

HISTORY OF PHARMACY

Before the Dawn of History

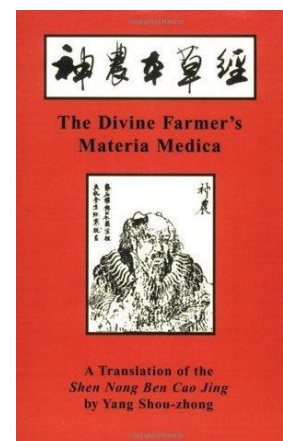
- In earliest times, medicine was based on magic and religion.
 - Sumerians living around 4,000 BC believed that demons were the cause of illness.
 - In many cultures, physicians were priests/shamans/faith healers and sometimes considered as gods.
- By trial and error, folk knowledge of the healing properties of certain natural substances was used.
- Concept of outside force in the form of remedies influencing bodily functions may be considered as one of humanity's greatest advances.
- Early man used materials in his surroundings. Example, leaves, mud and cool water were used to stop bleeding and heal wounds, dry clay was used to splint broken bones.

Pharmacy in Ancient Babylonia

- The earliest known record of the art of apothecary (the forerunner of the pharmacist) is in Mesopotamia at about 2600 B.C.
- Babylonian healing practitioners combined the responsibilities of priest, physician, and pharmacist.
- Some of the oldest pharmacy records are found in Sumerian (Babylonian) clay cuneiform tablets that date back to about 2000B.C.

Pharmacy in Ancient China

- Health and disease are due to imbalance of the living forces
- Legend says that Emperor Shen Nung investigated the medical properties of hundreds of herbs. He recorded 365 medicines derived from minerals, plants, and animals in the first Pen Ts'ao ching (*Divine Husbandman's Materia Medica*), the earliest extant Chinese pharmacopoeia. Herbs include rhubarb, ginseng, stramonium, cinnamon bark, and Ma Huang (ephedra).



Egyptian Medicine

- Pharmacy was a branch of Medicine, and the pharmacists were also priests.
- Thoth – god of healing
- Anepu – apothecary of the gods
- Skilled in the art of embalment, preservation, and chemistry
- The Ebers Papyrus (1500 B.C.), named by George Ebers. It is one of the earliest, best-known and most important pharmaceutical records from ancient history. It contains 800 prescriptions using 700 drugs. Of particular note in the papyrus is inclusion of quantities of substances which were largely missing from Babylonian clay tablets. Many modern dosage forms are also referred to in the Ebers Papyrus as gargles, inhalations, suppositories, ointments, plasters, and lotions.



Greeks and Romans

- Around 600 B.C. the Greeks integrated science into mythological thinking. They began thinking logically about disease rather than believing spiritual explanations. The Romans conquered the Greeks and the medical and pharmaceutical cultures merged; it is known as the Greco-Roman era.
 - **Aesculapius** – god of medicine. The staff of Aesculapius with coiled serpents is the traditional symbol of medicine. Among his children, the best known are his daughters Hygeia (goddess of good health), Panacea (all healing), and Iaso (remedy).
 - **Theophrastus of Eresus**– Father of Botany: His observations about the medicinal qualities of herbs have proven uncannily accurate. Theophrastus covered most aspects of botany including the descriptions of plants, classification, plant distribution, propagation, germination, and cultivation.
 - **Hippocrates** -The father of Medicine: He was a philosopher, physician and pharmacist. He liberated medicine from the mythical "Bad Spirits". He proposed that disease came from natural, not supernatural causes and established the theory of humors which needed to be imbalanced for good health:
 - air- blood
 - water- phlegm
 - earth-black bile
 - fire- yellow bile
 - **Pedanius Dioscorides** – A Greek physician and botanist. Wrote the first standard text/manual on drugs called De Materia Medica. It was published in 6 books that covered over 600 plants and their healing properties. His book was used for 1500 years. He is known as the "father of pharmacognosy"
 - **Claudius Galen** – He was a prominent Roman (of Greek ethnicity) physician, surgeon, and philosopher. He developed principles of preparing and compounding medicinal agents based on chemicals. He sought to restore humoral balances within a patient using medicine of opposing qualities. E.g. inflammation would be treated with cucumber, a cool drug. His name is associated with a class of pharmaceuticals from natural resources compounded by mechanical means, the 'galenicals'. He is the originator of the 'cold cream', and many of his procedures are still used in modern compounding.
 - **Mithridates VI** – King of Pontus - regularly ingested sub-lethal doses of poisons to develop immunity to them. His famed formula of alleged antidotal powers "Mithridatum", was popular for over a thousand years.
 - **Terra sigillata (sealed earth)** – clay-like soil that was believed to have medicinal qualities. It was first used in the Greek island of Lemnos. It was prepared into cakes and then dried. The clay was crushed into a powder and taken with liquids or made into paste and smeared



on the body. One of the first therapeutic agents to bear a "trademark" – a means of identifying the source and of gaining customer's confidence.

- **Roman pharmacy titles**
 - *Pharmacopeia*: Maker of remedies
 - *Pharmacotritae*: Drug Grinders
 - *Unguentarii*: Makers of ointments
 - *Pigmentarii*: Maker of cosmetics
 - *Pharmacopolae*: Seller of drugs
 - *Aromatarii*: Dealers of spices

The Arabian Influence

- **Formularies**: The continuation of documentation of drug information.
- **The First Apothecary Shops**- The first Pharmacy shop in the world was in Baghdad about 792 A.D. They preserved much of the Greco-Roman wisdom, added to it, developing with the aid of their natural resources. Syrups, confections, conserves, distilled waters and alcoholic liquids were dosage forms developed by the Arabians.
- **Alchemy**
- **Potable gold/ Elixir of life/ 'Geber'** – gold is dissolved in *aqua regia* ('royal water' – 1-part nitric acid and 3 parts concentrated hydrochloric acid) to produce gold tetrachloride
- **Avicenna (Ibn Sina)** – The "Persian Galen" - an intellectual giant, he was a physician, poet, philosopher, diplomat. His *Canon Medicinae* brought together the best knowledge of the Greeks and Arabs into a single medical text. His pharmaceutical teachings were accepted as authority in the West until the 17th century; and still are dominant influences in the Orient.
- **Damian and Cosmas** – Pharmacy's Patron Saints - They were Christians of Arabian descent. Damian was the apothecary, and Cosmas the Physician. They offered the solace of religion as well as the benefit of their knowledge to the sick who visited them. After canonization, they became the patron saints of Pharmacy and Medicine, and many miracles were attributed to them.

Byzantine Pharmacy and Medicine

- Together with the rise of Christianity, pharmacy and medicine, greatly influenced by the Arabs, started to flourish as well
- Cures and prophylaxis were advocated

The Middle Ages

- Remnants of the Western knowledge of Pharmacy and Medicine were preserved in monasteries (Monastic Pharmacy). Manuscripts were translated or copied for monastery libraries. The monks gathered herbs in the fields or raised them in their own herb gardens.
 - *Antidotaria* – collection of composite medications, often in the form of recipes for mixtures and antidotes
 - *Receptaria* – collection of medical recipes and remedies that provided therapeutic instructions for treating illnesses (formularies and pharmacopeias)
- Pharmacy differentiates in the Middle Ages. Pharmaceutical knowledge and the number of drugs available began to grow considerably mostly due to the Arabs. Pharmacy as a separate activity began to develop and privately owned pharmacies were established in Islamic lands.
- Medicine and pharmacy were for the first time separated from each other at the time of Frederick II of Hohenstaufen, who was Emperor of Germany as well as King of Sicily who issued an edict. This edict is known as the *Magna Carta of pharmacy*.
 - The three decrees of the *Magna Carta*:
 - The pharmaceutical profession was to be separated from the medical profession.
 - The pharmaceutical profession should be supervised officially.
 - Pharmacists should take an oath to prepare drugs reliably, according to skilled art, and in a uniform suitable quality.
 - **Paracelsus**: Theophrastus Phillippus Aureolus Bombastus von Hohenheim- Swiss born physician who believed in chemical treatment of disease rather than botanical. Paracelsus is referred to as the father of toxicology for his claim that, "All things are poison, and nothing is without poison."
 - **Andreas Vesalius** – Founder of Modern Human Anatomy
 - **Ambroise Pare** – one of the pioneers in surgical techniques

The Renaissance

- Contemporary beliefs and homeopathy arose. During the Renaissance, professional associations of pharmacists emerged.
- **The First Official Pharmacopeia**: The idea of a pharmacopeia with official status, to be followed by all apothecaries, originated in Florence (*Ricettario Fiorentino* – the first public pharmacopeia of Europe). It was the result of collaboration of the Guild of Apothecaries and the Medical Society - one of the earliest manifestations of constructive interprofessional relations.
- **The Society of Apothecaries of London**: In England, the pharmacist was under jurisdiction of Guild of grocers, which monopolized the drug and spice trade. King James I granted a charter recognizing the Society of Apothecaries of London in 1671 A.D. Early English apothecaries compounded as well as dispensed drugs. They also provided medical advice. This was the first organization of pharmacists in the Anglo-Saxon world.
- **"Dispensatorium" of Valerius Cordus**: first pharmacopeia adopted by the government of Nuremberg, Germany in 1546

General European Trends

- **Separation of Pharmacy from Medicine**
 - Gradual recognition from 13th century onward, codified by royal edicts and guild regulations.
- **Pharmacopoeias**
 - Standardized texts across Europe: Florence (1498), Cordus' *Dispensatorium* (1546), London (1618), Paris (1638).
- **Transition to Science-Based Pharmacy**
 - 18th–19th centuries: shift from herbal-based practice to chemical isolation of active principles.
 - Foundations of modern pharmacology and pharmaceutical industry laid in Europe.
- **Industrialization of Pharmacy**
 - Germany and France led the move from craft apothecaries to large-scale drug manufacturing.
 - Emergence of pharmaceutical companies set the stage for 20th-century global pharmacy.

The Empiric Era

- **1600-1940** – Pharmacopoeias were used to protect public health. Roots, bark, herbs, flowers etc. were used and controlled by the government. They questioned the toxicological effects on the human body. Created interest in testing of drugs and how they affected the body.
- - **Louis Herbert** – an apothecary from Paris who looked after the health of pioneers in Canada (New France). He cultivated native drug plants, and supervised gardens.
 - **John Winthrop** – from Britain – first governor of Massachusetts Bay Colony, sought advice from English apothecaries and physicians, and added to his small store of imported drugs those derived from plants native to New England
 - **Christopher Marshall** – an Irish immigrant, established his apothecary shop in Philadelphia. This pioneer pharmaceutical enterprise became a leading retail store, center of large-scale chemical manufacturing, a practical training school for pharmacists, and an important supply depot during the Revolution
 - In 1751 **Benjamin Franklin** started the first hospital in Pennsylvania, PA. It was moved but still stands today. The first hospital pharmacist to work in that hospital was **Jonathan Roberts**. First as pharmacist, later as physician, he advocated prescription writing and championed independent practice of two professions.
 - **A Revolution in Pharmaceutical Education:** When **Dr. Albert B. Prescott** launched the pharmacy course at the University of Michigan in 1868, critical attention was aroused because he abandoned the traditional requirement of pre-graduation apprenticeship.
 - **Isolation of pure, crystalline chemicals in lab research:**
 - **Carl Wilhelm Scheele** – Swedish pharmacist - discovered oxygen, chlorine, prussic acid, tartaric acid, tungsten, molybdenum, glycerin, nitroglycerin, and other organic compounds
 - **Friedrich Wilhelm Adam Serturner** – German - Isolation of crude opium and proved the importance of alkaloids
 - **Pierre-Joseph Pelletier** and **Joseph-Bienaimé Caventou** – French pharmacists - Isolation of emetine from ipecacuanha, strychnine and brucine from nux vomica, and quinine and cinchonine from cinchona bark
 - Germ theory of disease by **Louis Pasteur** and **Robert Koch** (1880-1890)
 - **Louis Pasteur's** rabies vaccine and **Emil Von Behring** diphtheria antitoxin can arise from the laboratory
 - **Paul Ehrlich's** Salvarsan/ arsphenamine (for syphilis) in 1910 - first discovered chemotherapeutic agents.
 - **Bernard Courtois** – French chemist – discovered elemental iodine and bromine
 - **Pierre Jean Robiquet** – discovered codeine
 - **Andreas Marggraf** – German – discovered sugar in beets
 - **Karl Friedrich Mohr** – German – introduced the apparatus Mohr Balance (Wesphal balance)
 - **Felix Hoffmann** – German – synthesized aspirin and heroin
 - **Antoine Lavoisier** – Father of modern Chemistry – help construct the metric system, research on gases, water, and combustion
 - **Edward Jenner** – cowpox vaccine
 - **Alexander Fleming** – discovered penicillin
 - **American Pharmacy in the 18th and 19th centuries**
 - **1729** - the first known apothecary was opened by Irish immigrant Christopher Marshall in Philadelphia, Pennsylvania. In 1752, Philadelphia Hospital, colonial America's first hospital, opened the first hospital pharmacy
 - In these early days, many physicians found themselves concerned about the quality of both medicine and pharmacists in the country. They founded the **United States Pharmacopeia (USP) in 1820** to develop and publish uniform sets of guidelines and standards of practice. The USP still performs this function today.
 - The Philadelphia College of Pharmacy was subsequently founded in 1821, becoming America's first pharmacy organization and first pharmacy school. Its graduates would take to using the term "pharmacist" to differentiate themselves from the more untrained apothecaries.
 - The Father of American Pharmacy - **William Proctor** - Spent most of his life on the advancement of pharmacy.
 - **John Pemberton** – inventor of Coca-Cola (addicted to morphine, experimented on painkillers – developed a beverage containing alcohol and cocaine)
 - **Samuel Hopkins** – issued the first patent for a process of making potash (used in fertilizers)
 - **The 20th Century:** The average life span in the United States increased by over twenty years in the 20th Century. A major factor in the increased health and life expectancy seen in this century was the dramatic growth in pharmaceutical medicine. With the increasing availability of powerful drugs, their regulation became more important than ever. Food and Drug Administration (FDA) was established in response to this need to regulate the sale and use of medication in the US.

Pharmacy Today and Tomorrow

Pharmacy's professional stature will continue to grow in the future as this heritage and tradition of service is passed on from preceptor to apprentice, and from teacher to student.

- **Retail Pharmacy:** Retail pharmacy has proved to be indispensable and irreplaceable as the fitting and distribution agency of medicinal products.
- **The Patient Care Era: Eugene White** started modeling a transformational shift in how pharmacies could be run with an enhanced focus on patient care. Some of his innovations include detailed record systems to keep track of a family's prescriptions, a support staff to help with administration and patient care, and more availability to counsel patients on medications, drug interactions, and other clinical concerns.
- Increased concentration on rational, targeted research using computers, increased number of available medicines, well-coordinated teams of scientists with other professions such as statisticians and financial managers. Multiple drug therapy, however, led to adverse reactions, interactions, and therapeutic outcomes that were greater or less than desired
- **Patient-Focused Drug Therapy: C.D. Hepler** established the concept of pharmaceutical care around 1988. A pharmacist's education must now focus on human behavior as it relates to providing practiced, patient-focused care. As the end of the 20th century approached, the pharmacy profession continued to embrace more patient care activities, establishing pharmacists as clinicians who could take responsibility for certain aspects of their patients' health. Patient counseling was becoming more widely accepted. In the 1990s, pharmacists also began to increase their role as community immunizers by administering vaccinations. Allowing pharmacists to immunize patients on-site at pharmacies was a critical reason for the increase in the immunized population going into the new century. Pharmacies became critical vaccine distribution sites for national and more-localized outbreaks.
- **The New Horizon:** Research into gene therapy and genetic defects has greatly increased, recombinant DNA technology is producing new medications based on the patient's genetic make-up, genetic research is involved in the pursuit of cures for major diseases, such as cancer.
- **The Prescription of Trust – Pharmacists transforming patient care**

This new research report, led by Columbia University Mailman School of Public Health, shows how pharmacists play an integral role in health care and how their role is expanding to meet the increased demand for access to quality care. The study explored the evolving role of pharmacists over the next 10 years by surveying more than 3,000 patients, 1,000 pharmacists, and 500 other health care providers (including physicians and nurse practitioners). Here are some key findings of the survey, conducted in November and December 2021:

 - **Pharmacists' Responsibilities Will Expand**
 - ✓ Pharmacists, providers, and patients agree that pharmacists are well-positioned to provide more patient care, filling gaps in access to other health care providers.
 - ✓ More than 85% of pharmacists agree that they will see increased patient counseling responsibilities, take on a bigger role in preventive care measures, and be more integrated in care management teams.
 - ✓ 63.4% of providers agree that pharmacists will play a greater role in preventive care activities; 51.1% agree that pharmacists will have greater specialization in specific diseases.
 - ✓ More than half of the patients surveyed would be extremely or very comfortable with pharmacists checking vital signs (76.2%); diagnosing acute conditions (54.9%); and prescribing medications for acute conditions (58.1%).
 - **Providers, Patients Trust Pharmacists**
 - ✓ Patients and providers have high trust for pharmacists in fulfilling their traditional role as well as expanded roles.
 - ✓ 77.3% of patients see pharmacists as an integral part of the health care team.
 - ✓ When providers were asked whether they trusted pharmacists to perform specific activities for patients with chronic conditions, providers noted a high level of trust for traditional pharmacist tasks, with high to moderate trust often exceeding 90 percent.
 - **As Roles Change, So Does Patient Engagement**
 - ✓ As consumers seek greater interaction with their pharmacist to better manage their overall health, the ways that interaction takes place is also evolving.
 - ✓ Patients' use of telehealth services has significantly increased during the COVID-19 pandemic. Despite that, consumers' adoption of telepharmacy services (via phone or video) may be slower. Our research shows that 71.1% of patients did not engage with a pharmacist via video in the past year, while only 16.0% of pharmacists currently engage with patients via telepharmacy all or most of the time.
 - ✓ Yet, the study showed that nearly half (49.7%) of patients would find it extremely or very helpful to have routine testing and medical visits done from home.
 - ✓ Home delivery pharmacists engage more with patients via telepharmacy, at 55.6%, while retail pharmacists indicated less engagement, at 14.5%. Of pharmacists who utilize this technology, more than a third (35.2%) say it gives them more time to interact with patients, allowing them to provide crucial information and support when patients need it most. This endorsement may also be attributed to an increased level of comfort of having a conversation regarding personal health issues with a patient from the privacy of their home.
 - The research also provided insights into the need for additional training for pharmacists to take on more direct patient care responsibilities. Specifically, pharmacists said that to meet the patient needs of the future, they needed additional knowledge in chronic disease education (35.5%), diagnosing (17.4%), and prescribing (13.3%).

I. Mythical Period – belief in gods

- a. Bathala (Tagalog)– supreme-like; “La-on” (Visayans)
- b. Captan – shared with Bathala the creative power
- c. Daragao (Bagobo); “Balbol and Saitan” (Tiruray)
- d. Patianak
- e. Katalonan or Babaylan
- f. Early Filipinos believed in the incarnation of their ancestors

II. The Superstitious Period:

- a. Pre-Spanish era: there were herbolarios – men skilled in the use of healing herbs
- b. Pharmaceutical forms adopted by the early cuarenderos or quack doctors were confined to:
 1. Macerations in cold and hot water
 2. Infusions or decoctions in oil of the curative plant parts
 3. Poultices and some powders
 4. Resinous plasters and salves with a waxy base
 5. Inhalations and fumigations and a few empyreumatic products.

III. The Empiric Period: Philippine Pharmacy During the Spanish Period

- a. **The University of Santo Tomas and the Development of Pharmacy in the Philippines-** UST was the first great institution of learning established in the Philippines. Fr. Miguel de Benavides established “Colegio de Nuestra Senora del Rosario de Santo Tomas” located in Intramuros.
- b. **Fr. Fernando Santa Maria (1704-1774)-** Dominican priest, native of Madrid- “Medicinas Caseras” 1st ed. 1786- contained suggestions for treatment of certain diseases. Topics of the book include (1.) Medicinal barks and herbs, (2.) Various sickness, (3.) Various secrets and rareties worth knowing
- c. **Fr. Manuel Blanco, OSA-** his botanical masterpiece “Flora de Filipinas” became the first comprehensive scientific catalog of the archipelago's plant life. It bridged traditional folklore, medicine, and scientific botany
- d. Foreign Pharmacists come to Philippines to do business or to practice their profession- the rector should approve first before the Foreign Pharmacist to practice here in the Philippines. Examinations were given to them
- e. **Establishment of the school of “Practicantes de Medicina y Farmacia”-** The purpose is to protect the health of the Filipinos by producing well-trained practitioners to help the physicians.
 - **Superior Gobierno** – approved and granted the official permit in December 1879. Rules and Regulations were promulgated by the rector and administration of the University among which were the following important points:
 1. The course will be given in four semesters
 2. Classes shall be daily
 3. Students must:
 - a. be able to read and write and possess a knowledge of the Catholic doctrine
 - b. be 18 years old shown in baptismal certificate and an affidavit of nationality
 - c. undergoes and passes an entrance examination that will include arithmetic
 4. Students must practice in any drug store or laboratory during the last three semesters of the course
 5. After completion of four semesters study, must pass both theoretical and a practical examination
- f. **The Hospitals in the Philippines During the Spanish Era:** Hospitals were already in operation in the islands
 1. The first hospital built by the Spaniards was the Military Hospital in Cebu, built by Legaspi in 1565.
 2. Hospital de San Juan de Dios – constructed in 1577 by the Franciscans
 3. San Lazaro – also built by the Franciscans in the same year
 4. Hospital de San Gabriel in Binondo – 1588- managed by Dominicans
 5. Hospital de Aguas Santas at Los Banos- 1596
 6. Hospital de Antipolo - 1602
 7. Hospital de San Jose at Cavite – 1641
 8. The Foundling Hospital de San Jose – 1782
 9. Hospital for Lepers in Cebu – 1850
- g. **The Boticas or Drugstore during Spanish period:**
 - **Botica Boie** - Started as a small apothecary shop at Escolta, Manila in 1830 by Spanish Pharmacist and physician, **Don Lorenzo Negrao**
 - **Botica de Santa Cruz established in 1861, located at Plaza de Goiti** - Original name is Farmacia y Drogueria de Santa Cruz. The original proprietor was **Pablo Schuster**, a chemist. It passed through several hands until 1902 it was purchased by **Dr. Carlos Jarhling**, a German-Filipino Pharmacist and **Mr. Luis Santos**, a Philippine born Spaniard

- Besides the two drug establishments, there were smaller business concerns in the City of Manila and other big cities of the country
 1. Botica Zobel, Botica Von Borrie and Botica de la Divisoria (1878)
 2. Farmacia de Quiapo (1883)
 3. Botica Nino in Cebu
 4. Botica De Lallo in Cagayan de Luzon
 5. Botica de D. Mariano Kuhnell
 6. Botica de D. Oscar Reyman in Binondo
 7. Botica de Fernandez
- **Don Leon Maria Guerrero** – Father of Philippine Pharmacy – among the first students of Ateneo – First Philippine Pharmacist – contribution to the use of medicinal plants in the Philippines

IV. Pharmacy in the Philippines During the American Occupation Until Its Independence

Establishment of the Board of pharmaceutical Examiners- The military government by the American Army organized the Board of Pharmaceutical Examiners under a military order in 1903. It was later converted to Act No. 597 of the Philippine Commission Board of examiners composed of a chairman, and two vice chairmen who took charge of the registration of the pharmacists and supervision of their practice.

The Philippine Pharmacists Association

Founded on August 29, 1920, is the only PRC accredited, integrated national organization of licensed Filipino pharmacists with 83 regional and local chapters, and 10 affiliate organizations.

Saint Louis University Department of Pharmacy

Founded in 1969

COMMON SYMBOLS USED IN PHARMACY

• BOWL OF HYGEIA: The bowl with a snake coiled around it is called the bowl of Hygeia with the serpent of Epidaurus. Hygeia was Aesculapius's daughter and a Greek Goddess of health.	
• MORTAR AND PESTLE: The mortar and pestle are tools of traditional pharmacy, hence their use as an easily recognizable visual motif.	
• RECIPE: The recipe sign appears at the start of prescriptions. Although universally accepted as an abbreviation of "recipe" (Latin for 'take thou'), it has also been suggested that it is the astronomical sign of the planet Jupiter. Chemical symbol meaning 'to compound'	
• Green Cross – indicates the presence of a pharmacy that is open and providing services. First introduced in continental Europe	
• Carboy – dates to 1600, when they were used to distinguish between chemists and apothecaries (who used mortar and pestle as their sign)	
• Phrase: Secundum Artem – "according to art". Embodies the pharmacist's professional skill, knowledge, and judgement in preparing medications tailored to a patient's specific needs. It is often depicted alongside traditional pharmacy tools and symbols like the mortar and pestle and the Rx sign.	