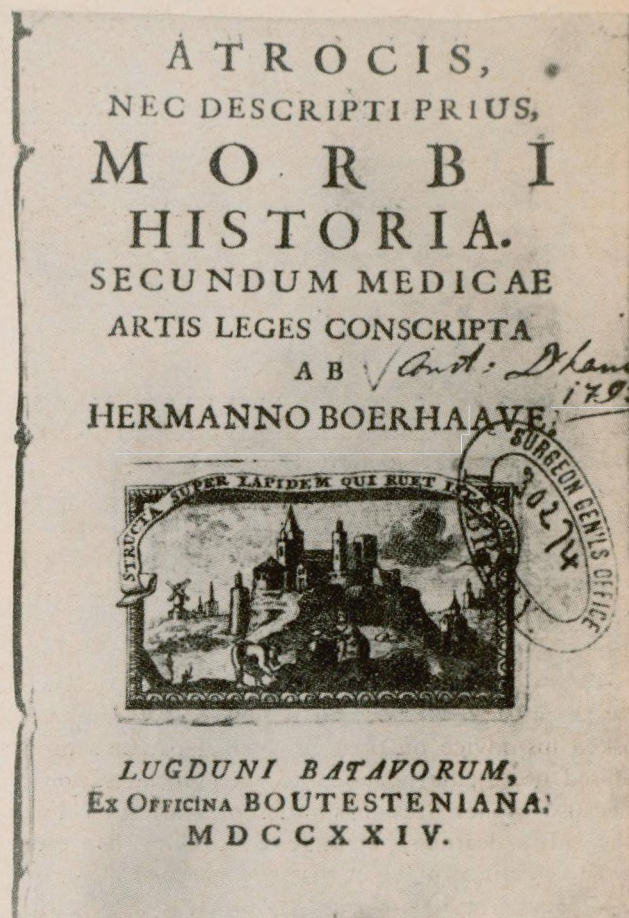
He wrote all his own letters, penned long lists of specimens in duplicate and mailed them on separate ships to make certain that a copy would reach English botanist William Sherard in Smyrna. During the summer of 1724 when Sherard visited him they spent many hours together on field trips and preparing a French colleague's work for posthumous publication.

When Carolus Linnaeus came to Leiden in 1735 Boerhaave suggested that he be appointed director of a wealthy banker's garden of rare plants and animals near Haarlem. In gratitude the Swedish botanist dedicated his catalogue to Boerhaave and named an Indian shrub *Boerhaavia diffusa*, known as *shol-baghni*, meaning cure for dropsy.*

CLINICIAN. The university conferred its highest honor on Boerhaave in 1714 by appointing him rector; at the same time he was made professor of practical medicine, a post accompanied by a hospital service. Twice a week he crossed the garden and broad stone stairs of Cecilia Hospital to two six-bed wards where he made rounds that soon became so popular that it was necessary to build galleries in the

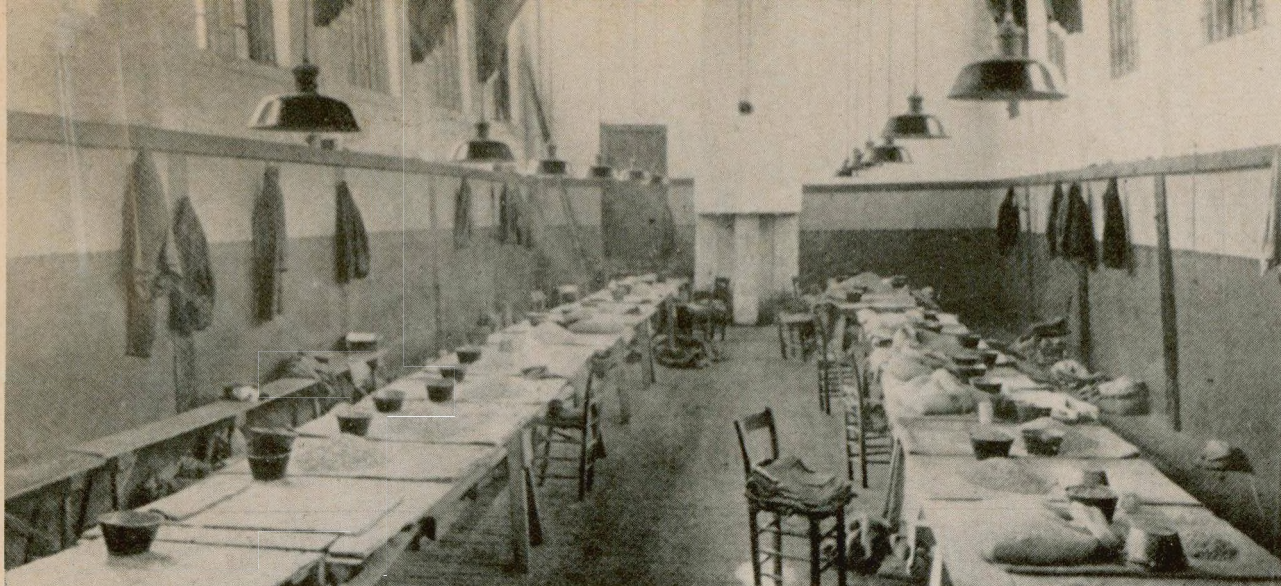
*Intravenous injection causes diuresis.

Title page of Boerhaave's unrivaled case history of baron John van Wassenae's fatal rupture of the esophagus which was published in 1724. Opposite, the room filled with littered tables and chairs was a ward at the Cecilia Hospital where Boerhaave made his rounds twice a week.



high-ceilinged rooms. Some bedside instruction was introduced by Giovanni Battista da Monte (Montanus) in 15th century Padua but modern clinical teaching was born on Boerhaave's two wards. He emphasized the importance of complete case histories, encouraged older students to examine patients and questioned them about their findings. After rounds he stopped at the hospital office to order diets and prescriptions. Whenever possible he autopsied fatal cases to show students that a disease was a natural phenomenon.

PRACTITIONER. On summer mornings Boerhaave rose at four, put on his clogs and spent some time transplanting and examining the plants in his garden. In the winter he stayed in bed until five, then spent an hour experimenting with his "chemical furnaces." In addition to teaching botany, theoretic and practical medicine he was appointed chemistry professor in 1718 which also entailed early morning lectures. He then attended to his voluminous correspondence in his unheated study in the family's



spacious handsome brick house on the Rapenburg.

Like most practitioners of the time he prescribed bleeding and clysters but he exercised moderation, used small doses of opium and ipecac, recommended bed rest, special diets, fruit juices, medicinal wines.

Before retiring at ten he continued his correspondence. He had become so famous that a letter from a Chinese mandarin addressed to "the illustrious Boerhaave in Europe" reached its destination.

For many years Boerhaave exchanged letters and plants with his friend and former pupil, the Austrian court physician Joannes Bassand. When Bassand asked his advice on treating a royal patient's prolapsed uterus, he hesitated to recommend surgery because of her "responsibilities of marriage." For the lady's deafness he suggested packing her ears with a goat's scrotal hair that was warmed in burning incense. He reassured Bassand that the infant prince of Savoy could be suckled even when the wet nurse was menstruating.

The duke of Tuscany and other notables consulted him but he refused to go to the bedside of Prussia's king Frederic Wilhelm I and wrote a friend: "There is nothing I have greater aversion to than becoming known to princes." Peter the Great who visited Leiden in 1716 docked his yacht near Boerhaave's house and at dawn he visited the busy man who showed him the gardens and anatomy theatre. During the tsar's final illness Boerhaave sent advice to his former pupil Laurentius Blumentrost who was then the imperial family physician.

Boerhaave's practice yielded a fortune estimated at 10 million florins. One grateful patient gave him a complete country estate after Boerhaave showed him how to derive the greatest benefit from rowing.

PRIVATE LIFE. Boerhaave was 42 when he wed Mary Drolenveaux, the only child of Leiden's burgomaster. The couple had one daughter, Joanna Maria, and lost three children in infancy.

In his prime Boerhaave was tall, vigorous, athletic.

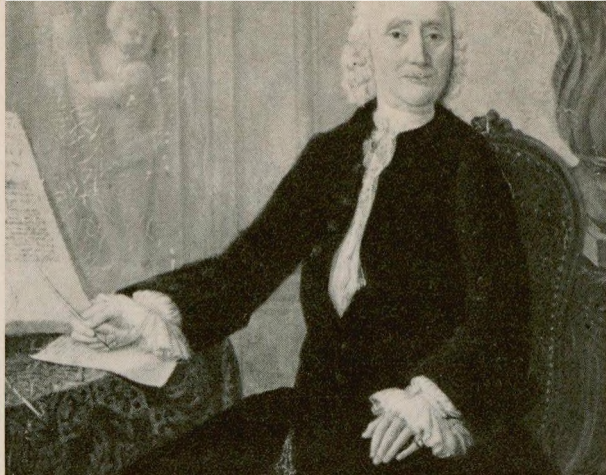
He had a large, noble head, thick brown curly hair, a kindly florid face with fine features, small and widely set sparkling eyes. Samuel Johnson wrote: "There was, in his air and motion, something rough and artless, but so majestic and great, at the same time, that no man ever looked upon him without veneration, and a kind of tacit submission to the superiority of his genius."

In his beautiful country house in Oud-Poelgeest, he worked in his gardens, rode horseback or walked. In the evenings music was played, often with Boerhaave on the violin and his daughter on the harpsichord.

CONTRIBUTIONS. The *Institutiones medicae* which Boerhaave published in 1708 was a compilation of contemporary knowledge of anatomy, pathology and physiology, a word he introduced. The 1495 entries in the *Aphorismi*, issued the following year, covered medical theory and practice. These works became standard texts, were reprinted and translated into many languages, including Arabic.

Boerhaave wrote treatises on nervous diseases, syphilis, heat stroke: he recognized the nature of nasal polyps, alcoholic amblyopia, the aura-like pain preceding hydrophobia, and he realized that inoculation could prevent smallpox. Inflammation, which he called "the evil mother of other ills," was attributed to changes in the plasma's composition. While he sought the biochemical and physical basis for body functions he was an eclectic and not an iatrochemist or iatrophysicist. Most of his ideas were quite modern but he believed in the transmutation of metals, the possibility of a panacea like Paracelsus' "arcanum," and he thought the phases of the moon influenced the effect of drugs.

His vivid case history of baron John van Wasenaer's fatal rupture of the esophagus is still unrivaled, and his *Elementa chymiae* of 1732 has been called "the most complete and luminous chemical treatise of his time." Many have charged that Boer-



Two outstanding Boerhaave students were Gerard van Swieten, left, who was prevented from succeeding him because of his religion, became court physician to Austrian empress Maria Theresa and organized the medical faculty at Vienna; Albrecht von Haller who founded the University of Göttingen medical faculty.



haave was not original but this work stated the laws of the solubility of air in liquids before Henry Cavendish and Joseph Priestley; it influenced Lavoisier's studies on heat and introduced the idea of the affinity between chemical substances. In dedicating the book to his brother James, who had become a minister, Boerhaave wrote that their exchange of careers "consigned you to the service of religion, and made me, whose talents were unequal to higher things, humbly contented with the profession of physic."

He rescued treatises by naturalist Jan Swammerdam and arranged for their publication, prepared an edition of Vesalius and works of Aretaeus, Lorenzo Bellini and others. Hippocrates and "the immortal Sydenham" were his great heroes but he said that except for about six "true sons of Aesculapius" man might have fared better without physicians.

Prussian king Frederic the Great told his academicians to follow Boerhaave's methods and the French and British royal societies made him a member. A few critics accused him of superficiality, ambiguity and "hashing up the partial truths and entire errors of his time."

HEALTH. After recovering from his boyhood leg ulcer Boerhaave apparently remained in good health until he was 52 when he suffered slight rheumatic pains in the shoulder. The following August he was working in his garden early one morning when he was seized with a violent pain in the left kidney region that he attributed to the passage of a stone. This was followed by an acute attack of lumbago that kept him in bed for more than three months. Sometimes he found relief in reading or thinking about his work but once after 15 hours of excruciating pain he confessed that he had prayed for death. When he finally recovered the residents of Leiden celebrated by ringing bells and illuminating the city.

Six years later another attack of arthritis forced Boerhaave to resign as professor of botany and chemistry. That year he described the choking sensation experienced by a patient with an enlarged heart, a symptom that he noted in himself when he was 68. In mid-September, 1738, he wrote to Bassand: "My malady gathers force. The cardiac op-

pression . . . is constant, and of the last degree of cruelty." A fortnight later, on the 23rd, he died at four in the morning and was buried in Leiden's gothic St. Pieterskerk.

HEIRS. Edinburgh's medical school, established by Alexander Monro, John Rutherford and some of his other Scottish students, has been called Boerhaave's daughter and the University of Pennsylvania medical school, which was modeled after Edinburgh, his granddaughter. The University of Göttingen's medical faculty was founded by one of his outstanding students, Albrecht von Haller. Another favorite, Gerard van Swieten, who took shorthand notes of Boerhaave's clinical demonstrations, was his logical successor, but because he was Catholic he was not appointed a Leiden professor. Instead he became court physician to Austrian empress Maria Theresa and organized Vienna's medical faculty.

In England Sir John Pringle and William Cullen boasted that they had studied with the noted Dutch physician. In Russia his nephew Hermann Kaaw Boerhaave attended empress Elizabeth while his brother, Abraham, taught anatomy and physiology at St. Petersburg University. Two former pupils practiced in the American colonies: Robert Johnston settled in Savannah, Georgia; John van Beuren headed the prison infirmary in New York that eventually became Bellevue Hospital. Boerhaave's ideas dominated colonial medicine: Phineas Bond and John Redman studied at Leiden after his death but they brought some of his methods home to Philadelphia and taught them to the early practitioners. Benjamin Rush wrote that while he was apprenticed to Redman, from 1761 to 1766, he "studied Boerhaave's lectures upon physiology and pathology with the greatest attention."

In Leiden today the medical center is in the Boerhaave Kwartier; a monument with a heroic statue of the great physician faces the hospital laboratory, and a clock that students presented in his memory in 1938 is in the tower of the medical school.

SUMMING UP. By Samuel Johnson: "Boerhaave was one of those mighty geniuses to whom scarce anything appears impossible."

