

History of Pharmacy SIG

Teaching History of Pharmacy
According to the AIHP
Guidelines:

B. Evolution of Pharmacy
Practice

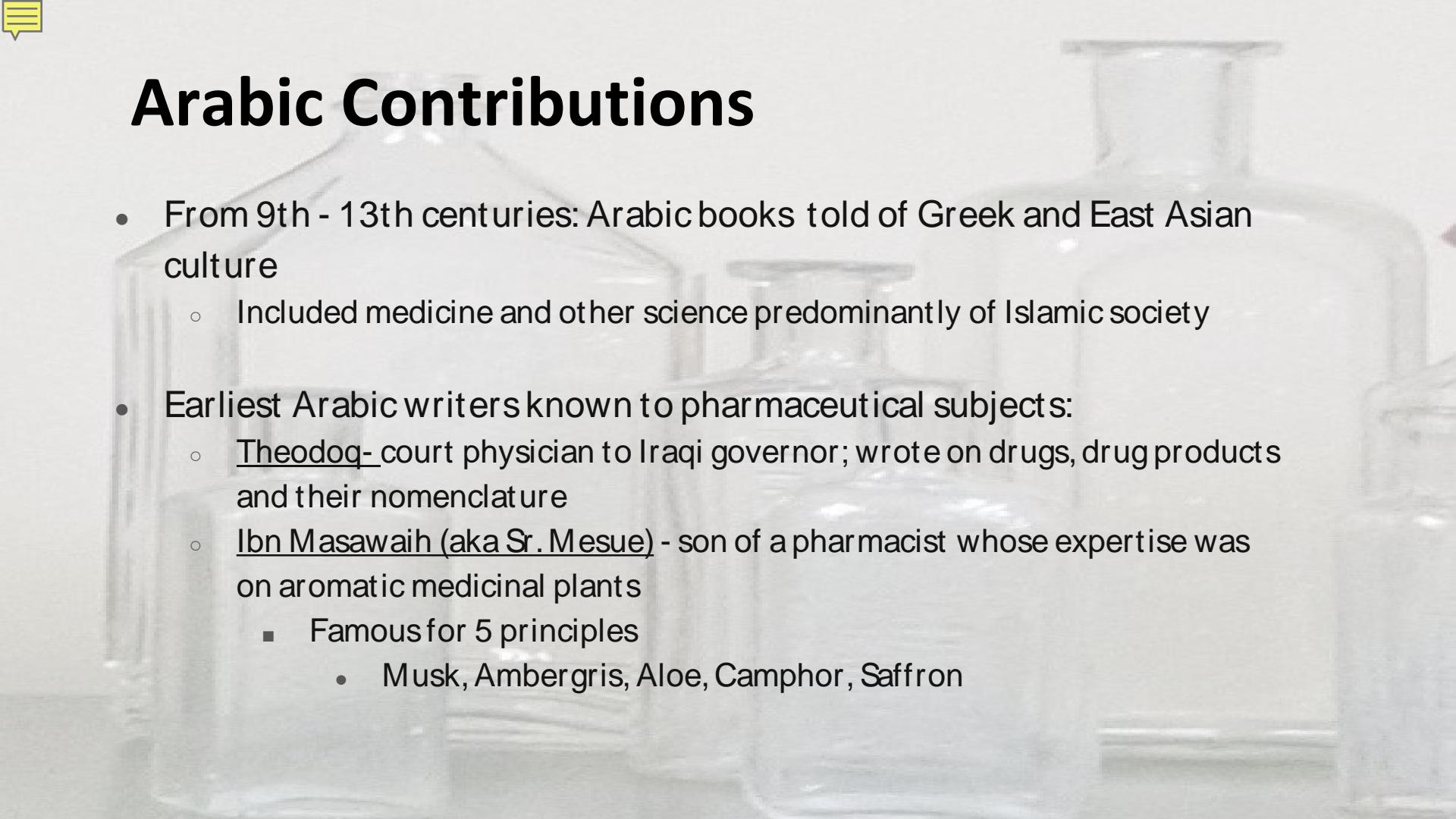
Created by: Essie Samuel,
PharmD, BCPS

Georgia-Philadelphia College of
Osteopathic Medicine, School of Pharmacy
Reviewed by: Karen Nagel-Edwards, PhD
Midwestern University Chicago College of
Pharmacy

Developed by the Teaching History of Pharmacy Committee
of the History of Pharmacy SIG, 2017-18

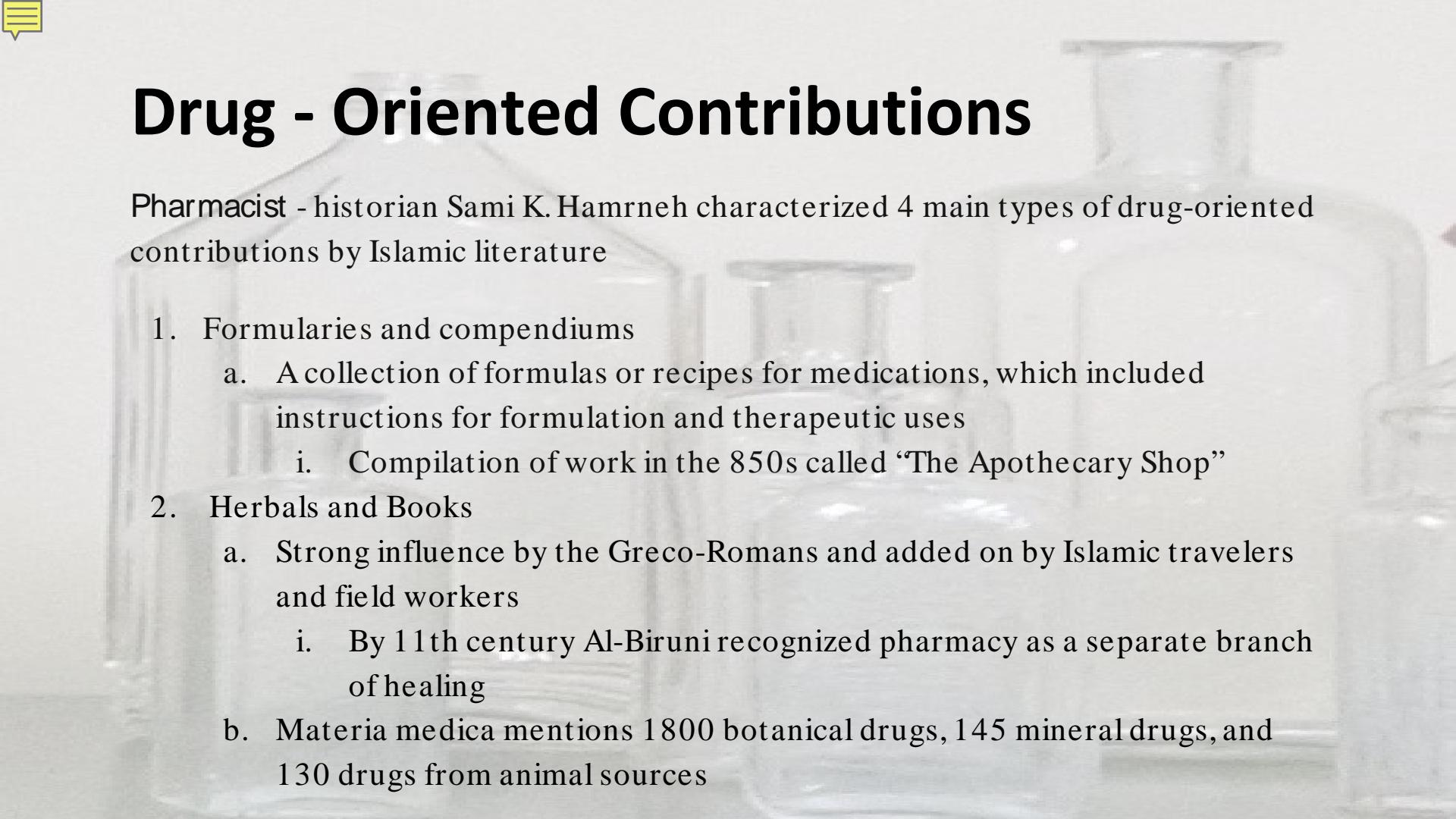


The Middle Ages



Arabic Contributions

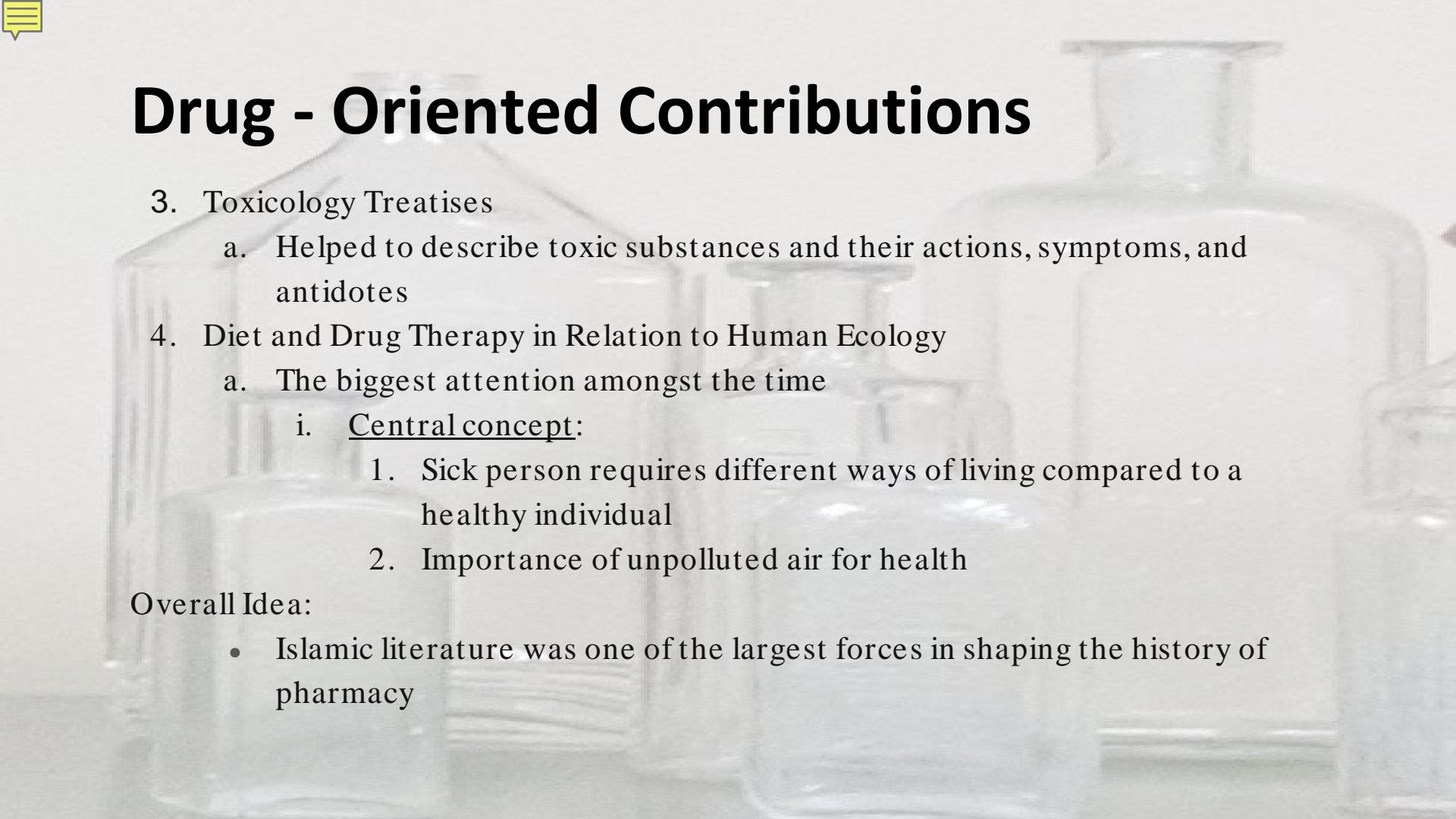
- From 9th - 13th centuries: Arabic books told of Greek and East Asian culture
 - Included medicine and other science predominantly of Islamic society
- Earliest Arabic writers known to pharmaceutical subjects:
 - Theodoq - court physician to Iraqi governor; wrote on drugs, drug products and their nomenclature
 - Ibn Masawaih (aka Sr. Mesue) - son of a pharmacist whose expertise was on aromatic medicinal plants
 - Famous for 5 principles
 - Musk, Ambergris, Aloe, Camphor, Saffron



Drug - Oriented Contributions

Pharmacist - historian Sami K. Hamrneh characterized 4 main types of drug-oriented contributions by Islamic literature

1. Formularies and compendiums
 - a. A collection of formulas or recipes for medications, which included instructions for formulation and therapeutic uses
 - i. Compilation of work in the 850s called “The Apothecary Shop”
2. Herbals and Books
 - a. Strong influence by the Greco-Romans and added on by Islamic travelers and field workers
 - i. By 11th century Al-Biruni recognized pharmacy as a separate branch of healing
 - b. Materia medica mentions 1800 botanical drugs, 145 mineral drugs, and 130 drugs from animal sources

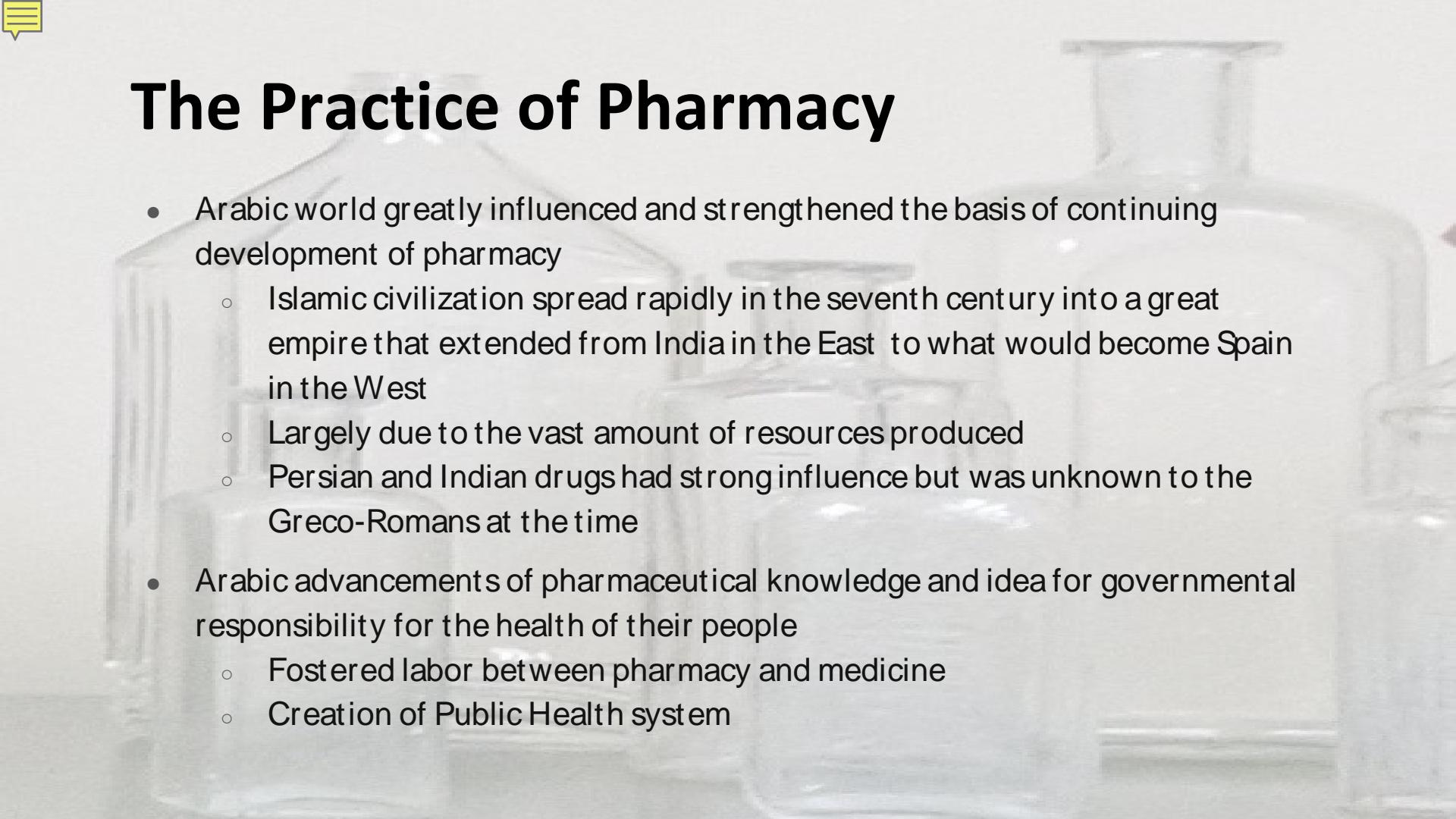


Drug - Oriented Contributions

3. Toxicology Treatises
 - a. Helped to describe toxic substances and their actions, symptoms, and antidotes
4. Diet and Drug Therapy in Relation to Human Ecology
 - a. The biggest attention amongst the time
 - i. Central concept:
 1. Sick person requires different ways of living compared to a healthy individual
 2. Importance of unpolluted air for health

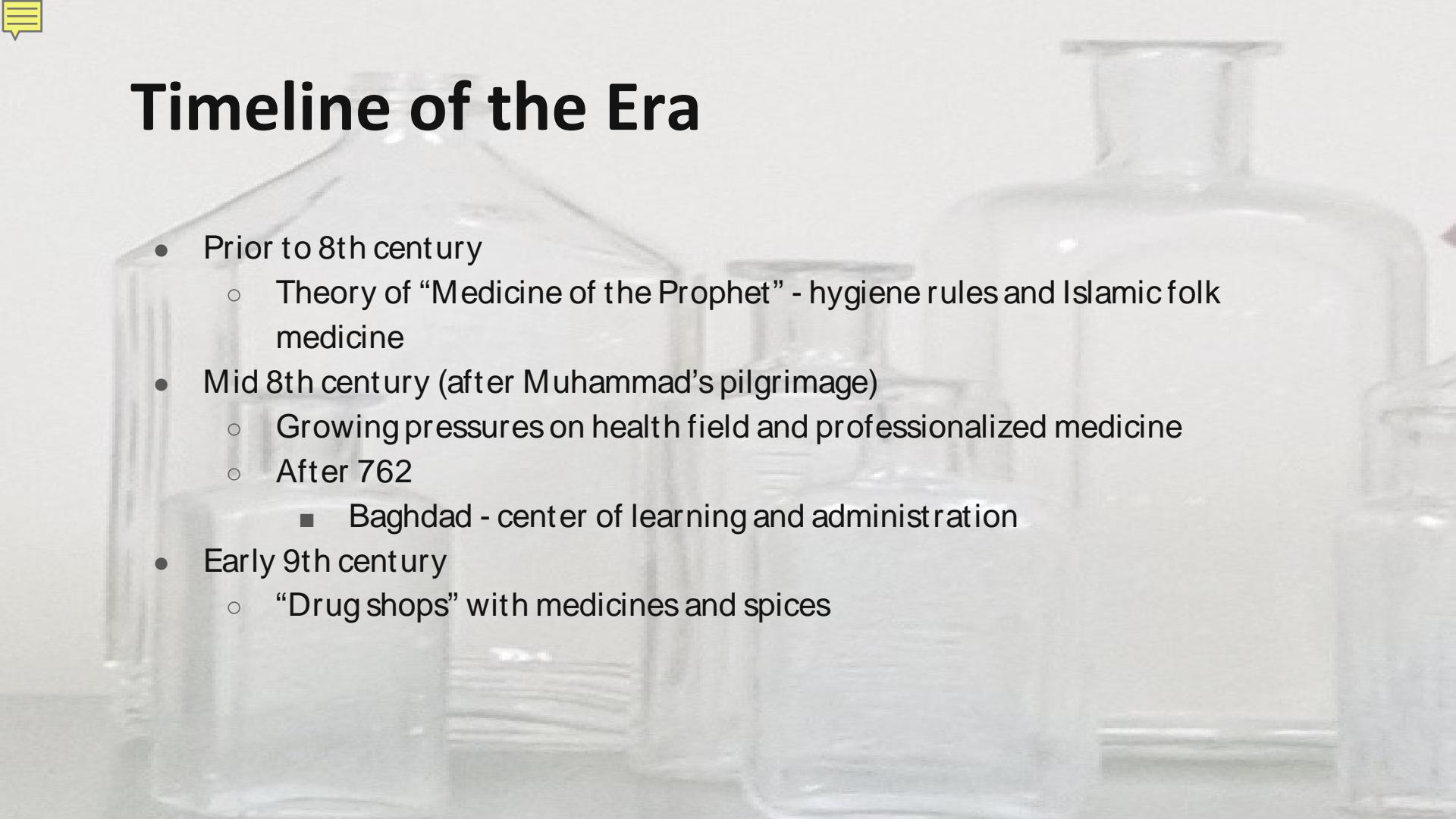
Overall Idea:

- Islamic literature was one of the largest forces in shaping the history of pharmacy



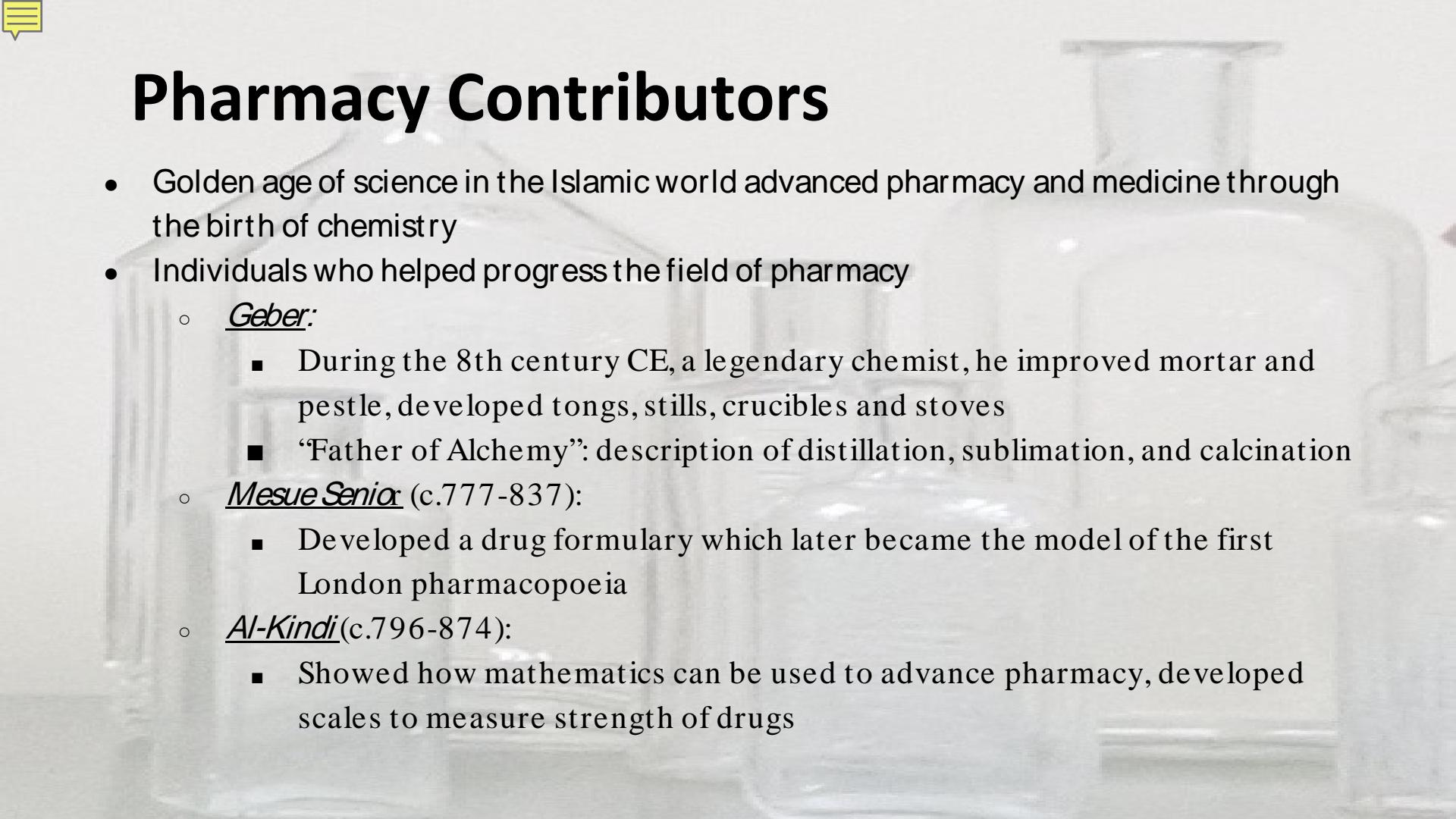
The Practice of Pharmacy

- Arabic world greatly influenced and strengthened the basis of continuing development of pharmacy
 - Islamic civilization spread rapidly in the seventh century into a great empire that extended from India in the East to what would become Spain in the West
 - Largely due to the vast amount of resources produced
 - Persian and Indian drugs had strong influence but was unknown to the Greco-Romans at the time
- Arabic advancements of pharmaceutical knowledge and idea for governmental responsibility for the health of their people
 - Fostered labor between pharmacy and medicine
 - Creation of Public Health system



Timeline of the Era

- Prior to 8th century
 - Theory of “Medicine of the Prophet” - hygiene rules and Islamic folk medicine
- Mid 8th century (after Muhammad’s pilgrimage)
 - Growing pressures on health field and professionalized medicine
 - After 762
 - Baghdad - center of learning and administration
- Early 9th century
 - “Drug shops” with medicines and spices



Pharmacy Contributors

- Golden age of science in the Islamic world advanced pharmacy and medicine through the birth of chemistry
- Individuals who helped progress the field of pharmacy
 - Geber:
 - During the 8th century CE, a legendary chemist, he improved mortar and pestle, developed tongs, stills, crucibles and stoves
 - “Father of Alchemy”: description of distillation, sublimation, and calcination
 - Mesue Senior (c.777-837):
 - Developed a drug formulary which later became the model of the first London pharmacopoeia
 - Al-Kindi (c.796-874):
 - Showed how mathematics can be used to advance pharmacy, developed scales to measure strength of drugs



Pharmacy Contributors

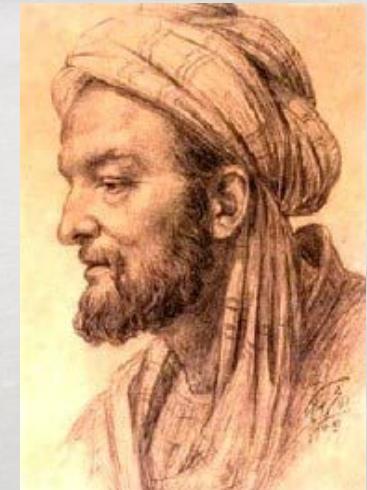
- Individuals who helped progress the field of pharmacy:
 - Albucasis (936-1013): known for inventing many medications, including one used to treat common cold that he called *Muthallaathat*, which was made from camphor, musk and honey that resembles today's Vicks Vapor Rub
 - Rhazes (936-1013):
 - Introduced case studies, separated wards in hospitals and used pills to administer medication
 - The first physician to distinguish measles from smallpox



<http://broughttolife.sciencemuseum.org.uk/broughttolife/people/alrazi>

Pharmacy Contributors

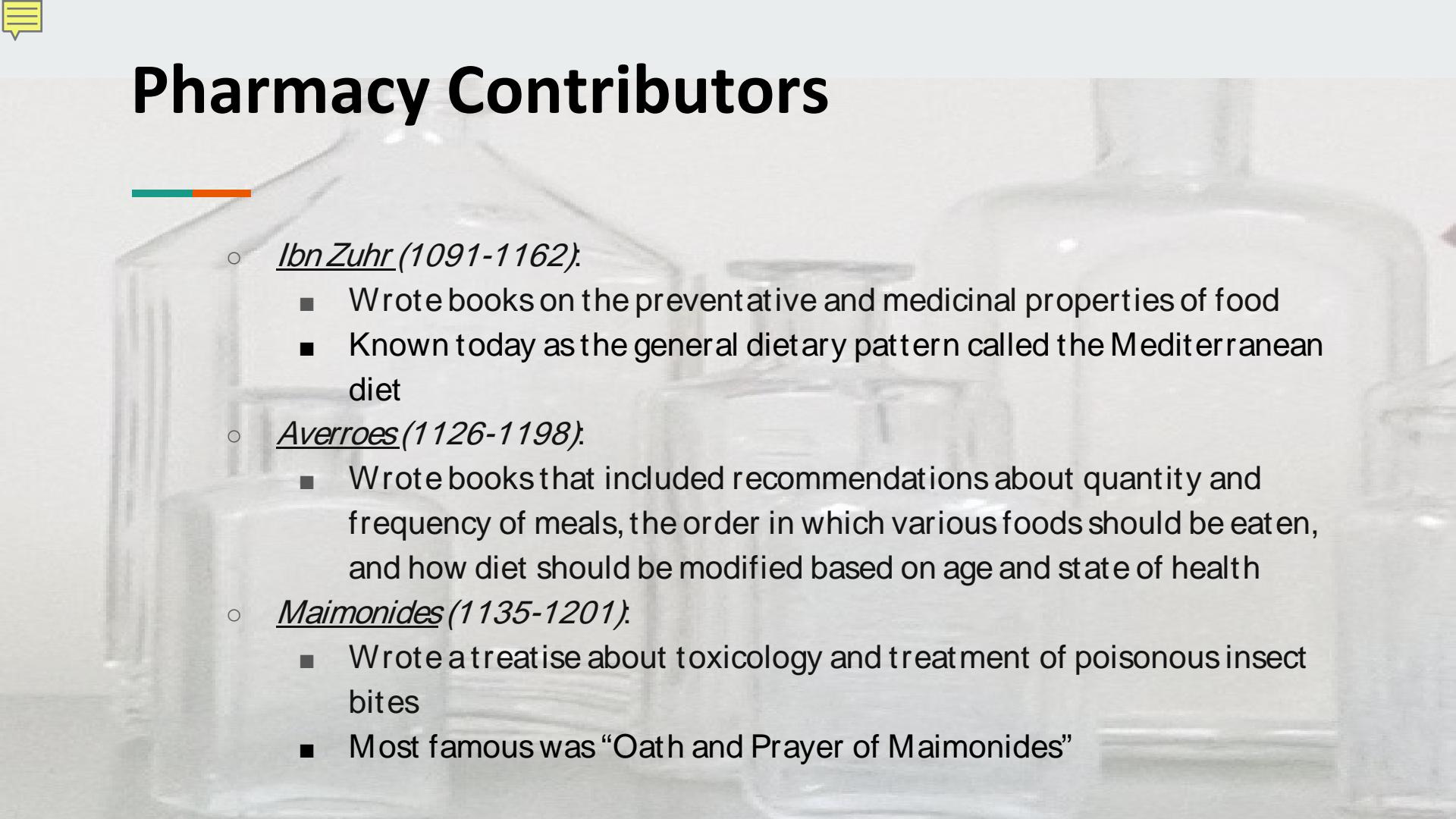
- Individuals who helped progress the field of pharmacy
cont.:
 - Avicenna (980-1037):
 - Wrote 200 medical treatises
 - *Cannon of Medicine*, a comprehensive medical encyclopedia. Two volumes about pharmacy: one on simples and one on compounds, including a cancer compound called *hindiba*
 - Contributed to the gilding and silvering of pills to make them easier to swallow



<https://www.the-philosophy.com/avicenna-ibn-i-sina-philosophy-summary>



Pharmacy Contributors



- Ibn Zuhr (1091-1162):
 - Wrote books on the preventative and medicinal properties of food
 - Known today as the general dietary pattern called the Mediterranean diet
- Averroes (1126-1198):
 - Wrote books that included recommendations about quantity and frequency of meals, the order in which various foods should be eaten, and how diet should be modified based on age and state of health
- Maimonides (1135-1201):
 - Wrote a treatise about toxicology and treatment of poisonous insect bites
 - Most famous was “Oath and Prayer of Maimonides”

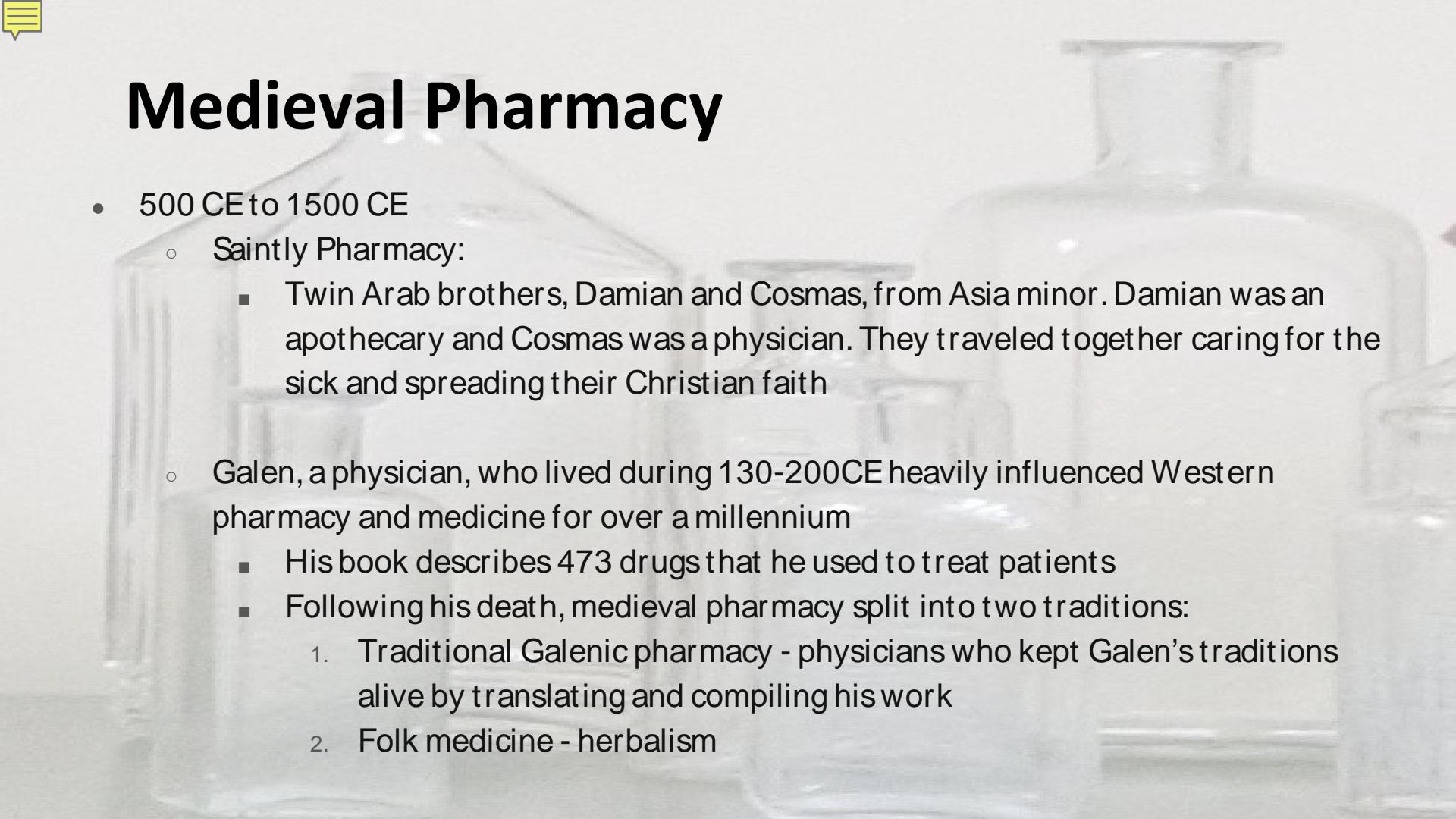


Summary of Arabic Influence

- The Arabic culture and literature made a distinctive place in the world of pharmacy
 - Considered a sideline of medical practitioner's office or technical commerce of marketplace vendors
- The most distinguishing features of Islamic medicine during medieval era includes:
 - New form of pharmacy literature in the formularies that serve as a guide in the preparation of drug recipes
 - Formularies written for hospital pharmacies
 - First full service pharmacy shops with educated and licensed pharmacists
- Arabic development helped to establish and shape Western pharmacy

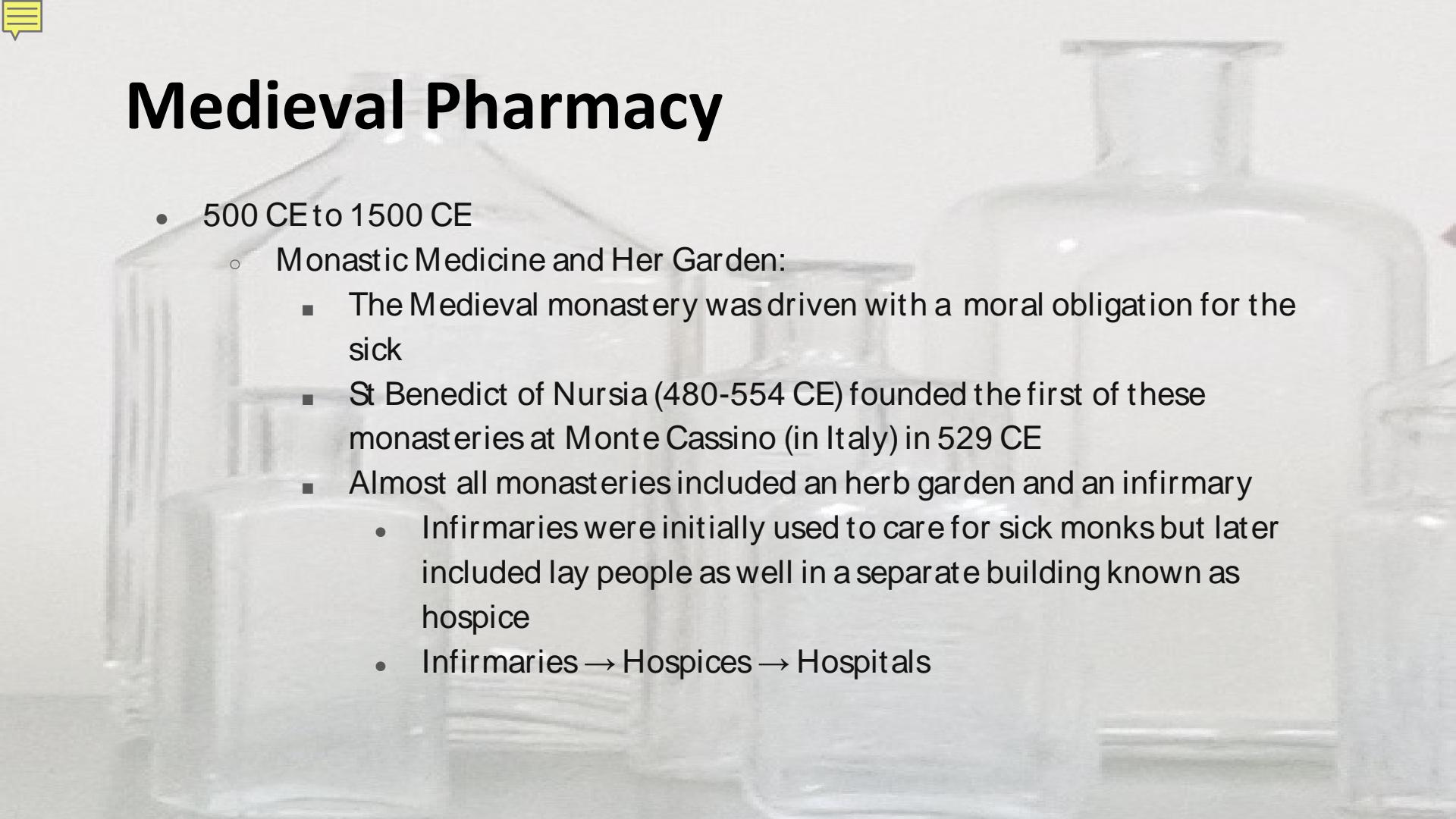
The Middle Ages: European World





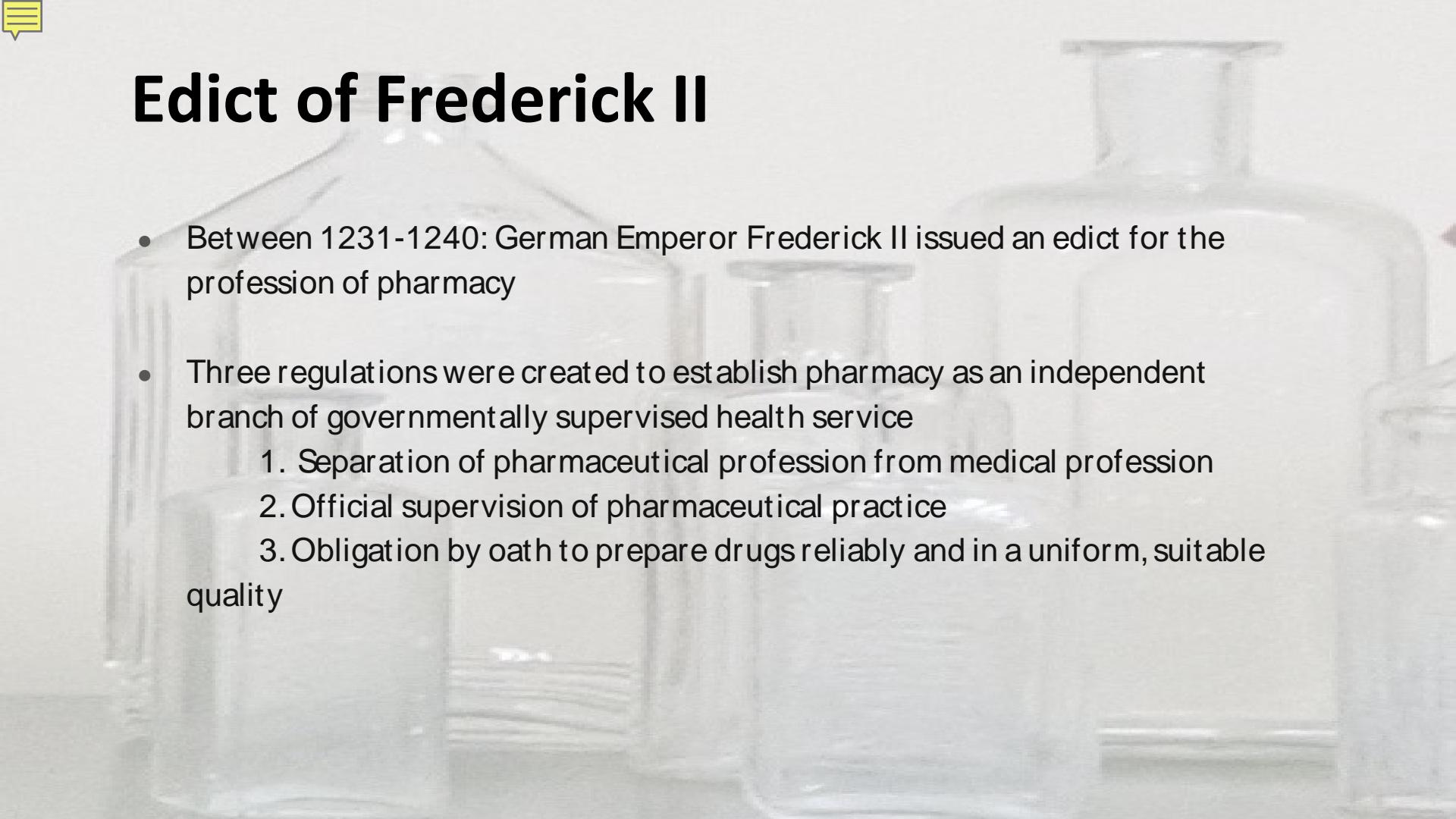
Medieval Pharmacy

- 500 CE to 1500 CE
 - Saintly Pharmacy:
 - Twin Arab brothers, Damian and Cosmas, from Asia minor. Damian was an apothecary and Cosmas was a physician. They traveled together caring for the sick and spreading their Christian faith
 - Galen, a physician, who lived during 130-200CE heavily influenced Western pharmacy and medicine for over a millennium
 - His book describes 473 drugs that he used to treat patients
 - Following his death, medieval pharmacy split into two traditions:
 1. Traditional Galenic pharmacy - physicians who kept Galen's traditions alive by translating and compiling his work
 2. Folk medicine - herbalism



Medieval Pharmacy

- 500 CE to 1500 CE
 - Monastic Medicine and Her Garden:
 - The Medieval monastery was driven with a moral obligation for the sick
 - St Benedict of Nursia (480-554 CE) founded the first of these monasteries at Monte Cassino (in Italy) in 529 CE
 - Almost all monasteries included an herb garden and an infirmary
 - Infiraries were initially used to care for sick monks but later included lay people as well in a separate building known as hospice
 - Infiraries → Hospices → Hospitals



Edict of Frederick II

- Between 1231-1240: German Emperor Frederick II issued an edict for the profession of pharmacy
- Three regulations were created to establish pharmacy as an independent branch of governmentally supervised health service
 1. Separation of pharmaceutical profession from medical profession
 2. Official supervision of pharmaceutical practice
 3. Obligation by oath to prepare drugs reliably and in a uniform, suitable quality

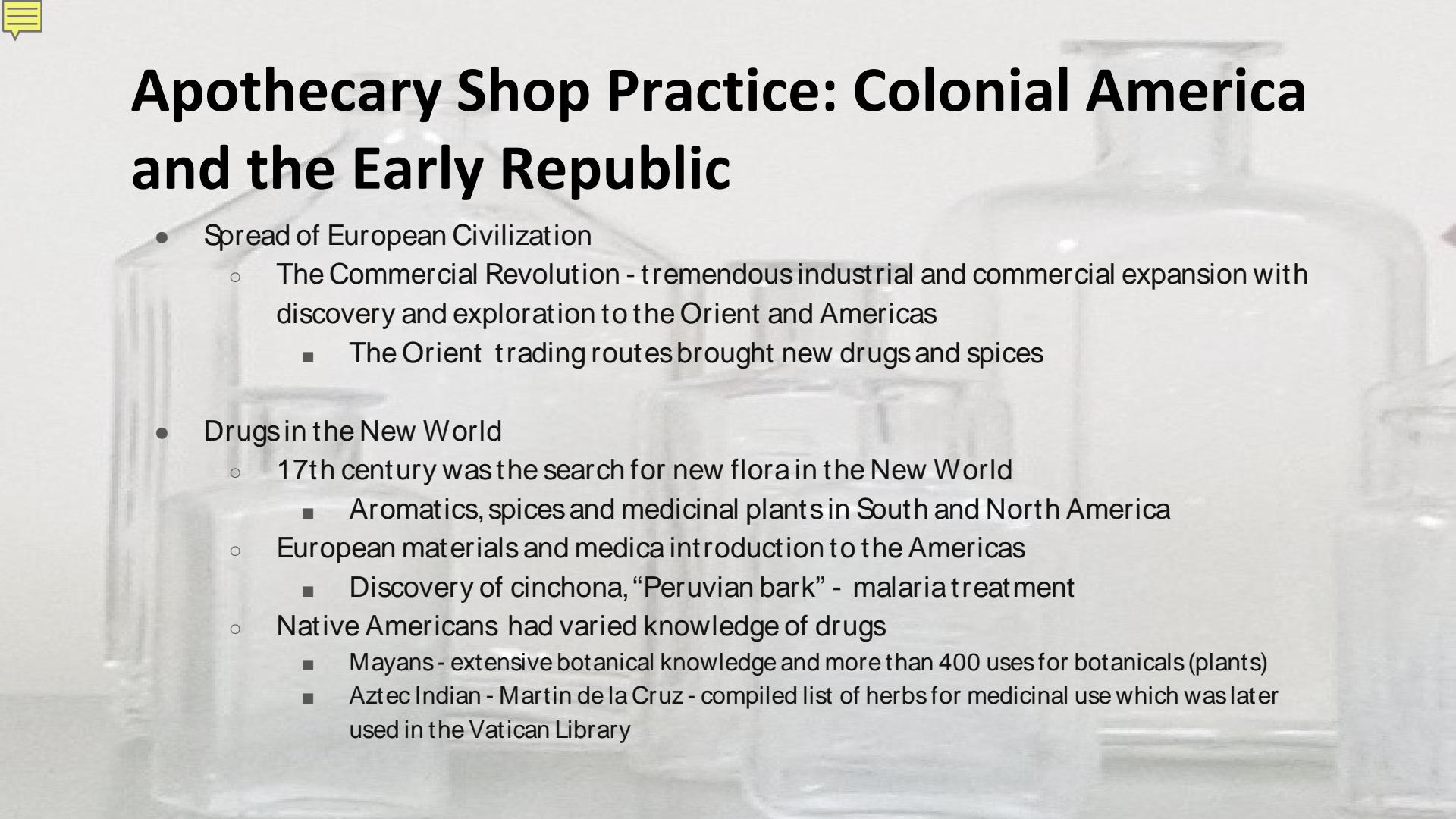


Birth of European Professional Pharmacy

- 13th century regulations allowed for the well-developed system of public pharmacies
 - Clerical dispensaries were initially open to general public, then later competition gave way to private pharmacies
- Profound impact in the Middle Ages
 - Citizen's need for publicly responsible specialist was recognized
 - The functions of a pharmacist (for more than 600 years):
 - Prepare medicaments
 - Try to ensure each medicine conformed to specifications

Colonial America





Apothecary Shop Practice: Colonial America and the Early Republic

- Spread of European Civilization
 - The Commercial Revolution - tremendous industrial and commercial expansion with discovery and exploration to the Orient and Americas
 - The Orient trading routes brought new drugs and spices
- Drugs in the New World
 - 17th century was the search for new flora in the New World
 - Aromatics, spices and medicinal plants in South and North America
 - European materials and medica introduction to the Americas
 - Discovery of cinchona, “Peruvian bark” - malaria treatment
 - Native Americans had varied knowledge of drugs
 - Mayans - extensive botanical knowledge and more than 400 uses for botanicals (plants)
 - Aztec Indian - Martin de la Cruz - compiled list of herbs for medicinal use which was later used in the Vatican Library

Cinchona, “Peruvian bark”



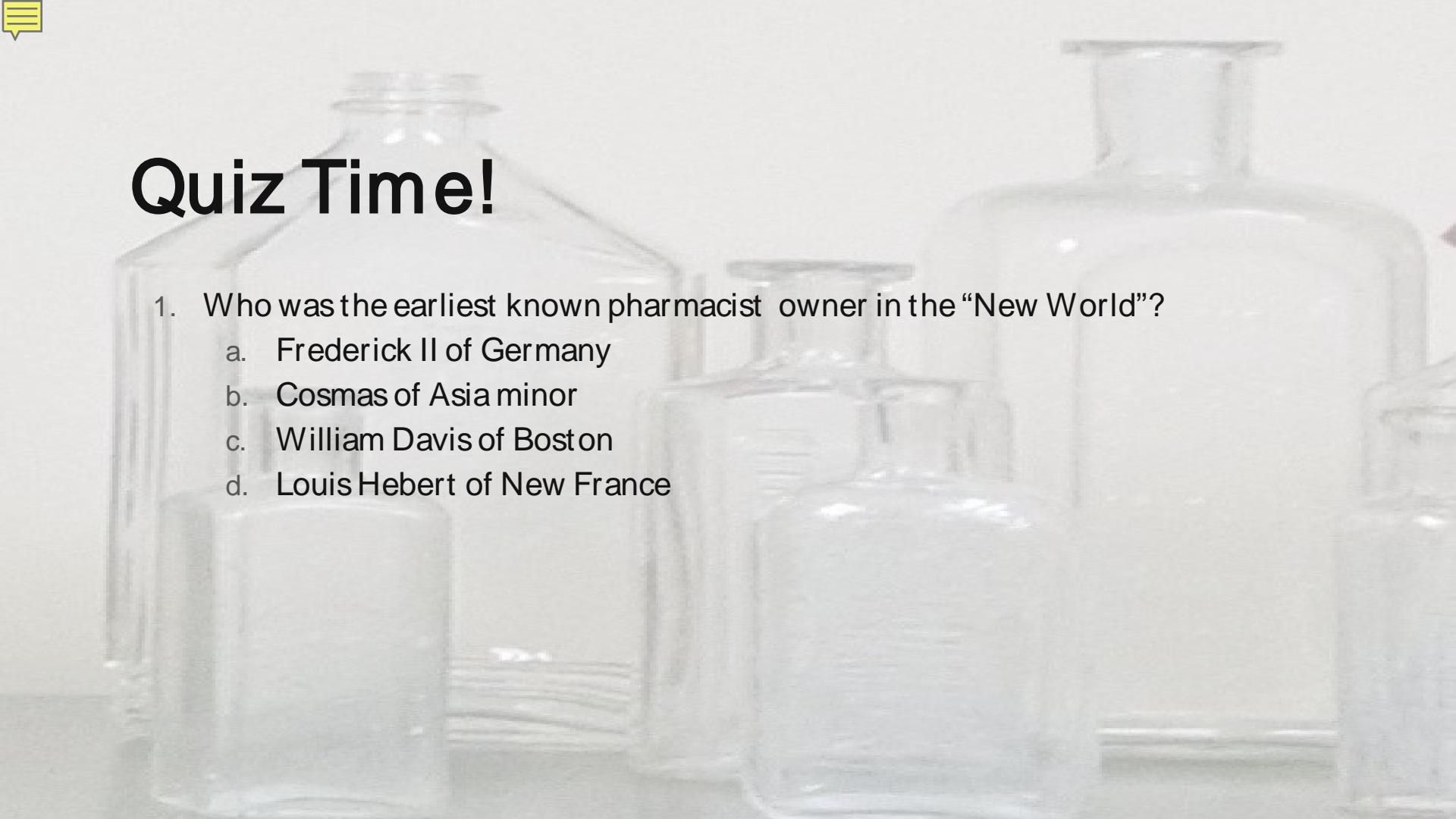
Apothecary Shop Practice: Colonial America and the Early Republic

- New Spain
 - The Spanish regulated medicine & pharmacy more strictly than the French, requiring a chief pharmacist to be responsible for compounding prescriptions in all colonial hospitals
- New France: Louis Hebert
 - French apothecary - landed in Western Nova Scotia with 50 settlers
 - Took care of the settlers' medical needs and learned about the native plants from the Micmac Indians
- New Sweden and New Netherlands: Gysbert van Imbroch
 - 1653 - practiced medicine and sold drugs as part of a general store
 - Barber-surgeon shop - may have been one of the first drug stores in North America



Apothecary Shop Practice: Colonial America and the Early Republic

- Pilgrims and Puritans in New England:
 - John Winthrop:
 - Later became the governor of Connecticut colony
 - Took avid interest in preparing medicine
 - Robert Cooke - trained English apothecary - assisted in preparing medicine (c. 1615-1640s)
 - Winthrop Jr.
 - Went beyond importing herbs from Europe
 - Prepared compounds from saltpeter, antimony, mercury and sulfur
- William Davis of Boston
 - First pharmacy owner in New England colonies
 - 1646 - fence built around window to help his apothecary



Quiz Time!

1. Who was the earliest known pharmacist owner in the “New World”?
 - a. Frederick II of Germany
 - b. Cosmas of Asia minor
 - c. William Davis of Boston
 - d. Louis Hebert of New France

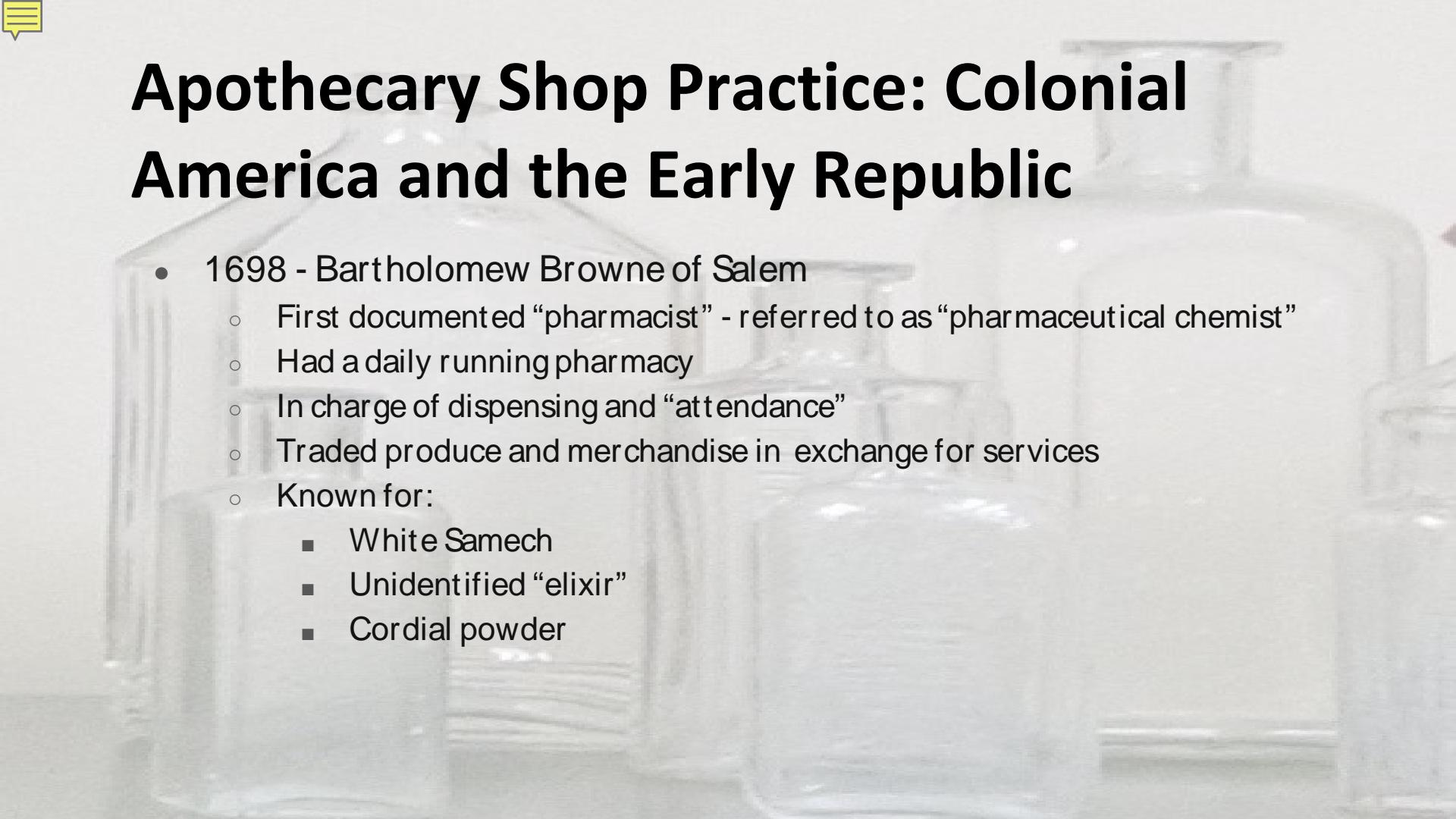
Apothecary Shop Practice: Colonial America and the Early Republic

- 1607: Thomas Field and John Harford (Virginia) - English apothecaries
 - Sent requests back to London for ministers, surgeons, and druggists
 - Early days of Virginian settlement - large presence of druggists and apothecaries despite lack of recording in history
- By 1700s, influx of physicians to the New England territories
 - Giles Firmin of Sudbury was one of the first physicians, but died shortly after arrival
 - His son followed and became a physician and apothecary (aka general practitioner)



Apothecary Shop Practice: Colonial America and the Early Republic

- Drugs in the New World
 - Drugs utilized by North American Indians documented by explorers and medical practitioners
 - Roughly 170 drugs were later officiated in the United States Pharmacopeia and/or National Formulary
- Early 18th century Europeans transplanted medicinal herbs from Spanish Central and South America to the Botanical Garden in Savannah, GA
 - Botanist Robert Miller travelled 5 years
 - Found ipecac, jalap, sarsaparilla, cinchona trees, etc.



Apothecary Shop Practice: Colonial America and the Early Republic

- 1698 - Bartholomew Browne of Salem
 - First documented “pharmacist” - referred to as “pharmaceutical chemist”
 - Had a daily running pharmacy
 - In charge of dispensing and “attendance”
 - Traded produce and merchandise in exchange for services
 - Known for:
 - White Samech
 - Unidentified “elixir”
 - Cordial powder



Apothecary Shop Practice: Colonial America and the Early Republic

- 18th century - development of American drugstores
 - Population expansion - increasing need for different modes of delivery to the people
 - The four ways of dispensing:
 1. Physician
 2. Apothecary Shop
 3. General Store
 4. Wholesale Druggist



Apothecary Shop Practice: Colonial America and the Early Republic

1. Physician

- Earliest documented beginnings in 17th-18th century New England
 - Medical practitioner - diagnose and treat with medications and surgery if necessary

2. Apothecary Shops

- “Doctor Shops” - nearly indistinguishable from “apothecary shops”
 - Run by practitioner of medicine - dispensed their own medications
- Apothecary - pharmaceutical practitioner specialist
 - Bartholomew Browne



Apothecary Shop Practice: Colonial America and the Early Republic

3. General Store

- Merchants with no claim to medical or pharmaceutical knowledge
 - Sold drugs solely for profit

4. Wholesale Druggist

- 18th century version of wholesale distributor
 - Smith, Moore & Co. - huge wholesaler that advertised collections of *materia medica*, botanical, chemical, and Galenical items



Fun fact!

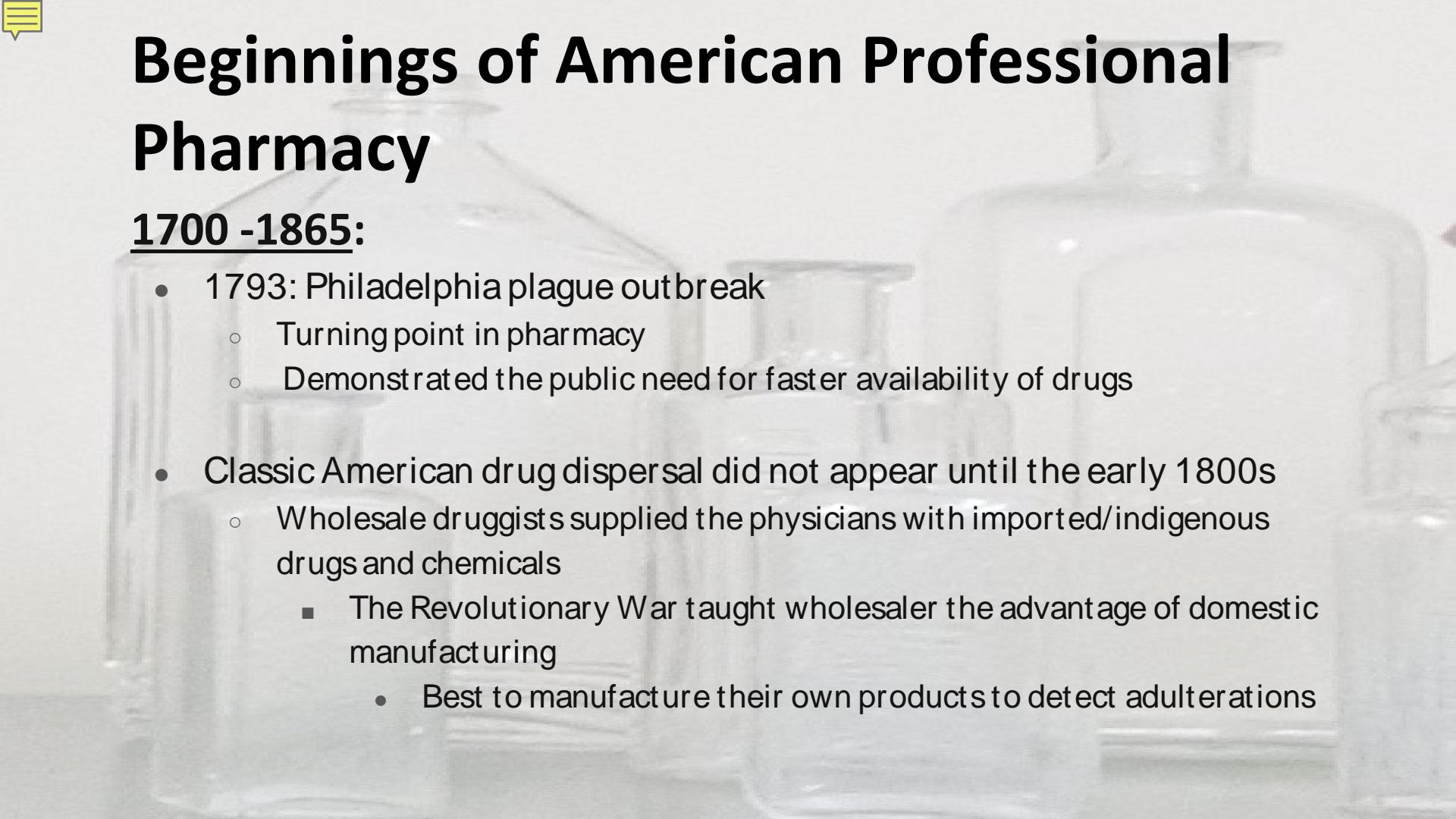
1. Which of the founding fathers owned a General Store?
 - a. George Washington
 - b. Benjamin Franklin
 - c. Alexander Hamilton
 - d. Thomas Jefferson





Apothecary Shop Practice: Colonial America and the Early Republic

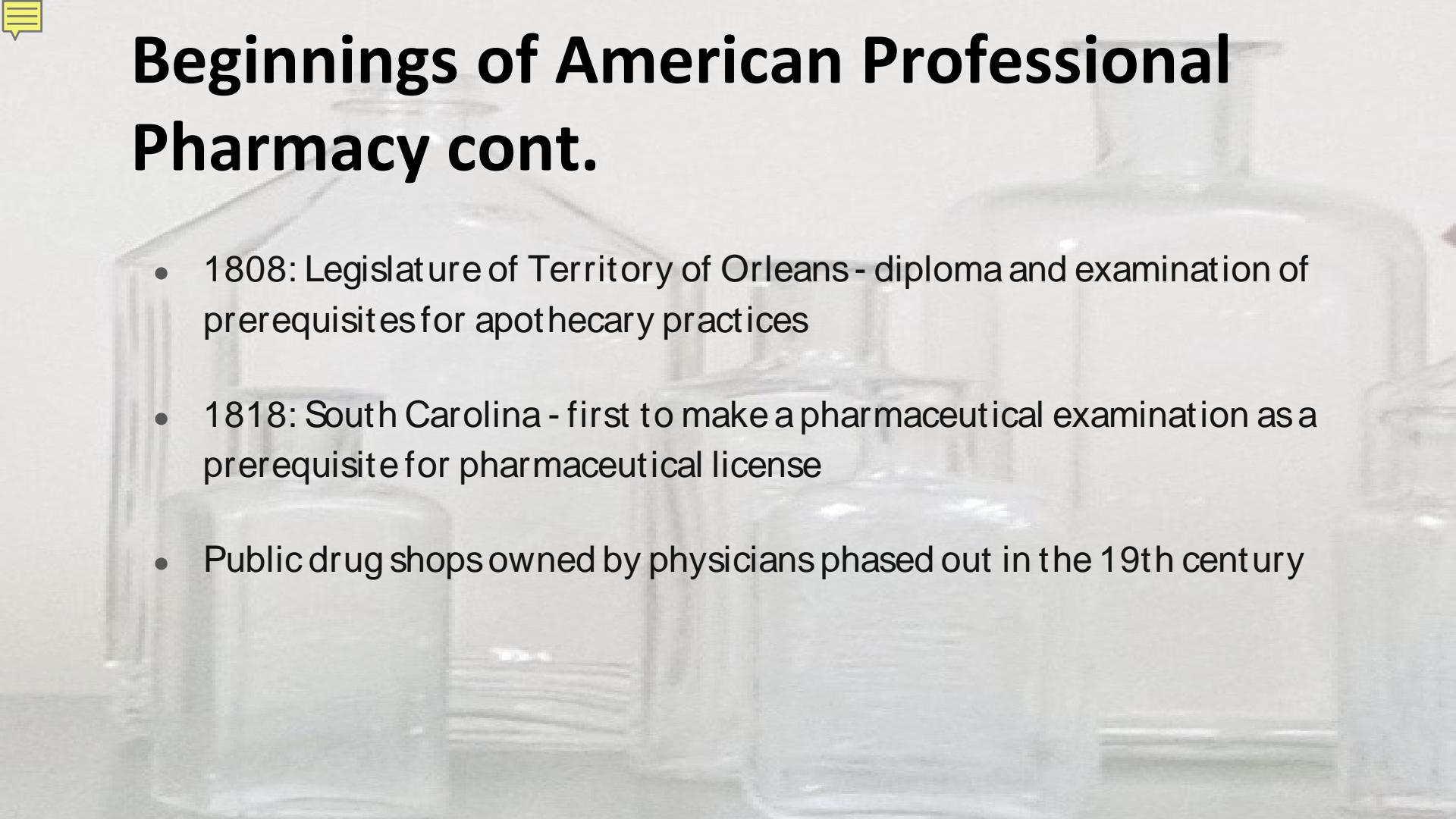
- Philadelphia: Christopher Marshall (1709-1797):
 - Founded apothecary shop in Philadelphia - expanded as a manufacturer of pharmaceuticals
- Pennsylvania Hospital and the birth of American Pharmacy:
 - North America's first hospital (1701-1790)
 - Practice of pharmacy as a separate and distinct field of medicine got its first boost
 - First American hospital pharmacy established
 - Due to an over shipment of drugs from London, drugs were stored in a special facility
- Attempted separation of pharmacy from medicine
 - John Morgan - former Pennsylvania Hospital pharmacist (1755-1765)
 - Attempted to solidify practice of writing prescriptions



Beginnings of American Professional Pharmacy

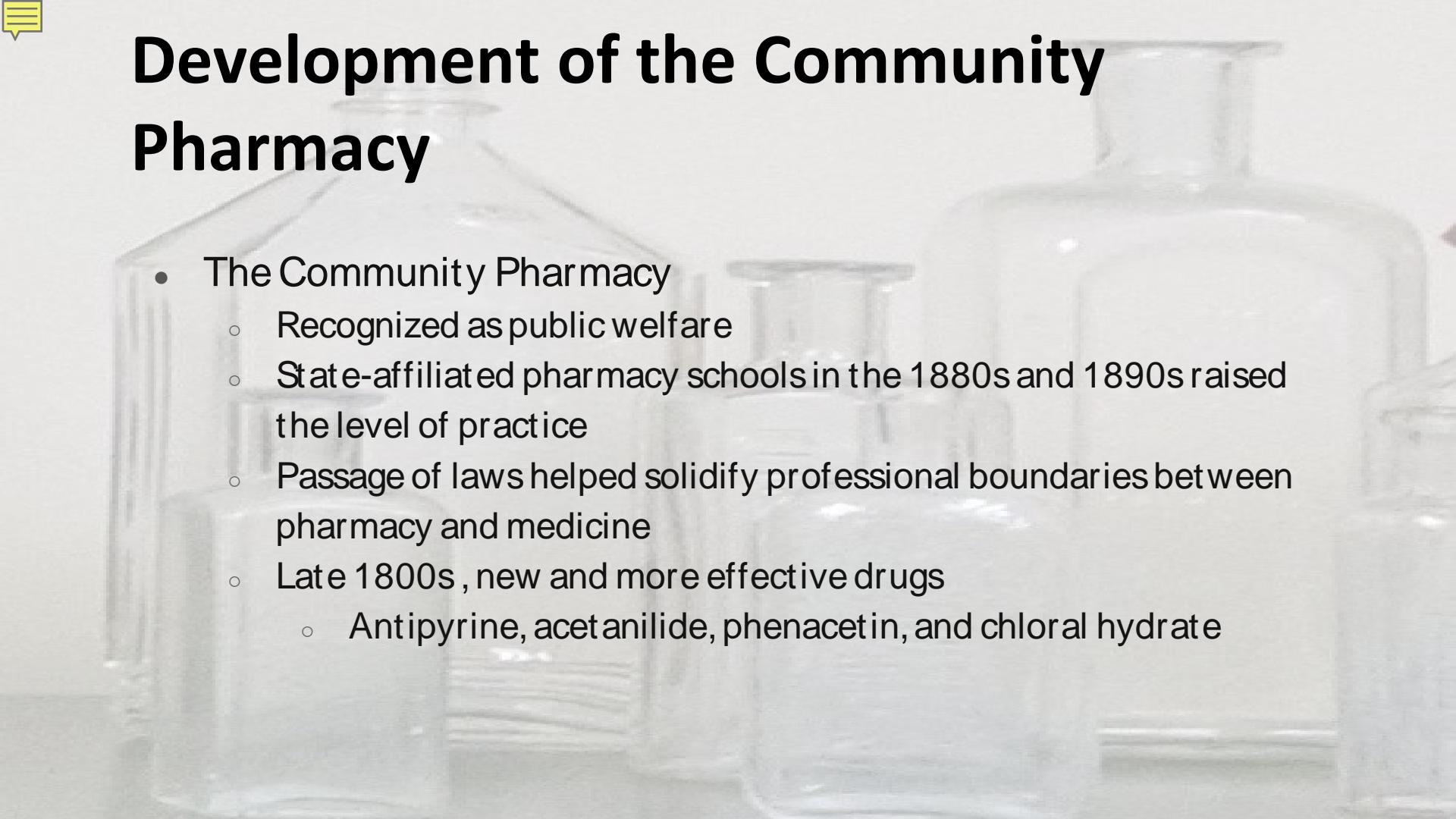
1700 -1865:

- 1793: Philadelphia plague outbreak
 - Turning point in pharmacy
 - Demonstrated the public need for faster availability of drugs
- Classic American drug dispersal did not appear until the early 1800s
 - Wholesale druggists supplied the physicians with imported/indigenous drugs and chemicals
 - The Revolutionary War taught wholesaler the advantage of domestic manufacturing
 - Best to manufacture their own products to detect adulterations



Beginnings of American Professional Pharmacy cont.

- 1808: Legislature of Territory of Orleans - diploma and examination of prerequisites for apothecary practices
- 1818: South Carolina - first to make a pharmaceutical examination as a prerequisite for pharmaceutical license
- Public drug shops owned by physicians phased out in the 19th century



Development of the Community Pharmacy

- The Community Pharmacy
 - Recognized as public welfare
 - State-affiliated pharmacy schools in the 1880s and 1890s raised the level of practice
 - Passage of laws helped solidify professional boundaries between pharmacy and medicine
 - Late 1800s, new and more effective drugs
 - Antipyrine, acetanilide, phenacetin, and chloral hydrate



American Pharmacy's First Great Transformation

- Before Civil War
 - Little opportunity for pharmacists
 - Drug were usually sold with everyday items in general stores
- True profession did not begin to exist until APhA
 - Founded in 1852
 - Collected statistical data on condition of pharmacy
- After the Civil War
 - Pharmacists evolved from manufacturers to compounding experts to professionalized dispensers

American Pharmacists Association (APhA)

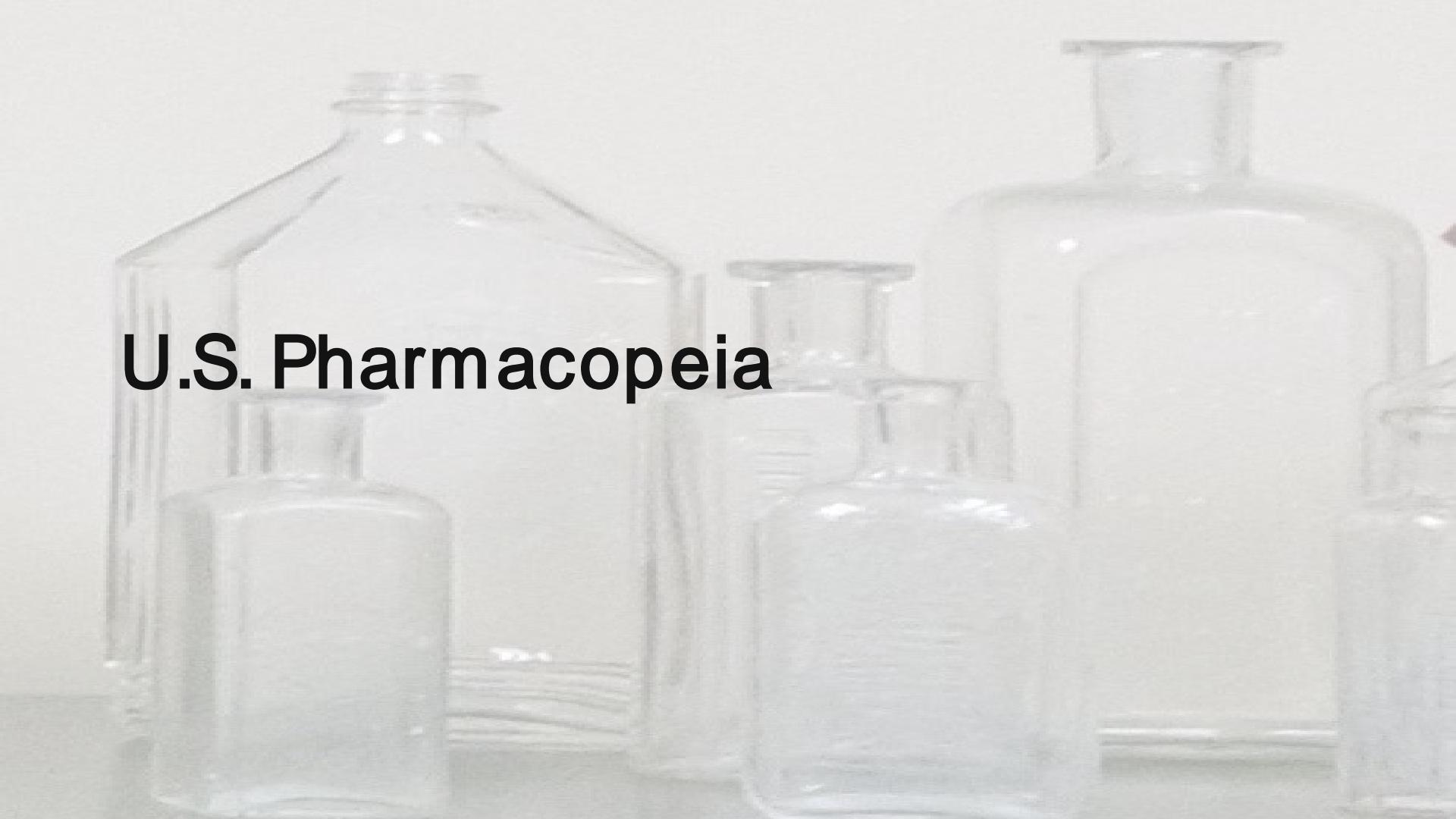
When established, they focused on **8 main objectives**:

- Creating a national association with code of ethics
- Support pharmacy schools
- Improve selection of pharmacy apprentices
- Investigate secret medicines
- Urge enactment of laws for inspection of imported drugs
- Curb poison sales
- Separate pharmacy from practice of medicine
- Encourage presentation of original paper on pharmacy & science

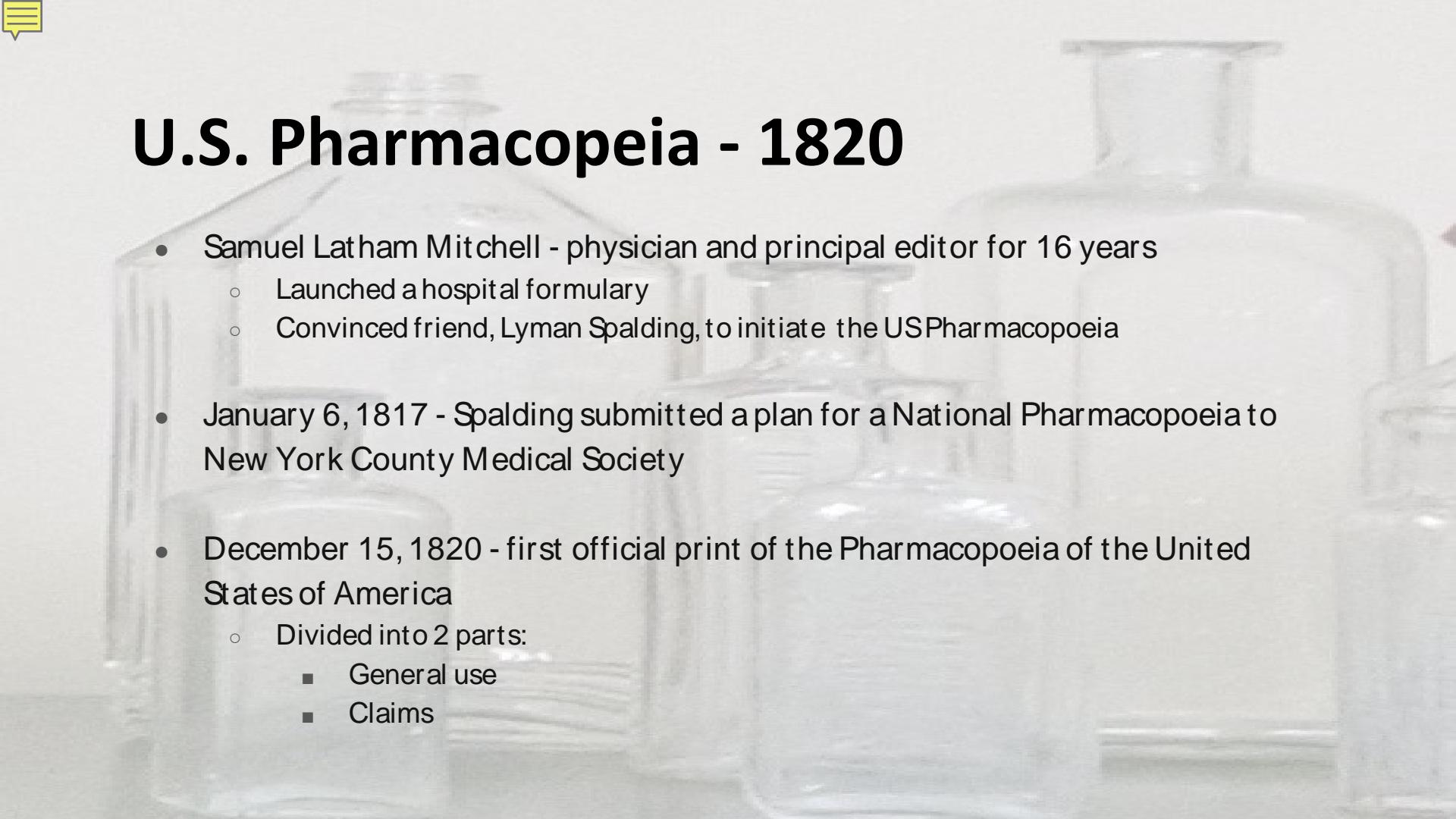


Quiz Time

1. Which state was the first to make a pharmaceutical examination as a prerequisite for pharmaceutical license?
 - A. South Carolina
 - B. New York
 - C. New Mexico
 - D. Philadelphia

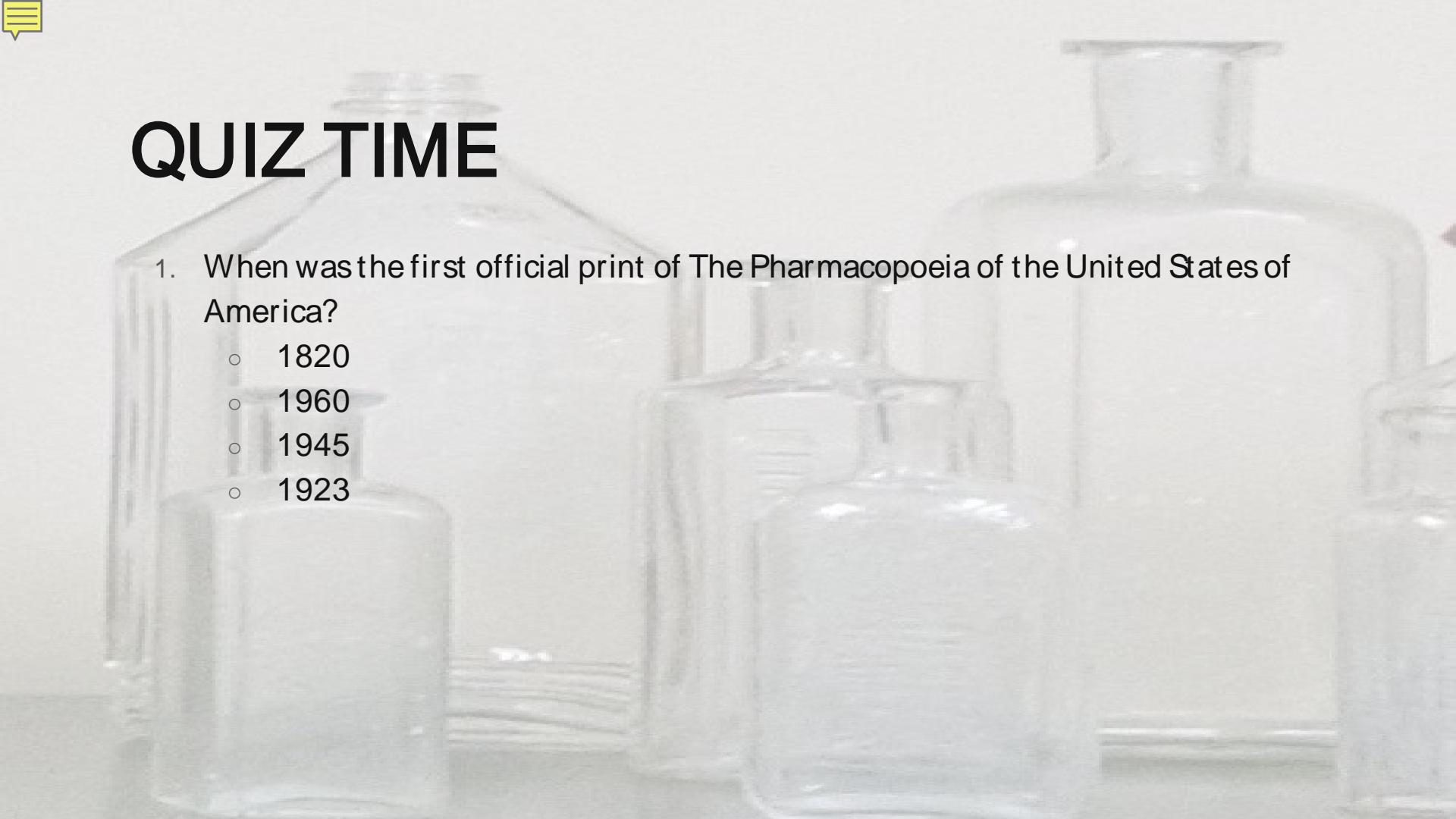


U.S. Pharmacopeia



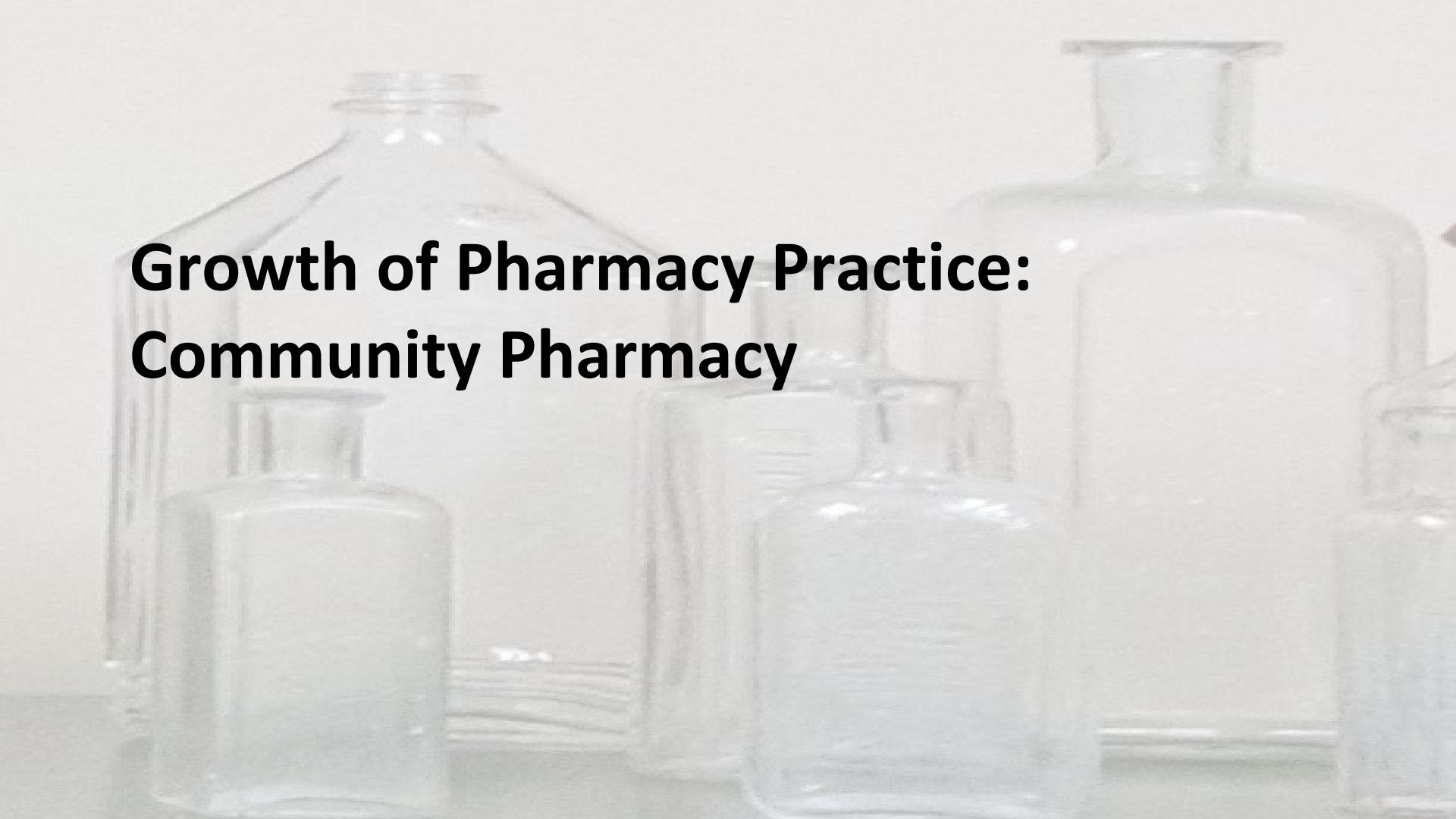
U.S. Pharmacopeia - 1820

- Samuel Latham Mitchell - physician and principal editor for 16 years
 - Launched a hospital formulary
 - Convinced friend, Lyman Spalding, to initiate the USPharmacopoeia
- January 6, 1817 - Spalding submitted a plan for a National Pharmacopoeia to New York County Medical Society
- December 15, 1820 - first official print of the Pharmacopoeia of the United States of America
 - Divided into 2 parts:
 - General use
 - Claims



QUIZ TIME

1. When was the first official print of The Pharmacopoeia of the United States of America?
 - 1820
 - 1960
 - 1945
 - 1923



Growth of Pharmacy Practice: Community Pharmacy



Pharmacy Practice

- 18th to 20th century → evolving from old-fashioned drugstores to more professional pharmacies
 - Community pharmacies operated within a framework of business enterprises
 - Some pharmacies started being incorporated into supermarkets
 - Rx and health-related products require <5% of total floor area
 - Pharmacies receiving 50% or more of their revenue from their prescription sale increased from 1% in 1931 to 16% in 1962
 - Increasing prescription numbers due to more effective drugs, less dispensing by physicians and increasing trend in prescribing individual drugs rather than compounded medications
 - Emergence of chain stores



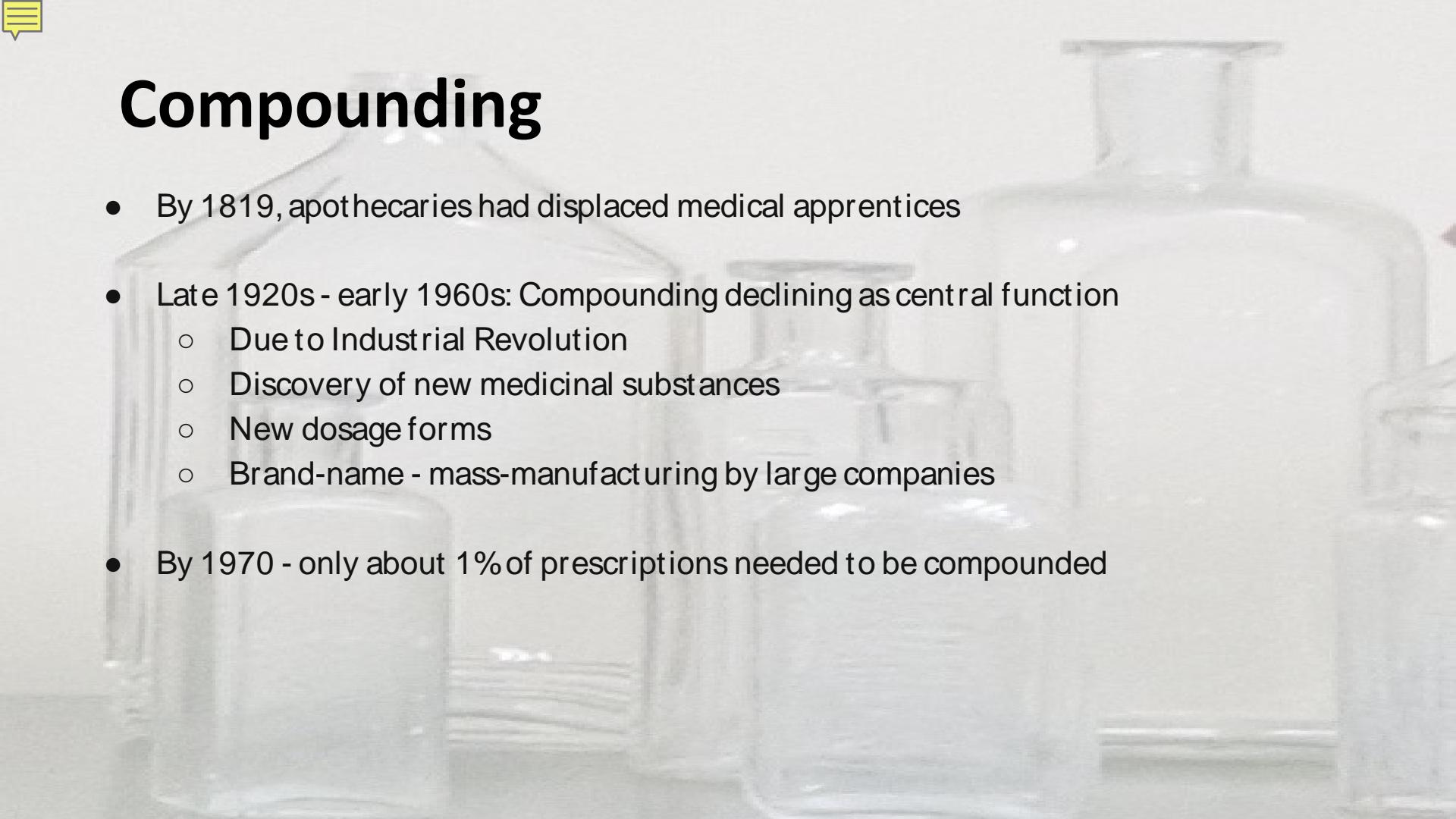
Pharmacy Practice

- 18th to 20th century → evolving from old-fashioned drugstores to more professional pharmacies
 - However, there was a trend toward more establishments specializing in pharmaceutical services
 - In 1960s, APhA started encouraging pharmacist involvement in direct patient care (e.g., counseling, monitoring, etc.)
 - The compact professional-office type layout started becoming more common
 - In recent years, pharmacists started providing more personalized pharmaceutical services in settings such as pharmacy-clinics, medication therapy managements, etc.



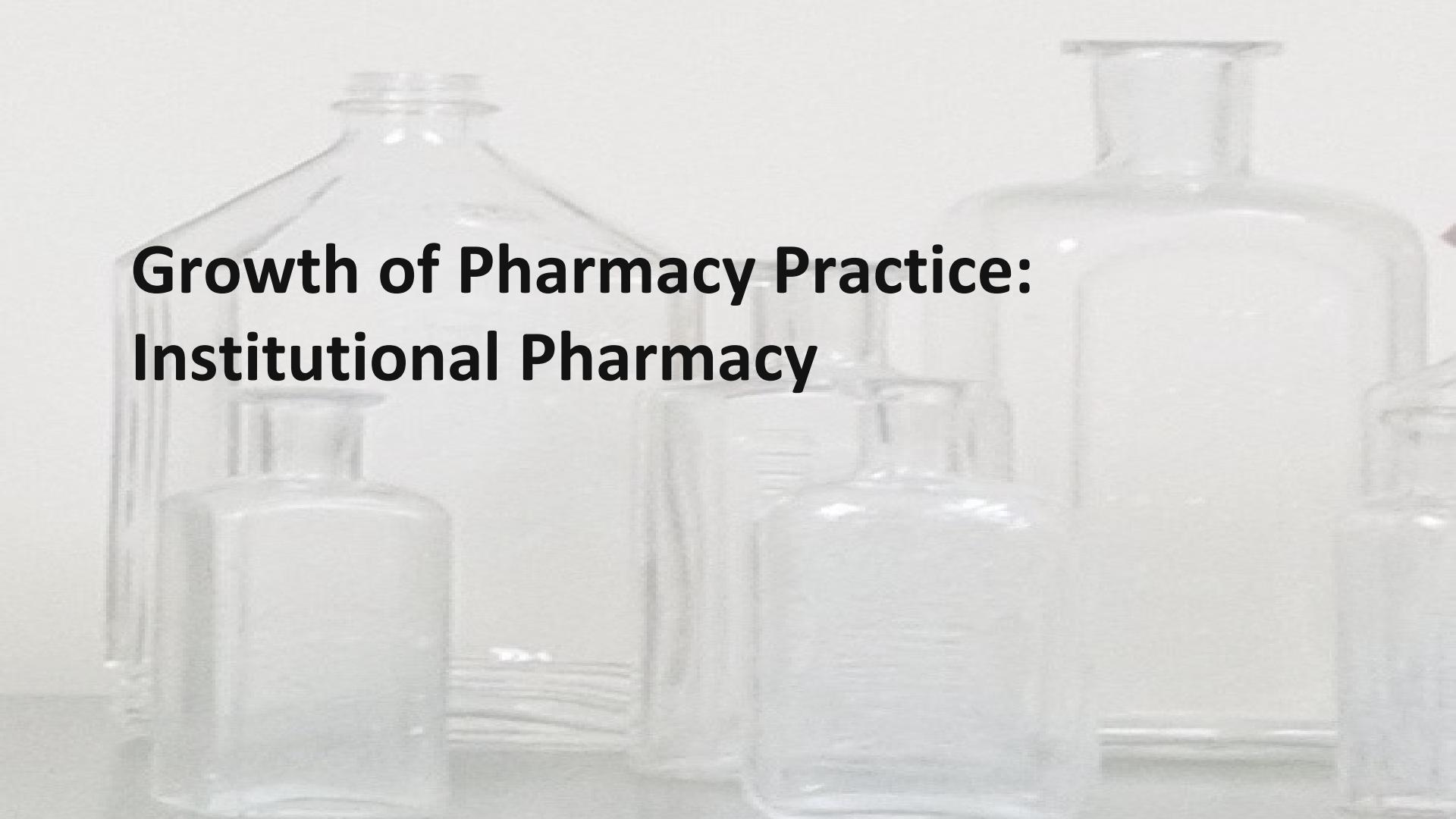
Pharmacy Practice

- Until 1940s - Pharmacist services were caught up in controversies related to “third party payments”
 - Tradition of patient’s fee for services rendered by health professionals were breaking down
- Late 1950s: implications of bringing prescription costs to health insurance were examined
- Early 1960s - APhA encouraged new framework of “patient - orientation”
- By late 1960s: one-third of Americans covered for “major medical”
- 1964-1969: organizations developed to provide prepaid prescription programs and/or assist with insurance companies
 - Paid Prescriptions, Prepaid Prescription Plans, and Pharmaceutical Card System Inc.
- By 1974: some third party plan were paying at least part of costs
- Overall: There was a clear decision within the American society - medical care payments would change

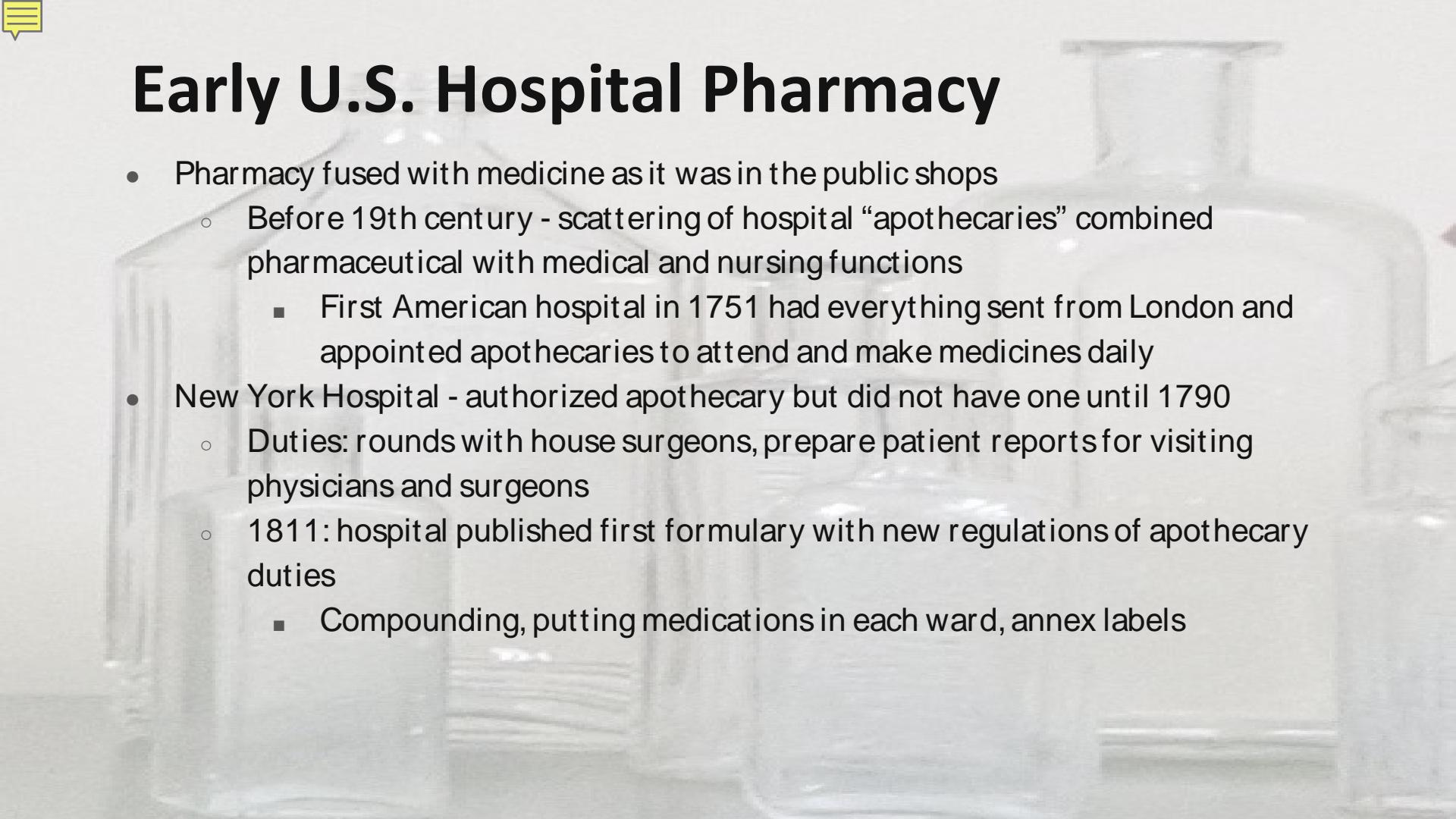


Compounding

- By 1819, apothecaries had displaced medical apprentices
- Late 1920s - early 1960s: Compounding declining as central function
 - Due to Industrial Revolution
 - Discovery of new medicinal substances
 - New dosage forms
 - Brand-name - mass-manufacturing by large companies
- By 1970 - only about 1% of prescriptions needed to be compounded

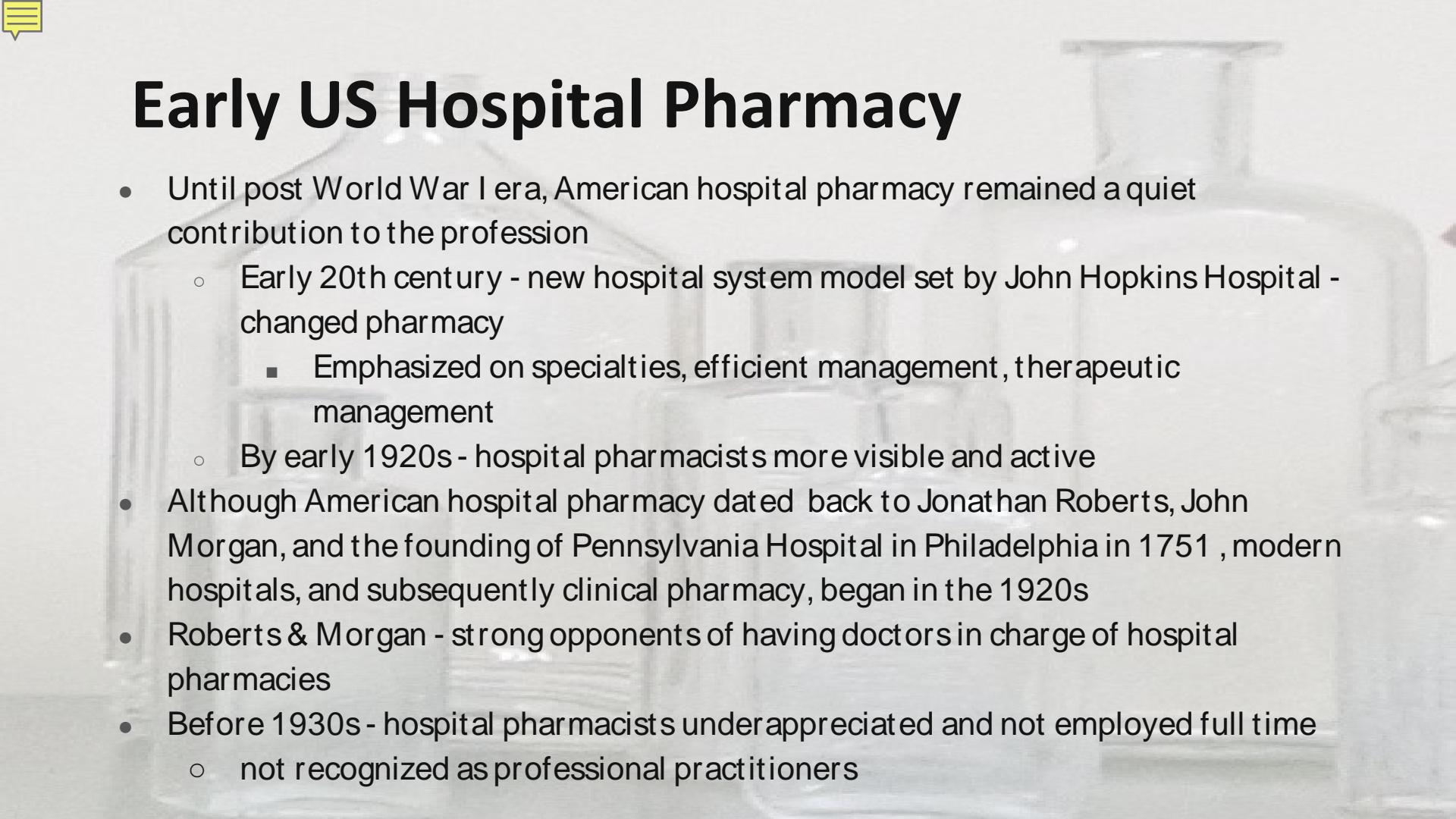


Growth of Pharmacy Practice: Institutional Pharmacy



Early U.S. Hospital Pharmacy

- Pharmacy fused with medicine as it was in the public shops
 - Before 19th century - scattering of hospital “apothecaries” combined pharmaceutical with medical and nursing functions
 - First American hospital in 1751 had everything sent from London and appointed apothecaries to attend and make medicines daily
- New York Hospital - authorized apothecary but did not have one until 1790
 - Duties: rounds with house surgeons, prepare patient reports for visiting physicians and surgeons
 - 1811: hospital published first formulary with new regulations of apothecary duties
 - Compounding, putting medications in each ward, annex labels



Early US Hospital Pharmacy

- Until post World War I era, American hospital pharmacy remained a quiet contribution to the profession
 - Early 20th century - new hospital system model set by John Hopkins Hospital - changed pharmacy
 - Emphasized on specialties, efficient management, therapeutic management
 - By early 1920s - hospital pharmacists more visible and active
- Although American hospital pharmacy dated back to Jonathan Roberts, John Morgan, and the founding of Pennsylvania Hospital in Philadelphia in 1751 , modern hospitals, and subsequently clinical pharmacy, began in the 1920s
- Roberts & Morgan - strong opponents of having doctors in charge of hospital pharmacies
- Before 1930s - hospital pharmacists underappreciated and not employed full time
 - not recognized as professional practitioners

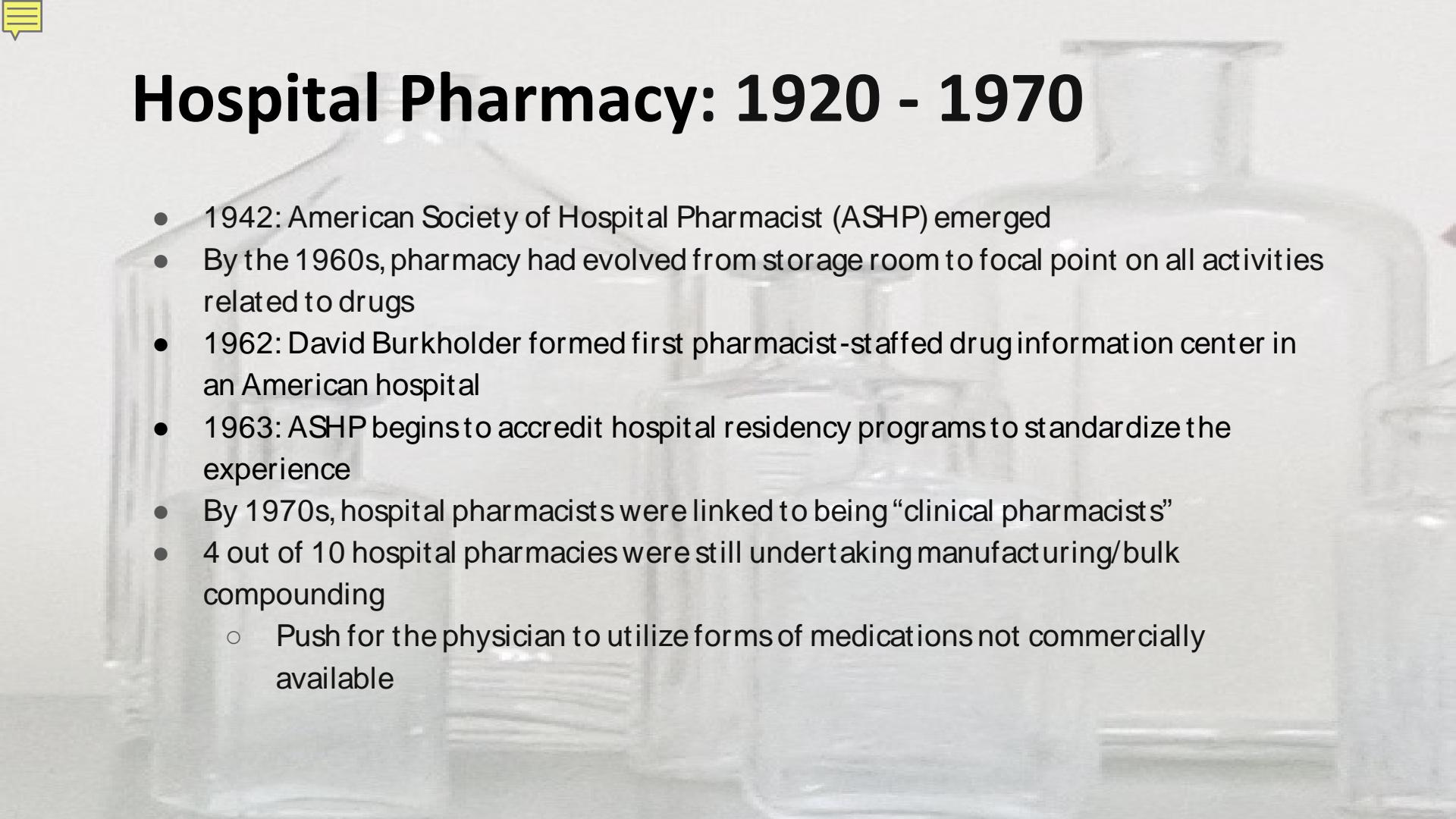
Hospital Pharmacy: 1920 - 1970

- Advancements in professional development of hospital pharmacist
 - Through APhA and ASHP (American Society of Hospital Pharmacists)
 - Organized local groups
 - Education:
 - Implemented standards for internships in hospitals
 - Pharmacists → drug therapy consultant to doctors and nurses
- Changes in legislature allowed hospital pharmacists to apply knowledge to greater extent than community pharmacist



Hospital Pharmacy: 1920 - 1970

- 1925: Hospital Pharmacy Association of Southern California formed
 - By 1939 - California, Illinois, Indiana, Iowa, Minnesota, Nebraska, New York, Ohio, Pennsylvania, and Wisconsin had state hospital pharmacy associations
- 1927: Harvey Whitey - 1st formal pharmacy internship program
 - Model for today's residency program
- 1928: Louis C. Michigan
 - Introduced practice of rounds with physicians
 - Hospital pharmacists delivered seminars on drug therapies and other pharmacy related topics for hospital staff



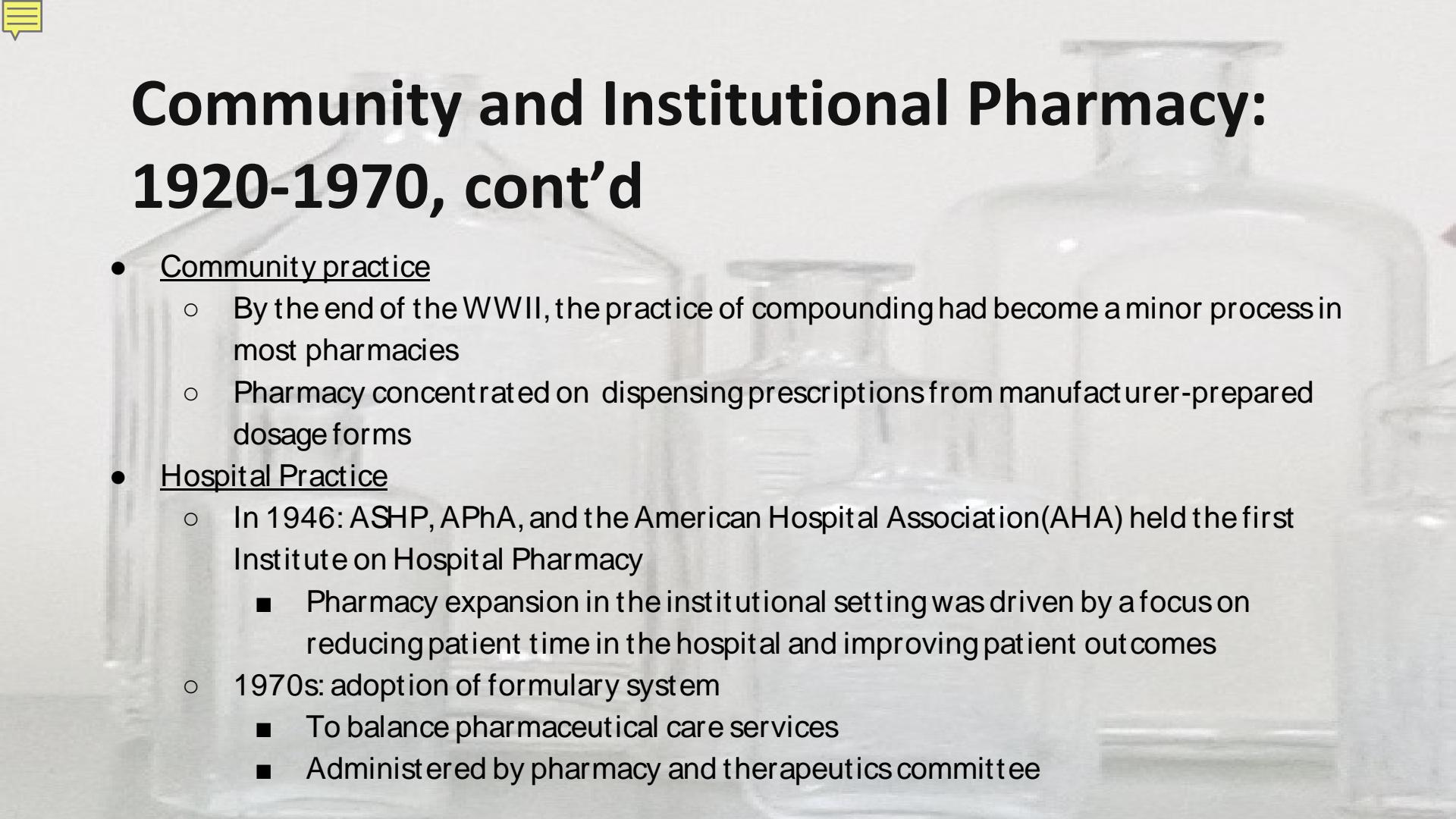
Hospital Pharmacy: 1920 - 1970

- 1942: American Society of Hospital Pharmacists (ASHP) emerged
- By the 1960s, pharmacy had evolved from storage room to focal point on all activities related to drugs
- 1962: David Burkholder formed first pharmacist-staffed drug information center in an American hospital
- 1963: ASHP begins to accredit hospital residency programs to standardize the experience
- By 1970s, hospital pharmacists were linked to being “clinical pharmacists”
- 4 out of 10 hospital pharmacies were still undertaking manufacturing/bulk compounding
 - Push for the physician to utilize forms of medications not commercially available



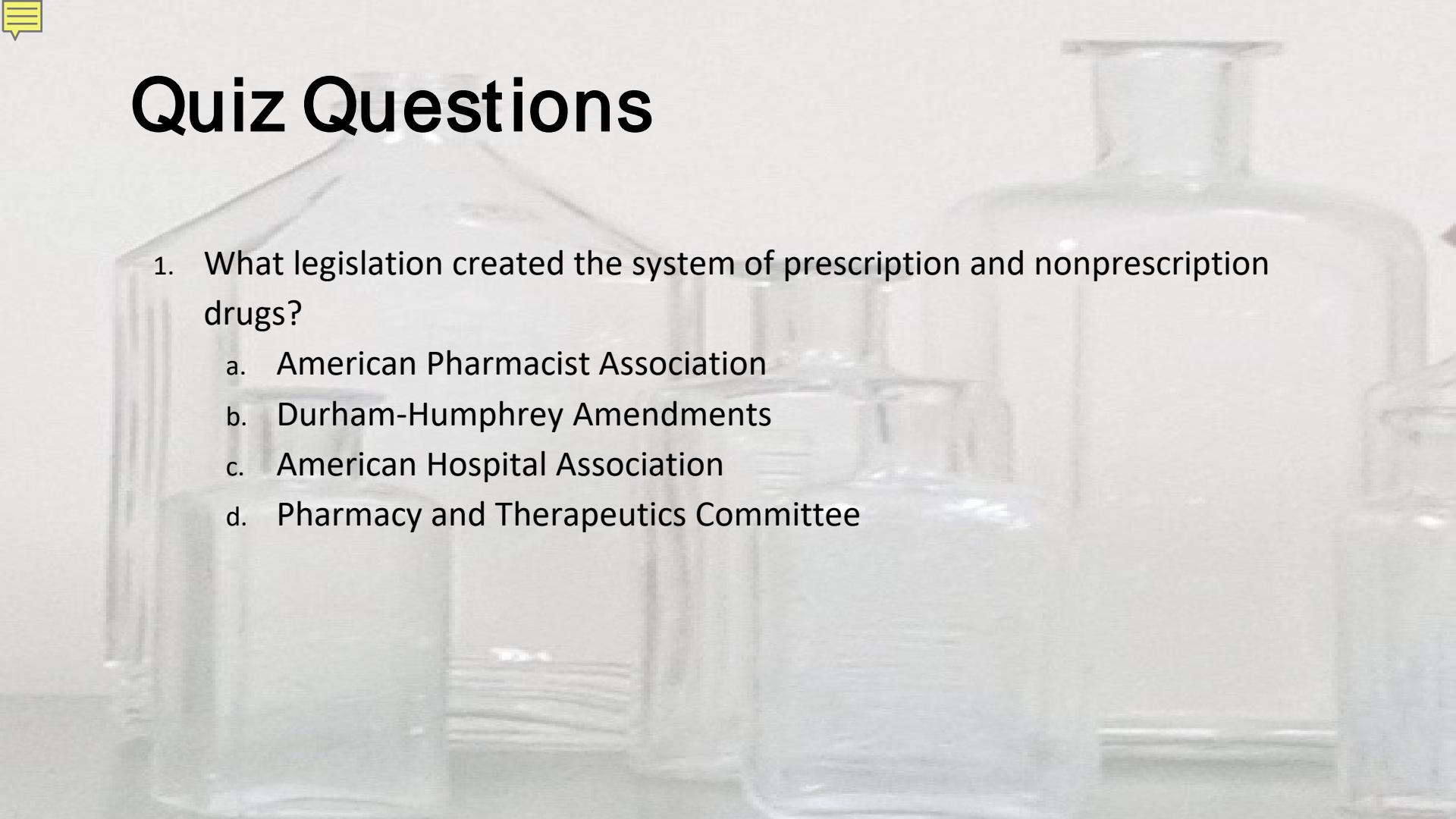
Quiz time!

1. Around what year did New York state begin to require graduation from at least a 2-year course in pharmacy school?
 - A. 1870
 - B. 1815
 - C. 1960
 - D. 1905



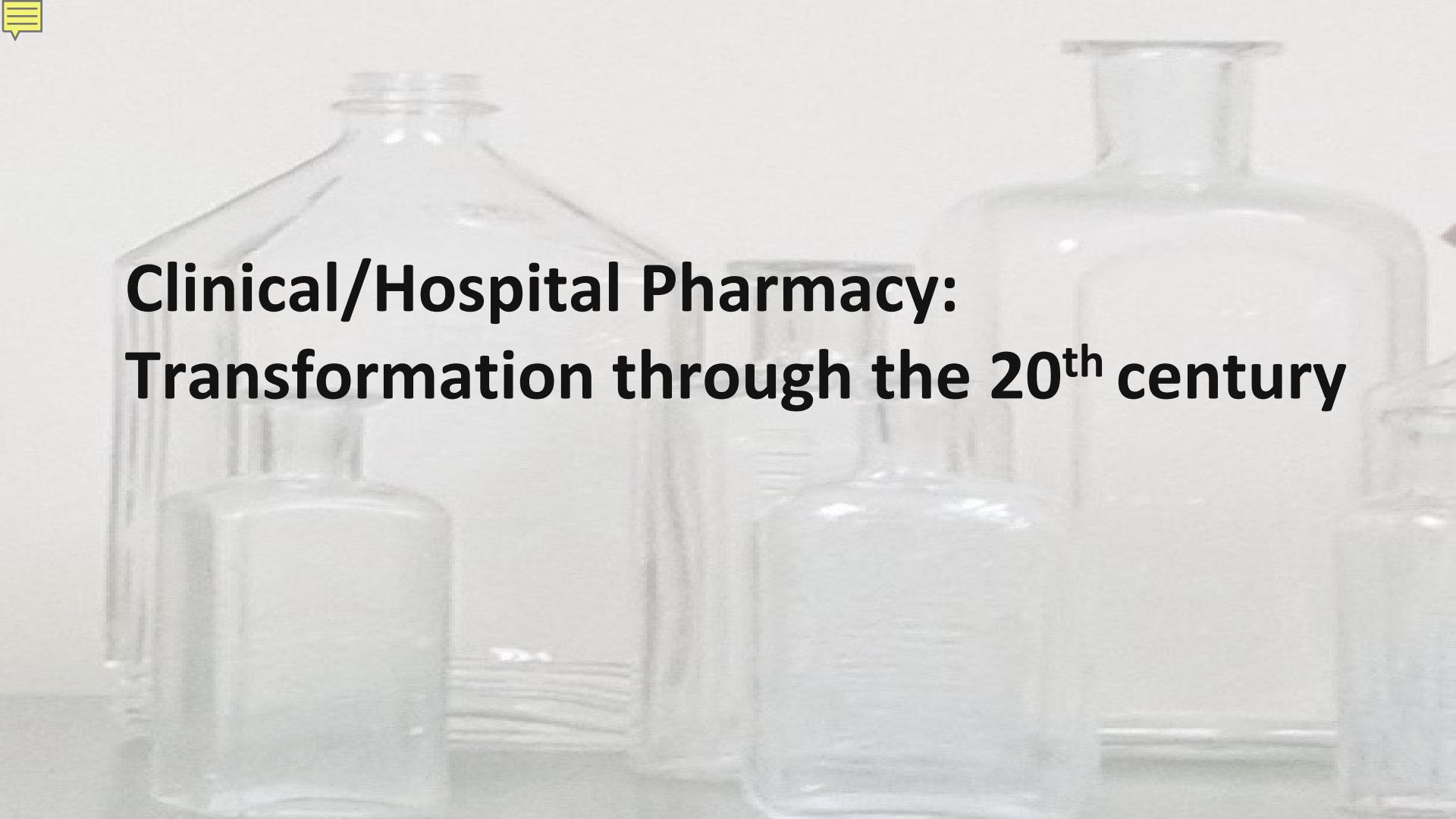
Community and Institutional Pharmacy: 1920-1970, cont'd

- Community practice
 - By the end of the WWII, the practice of compounding had become a minor process in most pharmacies
 - Pharmacy concentrated on dispensing prescriptions from manufacturer-prepared dosage forms
- Hospital Practice
 - In 1946: ASHP, APhA, and the American Hospital Association(AHA) held the first Institute on Hospital Pharmacy
 - Pharmacy expansion in the institutional setting was driven by a focus on reducing patient time in the hospital and improving patient outcomes
 - 1970s: adoption of formulary system
 - To balance pharmaceutical care services
 - Administered by pharmacy and therapeutics committee



Quiz Questions

1. What legislation created the system of prescription and nonprescription drugs?
 - a. American Pharmacist Association
 - b. Durham-Humphrey Amendments
 - c. American Hospital Association
 - d. Pharmacy and Therapeutics Committee



Clinical/Hospital Pharmacy: Transformation through the 20th century



Pharmacy's Transformational Timeline

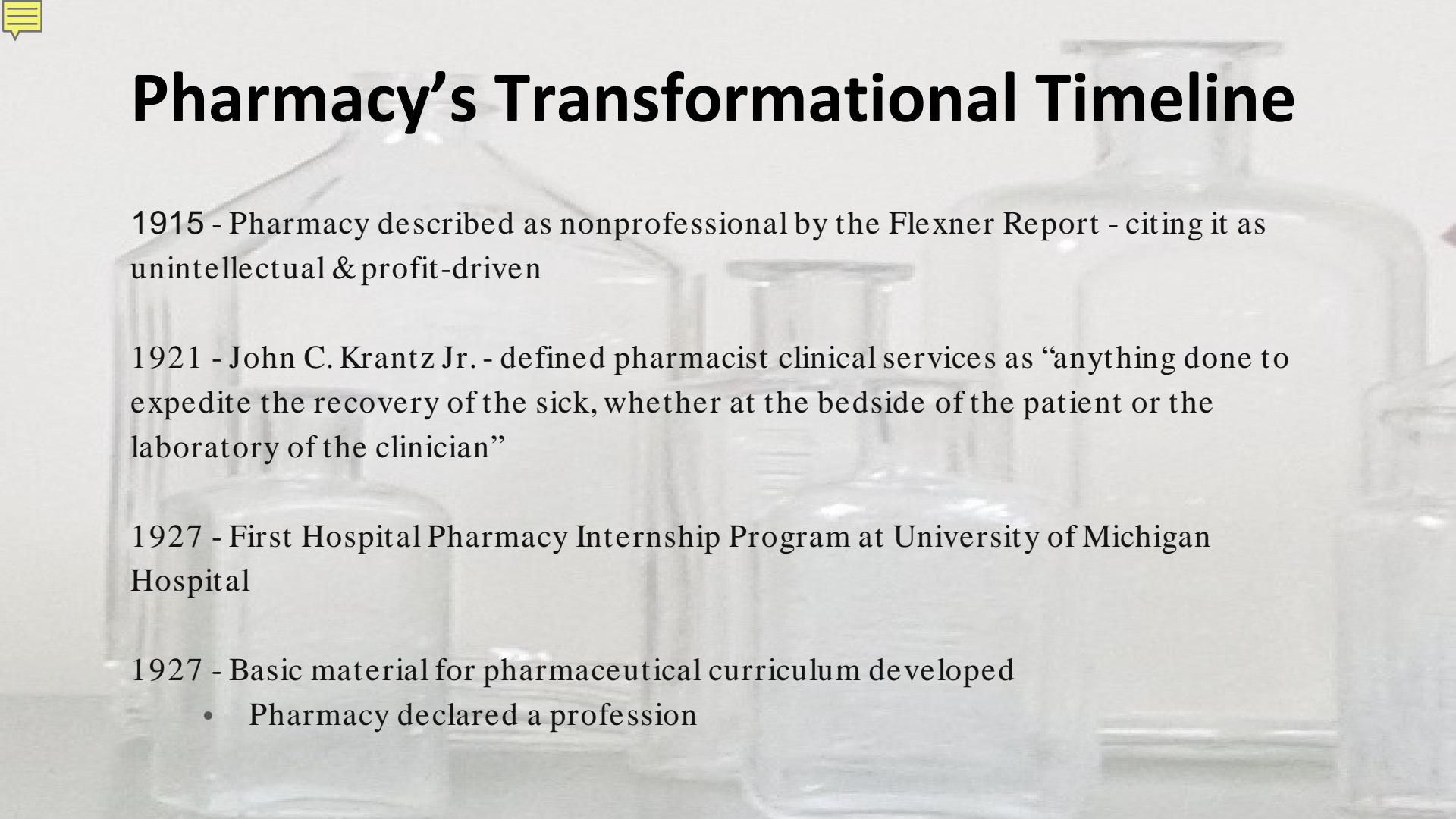
- 1900: American Conference of Pharmaceutical Faculties (today's American Association of Colleges of Pharmacy) formed by 21 colleges and schools of pharmacy
 - Individuals interested in becoming licensed pharmacists may have:
 - Graduation from a college of pharmacy
 - Cram course
 - Apprenticeship
- 1907: 2-year Ph.G. (graduate in pharmacy) set as minimum entry level
- 1910: New York State Board of Pharmacy developed first pharmaceutical syllabus for the boards and schools of pharmacy
- 1925: standard increased to 3-year Ph.C. (pharmaceutical chemist)
- 1929: B.S. became national minimum standard
- 1954: standard increased to a 5-year B.S.



Quiz

In 1900 what was the standard to become a licensed pharmacist?

- a. Cram course
- b. Apprenticeship
- c. Graduation from a college of pharmacy
- d. All of the above



Pharmacy's Transformational Timeline

1915 - Pharmacy described as nonprofessional by the Flexner Report - citing it as unintellectual & profit-driven

1921 - John C. Krantz Jr. - defined pharmacist clinical services as “anything done to expedite the recovery of the sick, whether at the bedside of the patient or the laboratory of the clinician”

1927 - First Hospital Pharmacy Internship Program at University of Michigan Hospital

1927 - Basic material for pharmaceutical curriculum developed

- Pharmacy declared a profession

Pharmacy's Transformational Timeline

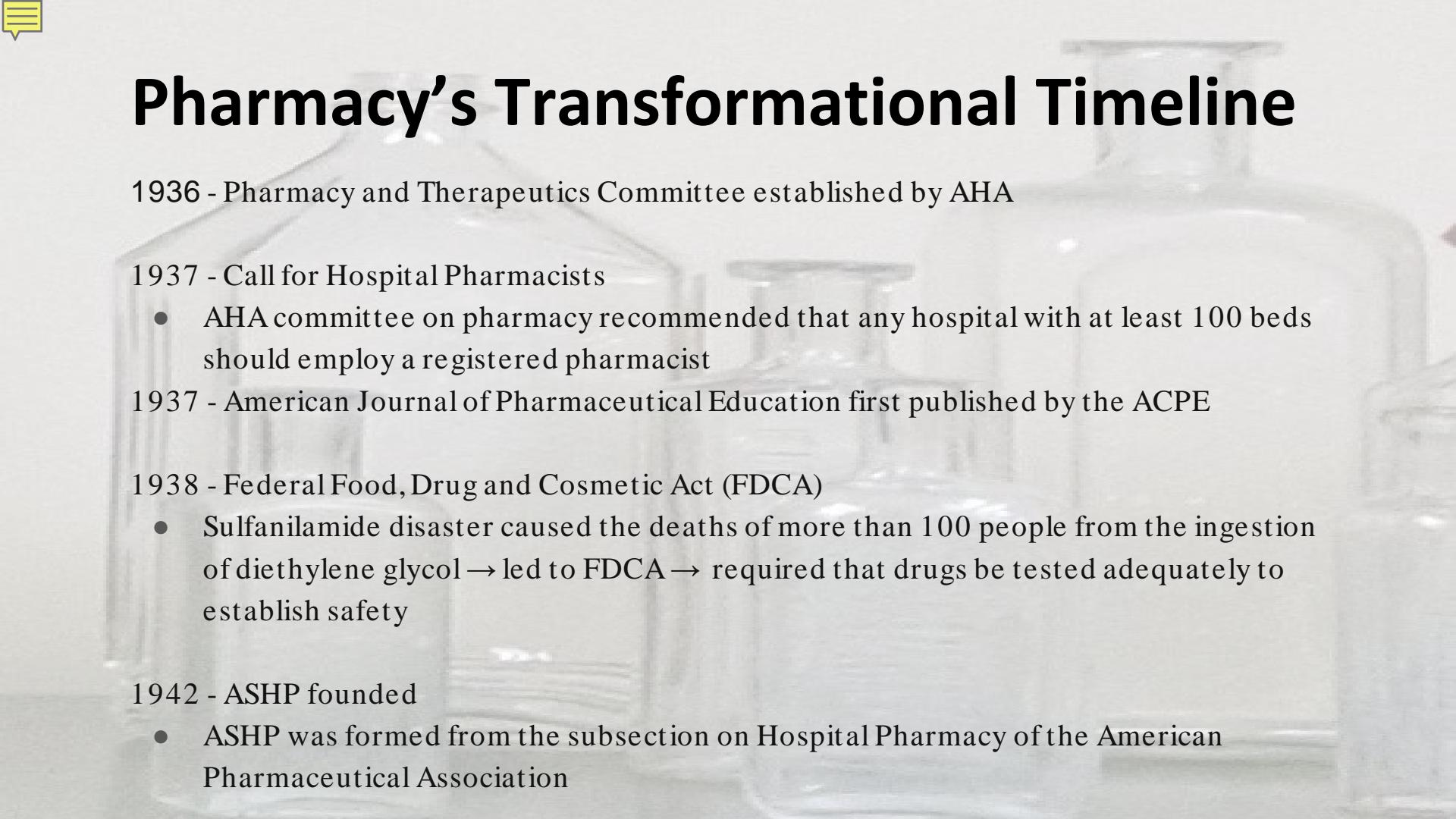
1932 - ACPE established - standards in pharmaceutical education through accreditation of pharmacy schools

1932 - The Hospital Formulary

- Hatcher, a pharmacologist, and Stainsby, a physician, provided a description of their efforts to “limit the prescriptions of the staff to selected formulas” at a New York hospital

1933 -1938 - Pre-pharmacokinetic mathematical analysis to describe compartmental systems via linear differential equations introduced

1936 - APhA formed a subsection on hospital pharmacy within Practical Pharmacy and Dispensing section



Pharmacy's Transformational Timeline

1936 - Pharmacy and Therapeutics Committee established by AHA

1937 - Call for Hospital Pharmacists

- AHA committee on pharmacy recommended that any hospital with at least 100 beds should employ a registered pharmacist

1937 - American Journal of Pharmaceutical Education first published by the ACPE

1938 - Federal Food, Drug and Cosmetic Act (FDCA)

- Sulfanilamide disaster caused the deaths of more than 100 people from the ingestion of diethylene glycol → led to FDCA → required that drugs be tested adequately to establish safety

1942 - ASHP founded

- ASHP was formed from the subsection on Hospital Pharmacy of the American Pharmaceutical Association



Pharmacy's Transformational Timeline

1948 - Hospital Pharmacy Internship Program

- ASHP published the first Standards for Internships in Hospital Pharmacies → approved and sent to ACPE in 1951

1948 - Pharmacy Education

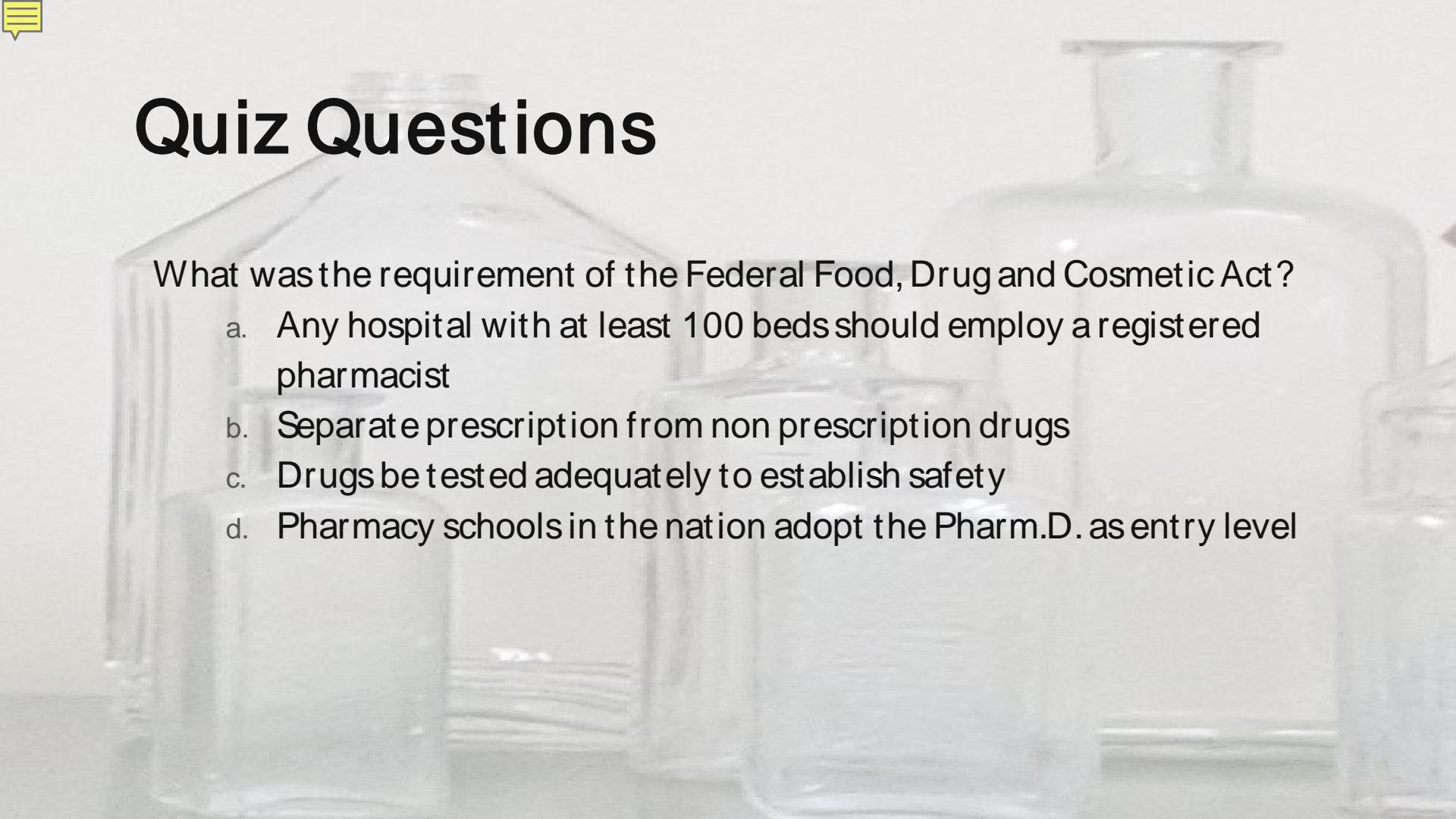
- 5-year curriculum for B.S degree in pharmacy was adopted by Ohio State University College of Pharmacy

1950 - Pharm.D. as entry-level degree

- Program admission requirement: “two or more years of general education and basic science training”
- 4 years of professional studies in a school of pharmacy

1951: Durham-Humphrey Amendments to Food, Drug, and Cosmetics

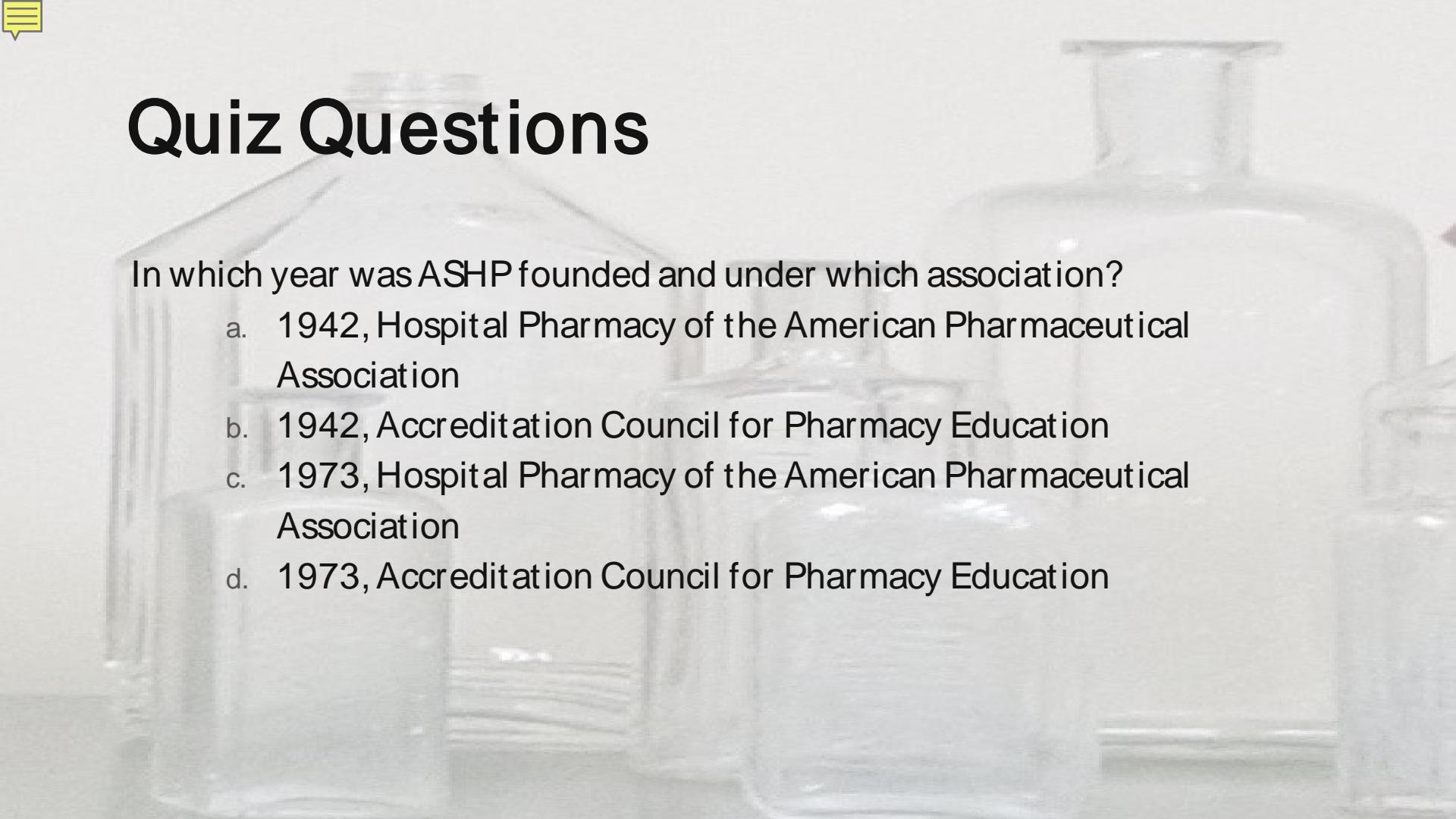
- Clearer definition of prescription drugs
- Went into effect in 1952 - created current system of prescription and nonprescription drugs.



Quiz Questions

What was the requirement of the Federal Food, Drug and Cosmetic Act?

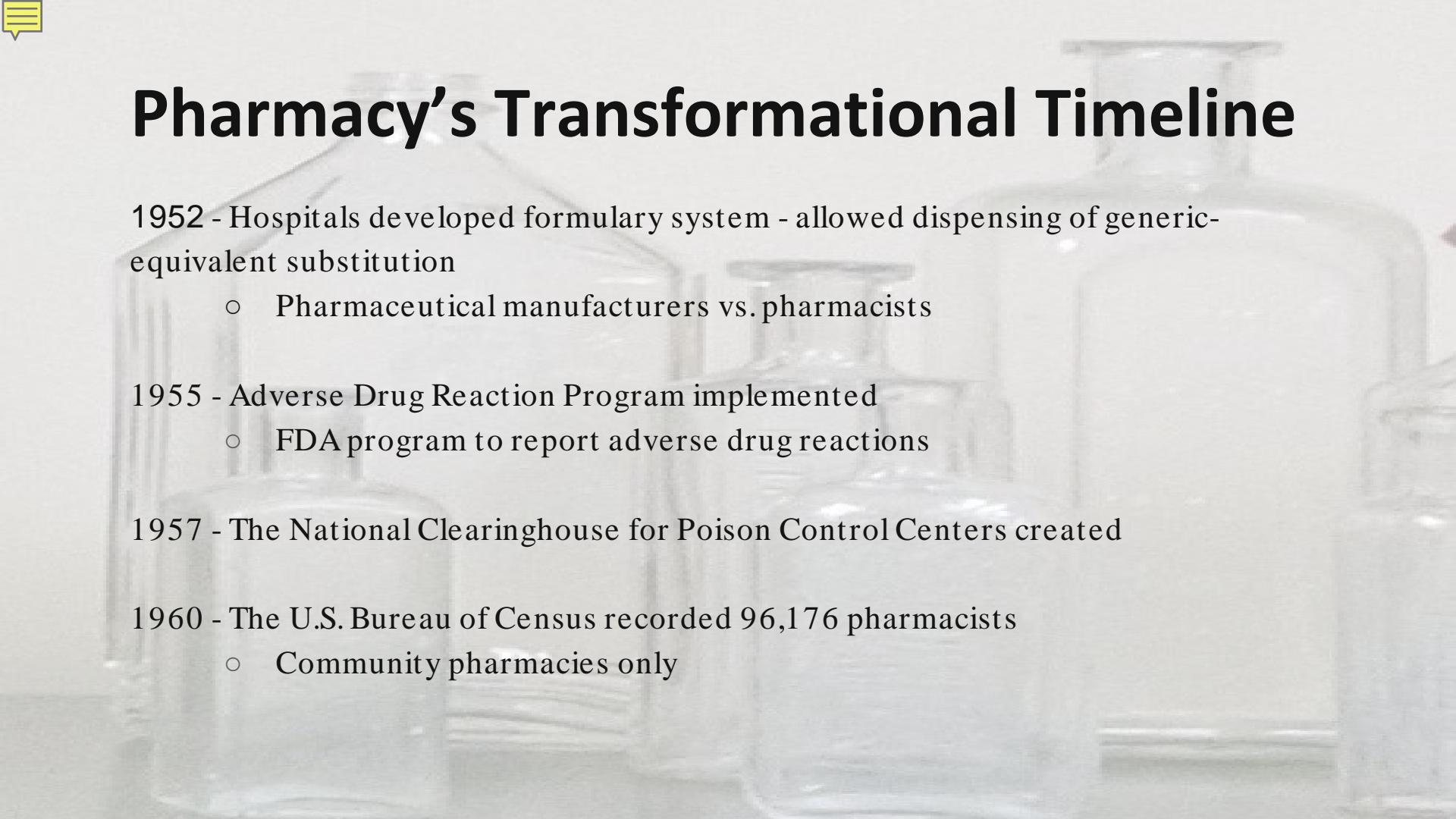
- a. Any hospital with at least 100 beds should employ a registered pharmacist
- b. Separate prescription from non prescription drugs
- c. Drugs be tested adequately to establish safety
- d. Pharmacy schools in the nation adopt the Pharm.D. as entry level

A grayscale photograph of laboratory glassware, including a large Erlenmeyer flask in the foreground and a graduated cylinder in the background, set against a light, textured background.

Quiz Questions

In which year was ASHP founded and under which association?

- a. 1942, Hospital Pharmacy of the American Pharmaceutical Association
- b. 1942, Accreditation Council for Pharmacy Education
- c. 1973, Hospital Pharmacy of the American Pharmaceutical Association
- d. 1973, Accreditation Council for Pharmacy Education



Pharmacy's Transformational Timeline

1952 - Hospitals developed formulary system - allowed dispensing of generic-equivalent substitution

- Pharmaceutical manufacturers vs. pharmacists

1955 - Adverse Drug Reaction Program implemented

- FDA program to report adverse drug reactions

1957 - The National Clearinghouse for Poison Control Centers created

1960 - The U.S. Bureau of Census recorded 96,176 pharmacists

- Community pharmacies only



Pharmacy's Transformational Timeline

1962 - Medical Record Prescription Filling

- Pharmacist Albert Ripley at the Indian Hospital in Montana, began filling prescriptions directly from the patient's medical record
- Led to the incorporation of private patient consultation offices in almost all Indian Health facilities

1962 - Kefauver-Harris Amendment to Food, Drug and Cosmetics Act

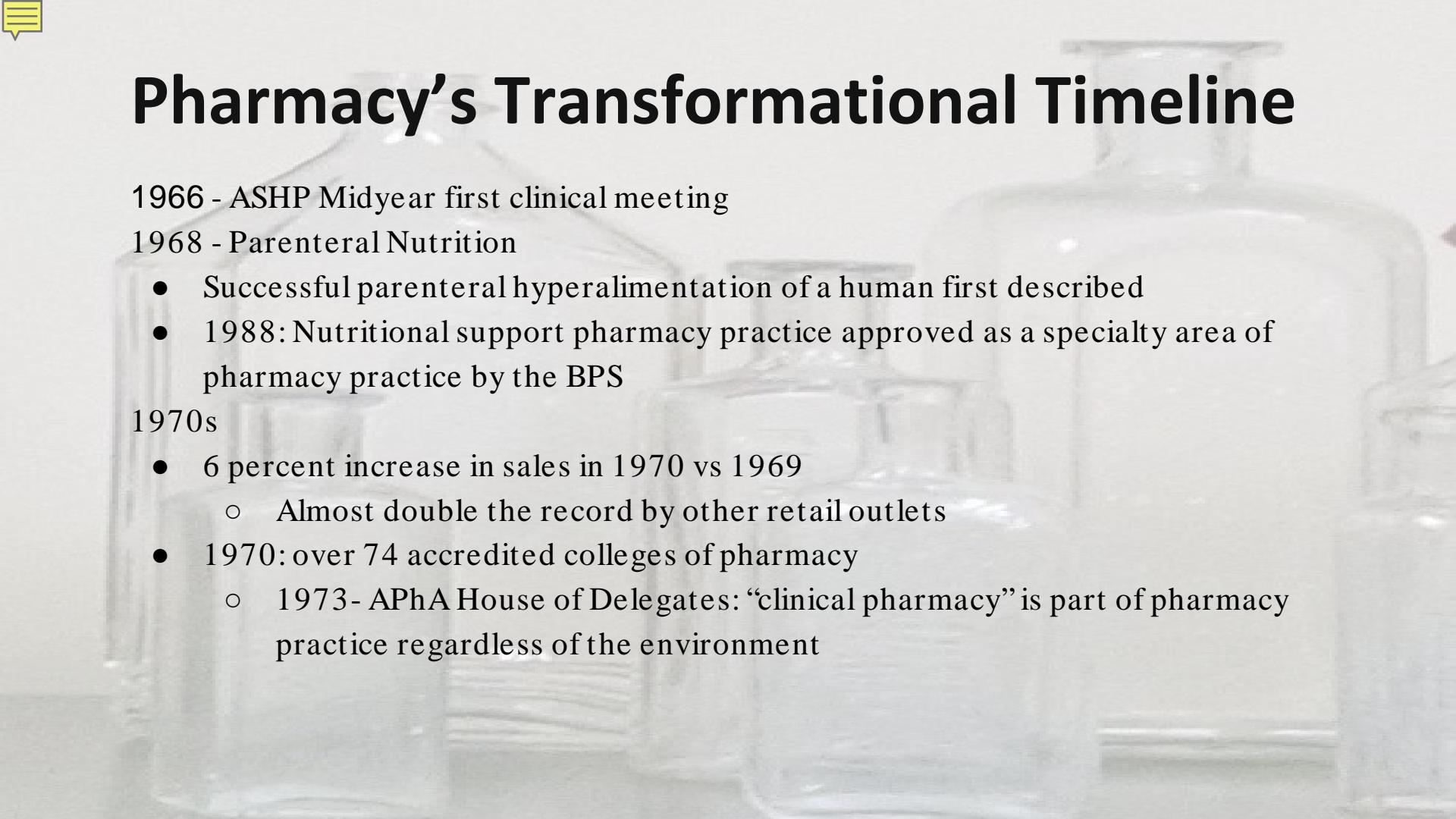
- Thalidomide drug induced birth defects
- To enhance drug safety development and approval process

1965 - Medicare Title XVIII and Medicare Title XIX

- Provide insurance for senior citizens & payment health care for those with lower incomes
- Medicare helped spur the growth of healthcare with “cost plus” reimbursement payment plan

Clinical Pharmacy Emergence: 1965-1990

- 1960: Pharmacist Eugene White remodeled his drugstore
 - Office style, used patient profile cards
 - 1965: APhA promoted a Pharmaceutical Center based on his ideas
 - Basis for pharmacy consultation area



Pharmacy's Transformational Timeline

1966 - ASHP Midyear first clinical meeting

1968 - Parenteral Nutrition

- Successful parenteral hyperalimentation of a human first described
- 1988: Nutritional support pharmacy practice approved as a specialty area of pharmacy practice by the BPS

1970s

- 6 percent increase in sales in 1970 vs 1969
 - Almost double the record by other retail outlets
- 1970: over 74 accredited colleges of pharmacy
 - 1973- APhA House of Delegates: “clinical pharmacy” is part of pharmacy practice regardless of the environment

Pharmacy's Transformational Timeline

1974 - ACPE "Clinical" Pharmacy Accreditation Standards

- Called for separate accreditation:
 - B.S. and Pharm.D. degree programs
 - Both programs to include clinical sciences and practice experience gained through clerkships and externships

1975 - ACPE Accreditation Guidelines

- Required a minimum of 1,500 clock hours for clerkship component
 - Defined the Pharm.D. degree as a clinical educational program

Pharmacy's Transformational Timeline

1976 - Board of Pharmaceutical Specialties (BPS) established by APhA

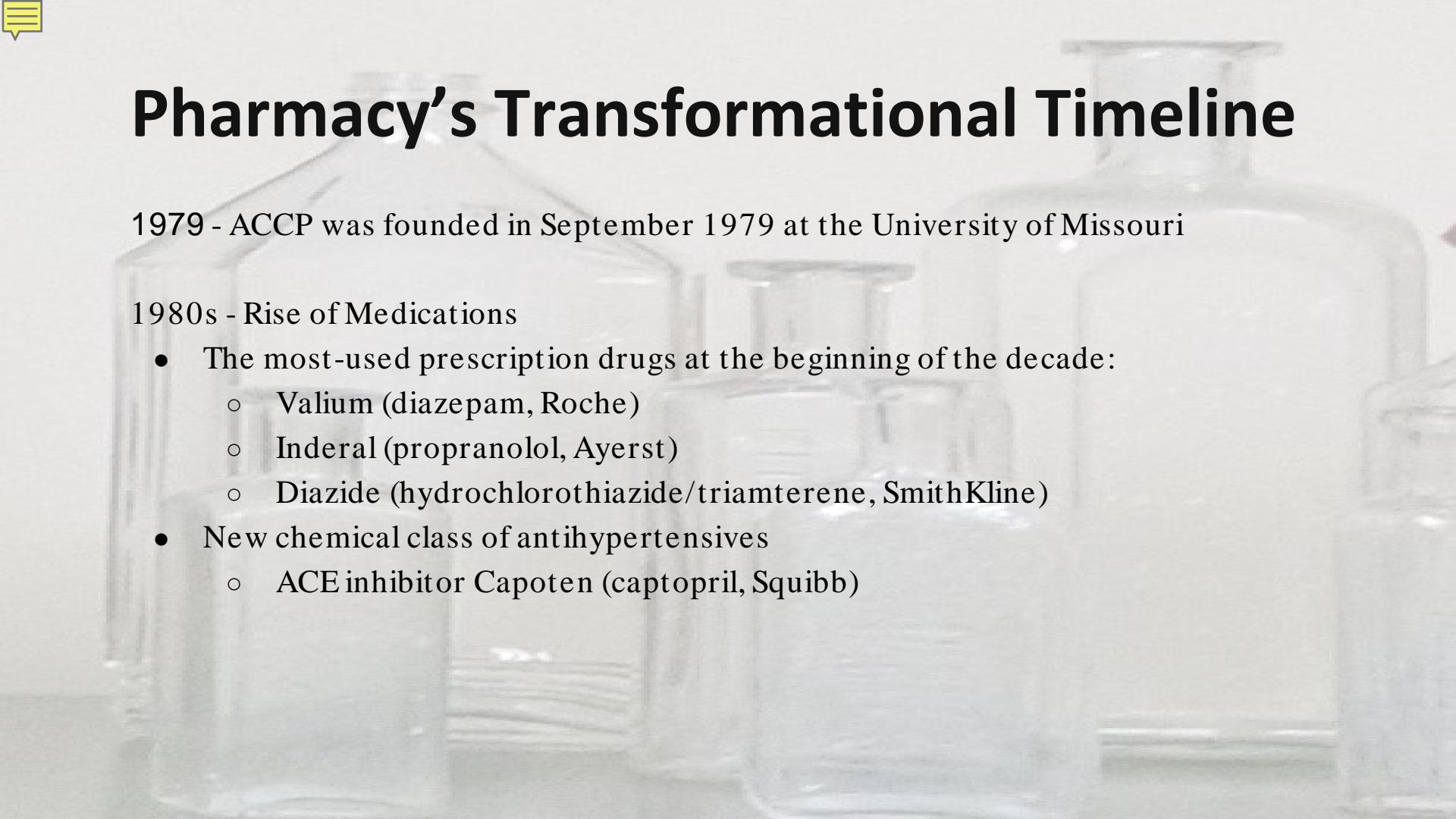
- The APhA house of delegates recommended a ‘board with independent decision-making authority be established’
- BPS was established to recognize:
 - Specialty
 - Demand
 - Need
 - Number and time
 - Specialized knowledge
 - Education or training

Pharmacy's Transformational Timeline

1977 - Collaborative Drug Therapy Management

- Assembly Bill 717: authorized prescribing authority to selected healthcare professionals directly involved in a series of pilot projects conducted at University of Southern California
 - Nurses, physicians assistants, pharmacists

1978 - Nuclear Pharmacy - first specialty recognized by BPS



Pharmacy's Transformational Timeline

1979 - ACCP was founded in September 1979 at the University of Missouri

1980s - Rise of Medications

- The most-used prescription drugs at the beginning of the decade:
 - Valium (diazepam, Roche)
 - Inderal (propranolol, Ayerst)
 - Diazide (hydrochlorothiazide/triamterene, SmithKline)
- New chemical class of antihypertensives
 - ACE inhibitor Capoten (captopril, Squibb)



Pharmacy's Transformational Timeline

1984 - Patient Counseling Competition

1986 - NAPLEX

- The North American Pharmacist Licensure Examination (NAPLEX) for pharmacy licensure debuted in a revised, interrogated format

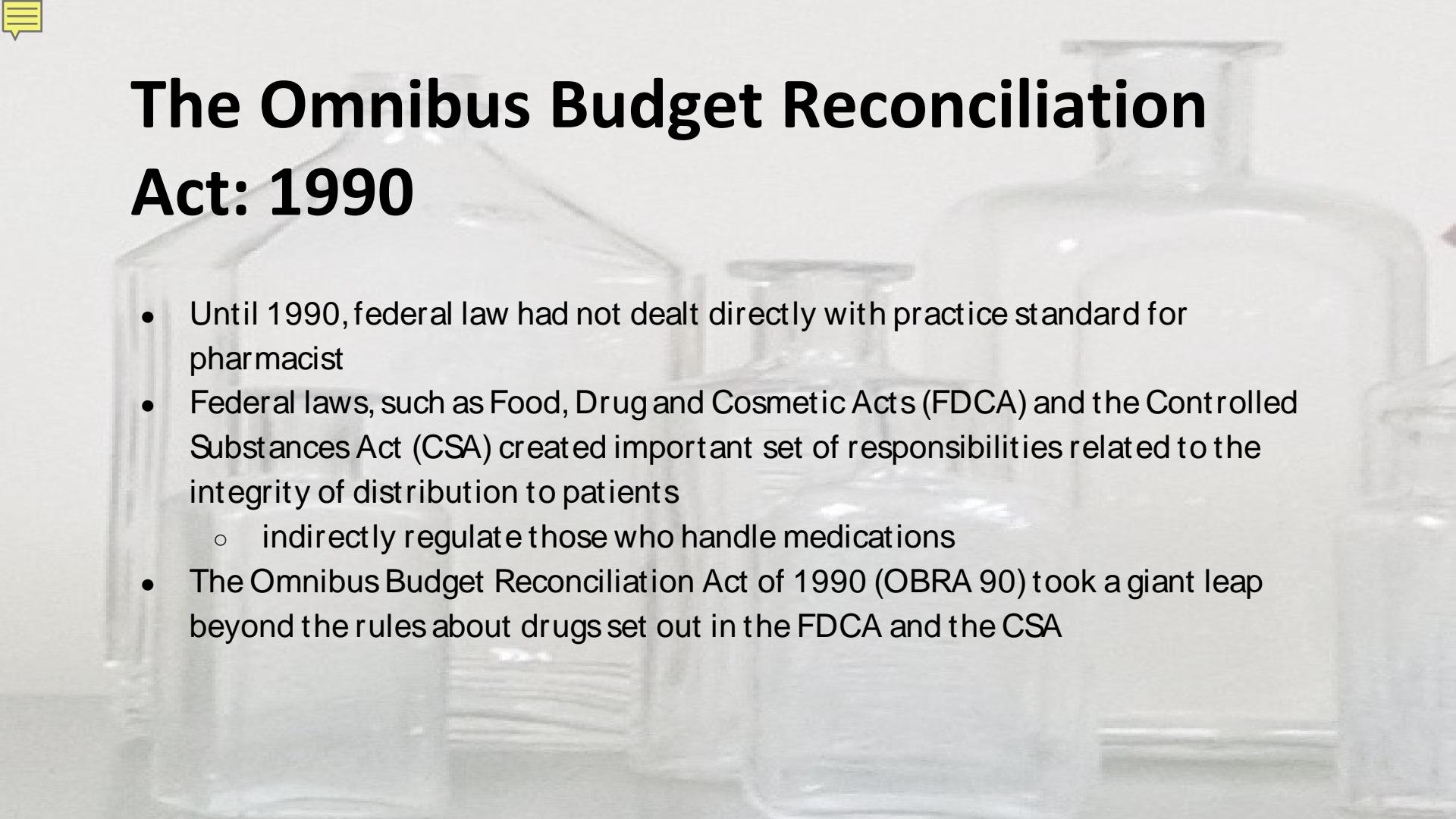
1990s

- There were 120,000 employed pharmacists in the United States
 - Community and institutional practice



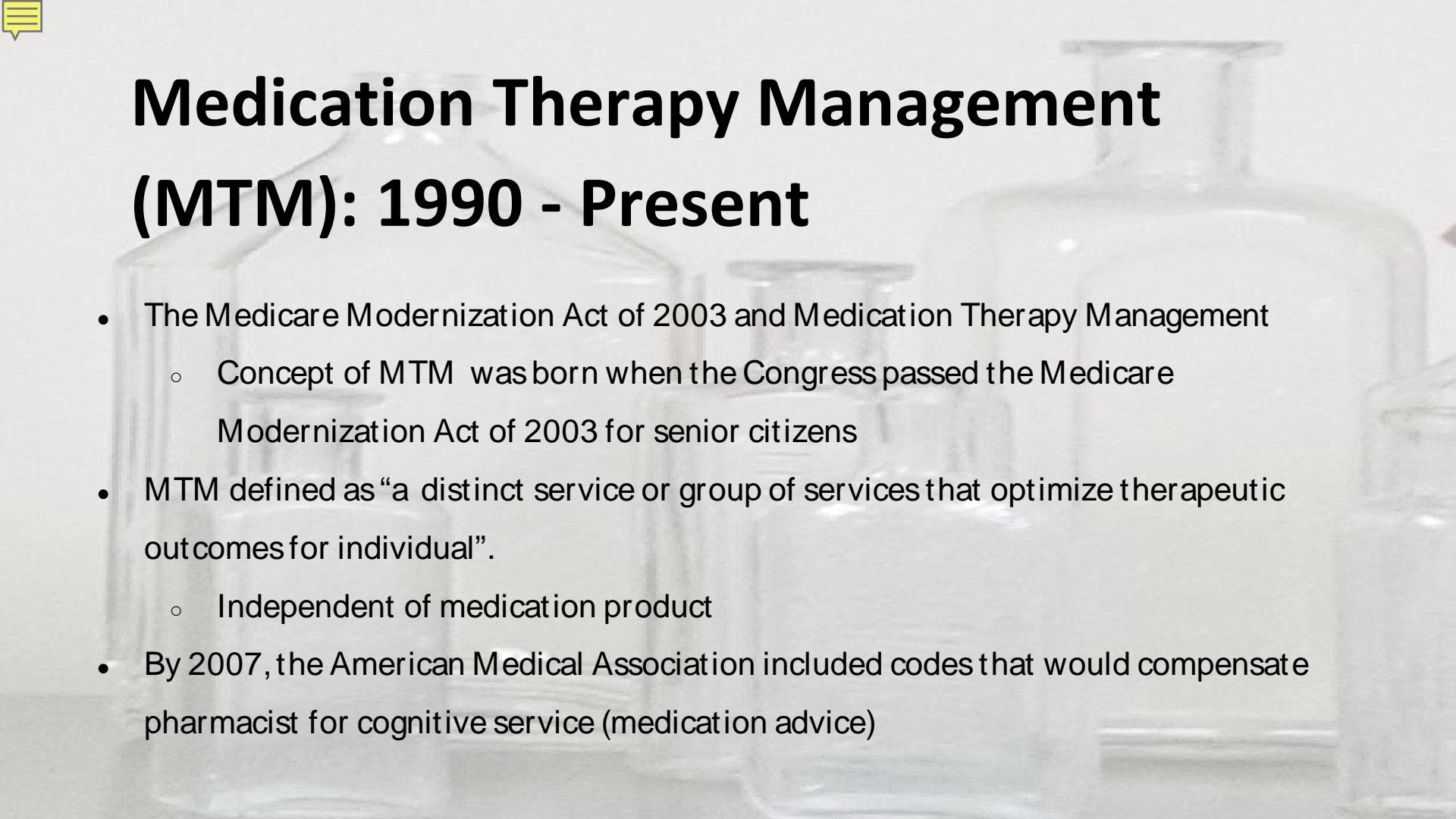
Pharmaceutical Care Era: 1990 - 2005

- 1980: Don Brodie broadened his definition of pharmaceutical care to include all patients, whether in an institution or ambulatory care
- Shift in focus from dispensing medications to caring for patients regardless of practice setting
- Formal mission statement for pharmacy developed by Joint Commission of Pharmacy Practitioners (JCPP):
 - To help people make the best use of medications
- 1985: ASHP held invitational conference at Hilton Head, South Carolina to define and advance clinical pharmacy
 - Key speaker: Douglas Helper - “Pharmacy as a Clinical Profession”.
 - Advanced idea of clinical pharmacists as drug experts who give drug therapy to patients, ensuring the safe and appropriate use of drugs.



The Omnibus Budget Reconciliation Act: 1990

- Until 1990, federal law had not dealt directly with practice standard for pharmacist
- Federal laws, such as Food, Drug and Cosmetic Acts (FDCA) and the Controlled Substances Act (CSA) created important set of responsibilities related to the integrity of distribution to patients
 - indirectly regulate those who handle medications
- The Omnibus Budget Reconciliation Act of 1990 (OBRA 90) took a giant leap beyond the rules about drugs set out in the FDCA and the CSA



Medication Therapy Management (MTM): 1990 - Present

- The Medicare Modernization Act of 2003 and Medication Therapy Management
 - Concept of MTM was born when the Congress passed the Medicare Modernization Act of 2003 for senior citizens
- MTM defined as “a distinct service or group of services that optimize therapeutic outcomes for individual”.
 - Independent of medication product
- By 2007, the American Medical Association included codes that would compensate pharmacist for cognitive service (medication advice)