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*** START OF THE PROJECT GUTENBERG EBOOK HISTORY OF THE DIVISION OF MEDICAL SCIENCES ***

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SMITHSONIAN INSTITUTION UNITED STATES NATIONAL MUSEUM BULLETIN 240



SMITHSONIAN PRESS

MUSEUM OF HISTORY AND TECHNOLOGY

CONTRIBUTIONS
FROM THE
MUSEUM

OF HISTORY AND TECHNOLOGY

*Papers 34-44
On Science and Technology*

SMITHSONIAN INSTITUTION · WASHINGTON, D.C. 1966

Publications of the United States National Museum

The scholarly and scientific publications of the United States National Museum include two series, *Proceedings of the United States National Museum* and *United States National Museum Bulletin*.

In these series, the Museum publishes original articles and monographs dealing with the collections and work of its constituent museums—The Museum of Natural History and the Museum of History and Technology—setting forth newly acquired facts in the fields of anthropology, biology, history, geology, and technology. Copies of each publication are distributed to libraries, to cultural and scientific organizations, and to specialists and others interested in the different subjects.

The *Proceedings*, begun in 1878, are intended for the publication, in separate form, of shorter papers from the Museum of Natural History. These are gathered in volumes, octavo in size, with the publication date of each paper recorded in the table of contents of the volume.

In the *Bulletin* series, the first of which was issued in 1875, appear longer, separate publications consisting of monographs (occasionally in several parts) and volumes in which are collected works on related subjects. *Bulletins* are either octavo or quarto in size, depending on the needs of the presentation. Since 1902 papers relating to the botanical collections of the Museum of Natural History have been published in the *Bulletin* series under the heading *Contributions from the United States National Herbarium*, and since 1959, in *Bulletins* titled "Contributions from the Museum of History and Technology," have been gathered shorter papers relating to the collections and research of that Museum.

The present collection of Contributions, Papers 34-44, comprises Bulletin 240. Each of these papers has been previously published in separate form. The year of publication is shown on the last page of each paper.

FRANK A. TAYLOR
Director, United States National Museum

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CONTRIBUTIONS FROM THE MUSEUM OF HISTORY AND TECHNOLOGY: PAPER 43

HISTORY OF THE DIVISION OF MEDICAL SCIENCES

Sami Hamarneh

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Figure 1.—EARLY VIEW OF THE UNITED STATES NATIONAL MUSEUM, known for the last quarter of a century as the Arts and Industries building. Completed in 1881, it housed the Division of Medical Sciences from its establishment in 1881 as a Section of Materia Medica to the time of the writing of this paper. While the medical collection remained in the Department of Arts and Industries, by the end of June 1912 practically all other collections belonging to the fields of natural history and anthropology were transferred to the then new Natural History building.

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HISTORY of the DIVISION of MEDICAL SCIENCES

In The Museum of History and Technology

This paper traces, for the first time, the history of the Division of Medical Sciences in the Museum of History and Technology from its small beginnings as a section of materia medica in 1881 to its present broad scope. The original collection of a few hundred specimens of crude drugs which had been exhibited at the centennial exhibition of 1876 at Philadelphia, has now developed into the largest collection in the Western Hemisphere of historical objects related to the healing arts.

THE AUTHOR: *Sami Hamarneh is the curator of the Division of Medical Sciences in the Smithsonian Institution's Museum of History and Technology.*

By the early 1870's, leading figures from both the health professions and the general public had begun to realize the necessity for having the medical sciences represented in the Smithsonian Institution. The impetus behind this new feeling resulted from the action of a distinguished American physician, philanthropist, and author, Joseph Meredith Toner (1825-1896), and came almost a decade before the integration of a new section concerned with research and the historical and educational aspects of the healing arts in the Smithsonian Institution.

In 1872, Dr. Toner established the "Toner Lectures" to encourage efforts towards discovering new truths "for the advancement of medical science ... for the benefit of mankind." To finance these lectures, he provided a fund worth approximately \$3,000 to be administered by a board of trustees consisting of the Secretary of the Smithsonian Institution, the Surgeon General of the U.S. Navy, the Surgeon General of the U.S. Army (only in some years), and the president of the Medical Society of the District of Columbia. The interest from this fund was to compensate

physicians and scholars who were to deliver “at least two annual memoirs or essays” based on original research on some branch of the medical sciences and containing information which had been verified “by experiments or observations.”^[1]

The Secretary of the Smithsonian Institution agreed to have these lectures published by the Institution in its Miscellaneous Collections. The first lecture given by the Assistant Surgeon of the U.S. Army, “On the Structure of Cancerous Tumors and the Mode in which Adjacent parts are Invaded,” deserves credit even by current standards of scientific research.^[2] Only 10 lectures were given between 1873 and 1890 (see bibliography), despite the recommendation for at least two every year.^[3]

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Figure 2.—DR. JOSEPH M. TONER, a leading physician in Washington, D.C., and founder of the “Toner Lectures” for the promotion and advancement of medical education and research. In 1873, Dr. Toner became president of the American Medical Association and, in 1874, he became president of the American Public Health Association. He was a physician to St. Joseph’s Male Orphan Asylum and St. Ann’s Infants’ Asylum in Washington, D.C. In addition, he was instrumental in establishing Providence Hospital in the District of Columbia. He also provided a workable plan for the American Medical Association’s library in Washington, D.C. (1868-1871). Among his several publications are: *Contributions to the Annals of Medical Progress and Medical Education in the United States before and during the War of Independence* (Washington: Government Printing Office, 1874) and *Medical Men of the Revolution* (1876). In 1882, he donated his large library, consisting of 44,000 books and pamphlets on topics related mainly to medicine and history, to the Library of Congress. (Photo courtesy of National Library of Medicine.)



A more direct factor, which not only contributed to the establishment of a section on the healing arts, but also had a greater effect upon the Smithsonian Institution than any other event since its founding, was the 1876 centennial exhibition in Philadelphia.

This magnificent international fair commemorated the hundredth anniversary of the adoption of the Declaration of Independence. The finest exhibits of 30 foreign countries and various States of the Union participating in the fair were finally donated to the Smithsonian Institution as the official depository of historical and archeological objects for this country. As a result, the Institution’s collections increased to an extent far beyond the capacity of the first Smithsonian building. This led to the erection of the National Museum, known for the last two decades and until date of publication as the Arts and Industries building, which was completed on March 4, 1881, and was used that evening for the inaugural reception of incoming President James A. Garfield.

Section of Materia Medica (1881-1898)

Throughout the 19th century, the study of *materia medica* (dealing with the nature and properties of drugs of various kinds and origins, their collection and mode of administration for the treatment of diseases, and the medicinal utilization of animal products) held an increasingly important place among the medical sciences. In the United States, as in other civilized countries, this topic was greatly emphasized in the curriculum of almost every school teaching the health professions. Today, the subject matter contained in this branch of science is taught under the heading of several specialized fields, such as pharmacology, pharmacognosy, and drug analysis of various types. However, when the decision was made in 1881 to promote greater knowledge and interest in the healing arts by creating a section devoted to such pursuits in the U.S. National Museum, the title of Section of Materia Medica was adopted. Added to this, was the fact that the bulk of the first collections received in the Section was a great variety of crude drugs, which constituted much of the material then taught in the academic courses of *materia medica*.

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The new Section was included in the Department of Arts and Industries, then under the

curatorship of Assistant Director G. Brown Goode. From its beginning and for two decades, however, the Section of Materia Medica was sponsored and supervised by the U.S. Navy in cooperation with the Smithsonian Institution. For this reason, the Navy decided not to establish a similar bureau for a health museum as did the Army in starting the Medical Museum (of the Armed Forces Institute of Pathology) in 1862 through the efforts of Dr. William Alexander Hammond. The Smithsonian did, however, provide a clerk to relieve the curator of much of the routine work. The Section's early vigorous activities were the result of the ingenuity of the first honorary curator, Dr. James Milton Flint (1838-1919), an Assistant Surgeon of the U.S. Navy. From the establishment of the Section, in 1881, to 1912, Dr. Flint was curator during separate periods for a total of nearly 25 years. For three of his tenures (1881-1884; 1887-1891; 1895-1900), he was detailed to the Smithsonian Institution by the Surgeon General of the U.S. Navy. During the interim periods, other naval doctors were detailed as curators. Finally, in 1900, Dr. Flint retired from the Navy with the rank of Rear Admiral and volunteered to continue his services to the National Museum. The proposal was gladly accepted and he continued as a curator until his retirement from the Smithsonian Institution in 1912.



Figure 3.—REAR ADMIRAL JAMES M. FLINT, U.S. Navy surgeon and first honorary curator of the Section of Materia Medica. (Photo courtesy of the Library of Congress.)

The Section commenced with a wealth of material. After the close of the 1876 centennial exhibition, its *materia medica* collection had been stored with the other collections in a warehouse, awaiting an appropriation by Congress for transfer and installation. This collection was gradually brought into the new National Museum after that building's completion in 1881. Many other *materia medica* specimens were transferred from the Department of Agriculture. In addition to these large collections of crude drugs, generous contributions came from several prominent pharmaceutical firms such as Parke, Davis & Company of Detroit, Michigan; Wallace Brothers of Statesville, North Carolina; and Schieffelin and Company of New York City. These manufacturing houses are mentioned here because they and their agents abroad were the first to take interest and donate to the Section, complete assortments of contemporary remedial agents then in common use throughout the United States and Europe, besides many hundreds of "rare and curious drugs." Thus, in spite of difficulties encountered from bringing several collections into the building at one time, the *materia medica* exhibition got off to a good start.

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It was Dr. Flint, the first curator, who stated in 1883 that remedial agents used by a nation or a community are as indicative of the degree of their cultural development and standard of living as is the nature of their food, the character of their dwellings, and their social

and religious traditions. Therefore, he felt that collections of drugs and medical, surgical and pharmaceutical instruments and appliances should not be thought of or designed as instructive to the specialist only, but should also possess a general interest for the public. Because of these objectives, Dr. Flint added, this section was conceived as a departmental division for the collecting and exhibiting of objects related to medicine, surgery, pharmacology, hygiene, and all material related to the health field at large.^[4]

During his first term of curatorship (1881-1884), Dr. Flint devoted much of his time to sorting, examining, identifying, and classifying the *materia medica* specimens.^[5] In 1881, he issued a memorandum of instructions to be followed by collectors of drugs and urged them to give detailed and accurate information regarding acquired specimens so that they might be "more than mere museum curiosities." In addition, in 1883, he prepared a brief manual of classification of the *materia medica* collection in the Museum as well as a useful, detailed catalog of informational labels of the individual objects on exhibition. The unpublished catalog is still the property of the Smithsonian Institution Archives, Division of Medical Sciences' Library.

It was Dr. Flint's ambition to obtain a comprehensive, worldwide collection of all substances used as remedies. Then, in order to identify drugs from foreign countries, he tried to collect illustrated works on medical botany and printed pharmacopoeias of all nations having them. He rightly defined an official pharmacopoeia as "a book containing directions for the identification and preparation of medicines prepared and issued with the sanction of a government or organized and authorized medical and pharmaceutical societies. Its purpose is to establish uniformity in the nomenclature of remedies and in the character and potency of the pharmaceutical preparations. It is enacted by legislation, and thus becomes binding on all who prepare drugs or sell them for

medication." By soliciting the help of various American consuls and Navy officers abroad, about 16 such official pharmacopoeias were collected, making an almost complete international representation of all available, official, drug standards. With these sources of information, Dr. Flint compiled and arranged an international list of *materia medica* specimens, indicating the authorized preparations of each. By so doing, the first curator of this Section took the initiative at least in proposing and, to some extent acting, on the preparation of an international pharmacopoeia of drugs used in existing authorized formularies giving "official synonyms, and tables showing the constituents and comparative strength of all preparations."^[6] This undertaking is of special importance in the history of American pharmacy, since it was probably the first attempt of its kind in the United States.^[7] In addition, colored plates and photographs of medicinal plants were collected, forming the nucleus of the Division's current collection of pictorial and photographic material related to the history of the health field.

Dr. Flint also put on exhibition 630 Chinese *materia medica* specimens from the 1876 Philadelphia centennial. These had been collected originally by the Chinese Imperial Customs Commission for the centennial and were subsequently given to this country.

In 1881, the numbered objects in the Section's register amounted to 1,574 entries. In the following year, 1,590 more specimens were added, most of them drugs in their crude state. By the end of 1883, the total collection had reached 4,037, out of which 3,240 individual drugs in good condition were classified and put on display. Of these, about 500 specimens with beautiful illustrations of parts of their original plants had been mounted for exhibition. The drug exhibitions also included materials transferred from the Department of Agriculture in 1881, which originally had been brought from Central America and South America for the 1876 centennial exhibition, a variety of opium specimens from Turkey, and a number of rare drugs listed in the official formulary which were acquired from the Museum of Karachi in what was then India.

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Dr. Flint commented in the *Smithsonian Annual Report* for 1883 that the collection of cinchona barks was especially complete. It was comprised of specimens of nearly all the natural cinchona barks of South America and every known variety of the cultivated product from the British government plantations in India. In addition, there were specimens from Java, Ceylon, Mexico, and Jamaica. The Indian and Jamaican barks were accompanied by herbarium specimens of the leaf and flower (and, in some cases, the fruit) of each variety of tree from which the bark was obtained.^[8]

In an attempt to protect specimens liable to attack by insects, a small piece of blotting paper moistened with chloroform was inserted underneath the stopper in each bottle. Later on, bichloride of mercury was found to be a better insecticide.

These early collections of the Section were brought into admirable condition and received compliments for their organization and completeness. In the *Smithsonian Annual Report* for 1883, the collections were praised as "superior to any other in the United States and scarcely excelled by any in Europe."

In spite of the apparent emphasis on the displaying of drugs, the first curator of the Section had envisioned that the exhibits eventually would embrace the entire field of the healing arts. In the *Smithsonian Annual Report* for 1883, Dr. Flint noted that "in the establishment of a museum designed to illustrate man and his environment, it is proper that the materials and methods used for the prevention and cure of disease should have a place." However, his plans were temporarily interrupted when his first term as honorary curator ended in 1884.

On June 4, 1884, Dr. Henry Gustav Beyer was detailed by the Department of the Navy to become the second honorary curator of the Section of *Materia Medica*. As a young man, Dr. Beyer (1850-1918) had come from Saxony, Germany, to the United States and, in due course, became a naturalized citizen. He was graduated from the Bellevue Hospital Medical College of New York City in 1876.

Because of his interest in physiological experimental research, Dr. Beyer enrolled at the Johns Hopkins University, where he was awarded a Ph. D. degree in 1887. Unlike his predecessor, Dr. Beyer was primarily interested in carrying on research on the physiological action of certain drugs and in pharmacology. This was evident from the



Figure 4.—DR. HENRY GUSTAV BEYER, the second honorary curator of the Section of *Materia Medica* (1884-1887). (Photo

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original scientific papers mentioned in the *Smithsonian Annual Reports* and published by him during the period of his curatorship from 1884 to 1887. *courtesy of American Physiological Society.)*

Despite the pressure of his postgraduate studies at Johns Hopkins University, Dr. Beyer helped in arranging and classifying the *materia medica* collection without trying to extend materially the scope of the Section.

After the term of Dr. Beyer expired in 1887, Dr. Flint returned to take charge of the Section. Surprisingly, at this time, it seems that he showed less enthusiasm and devotion to the work of the Museum which he had previously served so well. It could have been a disappointment resulting from a lack of evidence of any real progress in the Section since he had left it three years before. Whatever the reasons may have been, the *Smithsonian Annual Reports* show that only a few hundred specimens were added to the *materia medica* collections between 1887 and 1890, bringing the total to 5,915 preserved in good condition. Further curtailment of the Section's activities began in November 1891 when Dr. Flint was again transferred to other duties for the U.S. Navy. From November 1891 to May 24, 1895, curatorship of the Section was charged to five physicians of the U.S. Navy: Drs. John C. Boyd (from November 1891 to April 6, 1892); William S. Dixon (April 1892 to January 5, 1893); C. H. White (January 1893 to July 15, 1893); C. U. Gravatt (July 1893 to January 22, 1894); R. A. Marmion (January 22, 1894 to June 15, 1894); and to Medical Inspector Daniel McMurtrie (June 1894 to May 24, 1895). During this interim of nearly three and a half years, there were neither literary contributions nor additions made to the collections of the Section that were of any significance. The reason is obvious, for all of these curators averaged less than seven months of service which is not enough time, even for a well-trained individual, to accomplish very much in a museum. Therefore, it is easy to imagine that when the Secretary of the Navy detailed Dr. Flint for a third time to take charge of the Section, he was rather discouraged. Nevertheless, at the Cotton States and International Exposition in Atlanta, Georgia, from September 18 to December 31, 1895, the *materia medica* was represented by two displays: one on mineral waters and amounts of solid constituents in pure state; and another showing the quantities of minerals after analysis of the composition of the human body.

A similar project was undertaken in 1897 at the Tennessee Centennial Exposition (May 1 to October 31) in Nashville, where there were two displays of *materia medica*. One showed several kinds of the cinchona barks and the medicinal preparations made from them, and another containing the commercial varieties of the alkaloids of opium.

At this time, Dr. Flint's attention turned to a new phase of medical exhibition. He felt the need for a program of exhibits on the practice and the historical development of the healing arts. A change of the Section's name was deemed necessary and, thus, in 1898 the more comprehensive title of Division of Medicine was adopted.

Division of Medicine (1898-1939)

The statement by L. Emmett Holt of the Rockefeller Institute for Medical Research, that before 1906, the Smithsonian Institution was never a beneficiary to medicine in any form,^[9] is not entirely applicable. The previous discussion has clearly shown that the U.S. National Museum's cooperation with the Navy contributed materially towards encouraging and promoting medical knowledge. Furthermore, Dr. Flint tried to bring many of his plans for this medical division of the Museum to a practical fulfillment. He devised a program for presenting medical history in a way which would be of interest both to the public and to the profession. In order to best illustrate the history of the healing art, he divided his subject matter into five provisional classifications according to the *Report upon the Condition and Progress of the U.S. National Museum* during 1898:

1. Magical medicine including exorcism, amulets, talismans, fetishes and incantation;
2. Psychical medicine including faith cures, and hypnotism;
3. Physical and external medicine including baths, exercise, electricity, massage, surgery, cautery, and blood-letting;
4. Internal medicine including medications and treatment used by the ancient Egyptians, Greeks, Hindus, Arabians, and Chinese; and
5. Preventive medicine including beverages, food, soil, clothing and habitation.

It is certainly to Dr. Flint's credit that from its early conception, first as Section of *Materia Medica* and thereafter as Division of Medicine, he planned for an all-embracing exhibition and reference collection of the medical sciences. Until the end of the 19th century and the early years of the 20th century, crude drugs as well as primitive and magic medicine held a more prominent place than medical instruments in the exhibits and collections. In 1905, Flint issued his last, known, literary contribution, "Directions for Collecting Information and Objects Illustrating the History of Medicine," in Part S of *Bulletin of the U.S. National Museum*, no. 39. The emphasis he

put upon this shows Dr. Flint's interest in collecting medical and pharmaceutical objects and equipment of historical value. Consequently, he arranged new exhibits including one on American Indian medicine. A medical historian, Fielding H. Garrison, inspected these about 1910 and, in his "An Introduction to the History of Medicine," wrote of their novelty and appeal. "In the interesting exhibit of folk medicine in the National Museum at Washington," he commented, "a buckeye or horse chestnut (*Aesculus flavus*), an Irish potato, a rabbit's foot, a leather strap previously worn by a horse, and a carbon from an arc light are shown as sovereign charms against rheumatism. Other amulets in the Washington exhibit," he added, "are the patella of a sheep and a ring made out of a coffin nail (dug out of a graveyard) for cramps and epilepsy, a peony root to be carried in the pocket against insanity, and rare and precious stones for all and sundry diseases." It had been Dr. Flint's intention, besides presenting an educational display on the history of the medical arts, to warn the public against the perils of quackery and the faults of folk medicine, as well as to expose evils in drug adulteration. Today, we can see actual fulfillment of these intentions in the present exhibit at the medical gallery which has been executed recently on the basis of scientific, historical research.

After Dr. Flint's retirement from the Smithsonian Institution in 1912, there was no replacement for over five years. Therefore, the Division of Medicine was placed, for administrative purposes, under the supervision of the curator of the newly reestablished (1912) Division of Textiles, Frederick L. Lewton. During these years, he fought against the dispersal of the medical and *materia medica* collections. Thus, for lack of a curator of its own, almost all new activities in the Division of Medicine were curtailed until 1917.

On January 31, 1917, Lewton addressed members of the American Pharmaceutical Association inviting them to cooperate in gathering up and preserving at the National Museum the "many unique and irreplaceable objects" connected with the early history of pharmacy in this country which could still be saved.^[10] Then, on March 14, 1917, an examination was announced by the Civil Service (held May 2) for an assistant curator for the Division of Medicine, and the position was filled by Joseph Donner on August 16, 1917. Donner was the first full-time employee paid by the Smithsonian Institution for the curatorship of this Division. He held the post until January 31, 1918, when he was inducted into the Sanitary Corps of the United States Army. No significant activities in the Division of Medicine were reported during these few months.

Mr. Donner was followed by a second, full-time, museum officer who promoted a great amount of good will towards the Division during his curatorship of a little over 30 years. Dr. Charles Whitebread (1877-1963), the first pharmacist to head the Division, joined the Smithsonian in 1918 and remained until his retirement in 1948, the longest service, thus far, of any individual in the Division.

Dr. Whitebread received his degree of Doctor of Pharmacy from the School of Pharmacy at George Washington University in Washington, D.C., in 1911. He entered government service late in 1915, but it was not until April 2, 1918, that he agreed to become assistant curator of the Division of Medicine.

Curator Whitebread's first year was an active and challenging one, for in this new position he began to develop a deep interest in the history of the healing arts. He made a number of important acquisitions, most of them pertaining to pharmaceutical products, synthetic chemicals and crude drugs. He found that many specimens from the older drug collections had deteriorated to such an extent as to be worthless, and he began replacing them with freshly marketed drugs.

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Plans were completed for the opening of new medical exhibits and adopting, with some modifications and additions, earlier classifications set by Dr. Flint. Dr. Whitebread grouped these into the following classes: the evaluation of the healing arts; a picture display of medical men prominent in American history;^[11] a *materia medica* display including the history of pharmacy; and an exhibition on Sanitation and Public Hygiene^[12] which was later to evolve into the Hall of Health.

In 1920, Dr. Whitebread added a number of specimens of medical-dosage forms and pharmaceutical preparations to the Division's collections. He also acquired other gifts to complete existing exhibits illustrating the basic principles of the various schools of medicine, such as homeopathy and osteopathy—their methods, tools, and ways of thought.

In 1921, a tablet machine by the Arthur Colton Company of Detroit, Michigan, was acquired, and an exhibit illustrating vaccine and serum therapy was installed in the medical gallery. This was followed, in 1922, by a collection arranged to tell the story of the prevention

Figure 5.—CURATOR CHARLES WHITEBREAD inspecting, with admiration, five drug containers from the Squibb collection (1945). (Photo courtesy of the American Pharmaceutical Association.)

and cure of specific diseases by means of biological remedies.

During the following two years, two more exhibits related to hospital supplies and sanitation were added to the rapidly developing Hall of Health exhibition which

was opened in 1924. A third exhibit in 1925 consisted of 96 mounted color transparencies illustrating services provided by hospitals to promote public health. Plans for the further development of the Hall of Health continued during 1926, and contacts were made with organizations interested in the educational aspects of the healing arts. As a result, several new exhibits were added. In 1926, the American Optometric Association helped in the installation of an exhibit on conservation of vision or the care of the eyes under the slogan "Save your vision," as a phase of health work. Other exhibits in the Hall at this time were: what parasites are; water pollution and how to obtain pure water; waste disposal; ventilation and healthy housing, and the importance of recreation; purification of milk and how to obtain pure milk; transmission of diseases by insects and animals; how life begins; prenatal and postnatal care and preschool care; duties of the public health nurse; and social, oral and mental hygiene.

With the acquiring of more medical appliances and the widening of the scope of the exhibits, more and more space was needed, and attention was turned to the area of the medical gallery which had been occupied by the *materia medica* collection for almost four decades. To gain more exhibit space, it was decided that the greater part of the crude drugs should be removed from the exhibits and be kept as a reference collection and for research.^[13]

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Figure 6.—EXHIBIT ON EGYPTIAN AND HEBREW MEDICINE, installed about 1924, which was illustrated by graphs and drugs mentioned in extant records of this ancient period. (Smithsonian photo 30796-C.)



Figure 7.—EXHIBIT ON MEDICAL HISTORY during the Greco-Roman period. (Smithsonian photo 30796-D.)



Figure 8.—EXHIBIT ON REMEDIES DERIVED FROM DRUGS of vegetable origin, displayed about mid-1930's. (Smithsonian photo 30439.)

In 1926, original patent models including those related to pharmacy, medicine, and dentistry, were transferred from the U.S. Patent Office to the National Museum. These patent models, together with other apothecary tools and the machines used in drug production took up most of the available space. This unfortunate situation led Dr. Whitebread to turn down significant

medical and pharmaceutical collections offered the Museum between 1927 and 1930. Since the patent models were devised for inventions designed to simplify the practice of the health professions, three cases of these models were displayed in the medical gallery in the early 1930's. Other exhibits shown during this decade included the deception of folk medicine with warnings against superstitions, and an exhibition on osteopathy,^[14] as well as dioramas on the manufacture of medicines and their use in scientific medical treatment.

In the meantime, Dr. Whitebread was an active contributor to the literature of the health field in various periodicals, as well as in pamphlets issued by the Museum and other governmental agencies (see bibliography). His literary contributions, guided by the exhibits he designed and the collections he acquired, were focused on the Division's collections, such as primitive and psychic medicine and warnings against reliance on magic and superstitions in treatment, medical oddities, and the utilization of drugs of animal origin, both past and present.

Division of Medicine and Public Health (1939-1957)

After taking charge of the Division of Medicine in 1918, Dr. Whitebread gave special attention to public health displays. His activities in this area were accelerated after 1924 when the health exhibit at the Smithsonian Institution was inaugurated. As the exhibits in this field increased, the Division, in 1939, took the more comprehensive title of Division of Medicine and Public Health. Also, in 1939, Dr. Whitebread was promoted to the rank of associate curator.

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Figure 9.—EXHIBIT ON METHODS OF TREATMENT of diseases through mental impressions and psychic conditions as displayed about 1925. (Smithsonian photo 30796-B.)

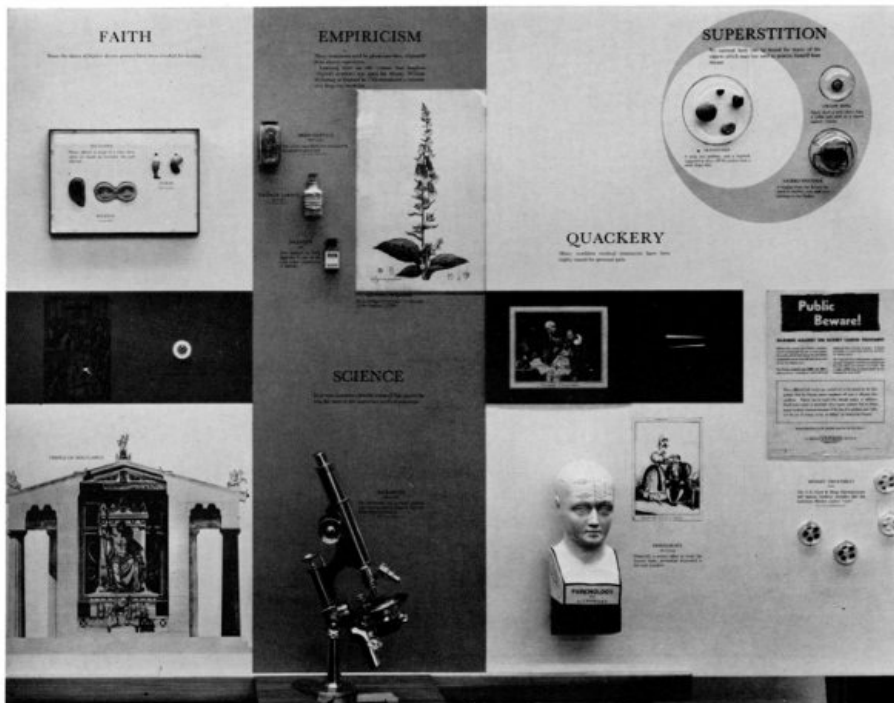


Figure 10.—An exhibit on superstitions, empiricism, magic, and faith healing in the light of scientific medicine, completed in 1962, is in sharp contrast with that shown in figure 9.

He continued his efforts to collect more specimens of interest to medical history and to contribute to the literature. Among exhibited specimens in 1941 were a powder paper-crimping machine, a portable drug crusher, an odd device for spreading plaster on cloth, a pill-coating apparatus, various suppository molds, a lozenge cutter, and an ingenious Seidlitz powder machine. The derivation of medicinal drugs from animal, vegetable, and mineral sources was also depicted, as were synthetic materials and their intermediates. Basic prescription materials were displayed, and rows of glass-enclosed cases held samples of crude botanical drugs from almost every part of the globe with explanatory cards giving brief, concise descriptions. The exhibition provided medical and pharmaceutical students about to take state-board examinations, the opportunity to study the subject in detail, especially the enormous collection of *materia medica* samples.^[15] Also in 1941, Eli Lilly and Company donated an exhibit on the medical treatment of various types of anemia. In the same year, a diorama including a hypochlorinator for purification of water on a farm was installed in the gallery. In 1942, the first Emerson iron lung (developed in 1931 by John Haven Emerson) for artificial respiration was acquired by the Division. The Division acquired, in 1944, the first portable x-ray machine known to have been operated successfully on the battlefield, as well as other x-ray equipment and early medicine chests.

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Figure 11.—Old PUBLIC HEALTH EXHIBITION installed in the gallery about 1924. (Smithsonian photo 19952.)



Figure 12.—THE HALL OF HEALTH, reestablished and opened in November 1957. (Smithsonian photo 44931.)

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Figure 13.—EARLY EXHIBIT ON HOMEOPATHY showing its history, methods and remedies which was installed about 1929. (Smithsonian photo 27049.)

Without a doubt, the most outstanding accession in the field of pharmaceutical history during Dr. Whitebread's years of service was the acquisition of the E. R. Squibb and Sons old apothecary shop. Most of the baroque fixtures, including the stained-glass windows with Hessian-Nassau coats of arms and wrought-iron frames, were part of the mid-18th-century cathedral pharmacy "Münster Apotheke" in Freiburg im Breisgau, Germany. It was offered for sale in September 1930 by Dr. Jo Mayer of Wiesbaden, Germany, who was an enthusiastic collector of antiques, especially those related to the health professions. Earlier that year, a historian of pharmacy and chemistry, Fritz Ferchl of Mittenwald, Germany, had published a series of scholarly and informative articles on the Meyer collection in which the outstanding specimens were beautifully portrayed and thoroughly described (see bibliography).

As a result of Dr. Mayer's efforts to sell his collection, the impact of Ferchl's illustrated articles, and the uniqueness of the collection, E. R. Squibb and Sons purchased it in 1932 and brought it to the United States "with the thought that it would provide for American pharmacy, its teachers and students, a museum illuminating the history, growth, and development of pharmacy, its interesting background and struggle through the ages." It was displayed at the Century of Progress exposition held in Chicago during 1933 and 1934; subsequently, it was assembled in the Squibb Building in New York City as a private museum where, for about 10 years, it was visited by many interested in pharmacy, ceramics, and art. Charles H. LaWall, who was originally engaged to prepare a descriptive catalog on the exhibit, gave it the title "The Squibb Ancient Pharmacy."

Late in 1943, E. R. Squibb and Sons offered the collection as a gift to the American Pharmaceutical Association if the latter would provide museum space for it. The offer was accepted, but the Association finally found it difficult to spare the needed space for the collection and decided to take up the matter with the U.S. National Museum.

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Figure 14.—THIS EARLY EXHIBIT ON OSTEOPATHY was renovated several times prior to the early 1940's. (Smithsonian photo 19250.)

At this point, it should be stated that since 1883 the members of the American Pharmaceutical Association have been keenly interested in having the National Museum serve as the custodian for all collected objects and records of historical interest to pharmacy. In 1944, the Association officially offered to deposit on permanent loan, the Squibb's pharmacy collection in the Smithsonian Institution with the understanding that a suitable place would be provided for prompt and permanent display. The offer was accepted, and during April and May of 1945, the entire collection was transferred to the Smithsonian Institution, and construction to recreate the original two rooms for the old, 18th-century, European "Apotheke" was underway.

By August 1946, the exhibit was completed. In the large room where the pharmacist met his customers, the shelves were filled with 15th- to 19th-century, European pharmaceutical antiques. These included Renaissance mortars; 16th- and 17th-century nested weights; beautiful Italian, French, Swiss, and German majolica and faience drug jars; Dutch and English delft; drug containers made of flint or opal glass with fused-enamel labels with alchemical symbols; rare, 16th-century, wooden drug containers, each with the coat of arms of the city in which each was made; and two glass-topped, display tables contained franchises issued and signed by Popes or state rulers, medical edicts, dispensatories, herbals, pharmacopoeias, and pharmaceutical utensils.

On the walls in the small laboratory room, which also had been used as a workshop and a study, were a stuffed crocodile, shark's head, tortoise, fish, and salamander, parts of which were utilized as remedial agents. Their presence provided tangible evidence that the pharmacy dispensed genuine drugs and not substitutes.

The pharmaceutical profession in this country hailed the outstanding exhibition, and the November 1946 issue of the *Journal of the American Pharmaceutical Association, Practical Pharmacy Edition*, devoted its front cover to depicting one corner of the study and laboratory room of the shop.^[16] Also, in a letter dated January 2, 1947, addressed to Dr. Alexander Wetmore, then Secretary of the Smithsonian Institution, Dr. Robert P. Fischelis, the secretary of the American Pharmaceutical Association, considered the completion of the deposited exhibition a triumph and "as one of the highlights of the accomplishments of the Association in 1946."

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From 1946 to 1948, the Division's collection was further enriched with a number of historical specimens, among which was a "grosse Flamme" x-ray machine with induction-coil tube and stand developed by Albert B. Koett. It is one of the earliest American-made machines of its kind, producing a 12-inch spark, the largest usable at that time with 180,000-volt capacity, and a forerunner of later autotransformers. Other accessions included two 19th-century drug mills, an electric belt used in quackery, two medicine chests, three sets of Hessian crucibles used in a pioneer drugstore in Colorado, a drunkometer, mineral ores, and purely produced chemical elements.



Figure 15.—LATE 16TH-CENTURY, wooden drug container with coat-of-arms, in the Squibb collection. The inscription *Ungula Alci* (the hoof of the elk) suggests a superstitious attitude in medical practice and the wide use of animal organs in medical treatment. (Courtesy of the American Pharmaceutical Association.)



Figure 16.—A RARE, ANTWERP, 16th-century drug jar in the Squibb collection deposited by the American Pharmaceutical Association.

In the spring of 1948, Associate Curator Whitebread retired after 30 years of service with the U.S. National Museum. He was a pioneer in the field of health museums and during his curatorship had developed a moribund section into a Division of field-wide importance. Dr. Whitebread was succeeded by George S. Thomas, also a pharmacist, who served as associate curator from August 1948 until early 1952.



Figure 17.—THE APOTHECARY SHOP as seen in the Arts and Industries building (1946-1964). (Courtesy of the American Pharmaceutical Association.)



Figure 18.—VIEW OF THE LABORATORY AND STUDY ROOM OF THE apothecary shop. On the left, the German-Swiss bronze mortar and pestle (1686) sign and above it an 18th-century German painting on canvas of Christ, “the apothecary of the soul.” The drug containers represent “the fruits of the spirit,” faith, patience, charity, etc., and the scales represent justice. Underneath is the verse from Matthew, 11:28, “Come unto me, all ye that labour and are heavy laden, and I will give you rest.” (Courtesy of the American Pharmaceutical Association.)

During his almost-three and a half years of service, Thomas acquired hearing-aid appliances from which he designed an exhibit on the development of these aids, surgical sutures, early samples of Aureomycin, and a static-electricity machine made by Henkel about 1840. He also published three short articles under the title, “Now and Then,” in the *National Capital Pharmacist* (1950), no. 1, pp. 8-9; no. 2, pp. 18-19, 29; and no. 3, pp. 15-16. In early 1952, Dr. Arthur O. Morton presented to the Division, a Swiss-made keratometer which he had purchased in 1907, and it is believed to be one of the first used in the United States to measure the curves of the cornea.

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The achievements of the Division reached their highest point, thus far, in significantly increasing the national collection, as well as in contributing to the scientific, historical, and professional literature, under the curatorships of George B. Griffenhagen (December 8, 1952, to June 27, 1959) and John B. Blake (July 1, 1957, to September 2, 1961). Their reorganization of exhibits and collections, their competence and industry, fulfilled the hopes, plans, and purposes laid down by earlier curators for the Division.

Immediately after assuming the responsibilities of the Division and throughout 1953, Mr. Griffenhagen (M.S. in pharmaceutical chemistry from the University of Southern California) undertook to develop the collections still further. He increased the emphasis not only on historical pharmacy, but also on medicine, surgery, and dentistry. He also renovated the exhibits in the medical gallery.

In 1954, several antibiotics were donated to the Division including a mold of *Penicillium notatum* prepared and presented to the Smithsonian Institution by Sir Alexander Fleming (1881-1955), the discoverer of penicillium (1929), and a few Petri dishes used by botanist Benjamin M. Daggar who, while working for Lederle Laboratories, developed Aureomycin (chlortetracycline) in 1948. The Forest D. Dodrill—G.M.R. mechanical heart (1952), the first machine reported to be used successfully for the complete bypass of one side of the human heart during a surgical operation, [17] was presented to the Smithsonian Institution.

The following year, 1955, the Division acquired one of the earliest Einthoven string galvanometers (named after the Dutch physiologist Willem Einthoven, 1860-1927) made in the United States in 1914 by Charles F. Hindle for an electrocardiograph. Also added to the Division's collections was the electrocardiograph used by Dr. Frank E. Wilson of the United States, a pioneer educator in this field. Two temporary exhibits on allergy and surgical dressings were installed in the gallery. In the same year, Curator Griffenhagen published *Early American Pharmacies*, a catalog on 28 pharmacy restorations in this country.

In 1956, among many publications of interest in the fields of medical and pharmaceutical history, was Curator Griffenhagen's *Pharmacy Museum*, with a foreword by Laurence V. Coleman, who termed it a useful catalog and “a good reflection of the history of the museum movement at large.” A third x-ray tube of Wilhelm Konrad Roentgen (1845-1922) was added to the collection in 1957 as well as a complete set of hospital-ward fixtures of about 1900 from the Massachusetts General Hospital, rare patent medicines, 18th-century microscopes, and a 13th-century mortar

and pestle made in Persia.

In 1957, Mr. Griffenhagen published a series of illustrated articles in the *Journal of the American Pharmaceutical Association, Practical Pharmacy Edition*, which were later reprinted by the Association in a booklet entitled, *Tools of the Apothecary*. In it, he described several pharmaceutical specimens in the collection and their place in history.

Division of Medical Sciences (1957 to Present)

The U.S. National Museum was reorganized on July 1, 1957, into two units, the Natural History Museum and the Museum of History and Technology. At the same time, and in view of the widening scope of the Division, its more scientifically based planning, and the constantly increasing collection with equal emphasis on all branches of the healing arts, the Division's title was changed to the Division of Medical Sciences—the title it still bears in 1964. With the reorganization, the Department of Engineering and Industries, under which the Division fell administratively, was renamed the Department of Science and Technology of the Museum of History and Technology. It was also the first time since its establishment in 1881 that the Division had two curators, for on July 1, 1957, Dr. John B. Blake joined the staff.

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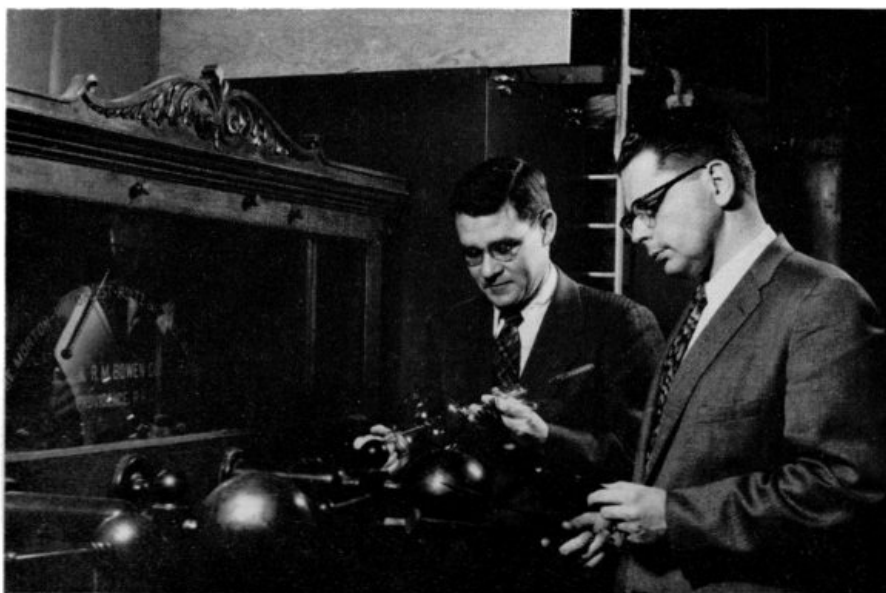


Figure 19.—CURATORS JOHN B. BLAKE AND GEORGE GRIFFENHAGEN examine the newly acquired (1957) electromagnetic, Morton-Wimshurst-Holz Influence Machine. It was manufactured by the Bowen Company of Providence, Rhode Island (1889). With the discovery of x-ray, it was used for making x-ray photographs until early in the 20th century.

As a result of these changes, the Division was subdivided into a Section of Pharmaceutical History and Health and a Section of Medical and Dental History. The former was planned to encompass the collections of *materia medica*, pharmaceutical equipment, and all material related to the history of pharmacy, toxicology, pharmacology, and biochemistry, as well as the Hall of Health which was opened November 2, 1957, and which emphasizes man's progressing knowledge of his body and the functions of its major organs.^[18] The latter Section was planned to include all that belongs to the development of surgery, medicine, dentistry, and nursing, especially in relation to hospitals.

In October 1957, the Division acquired a collection of rare, ceramic, drug jars which included two, 13th-century, North Syrian and Persian, albarello-shaped, majolica jars; a 15th-century, Hispano-Moresque drug container; and a 16th-century, Italian faience, dragon-spout ewer. During the following two years, Curator Griffenhagen periodically toured museums and medical and pharmaceutical institutions in this country, South America, and Europe gathering specimens and information for the Division and for publication, respectively. However, on June 27, 1959, he resigned his curatorship to join the staff of the American Pharmaceutical Association in Washington, D.C. Dr. Blake became the curator in charge of the Division and Mr. Griffenhagen was succeeded on September 24, 1959, by the author of this paper as associate curator in charge of the Section of Pharmaceutical History and Health.

Dr. Blake, as curator of the Section of Medical and Dental History, acquired a large number of valuable and varied specimens for the Division's collections. They included optometric refracting instruments, an early 1920's General Electric, portable, x-ray machine, the Charles A. Lindbergh and Alexis Carrel pump (designed in 1935 to perfuse life-sustaining fluids to the organs of the body), the Sewell heart pump (1950) to control delivery of air pressure and suction to the

pumping mechanism, and a large and valuable collection of dental equipment formerly at the universities of Pennsylvania and Illinois. Dr. Blake wrote the explanatory material and supervised the design and production of the majority of exhibits in the renovated hall of medical and dental history. He also contributed several scholarly articles and a book (see bibliography) on the history of the healing arts and public health in particular. He resigned on September 2, 1961, to join the staff of the National Library of Medicine as chief of the History of Medicine Division, and was succeeded by the author as curator of the Division. From the summer of 1962 to April 1964, the Division benefited from the expert advice of Dr. Alfred R. Henderson as consultant in the preparation and designing of the surgical and medical exhibits of the Museum of History and Technology.

During the period from 1961 to May 1964, the Division's collections expanded greatly through its medical, dental, and pharmaceutical acquisitions. Specimens of antiques acquired from 1961 through 1963 numbered up to 1,539 and included gifts from leading institutions and individual philanthropists. The scope of these gifts and acquisitions ranges from electronic resuscitators, microscopes, x-ray equipment, and spectacles, to patent medicines, amulets, apothecary tools, dental instruments, and office material of practitioners.

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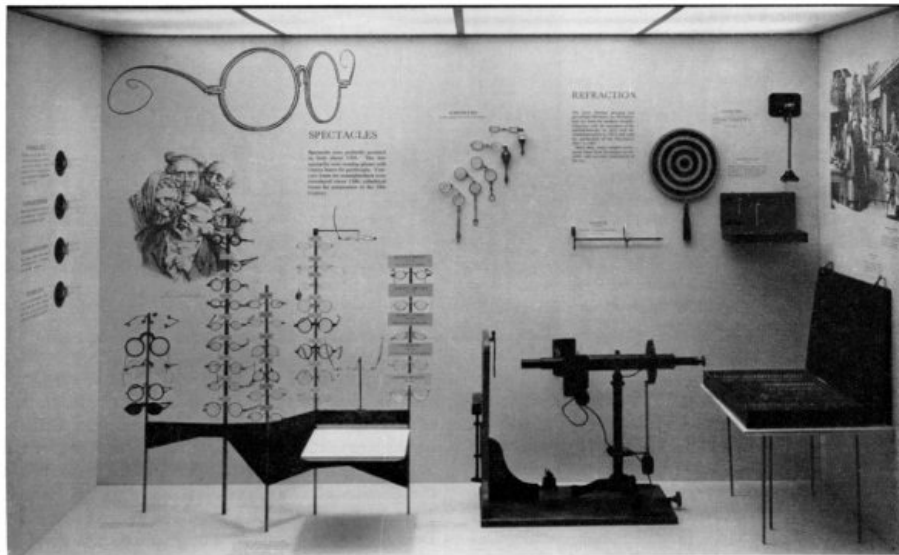


Figure 20.—EXHIBIT ON SPECTACLES, LORGNETTES, OPTOMETERS, and refraction, completed in 1960. It features a cross section of the Division's large collection of eyeglasses. (Smithsonian photo 47943-D.)

In the last decade, the interest in the national endeavor for promoting research and scholarship in the history of medicine has increased greatly. It was most appropriate, therefore, for the Smithsonian Institution to play host on May 2 for two sessions of the 37th annual meeting of the American Association for the History of Medicine held in the Washington, D.C., area from April 30 through May 2, 1964. In welcoming the members to the morning session in the auditorium of the new Museum of History and Technology, Frank A. Taylor, director of the United States National Museum, expressed the feeling that the meeting of the Association was, in a sense, a dedication of the new auditorium and an opportunity for the Smithsonian to reaffirm its deep interest and commitment in fostering research and furthering the appreciation of scholarly endeavor in the history of the healing arts.

A New Dimension For the Healing Arts

"One day the United States will have a National Museum of science, engineering, and industry, as most large nations have." This was the prediction made in 1946 by the director of the U.S. National Museum, Mr. Frank A. Taylor, then curator of the Division of Engineering.^[19] It was in 1963, that the new \$36,000,000 building of the Museum of History and Technology was completed, and opened to the public in 1964. The offices of the Division of Medical Sciences as well as the reference and study collections were moved to the fifth floor of the new building. The exhibits, however, will be displayed in the gallery at the southwest corner of the first floor. These exhibits, it is hoped, will show a new dimension and an unprecedented approach in displaying the development of the healing arts throughout the ages and the instruments and equipment associated with health professions. They also present the expanding objectives and plans of the Division's growth as an integral part of the Smithsonian Institution. Conveniently, the exhibits form four, closely connected halls in one large gallery which will be open to the public in the summers of 1965 to 1966.

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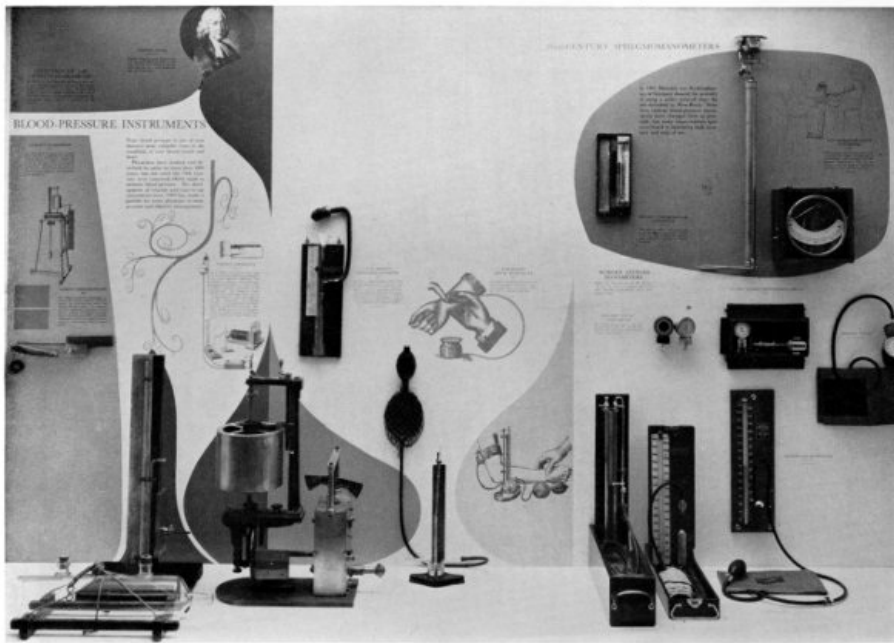


Figure 21.—EXHIBIT ON THE DEVELOPMENT OF BLOOD-PRESSURE INSTRUMENTS and the early 20th-century sphygmomanometers which was completed in 1960. (Smithsonian photo 47943-M.)

1. THE HALL OF HEALTH displays models and graphic and historical exhibit materials to demonstrate the function of the various healthy organs of the human body. The main topics emphasized are: embryology and childbirth; tooth structure; the heart and blood circulation; respiration; the endocrine glands; kidneys and the urinary-excretory system; the brain and the nervous system; the ear; and vision and the use of eyeglasses.

The most appreciated exhibit of all in this Hall is the “transparent woman” figure which rotates, automatically, every 15 minutes with a recorded message describing the function of each major organ of the body at the same time that the organ is electronically lighted, so that the viewer can see its place in the body.

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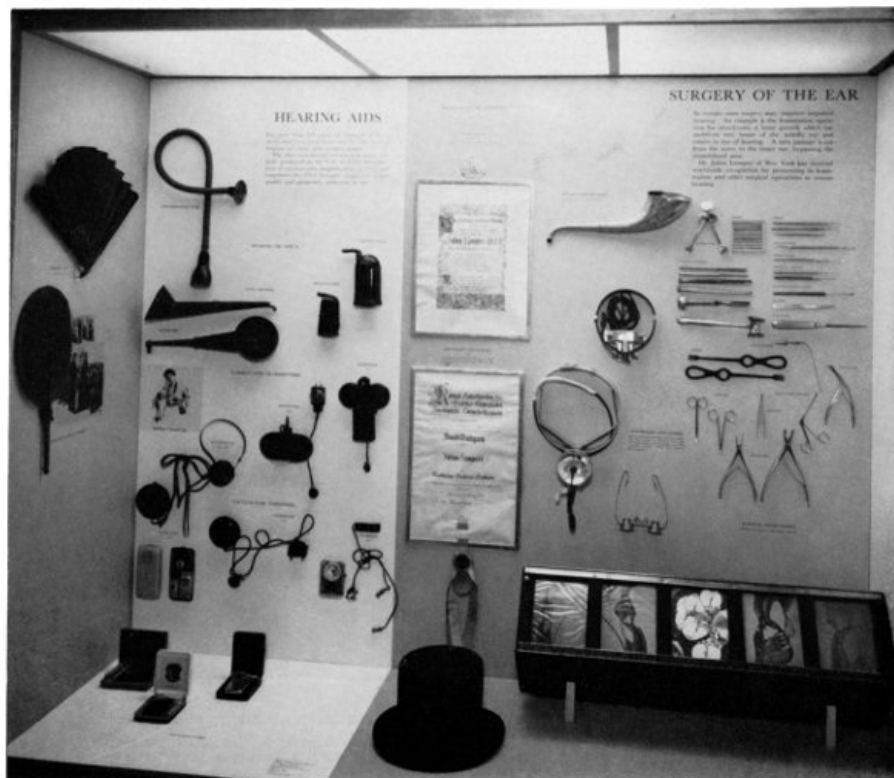


Figure 22.—HEARING-AID EXHIBIT designed in 1962. It includes otologist Julius Lempert’s personal memorabilia and original surgical instruments used in the fenestration operation for restoring hearing. (Smithsonian photo 49345-C.)

2. THE HALL OF MEDICINE AND DENTISTRY will depict the history of these two sciences with exhibits of the equipment used through the centuries. In the medical field, early trephining and other surgical instruments will be displayed along with a diorama of an 1805 surgical operation performed by Dr. Philip Syng Physick in the amphitheater of the Pennsylvania Hospital.

Diagnostic instruments such as stethoscopes, endoscopes, speculums, and blood-pressure measuring devices will be exhibited with a series of microscopes illustrating the development of these instruments. Exhibits of original galvanometers and other apparatus will trace the development of cardiography. The early use of anesthesia will be shown by apparatus of William Morton and Crawford W. Long, American pioneers in this field. The development of the devices of modern medicine and surgery will be shown by exhibits of the iron lung and x-ray tubes, including a tube used by W. K. Roentgen. Medicine chests and surgical kits of different periods will graphically summarize the state of medical science in the period each represents.

Exhibits on the development of dentistry and dental surgery will display examples of tooth-filling and extracting tools, drilling apparatus from the early hand and foot engines to the first ultrasonic cutting instrument (1954), and the original contra-angle, hydraulic and air-turbine handpiece model^[20] which revolutionized the field of instrumentation for dental surgery (with speeds of 200,000 to 400,000 rpm). This hydraulic turbine of Dr. Robert J. Nelson and associates of the National Bureau of Standards set the design pattern for the remarkable and successful high-speed, air-turbine handpiece developed by Paul H. Tanner and Oscar P. Nagel of the U.S. Naval Dental School in 1956. Also underway is the reconstruction of the offices of famous dentists such as G. V. Black and the father of American orthodontia, Edward H. Angle, using their original equipment and instruments. In addition, an exhibit is planned to include x-ray tubes and the electric dental engine, the first to be operated in a human mouth by the pioneer dentist on dental skiagraphy, Charles E. Kells (1856-1928).^[21]

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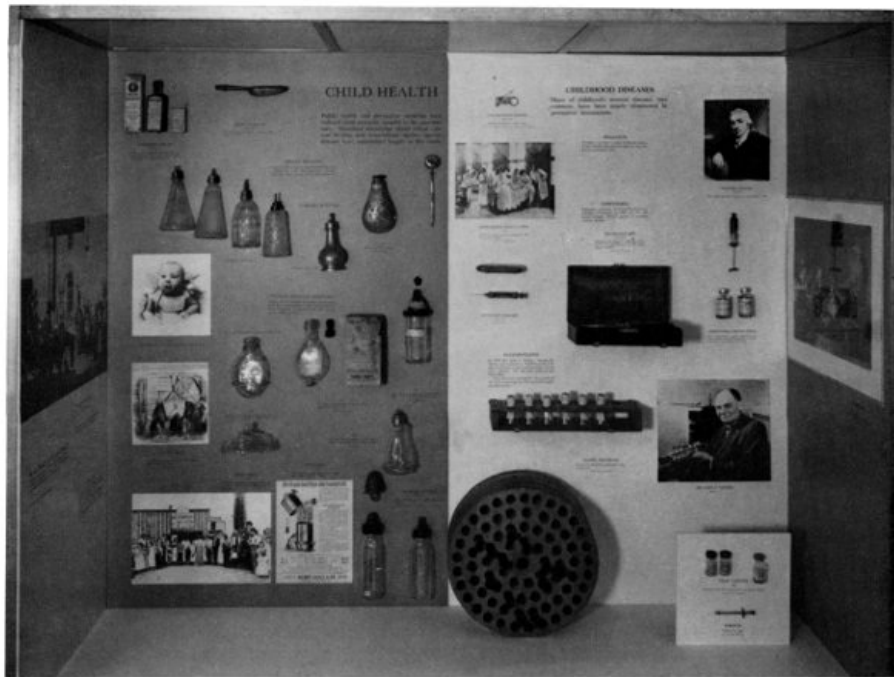


Figure 23.—EXHIBIT ON NURSING BOTTLES and measures to promote child health to counteract the once-common diseases of childhood. This display was completed in 1962. (Smithsonian photo 49345-G.)

3. THE HALL OF PHARMACEUTICAL HISTORY will feature exhibits on the reconstruction of two pharmacy shops: an 18th-century apothecary shop, originally from Germany, with a very elegant collection of drug jars, decorated medicinal bottles, balances, mortars and pestles, and other tools and documents pertaining to the apothecary art, and a late 19th-century American drugstore with shelves filled with patent medicines and drug containers of various sizes and shapes. The window will also feature symbols of pharmacy and beautiful show globes. Displays will show the development of antibiotics and the early tools used in the manufacture of the so-called "miracle drugs," including a mold from Sir Alexander Fleming, the discoverer of penicillin. In addition, a platform will be reconstructed to display a variety of pharmaceutical apparatus used in the preparation and manufacture of drugs, such as tablet and capsule machines and drug mills and percolators. Recently, with the assistance of Professor Glenn Sonnedecker, the Division acquired a fine collection of pharmaceutical equipment and devices from the School of Pharmacy of the University of Wisconsin.

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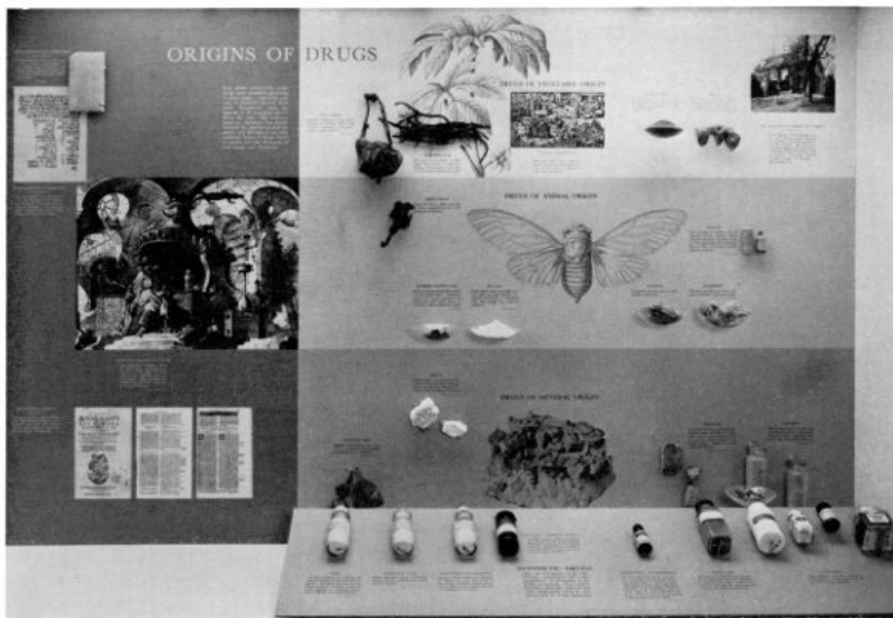


Figure 24.—THE ORIGINS OF DRUGS from the three natural kingdoms, drug synthesis, and the increase in the manufacture of vitamins. This display was completed in 1962 and is now on display at the Museum of History and Technology. (Smithsonian photo P6316.)

Since the Division houses the largest collection of *materia medica* in the country, a representative cross section of crude drugs will be displayed in alphabetical order as well as a display illustrating the role of cinchona and antimalarial drugs in the fight against disease. An exhibit will portray the “origin of drugs” from the three natural kingdoms, animal, vegetable, and mineral, together with synthetic drugs including the manufacture of vitamins.

Plans are being made for an elaborate exhibit of weights and balances used in many countries throughout the centuries, their impact on accuracy of dosage and weighing of drugs, and their use in the apothecary art.

The Division will also display pictorial and printed materials, as well as artifacts from all periods and all countries. These collections are intended to help in presenting a more complete picture of the story of the medical sciences for educational purposes and research, and to increase man’s knowledge in fighting disease and promoting health.

Thus, from a few hundred specimens of crude drugs in the Section of Materia Medica of 83 years ago, there has developed a Museum Division today which embraces the evolution of the health professions through the ages. This Division now has the largest collection in the Western Hemisphere of historical objects which are related to the healing arts. The reference collections are available to the researcher and scholar, and the exhibits are intended for pleasure and educational purposes in these fields. The plans for expansion have no limitation as we keep pace with man’s progress in the medical sciences and continue to collect materials that contributed to the historical development in the fight against diseases and the attempts to secure better health for everyone.

Footnotes

- [1] *Annual Report of the Board of Regents of the Smithsonian Institution for the Year 1882* [hereinafter referred to as the *Smithsonian Annual Report*], pp. 101-103; and introductory “advertisement” to the lectures published by the Smithsonian Institution in its Miscellaneous Collections (see bibliography).
- [2] Dr. J. J. Woodward’s lecture explained the progress of medical knowledge of morbid growth and cancerous tumors from 1865 to 1872. It cautioned that uncertain methods of diagnosis at that time allowed charlatans and uneducated practitioners to report cures of cancer in instances where nonmalignant growths were “removed by their caustic pastes and plasters.”
- [3] The two longest intervals were in preparing the last two lectures: the ninth in 1884, and the tenth, 1889. Both came after the establishment in 1881 of the Section of Materia Medica in the U.S. National Museum, to display the development and progress of the health professions.
- [4] *Annual Report of the Secretary of the Navy for the year 1883*, pp. 190, 614-615.
- [5] For classifying chemical compounds, Dr. Flint relied on the work of H. E. Roscoe and C. Schorlemmez, *A Treatise on Chemistry*, 2 vols. (New York: D. Appleton, 1878-1800.)
- [6] *Annual Report of the Secretary of the Navy for the year 1882*, vol. 2, part 2, pp. 100, 228, 656-657. Dr. Flint in his article “Report on Pharmacopoeias of All Nations,” *ibid.*, pp. 655-680, remarks that there were then 19 official pharmacopoeias in the world,

besides three semiofficial formularies in certain localities in Italy. The pharmacopoeias collected represent Austria, Belgium, France, Germany, Great Britain, Greece, Holland, India, Mexico, Norway, Portugal, Spain, Sweden, Switzerland (two), and the United States.

- [7] The *Universal Formulary*, by R. Eglesfeld Griffith, first edited in March 1850 (3rd ed. rev. and enlarged by John M. Maisch, Philadelphia: Lea, 1874) should not be considered an international drug standard. It was mainly concerned with compiling a great number of formulas and recipes, methods of preparing and administering official and other medicines, and tables on weights and measures for utilization by the U.S. practitioners of the time.
- [8] Other elaborate arrangements were also made to improve and expand the Section's activities and services, though some have never materialized. For example, a herbarium was suggested from which specimens could be obtained for display of the actual drug with painted pictures of its plant next to it. Consideration was given to displaying enlarged drawings to show the minute structure of the specimen for better identification. In addition, an exhibition of several 10-liter vessels of the most popular mineral waters was planned. The amount of saline substances which analysis had shown to be present in each vessel was to be listed in a table to be attached to that vessel, or the same amount of minerals was to be put in a small bottle beside it. This plan was carried out to the best advantage at the Cotton States and International Exposition held in 1895 in Atlanta, Georgia.
- [9] HOLT, "A Sketch of the Development of the Rockefeller Institute for Medical Research," p. 1. A similar comment was voiced by GALDSTON, "Research in the United States," p. 366.
- [10] *Journal of the American Pharmaceutical Association* (1918), vol. 7, pp. 376-377, 466.
- [11] Two decades later, Dr. Whitebread designed a panel showing photographs of famous medical pioneers of all nationalities. See his article, "The Odd Origin of Medical Discoveries," p. 321.
- [12] GEBHARD, "From Medicine Show to Health Museum," p. 579. The original plan for this Hall of Health was to feature exhibits on public health for popular educational purposes, including an illustrated exhibit on hospital care. See FOLEY, "Smithsonian Institution Devotes Much Space to Hospital Exhibit," pp. 43-44.
- [13] Lack of space notwithstanding, valuable accessions were added about 1930, including a collection of early x-ray tubes and personal memorabilia of Drs. William T. G. Morton (1819-1868), Crawford W. Long (1815-1878), and William Gorgas (1854-1920).
- [14] D. RILEY MOORE published a series of short reports under the title "Committee on Osteopathic Exhibits in the U.S. National Museum," in the *Journal of the American Osteopathic Association* (1933-1946), vols. 33-46, regarding the exhibit on osteopathy.
- [15] [KLEIN], "He Directs Pharmacy Exhibits at the Smithsonian Institution," pp. 20-21.
- [16] Several other journals reported the exhibition with illustrations: *Drug Topics* (July 8, 1946), vol. 90, no. 2, pp. 2, 79; *National Capital Pharmacist* (September 1945), vol. 7, p. 11, and (September 1946), vol. 8, pp. 11-13; and *The Scientific Monthly* (November 1952), vol. 75, p. 268.
- [17] DODRILL, and others, "Temporary Mechanical Substitution for the Left Ventricle in Man," pp. 642-644, and "Pulmonary Volvuloplasty under Direct Vision using the Mechanical Heart for a Complete Bypass of the Right Heart in a Patient with Congenital Pulmonary Stenosis," pp. 584-595.
- [18] For the design, expert arrangement of the exhibits, and the legends that accompany each exhibit in the Hall of Health, we are indebted to Drs. Bruno Gebhard, Richards H. Shryock, Thomas G. Hull, James Laster, Walle J. H. Nauta, Leslie W. Knott, Theodore Wiprud, and other physicians, dentists, and scholars who have offered their advice, assistance, and expert skills.
- [19] TAYLOR, "A National Museum of Science, Engineering and Industry," p. 359.
- [20] NELSON, PELANDER, AND KUMPULA, "Hydraulic Turbine, Contra-angle Handpiece," pp. 324-329.
- [21] MONELL, "Dental Skiagraphy," pp. 313-336.

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Transcriber's corrections:

P. [277](#) 'the basis of scientific, historical'—was 'the bases of scientific, historical'

P. [287](#) 'purely produced chemical elements'—was 'purely produced, chemical elements.'

P. [290](#) 'string galvanometers (named'—was 'string galvanometer- (named).'

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